

THE VOICE OF THE GREEN INDUSTRY

LANDSCAPE *management*

NOVEMBER 1995 • \$4

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Do you make it easy for your customers to use your services? Do you provide open communication lines to let them interact with you? Is the service you provide *useful* to your customers? Do you genuinely *care* about them?

These are all questions for which you should have answers, whether you're a golf course superintendent, landscape contractor, lawn care operator or groundsman.

They are the same questions the staff of LANDSCAPE MANAGEMENT pondered not long ago. This self-inspection process led us to the fact that—while we may be the most useful magazine in the turf industry—we could still improve upon our direct, interactive communication with the customer (you), and we could be even more “user-friendly” than we've been in the past.

Hence, this month you are seeing the fruits of our labor. We've changed our look and added some new departments.

First of all—and most noticeable—our design and typography is all new. We realize that we're not the only magazine competing for your valuable time. With our new design, thanks to Mark Wrasman of our Chicago office, we want to be more efficient for you to read.

This month, we've made the “Hot Topics” section more interesting (and, yes, a bit more “fun”), and moved it closer to the beginning of the magazine.

We've added two new “Think Tank” columns, one each by Senior Editor Ron Hall (in the “Lawn & Landscape” section) and Managing Editor Terry McIver (in the “Golf & Grounds” section). We hope their monthly commentary will

help make your jobs run more smoothly.

For those of you who receive our “Lawn & Landscape” demographic section, we've added a new column, “Around the Shop” by Bob Andrews, a former president of the Professional Lawn Care Association of America who gives a unique first-person look at the business.

We've also added a department called “Industry Almanac” that will provide a current snapshot of what's going on in the turf and ornamental business. Again, this department was created with your needs in mind; its purpose is to help you forecast the direction your business or department needs to take, in order to more accurately tune it to the needs of the country.

Becoming 'interactive'

We've added a department called “Reader Feedback” in response to an editorial presentation we heard not long ago by magazine guru Dr. Don Ranly of the University of Missouri. He told us this: “Become more accessible and engaging. The buzzword is interactivity. When you make readers do more, they learn faster and remember better.”

To that end, we introduced our e-mail address two months ago. (And thanks to the dozens of e-mailers who've responded.)

Starting this month, you'll have a chance to win a variety of prizes by responding to our questions in the “Reader Feedback” section. And you'll also be seeing other contests, letters to the editor and “neat stuff” on these pages.

Finally, we've all reluctantly updated our portrait photos, at the urging of friends, family and many of you. *Very* reluctantly.

This, then is the “new” LANDSCAPE MANAGEMENT: more of the things you like, and new things we hope you'll like even better. Enjoy.

We realize that we're not the only magazine competing for your valuable time.

Taking a couple steps forward, for the customer



Jerry Roche

JERRY ROCHE
Editor-in-Chief

INSIDE

THE VOICE OF THE GREEN INDUSTRY

LANDSCAPE *management*



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JERRY ROCHE

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As plants wither from drought and high temperatures, turfgrass managers and research scientists appreciate the importance of roots to successful turfgrass culture. Management practices to achieve maximum rooting must be timed to take advantage of the natural periods of rapid growth.
DR. ROBERT N. CARROW

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JIM CHATFIELD

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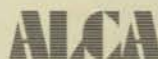
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A. Thomas Perkins, Ph.D.

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Poa annua



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Stellaria media



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Setaria viridis



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Setaria faberi



SPURGE
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Oenothera biennis



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Eleusine indica

“Once in a great while, a product comes along that deserves not just a minor mention, but a major announcement. PENDULUM® Plus Fertilizer belongs in that category.”

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American Cyanamid is so excited about introducing new PENDULUM Plus Fertilizer, we're giving away \$10,000 in cash to the ultimate weed picker. PENDULUM brand Pendimethalin has earned a reputation for providing cost-effective, broad spectrum, season-long, preemergent control against many troublesome weeds. And now it's available on quality

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PTO-953



Critical moss

How do you deal with moss problems on the golf course?

—NEW YORK

Moss plants, like many weeds, establish in open areas where turfgrass is not very aggressive. This might be related to cultural practices such as shorter mowing and/or low nitrogen fertilization. Other factors include too much shade, soil compaction, wet conditions due to poor drainage, poor air circulation and improper pH.

Mosses are small, leafy plants which usually grow in large numbers close to each other. They vary in size and do not have roots. However, they have root-like structures which help them attach to soil or other surfaces.

Usually, moss plants begin to grow before bentgrass turns green in the spring. You could consider using 3 to 5 lbs./1000 sq. ft. of hydrated lime in late March to burn back moss. For ease of dry application, lime can be mixed with a sand topdressing. Lime is also helpful if the soil pH is too acidic for optimal turfgrass growth.

Moss problems cannot be satisfactorily managed unless growing conditions for the desirable turfgrass is improved. Consider providing the following:

1) Maintain good soil fertility to help improve turfgrass health and competitive ability. Maintain good nitrogen and potassium in your program.

2) Improve drainage.

3) Provide selective pruning and/or remove dense shade to improve light. This may require removing some less desirable trees.

4) Plant shade-adapted aggressive turfgrass if shade is a factor.

5) Reduce soil compaction with yearly aerification. If you then apply sand topdressing, you create a system of vertical drains that helps water move from the surface.

6) Improve air circulation by removing low-growing branches.

7) Correct soil pH. Moss is tolerant of a wider pH range than turfgrass and can grow in either acidic or alkaline soils.

When these practices fail, consider using one of the three following chemical management options:

- When moss plants are actively growing, directly apply 10 lbs. of ammonium sulfate per 1,000 sq. ft. This treatment may cause some turfgrass to temporarily burn.

- Mix three level table-spoons of powdered copper sulfate in five gallons of water and apply over 1,000 sq. ft. Copper sulfate can stain clothes and non-target areas; therefore, use caution during application.

- Treat the area with herbicides such as Scott's Goosegrass Control (Betasan/oxidiazon combination), Siduron (Tupersan) or Bentazon (Basagran). Scott's Goosegrass Control may give the best control; however, it can cause turfgrass discoloration. Tupersan and Basagran

may not be as effective, but they are less injurious to turf.

Read and follow label specifications for best results.

Clogged tines

When aerating a green, the tines often clog up, resulting in the core being pushed down into the green rather than ejected. Can this lead to problems by compressing the soil beneath the surface?

—NEW YORK

Yes, clogged tines can cause soil compaction similar to a "spiking" operation. During spiking, soil is pushed down and to the sides of the spiking tool, creating the possibility of lateral as well as downward soil compaction.

Ideally, aerification should remove at least a two-inch core to obtain optimum benefit. If the tines are not penetrating deep enough into the soil or the cores are not being ejected, you may not get any aerification benefits. First, determine the problem:

- Are the tines too small?
- Is the soil too dry or too wet?
- Is the equipment heavy enough?
- Is there too much thatch?

To get maximum benefit out of your aerification operation, make sure that the equipment is in good condition and that the soil is moist but not wet.



BALAKRISHNA RAO

Manager of Research and Technical Development for the Davey Tree Co. Kent, Ohio

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Circle No. 111 on Reader Inquiry Card

Sod: a booming market in America

Millions of American households purchased in excess of \$420 million worth of turfgrass sod in 1994, according to a benchmark survey of 72 million households conducted by the Gallup Organization for the Turfgrass Producers International (TPI).

Unfortunately for the professional lawn and landscape

market, however, homeowners purchased and installed the sod themselves five times more often than they paid for its installation.

Survey findings:

- households that bought sod in 1994: 3.6 million
- average homeowner sod purchase: \$76
- total homeowner sod

purchases: \$272.2 million

- householders who paid to have sod installed: 700,000
- average paid to have sod installed: \$205

• total value of sod installed professionally: \$148 million

"These results offer real substantiation of the importance American homeowners place on turfgrass and the ease of using sod," says TPI executive director Doug Fender. "While \$420 million is just a small fraction of the estimated

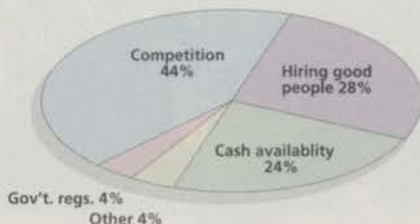
\$25.9 billion spent annually by Americans for their lawn and garden activities, it is certainly significant and meaningful."

When asked about turfgrass sod purchases planned for 1995, 2.2 million households said they planned to make a do-it-yourself sod purchase. But an additional 300,000 indicated that they would employ the services of a professional to install the sod.

Biggest obstacles to growth

Small business owners across the nation don't have any worries different than small business owners in the green industry.

A survey by the Integra Marketing Group found that—not unlike LM's 1995 "State of the Industry" survey—competition and hiring good people are the biggest obstacles to growth among small businessmen.



Lawn/garden tractor popularity grows by 13.9%...

...could a decrease in professional lawn and landscape maintenance be far behind?

The Outdoor Power Equipment Institute predicts a radical increase in domestic purchases of lawn and garden tractors—a statistic that could suggest a slight tightening in the residential lawn maintenance market.

According to OPEI figures, sales of front-engine lawn tractors will increase 13.9% this year to more than 1,235,000 units. The domestic market for riding garden tractors is increasing even faster: 15.6% this year on more than 218,000 units—the first time in history the 200,000 mark has been breached.

Homeowners typically use front-engine lawn tractors and riding garden tractors to mow their own lawns, as opposed to having professional lawn care or landscape maintenance contractors do it.

Purchases of mowers by American homeowners and the professional market, on the other hand, will not reach 1994 levels. Walk-behind powered mowers are expected to experience a 3.3 percent decrease, to 5.8 million units. Domestic sales of rear engine riding mowers are expected to decrease 6.0 percent, to slightly more than 166,000 units.

KEY INTEREST RATES

	CURRENT	ONE YR. AGO
credit cards	18.1%	17.8%
vehicle loans	9.4%	8.4%
15-year fixed-rate mortgages	7.4%	8.4%

Managed health care costs

Health care costs are not as big a concern among small businesses as they were in 1994, which seemed to be a watershed year. There are fewer changes among coverages bought for employees of small businesses this year, according to Arthur Andersen's Enterprise Group and National Small Business United.

Here are comparisons of how small businesses are changing in 1995, compared to 1994 and 1993. Fiscal years run from July of the previous year to July of the current year.

	'92-'93	'93-'94	'94-'95
changed insurance company	22%	40%	21%
changed policy to higher deductible	31%	36%	18%
switched to HMO or PPO	12%	26%	14%
changed to policy with higher co-pay	19%	22%	13%
instituted managed health care	3%	2%	9%
increased employee contributions	17%	25%	9%
reduced benefits	15%	16%	7%

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Ahh, television news in the 90s.

Tabloid journalism has sneaked its way onto the airwaves. And the pursuit of facts seems to have been replaced by the pursuit of ratings.

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Grubs: digging for answers

by RON HALL / Senior Editor



Dr. Harry Niemczyk, standing, gives volunteers data arising from the second day's dig at the Valley View Golf Course in Akron.

There's nothing fancy about a Harry Niemczyk grub dig. I can say that from first-hand experience.

But you should be excited about what we "diggers" learned this past fall: several new chemical products and one strain of BT show excellent promise as grub controls.

Some of the control products, the "dig" indicated, provide excellent control in these particular plots. Notable were Bayer's Merit, a strain of *Bacillus thuringiensis* (Bt) being readied for market by Mycogen Corp., and a compound submitted jointly by American Cyanamid and Rohm & Haas Co. This last molecule is being described as a molting inhibitor and is scheduled to receive an EPA experimental use permit next season, say sources at the dig.

Here's the discovery process we used:

1) Spade out a small square of earth.

2) Get down on your knees and start crumbling soil from the small chunk of sod.

3) As the soil falls into the plastic kitchen tub, pluck out the plump gray grubs and drop them into what looks like an empty cottage cheese container.

4) Count the grubs, some no larger than the head of a wood match.

"Rep 1, plot 3, no grubs," shouts one of the 15 volunteers, both men and women.

"Rep 1, plot 6, two grubs," shouts another. For two full days, that's the language of the grub dig. Some plots contain many grubs; some contain just a few; some contain none. Diggers yell out what they've found in each square plot.

Dr. Niemczyk records on a clipboard our numbers as he walks among the wooden stakes marking the boundaries of the individual test plots. We're digging to determine the effectiveness of various control products. Technicians applied the products in different formulations and rates to the test plots weeks prior to the dig.

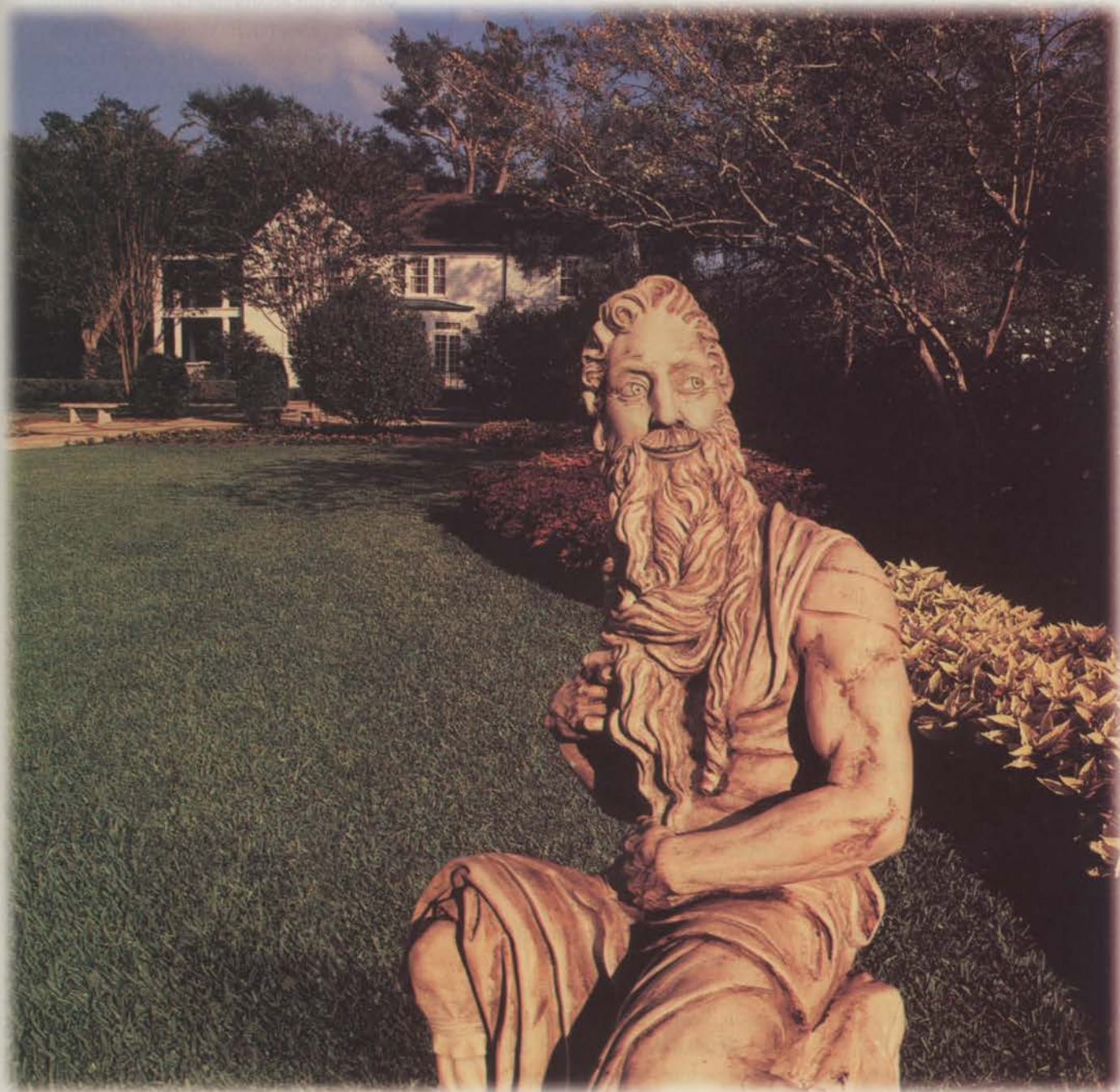
What does what

Some of the products applied to the plots are familiar to us—Dursban, Merit, diazinon, Sevin; some aren't because they've not yet come to market. But as we work, we're not aware which products were applied to which plots. (Nor do we care. We just dig, count, and shout out the number of grubs we've turned up.) Control plots,



About 15 volunteers, including representatives from companies testing products in the plots, dig and count grubs. Some make the dig an annual event.

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It wasn't hard to find Japanese beetle grubs in some test plots. They'd grown fat in the roots of turfgrass plants, particularly in the controls.

because of the large number of grubs they contain, virtually announce themselves.

At lunch, over burgers and fries, we do finally learn what products were used. That's when Harry and Dr. David Shetlar tabulate the number of grubs found in each replication.

We find two types of white grubs basically, Japanese beetle grubs and masked chafer grubs. They're easy to tell apart. The "mc" grubs are further in their development and about twice the size of the "jb" grubs. They also have a light brown head and there are much fewer of them. We find most of the grubs in the turfgrass roots, and at the thatch layer, but a significant number perhaps an inch, in some cases about two inches, in the soil.

Harry's been directing the digs for more than 25 years at various northeast Ohio locations. This year we work on plots on the 15th fairway of the Twin Lakes Golf Course in Mansfield, Ohio, and in a rough

at the Valley View Golf Course in Akron. Both afternoons we dig in a commons area at the OARDC in Wooster. A dig has never been rained out, says Harry, although once a wet snow briefly covered the plots.

Growing fat

Grubs are the most damaging insect pests of turfgrass in the northeast and a major problem in the midwest too. By the time they reach the third instar they've grown fat on turfgrass roots and thatch. Then, when heat or drought of late summer stresses the grass, it dies in irregular patches. Peel off the dead layer of turf like you're peeling an orange, only the turf comes off much easier. Sometimes, skunks and crows find the grubs and eat them. They worsen the turfgrass damage.

None of this is probably news to you. But what might surprise you is the amount of money Americans (both professionals and homeowners) spend to control grubs. A representative of a major chemical com-

A perfect golf gift

Want to out-environmental the environmentalists? How about using stationery made with actual turf clippings collected from golf course greens? Or giving out the stationery at Christmas?

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The catch? It's not cheap. Twenty-seven note sheets and nine envelopes cost \$32. Each sheet and envelope are letterpress-printed with one of three historic golf icons: a golfer, a golf ball on a tee and hickory shafted clubs.

"We were going to go with a standard 25 per



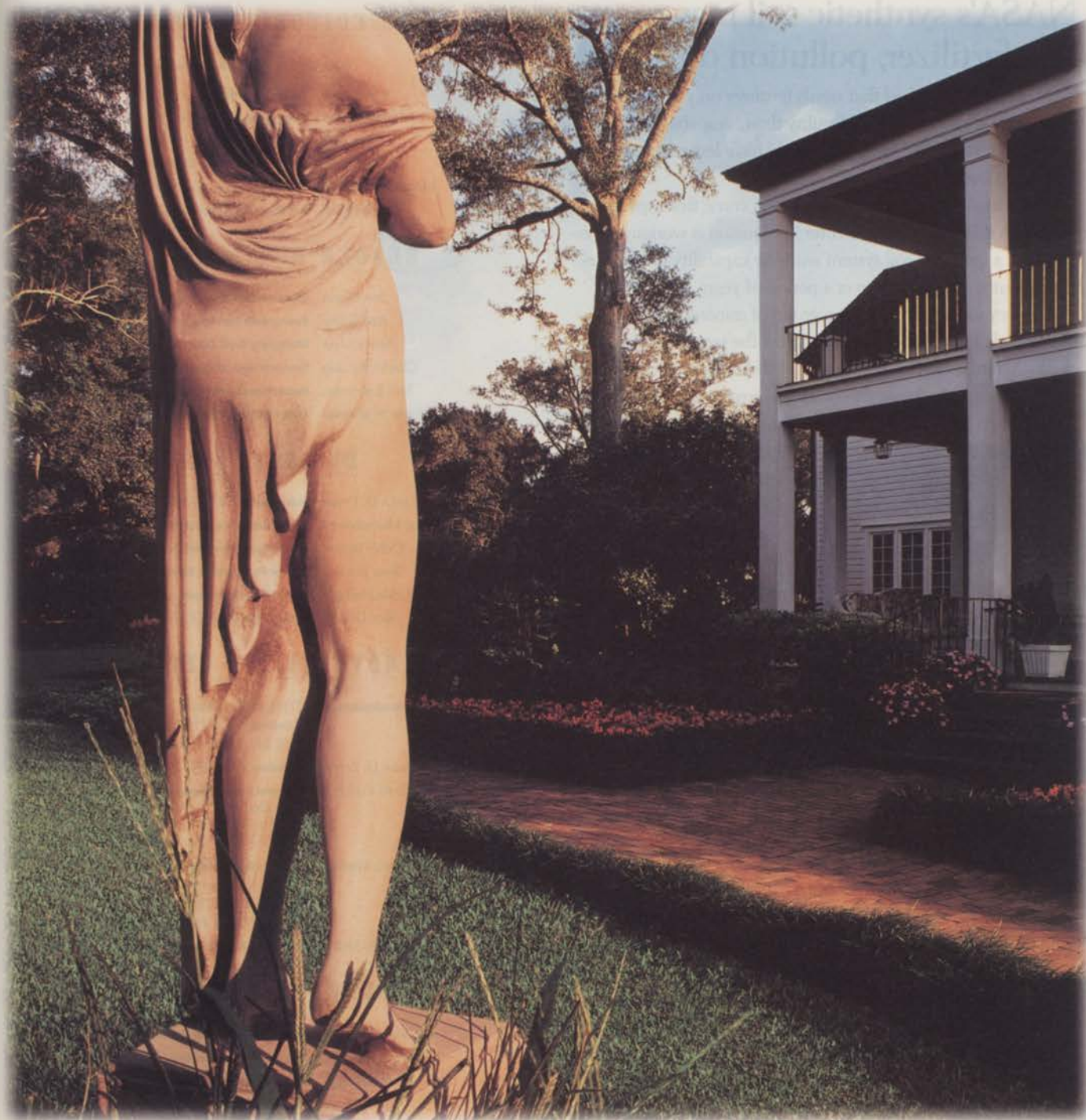
box," says Christi Ballard of Four Corners. "But everyone felt three 'nines' would be more appropriate—one for the front, one for the back and one for good luck."

For a retailer near you, call (602) 991-2320.

pany at the dig estimated the "grub market" at \$50 million annually.

Dr. Niemczyk will provide a detailed look at grubs and their control, and what the 1995 grub dig uncovered on the opening day of the Ohio Turfgrass Conference, Tuesday, Dec. 5, in Columbus, Ohio. Look for our report of his findings in LANDSCAPE MANAGEMENT's spring insect control issue.

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NASA's synthetic soil may mean less fertilizer, pollution on Earth

Imagine a flower bed that needs fertilizer only once every few years yet has a higher annual fertility than is capable with any mix of current fertilizers. And it would have less potential to pollute, to boot.

A soil to allow such fertility may soon come from space.

NASA's Johnson Space Center in Houston is working on zeolite soil, a synthetic soil system with the capability of time-releasing nutrients, perhaps over a period of years.

The key to the substance is a group of minerals called zeolites, which are found commonly across the western states as chalky, white rock. But they have the ability to adsorb and hold plant nutrients. And they can be engineered to time-release the

nutrients, according to NASA's Doug Ming, a researcher at Johnson Space Center.

Zeolite can store nitrogen and potassium; another NASA-developed supplemental mineral called synthetic apatite can similarly store the other essential plant nutrients (phosphorus, calcium, magnesium, sulfur, iron, zinc, manganese, copper, molybdenum, boron and chlorine).

The enriched zeolite and synthetic apatite are mixed together to form the zeolite soil mix, Ming says.

Original research stemmed from a problem of how to grow plants in the lunar soil and turned into a project involving hydroponics—growing plants in a precisely controlled and circulated nutrient-rich water solution—such as was planned to be used aboard spacecraft.

"We have continuously grown wheat in a zeolite soil mix for 225 days and still had 85 to 90 percent of its total fertility left," Ming says. "With its absorption and holding characteristics, it could provide a cost-effective solution to the increasing problem of pollution from fertilizers and their runoff."

If commercial concerns can reduce the expense involved in creating the zeolite soil, the potential for widespread use is great, NASA believes. In addition to a type of zeolite soil mix as a fertilizer, just the synthetic apatite could have potential as a fertilizer, providing the secondary and trace nutrients, Ming adds.

Future research may even reduce the need for watering by combining the zeolite soil mix with already-known materials that absorb water from the atmosphere.



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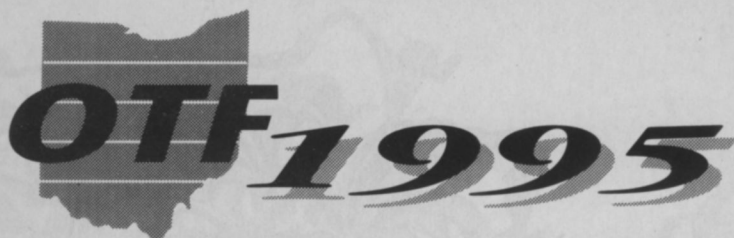
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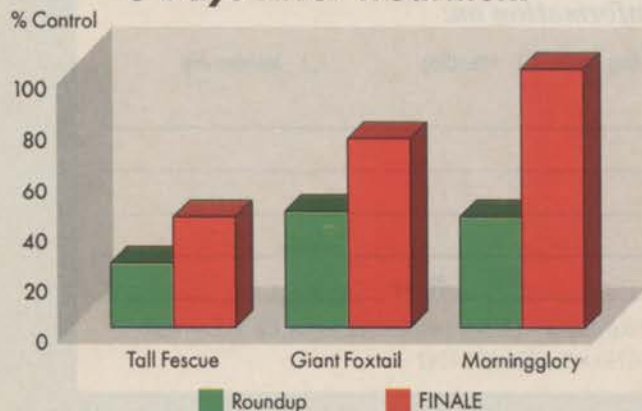
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Circle No. 101 on Reader Inquiry Card

[CHASING GEESE]

A Canada goose is wondrous in the air but one of God's most hateful creatures afoot. Noisy. Willful. Aggressive. Get too close to a Canada goose and it'll spread its huge wings, extend its neck like a cobra and hiss with all the menace it can generate.

The late Ken Erhmann hated Canada geese. Ken was in charge of our grounds for about six years prior to this retirement which, unfortunately, he got too few years to enjoy.

It's because of Ken and his successors that the landscape here at the headquarters of Advanstar Communications in suburban Cleveland is a showcase of turfgrass and flowers.

I immediately thought of Ken when the description of a new product, Rejex-It, came across my desk. Apply it to turfgrass (or wherever you need it) and safely repel geese and other waterfowl, say product promoters.

Ken went to incredible lengths to protect our grounds—sometimes employees too—from geese.

It gnawed at him to see geese show so little regard for his handiwork as to rip the turfgrass out by its roots, not to mention the messes they made in the parking lot and on the walkways.

Tom Sprague's in charge of our grounds now. He doesn't like geese any better than Ken did. Tom, however, uses a different strategy.

If Tom decides he's had enough of a particular

goose (and he swears he can often tell one from another), he charges it, waving his arms and shouting like a madman. His face is so full of mayhem that the goose immediately takes off.



Tell us how you keep geese from destroying your turfgrass. At least, tell us what you've tried, and how effective it was. If we publish your idea—it doesn't have to be fancy or anything—we'll send you an official Landscape Management baseball cap.

(If you've got a turf or landscape problem you'd like to see discussed on this page, tell us.

Canada geese flee when Advanstar grounds manager Tom Sprague approaches. What's your solution to this common problem? It could earn you a free "Landscape Management" baseball cap (see below).

Your turn

Every other month, we report what readers think about current topics in **LANDSCAPE MANAGEMENT**. Tell us your solution to **CHASING GEESE** from the property. Tear out or photocopy this page and return it to us. If we use print your answer in the next "Talk Back" column, you'll receive a free high-quality "Landscape Management" baseball cap. Deadline for responses: December 1st. Fax to: (216) 891-2675 Mail to: LM Talk Back, 7500 Old Oak Blvd., Cleveland, OH 44130 E-mail to: 75553.502@compuserve.com

Do/did you have problem Canada geese on your property?

- Yes COMMENTS _____
- No _____

What methods have proven ineffective in controlling their presence?

COMMENTS _____

What particular method has proven most effective in controlling their presence, and why?

COMMENTS _____

Name _____

Company/Organization _____

Address _____

City/State/ZIP _____



Via mail, e-mail, fax, etc.

"Your editorial in the [September] issue was excellent. It was pertinent, gutsy and to the point. Landscape Management continues to get better with each issue. Keep up the good work."

Ron Kujawa
KEI, Inc.
Cudahy, Wis.

Thanks, Ron. We appreciate getting cards like this through the mail, but we're now open to re-

ceive e-mail through the Internet, too. The rest of this month's "letters" were received electronically.

Terrific idea of providing us with an e-mail address! I hope this works out.

One quick suggestion: please try to keep your articles on one page. Due to lack of space and computer scanning capabilities, I normally just tear out the articles I want to

keep on file. It's not impossible, but mainly aggravating, to have a short article start on the bottom of one page, and the end on the next.

I'm sure some Ph.D. in marketing psychology probably has a dozen good reasons why you do this, but from practicality, it's a pain. Otherwise, a very terrific periodical!

Larry Caplan
Extension Educator
Vanderburgh County, Ind.

Check out this issue, Larry. One of the strong points of the new design we're unveiling this month is that we're no longer jumping half-stories from page to page. The Ph.D. who reviewed our old design must've earned his degree in bad taste!

I would like to thank you for your quick and helpful response to the e-mail I sent you. Your magazine, which I receive free of charge, provides more service than any of the ones I have to pay for. Keep up the good work!

Dave Denison
Hay Harbor G.C.
Fisher's Island, N.Y.

You were lucky, Dave. The information you requested was on file. We've had other requests that weren't as easy, though: one guy wanted to know how to patch up a dusty, weedy football field in 100 words or less. Yeah. Right.

I'm glad to see someone in our industry has entered cyberspace. We can all benefit from better communications. Personally, I don't have time to play phone tag or write letters. I enjoy your magazine. Keep up the good work!

Jim Yonce
Yeamans Hall Club
Charleston, S.C.

Aside to newcomers in cyberspace: if you get lost, hit the "escape" key. Luckily, we found our way back to Cleveland just in time to get out this month's special GIE issue. Enjoy.

What 'seed bargaining' is all about

To the editor:

In your August issue, on page 10 you quoted a very good friend of mine and a former co-worker, Dr. Jerry Pepin of Pickseed West. The quote is subheaded, "Uh-oh" and says:

"Perennial ryegrass prices will be up considerably over last year. The Perennial Ryegrass Bargaining Association is a factor this year. But I don't know how long they will be able to keep prices up, because this is a supply-and-demand industry."

The PRBA acknowledges that it is the major influencing factor for a higher price to the turf-type perennial ryegrass seed producer for the 1995 crop year.

The average grower price for turf-type perennial ryegrass seed...compares with grower prices paid in the early 1970s. However, the prices for tractors, combines and other equipment have doubled since 1970. Additionally, the seed producer has faced increasing restrictions and regulations in field sanitation techniques and the use of pesticides.

Usage of perennial ryegrass seed in the same period has increased from 116 to 174 million pounds...[thanks to] the strong efforts by the Oregon Ryegrass Growers Seed Commission as well as market promotion by each of the companies.

The only aspect that the PRBA has any influence on is the price of the seed being produced under grower contracts. The seed dealer makes the decision on the acreage they want produced. Neither the PRBA nor the seed grower makes decisions on increasing or decreasing production of varieties being produced under a seed grower contract.

Supply and demand governs the commodity market price, whether it's speculative or a true market condition.

The PRBA recognizes the importance of the professional turf market. It is not the objective of the PRBA to cause any hardship on any segment of this market. Our objective is to continue production of a high quality product to ensure the ultimate user is provided with seed that is genetically pure, without weed and crop contamination.

We would like to point out that the quality standards of the PRBA's "Tournament" quality seed are higher than the quality standards for certified seed.

A final objective of the PRBA is to influence a more stable market price that professional turf managers can depend on for the improved turf-type perennial ryegrass varieties.

Jim Carnes
Executive Director
PRBA



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Steve "Bogie" Bogaards, President Preferred Maintenance, Inc. Miami, FL



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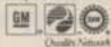
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Circle No. 108 on Reader Inquiry Card

SAFETY & STORAGE

Would your shop pass an EPA inspection? Know the mandates for pesticide containment and storage before you build. Here's an introduction.

Would you pass a Worker Protection inspection for safe chemical storage? If you *think* you have a problem, you probably *do*. Money spent *before* a possible inspection to comply will be saved many times over *after* the inspection.

Some self-contained sheds can be purchased for as little as \$5,000. Tips to remember when storing pesticides:

- ▶ Liquid and dry pesticides should be stored in separate areas, away from offices and workshops.

- ▶ Primary containment is used for storing and mixing concentrated pesticides. The area must be diked. Flooring should be made of impermeable materials like concrete, synthetic materials and steel with no drain, but curbing to retain spilled materials. The floor and dikes must be treated and/or coated with water-tight, wear-resistant materials that are also resistant to chemical corrosion.

- ▶ A ventilator fan that exhausts to the outside of the building is mandatory. The ventilation should go on automatically when the door is opened or the lights turned on.

- ▶ Shelving should be expanded metal with corrosion-resistant coating.

- ▶ Walls should be made of concrete block or steel, and ceiling materials should be fire-resistant.

- ▶ The door should have a lock, and "Warning: Pesticides" signs should be posted.

- ▶ Emergency showers, at least one eyewash station and personal safety equipment should be located outside of the storage room on the wall next to the door.

- ▶ Finally, a kit with absorbent material (cat litter, soil, etc.), a shovel, a broom and buckets—outside of the stor-

age room—should be readily available in case of a spill.

Secondary containment is used for:

- storing and parking spray rigs or trucks,
- loading or fill operations with dilute pesticide mixes and fertilizers, and
- washing and rinsing pesticide residues from application equipment and vehicles.

Fill times can be reduced when primary and secondary containment areas are integrated correctly. Mishandling and accidental spills can also be reduced, as can unnecessary exposure to staff and wasted products.

A proper containment/storage system protects outside water systems from hazardous materials with a back-flow protection device at the main source.

How you will benefit:

- 1) \$8000-\$10,000 in annual chemical waste disposal.

- 2) Reduced exposure to spills, other accidents and cleanup.

- 3) Savings and/or reduction of insurance premiums.

- 4) Environmental benefits, such as reduced or eliminated point source contamination to groundwater, sewer and water systems.

- 5) Employee safety is enhanced, and the day-to-day business operation is simplified and ordered.

—Sources: *Containment System Design* by Fred Haskett, and the Florida Department of Agriculture & Consumer Services. To order the Haskett book, call Advanstar Marketing Services, (800) 736-3665.

STORAGE AND SAFETY PRODUCTS FOR THE GREEN INDUSTRY

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EarthSafe	203	Above-ground storage tanks for fire safety and environmental regulation compliance when dispensing fuel and storing oil in bulk.
Elvex Corp.	204	Personal protection products to guide against injury from power equipment; hearing protection.
Safety Storage, Inc.	205	Storage building and lockers for hazardous materials. Now with stainless steel interiors for corrosive material storage.
Spectrum Technologies	206	Spill absorbent materials.
Spraying Systems Co.	207	Teejet Pesticide Safety Kit contains face shield, gloves, apron and a nozzle cleaning brush.
J.V. Mfg. Co.	208	Spill absorbent materials in kit form (pads, socks, absorbents, etc.) and complete line of products to identify, contain and treat hazardous spills. Brochures available.

Extreme heat was an absolute in summer '95



Terry McIver

TERRY McIVER
Managing Editor

In days when every opinion on a certain topic is given a hearing on radio, television or in the newspapers, it's nice to see a group of experts come forward with the absolute last word on a subject, which none will dare dispute or criticize.

That's what we've received from The Ohio State University's Cooperative Extension. Some of the leading turf scientists there—John Street, Karl Danneberger, Bill Pound, Barbara Bloetscher and Joe Rimelspach—have issued a report on the disease pressure exerted on golf courses across the Midwest during the heat-wave of 1995.

The report says high soil temperatures were a major cause of root decline and provided, "No opportunity for root re-growth and recovery."

That "No" makes you sit up and take notice.

"Hot, humid days and nights," says the report, "provided no relief for turfgrasses..."

Another unqualified "no!"

Is there any hope for the future, when a heat-wave will *certainly* hit us again, you ask? The answer is an unqualified...YES!

Monitoring the weather and knowing the most likely sites for disease development on the golf course are two factors the OSU extension says can help you time and plan fungicide application strategies.

"Once a disease is active, fungicide applications to stop the progress are often ineffective," say the authors. "With many of these diseases, a preventive fungicide program is critical for successful management."

Management practices some superintendents were expected (forced?) to follow didn't help.

"To prepare for golf tournaments or special events, greens were often cut lower and more frequently to increase ball speed," says the report.

[GOLF/GROUNDS]

PAGE 26 ▶

Steady workers: dream come true

PAGE 46 ▶

Learning by doing

PAGE 66 ▶

Roadside brush control

PAGE 86 ▶

Designing tees for everyone

Turf had literally "no opportunity to recover" after July 4th, assert the OSU scientists.

A crushing "NO" to the midsection!

Small greens were especially hard-hit as pin placements dwindled quickly. Greens with poor tile drainage or internal soil drainage or inadequate irrigation systems also suffered.

Solutions for turf survival during the next heatwave begin with raising the height of cut.

"High-quality turf was maintained at the courses at which mowing heights were raised early, before the onset of heat," and where rollers were used to compensate, say the experts.

"GREEN SPEED MAY HAVE TO BE SACRIFICED for the overall betterment of turf and playability under extreme environmental conditions," say those in the know at OSU (emphasis mine).

Hard answers sometimes mean hard choices.

I ask you: Will golfers playing in 100° heat quibble over a measly sixteenth or thirty-second?

Let me know what you think of closing a course for some days—or even half-days—during severe heatwaves. Have you done it? If so, do you lose money, or ultimately save money from less turf repair maintenance?

I'd also like to know how you went about keeping turf alive in the summer of '95, and what you plan to do to prevent damage from heat stress the next time. Because it will happen again.

Absolutely.

Call me at (800) 225-4569, ext. 709.

Steady workers a dream come true

The days of 'political appointments,' goof-offs are gone at Ridgewood Country Club.

by TERRY MCIVER / Managing Editor

For years, the summer workforce at Ridgewood Municipal Golf Course in Parma, Ohio, was composed of teens whose fathers "knew somebody at city hall."

It was never a surprise when, on a day in early June, a few guys with very little ambition and a strong desire to goof off would mosey onto the course to begin their summer of fun.

"We had our share of misfits," remembers superintendent Ted Benze, who smiles with relief as he describes the changes that took place about eight years ago, after a new city administration took over. At that time, Benze had strongly suggested to the new mayor that politics be left out of golf course crew staffing.



Ted Benze finds continuity pays off when it comes to maintaining a well-trained, dedicated workforce.

Benze now relies on a dozen retirees to round out his peak-season staff of 22, and he praises the work ethic and dependability of the older men.

"Before," remembers Benze, "you'd get seasonal help and you couldn't keep them year after year. There was constant retraining. Now, I've got one guy who cuts greens, one guy who cuts fairways, right on down the line. The one who takes care of the greens mowers has been here eight years."

Ridgewood is located smack-dab in the middle of Cleveland's largest suburb. Main roads pass less than 100 yards from the clubhouse and along the number 10 and 11 fairways. The city's biggest shopping mall is about 500 feet away.

Disease hits hard

Benze says the heat wave of '95 didn't seriously affect Ridgewood's turf until the end of August, but when it hit, it hit with a vengeance.

"I usually buy pesticides out of season, but this summer was one of the few times we bought during the summer, due to the disease pressure," says Benze.

"There will always be a year like this year, where you get some surprises. At one time [during the heatwave] I had something I thought was sum-



mer patch; but I checked it up so fast that I'm not positive it was summer patch, or a form of anthracnose, or the two working together. I went out there with six ounces of Cleary's 3336, which everybody was trying, and it worked for me.

"Mercury would have knocked it down," insists Benze, "but it's not

labelled to use anymore. That's why you see a lot of these things showing up that never did before. You haven't been able to use mercury during the summer for 15 years now. You can use it during winter only, for snow mold control."

Designing to aid playability

Benze has modified the course design

considerably during his 15 years at Ridgewood. The back nine is now the front nine, a change which was made based on player preference and general playability.

"We've added blue tees, and an irrigation system (see sidebar) and enlarged the fourth tee, which used to be the 14th."

One hole on the front nine was decommissioned, and a new hole was added in its place, primarily as a way to shorten the walk between two holes which were very far apart (a player peeve for many years).

Benze buys good trees at bargain prices in late summer from a local nursery known for its end-of-summer clearance sales, such as red maples for \$30. He also grows trees in a small nursery near the maintenance shop. □

New irrigation system a double-row wonder

A new Buckner "Genesis" double-row irrigation system installed at Ridgewood Golf Course two years ago has made water management much more efficient.

Superintendent Ted Benze decided to use city water as the source for the system, after determining that a nearby lake contained too much septic and salt content. The lake has since been cleaned, but it still lacks sufficient volume.

Pressure drop is one of the challenges you face when you draw from a water source that also supplies a city of 88,000 people, especially during a heat wave, but the new system helps Benze adjust run times easily to compensate.

"Last year I had 120 pounds of pressure coming in from the city," recalls Benze. "This year I was lucky to have 57 pounds.

"The Buckner Genesis has been a big asset. Last year I was able to pump close to 1000 gallons per minute. This year, because of the pressure coming in to



the place I could only pump 600. If it wasn't for the convenience in changing the program around, I would never have been able to do it easily. I can change run times or lanes in less than 20 minutes. Using city water was still the best way to go."

The area from tees to fairways is covered by single-row irrigation; fairways are covered by a double row configuration.

C.J. Colein & Associates of Rochester, Mich., designed the configura-

tion. Benze is glad he went the route of an irrigation consultant. He tried to solicit bids and designs from individual contractors, but it became too confusing and complicated.

"I would recommend anyone—public, private or municipal golf course—to go that route," attests Benze.

"Carol Colein came up with a bid package and a system that fit our needs, and it turned out better than we expected." □

—T.M.

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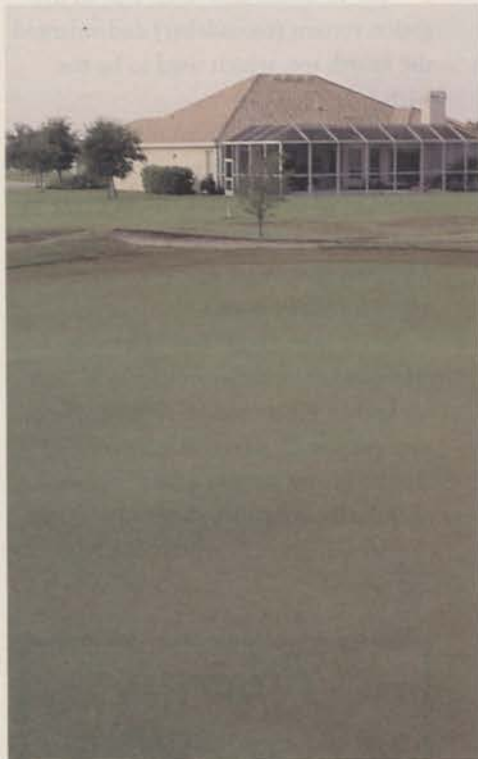


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Circle 106

Learning by doing

by TERRY MCIVER / Managing Editor



Dan Hall's prescription for fast greens: 'If I have a big event coming up on a Sunday, I topdress lightly on Tuesday or Wednesday. Then we single-mow on Thursday, Friday and Saturday nights, and double-mow on Friday, Saturday and Sunday mornings.'



You can't tell Daniel Hall, Jr.'s story without first saying something about his dad.

D. Lester Hall, Sr. began working on courses in 1915, when the only "utility vehicle" was a good, strong mule or plowhorse.

He developed U-3 and Hall Superior bermudagrasses, and helped build Atlanta's Peachtree Golf Course.

Hall Jr., 68, learned the art, craft and science of golf course turf management from working with his dad,

and, later, from his own study and experimentation. A few continuing-education credits were added along the way to dot the i's and cross the t's, but the wealth of his knowledge has come from the doing.

There isn't an area of turf management to which Hall hasn't applied his own methods, intuition and common sense. He's taken what he's needed from all the theories and let the rest go dormant.

Peachtree, San Jose, Imperial and Savannah are just some of the golf courses he's walked and rode, seeded and hoed.

Hall has been the superintendent at Serenoa Golf Course in Sarasota, Fla. since it opened in 1989.

A public-fee course in a neighborhood of more than 30 public courses, Serenoa holds its own against the competition. Thanks to Hall, his crew, and club president and pro Jim Owen, Serenoa is known as the best-conditioned course in Sarasota. It'll host about 70,000 rounds of golf, in this, its sixth year of operation.

Working with the weather

Stormy weather has made mole cricket control especially challenging.

"This is the worst year I've had for mole crickets only because the pastureland around the course has been flooded," says Hall. "They used red-eye fly (a predator form of biological control) out here four or five years ago; last year and the year before we didn't have any mole crickets."

Hall spot-treats with control products only when mole cricket or other pest populations warrant.

Eighty-plus inches of rain pelted the course from June to October, which altered Hall's usual fertility program.

"This year, with the rains, I put out about 18 pounds of nitrogen per 1000 square feet. Normally, I run about 12 to 16 pounds, depending on rainfall.

"Potash is more essential than nitrogen, as far as I'm concerned," Hall explains, "in a ratio of almost 1:3. But then, I don't use any potash until mid-October, when the overseeding starts to show."

Hall believes in the value of Milorganite as a nitrogen source.

"It's clean, it's easy to apply, and it will not burn except under sheer, stupid misuse. It absorbs heat and energy, it's got carbohydrates, amino acids and nitrogen; it's not going to release if the ground temperature is much below 72 degrees, because the bacteria's not working. It serves the same purpose as charcoal, and the golfers don't complain about it."

Serenoa is home to a thriving wildlife. Deer

roam the course in the early mornings to nibble on sugar-rich bermudagrass. Eagles and heron nest on the course, and live off fish from Serenoa's 83 acres of lakes.

Well-respected in changing times

Hall has always won the respect of co-workers and employers, thanks to his airtight knowledge of the business and a no-nonsense style.

Throughout his career, he's usually been able to convince golf course owners, club presidents and whomever else was his boss at the time that the way of the experienced superintendent is the only way to care for a golf course.

As the jargon of golf has expanded to include terms such as "bottom line," "profit-and-loss statement," and "stockholder dividends," Hall believes it's important that superintendents—largely at the private courses—communicate clearly what corners must not be cut in the interest of profits.



If you want to really ruin Dan Hall's day, tell him he's got to stay inside. Hall, left, insists that a superintendent has to be out on the golf course every day. 'When you get to be a manager, you lose contact with the people. You're in the office with the paper, the computer and the telephone.'

The status quo, says Hall, has become "saving money," which can be bad for a work environment and bad for turf.

He quotes turf research legend O.J. Noer: "A golf course is no place to waste money, but it's also no place to save money.'

"And Noer also calculated that for every dollar a course saves off bottom line in salary, it costs them \$3 to \$7 per year."

The member syndrome

"You take the most prominent people in the community—doctors, lawyers, businessmen, judges; it doesn't make any difference who they are," explains Hall. "Normally, those are the better-educated people in the community. As a general rule, they're also the most affluent people in the community, who donate the most time in areas of leadership for charitable institutions. And they do a lot of good.

"But for some reason, the minute they become a member of a board of directors of a private country club...you start to get political factions. Some want to renovate, and some don't want to renovate...And guess who's always in the middle of it? The superintendent!"

Hall estimates the average tenure at a Florida golf course to be about five-and-a-half years.

"Some younger fellows are also being squeezed out," he says. "Some are now selling equipment. They became disenchanted. Many would not go to work for a private course for any salary."

Member apathy for the superintendent's plight doesn't bode well for Florida superintendents who have had to deal with up to 100 inches of rain this summer.

"When them Yankees start coming down from the East Coast into the Naples/Ft. Myers/Sarasota area, and find that the golf courses are not in the condition they normally have

QUOTABLE QUOTES

from Dan Hall Jr.:

- ▶ 'Nobody knows the road better than somebody who's already travelled it.'
- ▶ 'What members forget is that the superintendents at tournament courses have had all year to get ready.'
- ▶ 'If you know turf, it really is the simplest part of the whole operation.'
- ▶ 'I know superintendents who wouldn't know how to start a triplex mower.'

been in, there's gonna be hell raised. There'll probably be guys who'll lose their jobs.

"That's why I would never work at another private golf course, especially in Florida."

Balance responsibilities

Today's "do-it-all" superintendent, says Hall, wants to give equal attention to all areas, which isn't always easy.

"If he's someone who is naturally most adept at growing grass, he'll spend more time on the appearance of the grass.

"And I don't care how smart you are. Whatever area you focus your attention on, other areas have got to go lacking. There are very few people who can oversee that infinite number of specialties."

Hall plans to work at Serenoa until it dries up and blows away, which is unlikely to happen, with all the rain they've had down there.

The point is, he will not retire.

That's one of the traits of many superintendents from Hall's generation. Their "What's-life-without-work?" philosophy is hard to dispute. □

Smoking out brush control on roadsides

by JAMES E. GUYETTE / Contributing Editor

A new cutting-edge program for controlling brush along highways actually involves cutting back: it's cheaper to spray once than it is to continuously mow.

The program, known as "Brush Busters," is being developed by Dr. Darrell Ueckert and Dr. Allan McGinty, Texas Agricultural Extension Service range scientists. The new approach is being funded through Texas A&M University with a \$222,000 contract from the Texas Department of Transportation (TxDOT).

"Brush Busters is a newly-packaged, common-sense brush control concept that uses proven chemical methods to selectively remove noxious plants without harming nearby desirable vegetation," Ueckert explains. "The funding is for developing uniform, statewide guidelines and procedures for use by TxDOT maintenance personnel. We plan to refine our new Brush Busters program to meet TxDOT needs."

The main target is the mesquite tree. And while mesquite wood may be in hot demand elsewhere as a flavorful fuel source for backyard barbecues, in the Lone Star State wild mesquite trees are an ongoing problem.

"They're considered a hazard to motorists," says Ueckert. The thorns find their way into tires, and the trees inflict serious damage to a vehicle that crashes into them. Some species of thorned shrubs are known for their ability to safely ease a careening car to a stop—but mesquite is not among those. "Most motorists, when they fall asleep and run off the road, wake up," Ueckert observes, "but if they were to run into a thicket of mesquite, they would not wake up."

Mesquite infests some 51 million acres of



The thorns of the mesquite find their way into automobile tires.

Texas land, including much of the 1.42 million acres of highway rights of way along the state's 78,000 miles of roads.

A natural appreciation

TxDOT's major goal is to maintain a roadside "native prairie" for each site or region across the state. Ueckert says this reflects the appreciation for aesthetics, wildlife habitat, soil stabilization and watershed values of prairie vegetation as well as the safety concerns for motorists and TxDOT crews. "The public loves to see bluebonnets and other native wildflowers along the roadside," Ueckert notes.

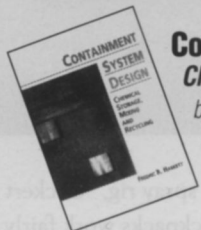
"You can't have a native prairie brimming with wildflowers when it's choked with mesquite," adds McGinty. The conventional control of mowing is not successful, and in fact, mowing makes mesquite worse.

It costs \$18 an acre to mow, and any mowing program must be repeated several times a season. "If you cut it off, mutilate it or burn it, you'll have more of a problem," according to Ueckert. "The plant will change from a single-stem tree plant to a multiple-stemmed shrub." Also, mowing mesquite creates more thorns that are just waiting to imbed themselves in a passing motorist's tire.

It costs just \$7 an acre to apply chemical controls for mesquite on rangeland. The actual finan-

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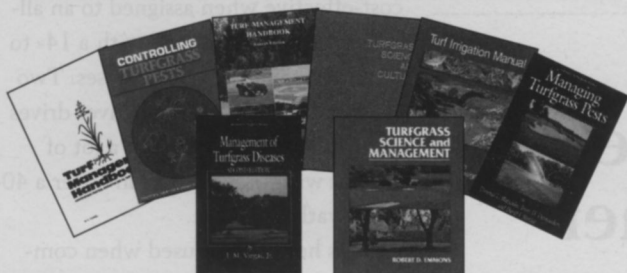
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cial figures are not yet in for median strip applications, but Ueckert and McGinty see sizable savings on the horizon.

Two techniques are being applied under the chemical control program, which uses triclopyr and clopyralid:

1) **The stem spray method.** The lower 12 inches of the plant is sprayed with a mixture of 15 percent triclopyr and 85 percent diesel fuel. "This can be done any time of the year, but it's more effective when temperatures are high," says Ueckert.

2) **The leaf spray method.** Using 0.5 percent triclopyr and 0.5 percent clopyralid, the materials are mixed with 5

Ueckert applies the leaf spray only during the June-September growing season.

percent diesel fuel in water, plus a commercial emulsifier or liquid dish soap. "The leaf spray can only be applied during the growing season—June through September."

The equipment needs are minimal.



Turf 101: hot + humid = disease pressure in the summer

July and August was a rough time for golf course turf across the Midwest this year.

The reason: the summer's "Extreme Environmental Conditions," as reported by turf scientists from the Ohio State University.

Air and soil temperature went way beyond the ideal ranges, for multiple days at a time, putting intense pressure on cool-season root systems. With the root systems weakened, the turf was unable to combat disease pathogens.

Soil temperatures, which are ideal in the 50-60°-range, rose to 100° F at mid-day. According to OSU scientists, bentgrass will not initiate new roots when soil temperatures exceed 90° F.

"High soil temperatures resulted in root decline and no opportunity for root regrowth and recovery," reports OSU.

In heavy rainfall, oxygen was pushed from the soil, and roots were suffocated. Extensive dieback and complete turf failure occurred so suddenly, that according to OSU professors, superintendents were

able to fix complete turf failure to a specific date and time.

Fertilize for winter survival

Richard Buckley, director of Rutgers University's Plant Diagnostic Lab, says it's essential that golf greens and ornamental plants are well-fed for winter.

According to Buckley, most of the drought-related problems he examined took the form of summer patch and anthracnose.

"Summer patch pushed turf to the limit," says Buckley, "and turf wasn't able to meet the transpiration demands necessary for survival."

Unfortunately, trees and new plants are going to show the effect of summer stress, come spring, says Buckley, even if those plants were well-irrigated during and after the heat wave.

"Plants don't respond as well to irrigation as they do to regular rainfall," says Buckley, who says he saw some early leaf drop in areas of Pennsylvania, New York and Connecticut. □

"You can use a \$25 spray rig," Ueckert points out. "The backpacks work fairly well if your brush is dense."

A three-person crew can be highly cost-effective when assigned to an all-terrain vehicle equipped with a 14- to 20-gallon tank with three hoses. Two walk and spray while the driver drives and sprays. "You can cover a lot of ground with those. You can cover a 40-foot swath."

Less herbicide is used when compared with broadcast applications. "The key thing is that it's low impact" on desirable species and the environment, Ueckert says.

Plans are afoot to augment the ATVs with a speedy device called the "Brush Robot."

"We want to automate this even more," Ueckert reports. "These sensors feel the brush and activate the spray nozzle," he explains. "You're putting the herbicide directly on the target and you have very little contact with wildflowers or prairie grasses."

Best of all are the savings to Texas taxpayers: "Chemical controls will only need to be applied every three or four years." This is a big improvement over multiple mowings that don't even work and result in additional hazards to the traveling public. Says Ueckert: "Instead of growing more thorns, we want to kill them." □

—Terry McIver

Designing from middle tees provides fair test for all golfers

by LESLEE JAQUETTE

In the early days of golf course design, the process usually started from the tournament tees and worked forward. Consequently, shots from the forward tees were more prone to crossing hazards and forced carries. Hitting from a hastily-added women's tee was indeed a trying feat.

The new LPGA International course in Daytona Beach, Fla., breaks with that design tradition. It has been designed completely from the middle tees, and has proven to be a fair test for the best women players. All tee areas, from front

to back, have been carefully designed and placed. Strategically-placed bail-out areas and greens give golfers of every level a challenging and fun golfing experience.

Dr. Jones on call

The LPGA course was designed by Rees Jones, and opened in July of 1994.

Known as "The Open Doctor," Jones has rehabilitated several courses for U.S. Open play, and was recently chosen to remodel Pinehurst No.2—the Donald Ross masterpiece—for the 1999 Open.

The most highly regarded Ross works are his original designs at Haig Point on Daufuskie

Island, S.C. ("Best New Private Course, 1992) and Sandpines in Florence, Ore. (Best New Public Course, 1993).

Pam Phipps, director of golf for the LPGA, says Jones was chosen not only for his expertise, but because he listens. According to Phipps, Jones sought the opinion of several women professionals before he finalized the design.

"What we have created at LPGA International," says Jones, "is a true tournament-caliber course that can also be enjoyed by less-than tournament-caliber players."

Tee area to spare

The intent and scope of the course is evident. Jones uses elevated tees for all five levels to allow for a huge range of player ability, allowing the course to be played from 5,134 to 7,088 yards. Increasingly, the tees are placed in directions and at distances appropriate with the average golfer at each level of play. For example, on No.5, the back tees are raised high enough to permit the better golfers to carry over a wetlands trap. The ladies' pro tee exacts the ability to carry 100 yards over the perimeter of the wetlands. The golf tee forces minimal water contact, and the red tee has no forward water hazard, only wetlands to the sides of the fairway.

"With this method of placement, we find the ladies can hit the same area as the guys off the longer tees," says Phipps. "It's fair—the way it should be."

Every hole allows for a pitch and roll to the green. This spares ground players the threat of landing in Jones's signature bunkers on each side of the greens.

Jones-style bunkers add interest and aesthetics to the course, and make it a great spectator course. Each green has five target areas. If you miss your first putt, the bowls and undulations of



Superintendent Mark Heater says it takes 12 man-hours a day to rake all the traps.

Dormant seeding sprouts quick results in spring

Dormant seeding is the process of planting turfgrass seed when soil temperatures are too low for germination.

Kevin J. Ross, superintendent at Falmouth (Maine) Country Club, has tried dormant seeding and likes the speed of springtime establishment.

"The first step in the seed germinating process is when water is absorbed by the seed," he notes. "The second step is when the seed undergoes a swelling which initiates several biochemical and morphological events. These steps ultimately result in the development of a seedling turfgrass plant.

Because the seed is partially germinated in the fall, it is four to six weeks ahead of spring-planted seed.

Ross suggests dormant seeding might be used in the following areas:

—on divots in tees and fairways at the end of the season. In Ross' part of the country, that is done between November 8-12, based on a test plot experiment he conducted.

—greens and other areas subject to winter kill.

—clubs on a bentgrass fairway conversion program might want to experiment with dormant seeding, suggests Ross.

"The *Poa annua* is at its weakest stage in the spring (if it survives the winter) and dormant-seeded bentgrass can compete very successfully with injured or stunted *Poa annua*," Ross says.

"We have also experimented with spraying Roundup in areas of poa infestation just prior to turfgrass dormancy, then dormant slice seeding bentgrass in these areas and had remarkable success.

Dormant seeding helps Ross out in an area which has a short growing season.

But he cautions superintendents to experiment before using it on a large area of turf. Timing, he says, is essential. □

—Adapted from Seed Research of Oregon's Seed Researcher.



'Water stops' around the course include water jugs, paper cups, trash bins and ice.

the green can wreak havoc with a putt.

Due to the acres of wetlands around the course, most holes are fairly straightforward.

A second 18 holes designed by Arthur Hills will be built starting in January and playable the following year. In contrast to Jones's links style, Hills' design includes more doglegs and large pine trees. Without the dramatic elevated greens and tees and mounds, the Hills course will be contoured but flatter looking.

Managing the LPGA

The new LPGA International is big, beautiful and demanding. Not only for golfers, but also for its superintendent, Mark Heater. With 250 acres of expansive wetlands, 16 miles of curbed cement cartpaths, and bunkers the size of Rhode Island, the course is a maintenance challenge.

Heater's biggest headaches are caused by the weather. Florida's infamous thunderstorms and gusty winds can greatly disrupt the 115 sand traps. The largest sand bunker on the course is 30,000 sq. ft.

Edging the bunkers is a nightmare in itself, Heater notes. Keeping the entire course edged in medium shape requires 100 man-hours a week; the cartpaths require 250 man-hours to edge. A crew

of 25 is divided into thirds, and each third works a 40-hour, five-day shift. Shifts run Tuesday through Saturday; Sunday through Thursday; and Monday through Friday.

An unexpected problem is damage caused by armadillos burrowing for mole crickets. "They wear us out," Heater says. All he can do is chase the critters away and fill in the holes.

Two of Heater's favorite pieces of equipment are a Jacobsen 3810 four-wheel drive mower for mounded areas, and a Soil Reliever deep-tine aerifier that can take whatever punishment the operator can dish out.

A former superintendent at Grand Cypress Resort in Orlando, Heater manages the largest irrigation system in Florida. Using a Toro LTC system, the LPGA course has 2,400 sprinkler heads. In the summer, the system distributes one million gallons of water per night; in the winter, 600,000 gallons a night. Located adjacent to the city's new water treatment facility, the course uses reclaimed water for irrigation. □

Problem-solver extraordinary

by JERRY ROCHE / Editor-in-Chief

Ever wonder why you're in this business? Ever tried putting it into words? Mike Schiller has wondered. He's been able to put his thoughts to words—and rather well, at that.

"Being a Cubs fan and going down to Wrigley Field as a kid, I always watched what the groundskeepers were doing," Schiller remembers. "If you don't mind work and like to be outside, it's a great business. We're kind of urban farmers planting things for future generations. And it's like an addiction. Once it gets in your blood, you can't get rid of it.

"We're not going to get rich, but we're leaving greenspace for future generations."

Schiller—assistant superintendent of parks and planning for Schaumburg, Ill.—likes to solve problems. And with a park system of 100 acres spread over 26 square miles, he runs into plenty of them.

"This business is not static," he observes. "You never know what you're going to do from day to day, or what problems you're going to run into. I like to consider myself a good problem solver. When somebody tells me I can't do something, I

like to find a way to do it. And I like to find new and better ways to do things." It helps that Schiller is blessed with capable employees, "people who can do almost anything." The expertise on hand runs even into the winter months.

"Snow is a top priority in the winter," Schiller notes, "especially at our community centers. I've never seen a crew that does a better job of keeping

sidewalks and parking lots clean and safe."

Schiller's supervisor is Dan Otto, superintendent of parks and planning. Jeff Richards is in charge of landscape construction crews and the horticulture crew, while John Gerker heads up the mowing and trimming crews, and coordinates special events maintenance tasks.

Schaumburg's parks include 40 baseball infields, 13 soccer fields and 60 playground sites. Seven new baseball infields and four new soccer fields are due in 1996. "I kind of watch over the playgrounds," he notes. "Special events are also a high priority. We take care of all the recreation staff's needs."

"We mow about 200+ acres a week. We mow athletic fields two times a week, but the main fields are mowed once a day," says Schiller, who has two associate degrees from Hartford College in Palatine, Ill., and served in the U.S. Air Force where he did much the same as he does today.

The Schaumburg parks department uses 15- and 16-foot gang mowers for productivity's sake, because many areas—including ballfields—are large.

"We also do broadleaf weed control, but we can't afford to do much disease control or anything," says Schiller. "It always seems as though one of our guys is out seeding somewhere. We oversee with new grasses and let them grow through it. Then, we try to keep the grass healthy and growing so it can tolerate all the use."

Some of Schiller's recommendations that have worked over the past year:

PROBLEM AREAS: "With 105 sites over 26 square miles, it's hard to see everything. We hope other people will be our eyes. You listen to the public and your recreation staff all the time. You try to serve their needs. If something's not right, people will tell you."

GEESE: "We just bought a puppy—Lucy—and found she's the best way to keep geese away. Each goose leaves behind a quarter-pound (of 'dirt') a day and you can't clean it up because it's greasy and gooky and dirties up athletic fields. The dog won't



Schaumburg's Mike Schiller uses four-day work weeks to keep his employees more productive.

GCSAA announces officer nominees for 1996

Bruce R. Williams has been nominated for the presidency of the Golf Course Superintendents Association of America. The association's 1996 election of officers and directors is scheduled for Saturday, February 10, during its annual meeting at the GCSAA International Golf Course Conference and Show in Orlando, Fla.

Williams is superintendent at Bob O' Link Golf Club in Highland Park, Ill., and is currently serving as vice president of GCSAA.

The nominee for vice president is Paul S. McGinnis, CGCS, of Union Hills Country Club in Sun City, Ariz.

Nominees for secretary/treasurer are Dave Fearis, CGCS, of Blue Hills Country Club, Kansas City, Mo.; and George Renault III, CGCS, of Burning Tree Club in Bethesda, Md.

Six candidates are up for election to two director posts: Paul A. Dermott, CGCS, of Oakdale Golf & Country Club in Downsview, Ontario, Canada; Ken Mangum, CGCS, of Atlanta Athletic Club in Duluth, Ga.; Samuel Snyder VII,

CGCS, of Hercules Country Club, Wilmington, Del.; Robert J. Tillema, CGCS, of Sherwood Forest Golf Club, Sanger, Calif.; Michael Wallace, CGCS, of Hop Meadow Country Club in Simsbury, Conn.; and R. Scott Woodhead, CGCS, of Valley View Golf Club, Bozeman, Mont.

Georgia Turfgrass Foundation earns golf industry support

The Georgia Turfgrass Foundation Trust reports contributions from the state's golf industry associations surpassed \$15,000 for 1995.

"GTFT is truly coming into it's own, with meaningful research and projects that the industry is supporting," says Mark Hoban, GTFT president. For information on tax-deductible donations to GTFT, call GTFT at (404) 975-4123.

Golf course project serves as training ground

Delhi College Golf Course recently added a back nine to its golf course in Delhi, N.Y., and the New York State Turfgrass Association used the project as the focal point for its 10th Annual Golf Course Design and Construction Seminar.

The course construction has served as a training ground for students in Delhi's turf/golf course operations; horticulture; landscape contracting; and landscape architectural technology programs.

According to Dominic Morales, profes-

sor and plant science program director at Delhi College, more than 20 green industry companies have donated equipment, supplies and services in excess of \$200,000 to help finance the project.

cont. from page 11G



Schiller, left, and Eric McMann make over a pitcher's mound with Flexiclay.

hurt the geese, but the geese take flight when they see her."

MORALE: "This summer, the toughest thing was keeping the staff healthy because it was so hot. Went through several hundred gallons of Gatorade. And we let the crews take more frequent breaks, as long as they got the job done."

PRODUCTIVITY: "Our mowing guys are more productive when they can work longer hours on a jobsite, so we're on a four-day work week, 10 hours a day."

PITCHER'S MOUNDS: "We're using a polymer/clay combination called Flexiclay. It holds up well in wetness. Our Eric McMann will rebuild the pitcher's mound in the fall. He says that it takes him one hour to add the Flexiclay and it saves him 50 hours the next summer. It's only \$11 a bag, so it's well worth it." **LM**



TruGreen/ ChemLawn finds a way to reduce callbacks in Houston

As branch manager for TruGreen/ChemLawn in the Houston, Texas area, Charlie Fallis faced a season full of customer complaints about brown patch. Once nights begin to cool off in mid-August, the region's predominantly St. Augustinegrass lawns are highly susceptible to rhizoctonia (commonly known as brown patch).

"I'd say a good 80 percent of our customers' yards have brown patch in them each year," notes Fallis. "The disease starts off as small, brown circles with leaves appearing wet or soaked. As it progresses, the circles get to be the size of a plate and then a trash lid, and it can take over the whole yard. The sheath of the leaf dies and you can just pull the dead grass away. It gets pretty ugly."

Since TruGreen/ChemLawn has a free service-call policy, the company lost revenue each fall by having to spot-treat customers' lawns in an attempt to control brown patch. "We used a variety of chemical controls, but we really didn't feel confident we even reduced the disease that much," adds Fallis. "I tried to concentrate on cul-

tural controls, telling customers to control watering, mow at the right height, keep a sharp mower blade and fertilize at optimum levels. But it's hard to get people to follow your advice."

If Jaynes could convince customers to limit watering their lawns in the fall, brown patch occurrence could be reduced dramatically, he says. Cultural controls work hand-in-hand with chemical controls to reduce disease outbreak.

"Brown patch is much worse in our area than farther north," he adds.

One solution

Last year, the Houston branches of TruGreen/ChemLawn used Prostar 50WP fungicide for brown patch control. The company tried the product on a limited basis in 1993 and found that it did a terrific job on brown patch, Fallis says. Used either preventively or curatively, it provided control for 14 to 21 days.

"Prostar is the most effective product we've ever used for brown patch," says Bob Jaynes, TruGreen/ChemLawn field service manager. "I'd say it reduced our callbacks by about 80 percent. [It] works so well that after we treat an area it dries up so effectively that customers are noticing the difference."

Routine lawn care for Houston area TruGreen/ChemLawn customers means seven applications each year. Since preventive disease control costs extra, Fallis and his employees had difficulty selling the service. But now more customers are requesting it.

Other headaches

Other seasonal lawn care challenges in the Houston area include gray leaf spot, Virginia buttonweed and dallisgrass. Though TruGreen/ChemLawn has found effective products to use on the first two problems, there is no registered pesticide to control dallisgrass in St. Augustine turf.

"It's one of those situations where you have to tell your customers they need to pull a few weeds in spite of paying for a lawn service," says Jaynes. "Sometimes they don't like that."

Getting the most out of your mowers

by JERRY ROCHE / Editor-in-Chief

In the last five years, I've seen some of the largest contractors in the country go broke," claims industry consultant Jim Huston. "It's been because they haven't had a handle on equipment costs."

Actually, Huston notes, equipment costs are just one small part of the bigger picture of estimating and bidding jobs, which should be a three-step process.

Phase I costs are those incurred for producing the end product: material, labor, equipment costs and sub-contracting costs.

Phase II costs are "general condition" costs: those required by the job but not part of the finished product

"Phases I and II are direct costs, Phase III indirect costs," Huston contends. "Direct costs are a piece of cake to estimate, but when it comes to overhead, there's a lot of heated discussion."

For instance, how are the costs measured? To what line are they allocated? And how do you, as owner, control them?

"Every cost you have should fit somewhere," Huston says. "Otherwise, you have a leak in your organization." He told landscapers in Louisville, Ky., last summer (during the Power Equipment Expo) that he consulted for one company that had a \$300,000 "leak" per year for 10 years.

Computers are not the total answer, either. "Most of the programs don't understand how complex estimating is," he contends.

Equipment costs

There are three components to equipment costs: acquisition, maintenance

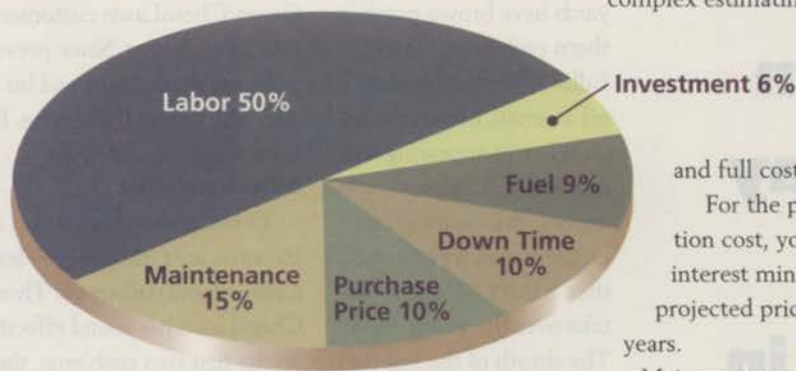
and full costs per hour.

For the purpose of determining acquisition cost, you take purchase price plus interest minus salvage value, divided by the projected price of the piece of equipment in years.

Maintenance costs applied to the estimating process are insurances, lube & oil, tires and other maintenance costs divided by the projected life in years.

"For a pick-up truck," Huston reveals, "equipment costs total about \$3.50 per hour, based on a life of 8,320 hours." For larger equipment like backhoes and tractors, and smaller equipment like mowers, Huston says you should calculate costs by engine running time rather than mileage or life in years. Lifetime maintenance costs for a

Mowing cost per acre or 1,000 sq. ft., of a typical mower used in the green industry, from Mike Bladon, University of Guelph, Canada.



like portable sanitary facilities, drive time, permits, soil tests and dump fees.

Phase III costs are mark-ups. They include sales taxes, labor burden (paid holidays, FICA, etc.); overhead recovery (rent, advertising, etc.); contingency factors and costs; and net profits. These can come to about \$10 per hour for installation jobs and about \$5 per hour for maintenance jobs.

tractor, he says, should run about the cost of a new tractor.

Be careful when calculating mower costs, though.

"A lot of fascinating things are happening in the small engine market," he cautions. "Engine life is very important to track. Equipment costs are extremely dynamic and if you're handling the equipment wrong, it can really increase your costs."

If you calculate equipment costs correctly, Huston notes, it should approximate 60 percent of the cost of renting the same piece of equipment.

Cost per unit

One of the keys to knowing mower costs is the ability to calculate costs per "unit" for a particular mower. The "unit" should be determined by your most common unit of measurement. If you're doing small home lawns, the "unit" is 1,000 sq. ft. If you're doing large landscapes, golf courses or athletic fields, the "unit" is acre.

"In order to save money, but not necessarily cut capital costs, the [mower] must minimize time and labor costs,"

according to an article in the Sports Turf Newsletter written by Mike Bladon of the grounds department at the University of Guelph (Canada).

Considerations he lists:

- ▶ Does it have engine power to cut heavy grasses at high ground speed?
- ▶ Does it have trimming capacity?
- ▶ Does it float to avoid scalping?
- ▶ Does it have adequate traction and side-hill stability?
- ▶ Does it have a sturdy frame construction?

According to Bladon, the biggest cost of operating a mower is labor—about 50% of the total cost of mowing.

Interestingly enough, purchase price comprises just 10 percent of the cost of mowing. Other costs: maintenance, 15 percent; fuel, 9 percent; downtime, 10 percent; investment, 6 percent.

A three-year formula

Ron Lauchnor of Gravely Tractor, speaking at the Louisville Expo a few years ago, came up with the accompanying chart listing "return" for various types of mowing equipment.

Lauchnor calculated acres per hour

by multiplying deck width by cutting speed and dividing by 10. He then extrapolated weekly gross profits from doing 30 typical jobs per week at what you might charge for that job. By subtracting costs (salaries, fuel, insurance, equipment and overhead) such as Huston notes above, Lauchnor comes up with net profits for one week using each piece of equipment. Assuming a 25-week production season, he then calculates a three-year return on the piece of equipment.

As you can see from the accompanying chart, any type of machine can bring you profits, if used properly and kept in constant use.

"If you understand the numbers, they're powerful data when it comes to negotiating," Huston says. "If you're making money now, don't panic—you're doing well. But costs could become a serious issue. Calculate and validate your costs, then compare your bidded costs to your actual costs." **LM**

EVALUATING MOWERS FOR PROFIT

Mower	Initial cost	Acres/Hr.	Jobs/Wk	Fee/Job	Gross/Wk.	Costs/Wk.	Net/Wk.	3-Yr. Return
21" push	\$400	0.5	30	\$15	\$450	\$175	\$275	\$20,625
40" rider	\$3000	1.0	30	\$25	\$200	\$200	\$550	\$41,250
42" rider w/bagger	\$6200	1.4	30	\$30	\$900	\$200	\$700	\$52,500
50" rider	\$3600	1.4	30	\$35	\$1050	\$250	\$800	\$60,000
60" rider (slower)	\$6400	2.5	30	\$60	\$1800	\$350	\$1450	\$108,750
60" rider (faster)	\$8400	3.0	30	\$70	\$2100	\$400	\$1700	\$127,500
72" rider	\$14,500	3.6	30	\$80	\$2400	\$450	\$1950	\$146,250
144" tractor	\$19,500	5.0	30	\$100	\$3000	\$500	\$2500	\$187,500

Acres/Hr. = width x cutting speed x 10
 Jobs/Wk. = if mower is kept busy all week
 Fee/Job = typical fees charged to customers
 Gross/Wk. = Jobs/Wk. x Fee/Job

Costs/Wk. = labor, fuel, insurance, maintenance, overhead
 Net/Wk. = Gross/Wk. — Costs/Wk.
 3-Yr. Return = Net/Wk. x 75 (based on 25-week season)

Managing turf for maximum root growth

by R.N. CARROW, Ph.D. / University of Georgia

MANAGING FOR BETTER ROOTS

WHAT TO DO

HOW TO DO IT

- 1) *Select species/cultivars with the best rooting potential* . . .examine use, soil properties, management regime
- 2) *Promote maximum net carbohydrate production:*
 - optimize leaf area** . . .mow as high as feasible
limit wear damage
control disease and insects
 - optimize leaf chlorophyll content** . . .avoid deficiencies in N, Fe, Mn, Mg, S
correct conditions that promote leaf color
loss such as waterlogging, low soil oxygen or prolonged drought stress
 - promote good light conditions** . . .remove excess clippings
prune lower limbs of trees and selected crown branches
- 3) *Avoid depletion of carbohydrates* . . .avoid excessive nitrogen application
- 4) *Correct soil physical conditions.*
 - high soil strength** . . .cultivate
modify with peat
modify soil with gypsum on sodium-affected soil
 - low soil oxygen** . . .cultivate
provide surface and subsurface drainage
 - soil layers** . . .cultivate
 - water deficits** . . .irrigate
increase water-holding capacity with organic matter
 - keep soil temperatures moderate** . . .irrigate
 - maintain dense turf** . . .mow as high as feasible
 - modify cold soil in spring** . . .assure proper drainage
cultivate
- 5) *Correct poor soil chemical conditions.*
 - acid, high aluminum soil** . . .lime
 - very alkaline soil** . . .if no free CaCO_3 exists, use S, H_2SO_4 or acidic N carriers
 - infertile soil** . . .fertilize, especially with N, P and K
 - avoid toxins** . . .limit excessive use of some herbicides
limit soil amendments with heavy metals
do not overuse micronutrients
 - cure salt-related problems** . . .cultivate or add gypsum or sulfur to improve drainage or use an alternate water source, depending on source of problem
- 6) *Correct poor soil geological conditions.*
 - root-feeding insects** . . .take chemical and biological control measures
 - root diseases** . . .make appropriate cultural and chemical preventive and control treatments
 - nematodes** . . .use chemical controls
 - thatch** . . .mechanically remove
promote microbial degradation

Roots are very important to successful turfgrass culture. Their five main functions are:

1) **Anchor:** a very basic role when the cleats of football players tear up large pieces of turf, or a golfer's iron shot pulls up a large divot from a golfer's iron shot, or sod easily lifts after grubs have damaged roots.

2) **Absorb and translocate water:** necessary for the cells to maintain biological functions and turgor pressure, and for transpirational cooling.

3) **Absorb and translocate nutrients:** for producing thousands of enzymes, carbohydrates, lipids and other compounds used in growth and development.

4) **Synthesize and transport certain hormones:** like cytokinins, gibberelins and abscisic acid.

5) **Sink for carbohydrates produced in the shoots:** roots depend on carbohydrate production via photosynthesis for their growth.

Root characteristics

Root systems are dynamic. Seasonal weather conditions trigger hormonal changes in turfgrass plants, resulting in growth cycles. Management practices to achieve maximum rooting must be timed to take advantage of the natural periods of rapid growth.

Scientists have identified the maximum rooting depth capability of different grasses under ideal conditions, which is important for knowing a grass's genetic potential to produce a root system when there are no limiting factors. Breeders now know that it is possible to breed or select for deeper-

rooted grasses within species.

Root hairs, which differ dramatically with species and cultivars in sand or water, greatly increase the root surface area for nutrient and water uptake.

Normally, live roots are water permeable, but they may become partially impermeable under low soil oxygen. These roots are less functional. Also, as roots age, some of the cells can die. On a large scale, it's called root dieback. Dead or partially dead root tissues take up less nutrients and water.

Roots usually live six months to two years, depending on the species, management conditions and environment. For example, certain spring climatic conditions can "prune" bermudagrass roots.

Finally, mycorrhizal relationships such as the influence of micro-organisms on roots may enhance water and nutrient adsorption.

Root limiting factors

Why does a bermudagrass exhibit a rooting depth of a few inches on a particular site when it has the genetic potential to develop a root system several feet deep?

Shoot factors—Factors that can limit actual rooting to much less than the genetic potential are either shoot-related (above ground) or soil-related.

Maintaining old roots and growing new ones depends on net food (carbohydrate) production in green shoot tissues by photosynthesis.

Roots get carbohydrates for growth only if enough are

manufactured for cell maintenance and shoot growth.

Anything that decreases photosynthesis or increases respiration will eventually reduce root growth; if severe, roots can die.

Anything that reduces leaf area—close mowing, leaf-feeding insects, and diseases—reduces rooting. It also tends to cause a temporary increase in respiration.

Chlorophyll, the light-absorbing pigment, is also necessary for photosynthesis. Low chlorophyll (a yellow plant) is often a result of:

- ▶ deficiencies of nitrogen, iron, manganese, magnesium and/or sulfur;

- ▶ low soil oxygen through compaction or waterlogging, drought stress, and burn from some pesticides and nitrogen sources.

If any of these conditions persist for more than a few days, root growth is likely to be impaired.

Because light is also needed for photosynthesis, anything that covers the leaves, such as excess clippings or shade, hinders rooting.

Persistent drought stress, which can cause leaf stomata to close and reduce CO₂ uptake, will also slow photosynthesis and retard rooting potential.

Above-ground factors—Mechanical, disease or insect injury can increase respiration rate, which causes greater use of carbohydrates and less root growth.

Higher temperatures, which also increase respiration and carbohydrate deple-

tion, are a major contributor to root deterioration of cool-season grasses during the summer.

Soil factors—Many soil conditions can limit rooting:

- 1) Each species has a genetic-based tolerance for factors like low soil O₂, high aluminum and mechanical strength. But breeders can develop cultivars with broader tolerance. For example, more aluminum-tolerant tall fescues could be developed for very acid, high-aluminum situations.

- 2) Within the genetic tolerance range, management practices can often correct a specific limiting factor. For example, cultivation can

improve low soil O₂ and/or high mechanical strength.

Broader genetic tolerance and management to correct or prevent a poor soil condition can improve rooting.

To choose cultural approaches on your site, identify the specific soil-based factors that actually inhibit rooting. To be successful, know your soil's properties and be able to evaluate each soil in terms of the physical, chemical and biological characteristics. □

—This article, condensed from the "Georgia Turfgrass Association News," is used with permission of the author and the Georgia Turfgrass Association.

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Circle 107

6 quick rules for diagnosing plant problems

by JAMES CHATFIELD / Ohio State Extension Service

Diagnosing plant problems is difficult and requires discipline and diverse knowledge. Yet everyone wants an instant and simple answer, not to mention an inexpensive and certain solution.

Is there a sure fire way to make diagnosis easy? Not really. But the following rules will lead to improved diagnostic success:

Rule 1: Know your plants.



Normal fall color on larch, a deciduous conifer. If you do not know it loses its needles each year, this would appear alarming.



Oak leaf blister: it looks serious, but rarely is significant to plant health.

Sometimes a homeowner cuts down a larch or bald cypress because he or she doesn't realize that these are deciduous conifers that drop needles in the fall. Likewise, a homeowner may notice brown needles on their white pines and believe the trees are diseased when, in fact, they're healthy. As horticulturists, not only do you know a larch from a pine (that's not too tough), but you know that loss of third-year needles is typical of white pine.

Another example that's not that uncommon is the severe yellowing between veins of the leaves of the pin oak. This may or may not be due to unavailability of iron in alkaline soil. But you know that that's a good place to start your diagnosis.

Certain plants are almost known by certain problems, such as black locusts in late summer skeletonized by locust leafminer adults, or sycamores with clusters of browned leaves and twig dieback, accompanied by leaf drop in June. They could be infected by sycamore anthracnose.

Finally, if you know your plants and where they should be placed, you will have an idea why taxus in a low, wet area is turning off-color and browning. Or why a European birch in the Midwest heat is losing upper branches from bronze birch borers.

Good diagnosis begins with plant knowledge.

Rule 2: Look for patterns.

First, determine the range of plants affected. If widely different species are damaged, it's unlikely that the problem is an infectious plant disease. Most disease-causing fungi and bacteria affect a limited number of plant types. If all the trees and shrubs in an area are dying, the problem is more likely environmental or cultural.

Check to see if problems are more widespread in low areas where poor drainage may be the key factor. Ask whether soil was disturbed by construction—trenching, soil grade changes, soil compaction. If contamination or overdoses of a pesticide are suspected, review what properties were sprayed and in what order. (If the problem is contamination of a hose line with a fertilizer or herbicide, the first properties sprayed should show the greatest damage.)

Also, notice the pattern of damage on the individual plant and plant parts. Diplodia tip blight of pine generally starts on the lower parts of the pine, spreading upward over the years due to splash of spores which cause new infections.

Dutch elm disease generally starts with flagging of upper branches where elm bark beetles have transmitted the fungus to vascular tissue of upper tree branches.

Rule 3: Learn the symptom profile.

An easy trap is to make a diagnosis on the basis of only one symptom. Diagnosis is not that simple.

For example, new leaves curling on a crabapple can be due to many different causes: aphid feeding, powdery mildew disease, growth regulator herbicide injury, moisture stress. Take the next step and match the symptom with further evidence. Unfurl the leaf to look for the aphids or their white cast skins. Look for evidence of powdery mildew with your hand lens.

Recognize that many problems have a whole set of characteristic symptoms. Verticillium wilt of maple causes leaf wilting and browning, dieback of branches (often one at a time), and discolored streakings in the wood. Each symptom alone is not sufficient for good diagnosis. But with a full profile of all the above symptoms you have enough to suspect verticillium wilt, which can then be verified by fungal isolation in the laboratory.

Rule 4: Perspective is valuable.

You can probably find at least one pest or disease problem on any tree. That does not mean that the maple bladder gall mite on the silver maple or the oak leaf blister on the red oak is important to plant health. This is a crucial perspective to relate to customers.

This brings us to an important realization. Although insects, mites and diseases harm trees, the majority of tree



Diplodia tip blight of pine: the pattern of damage is on new growth each spring, and gradually spreads over the years from lower to upper branches.



Powdery mildew on London planetree: note typical powdery white fungal growth and less typical (for powdery mildew) leaf distortion.

problems aren't caused by pests. They're caused by environmental and cultural factors such as drainage, improper plant siting (particularly in terms of sun and wind exposure), construction damage, storm damage, improper pruning, drought, and winter damage.

Be aware that if you do not constantly work at it, you will lose perspective. If you focus on only one symptom, if you always look for the easy answer like an identifiable leaf spot when the real problem is root decline, if you diagnose tree decline by simply asking if the customer has a lawn care service—you will not only be wrong most of the time, you will also soon lose the ability to even know what you are seeing.

Rule 5: Timing is everything.

One of the challenges of diagnosis is properly factoring time into the equation. Large, older trees that decline five

years after a new subdivision is put in are often dying from soil compaction by construction equipment, changes in soil grade which bury root systems, and outright root destruction by trenching. These trees do not typically fall overnight from this abuse.

Rarely does a customer want to hear about the role of these earlier stresses, that droughts stressed the tree, that a tree has been declining for years. Nevertheless, it's often true.

Try to be proactive by keeping records and informing customers of existing conditions when you start maintaining their trees. Set proper expectations based on a clear-headed estimate of tree health and the underlying history of the plants you will maintain. Estimate if tree health is declining by measuring annual growth increments using the bud scale scars.

Take your time when diagnosing. Everyone wants an instant answer, and someone is always willing to give one. However, step back, look for the pattern of damage, assemble the symptom profile, factor in what might have happened on the planting site in the past, and ask as many questions as possible.

Rule 6: Nothing is surefire.

The best diagnosticians, the best horticulturists, learn every time they go onto a landscape. There are always new things to learn about plants. Diagnosis is both an art and a science. There are the occasional "gimmies," but more often than not, your diagnosis will not be proven or certain.

A more reasonable goal is to arrive at the best evaluation of cause and effect from what is almost always incomplete information. **LM**

—The author is horticulture specialist with The Ohio State University Extension. He made this presentation at the Indiana State Lawn Care Association Summer Field Days in

Paul Zarlengo is new director of sales and marketing, and technical services support at **CLC Labs**, Westerville, Ohio. Zarlengo, who was appointed by CLC president Dr. Chuck Darrah, was a sales representative for O.M. Scotts and Benham Chemicals.

Jerry Shadley is new vice president of sales and marketing for **Homelite**, a subsidiary of Deere & Co. David Walker is new vice president of operations; and Stephen Peace is new manager of advertising and communications.

DowElanco strengthened its commitment to the turf and ornamental industry by creating two new sales districts. "We've enacted these changes to provide better, faster and more efficient service to current and future customers," says sales manager Gary Denhart. "The T&O marketplace is an important business for us." The company also named Dan Bouck to replace Mark Urbanowski as product communications manager for its turf & ornamental and technical products.

Stephen Guide, president of Fullerton, California's **Guise & Associates**, is a new **Netlon** North American distributor. He will assume the rights to distribute the Netlon Advanced (athletic) Turf system in the Pacific Northwest and the Southeast.

Aquatrols expanded its international sales force with the addition of Nick Gadd as international accounts manager. He comes from the largest distributor of specialty chemicals and chemical application equipment in the United Kingdom.

Kubota has launched an intensive new safety campaign promoting the use of roll-over protective structures (ROPS) and seat belts. As part of the campaign, Kubota is getting the word out to new tractor buyers about the importance of ROPS and asking owners of older model Kubota tractors without ROPS to consider buying a ROPS package at a very competitive cost.

Randy Lail and Rob Sosnowski have assumed new positions at **Stihl Southeast**. Lail is new vice president of finance and resources; Sosnowski is district manager for south Florida. Other appointments: Russ Happney to industrial products manager, Shari Noble and Al Taylor to sales representatives.

Info center

VIDEOS AND LITERATURE FOR THE GREEN INDUSTRY

CHAINSAW SAFETY... Learn basic chainsaw safety in an easy-to-understand video format from Progress Products. Topics include protective dress and safety gear, body position, fueling, and protection from vibration, blade kickback, pinching causes and prevention, and cutting techniques. Free handout with test and answers. To order: send check or purchase order (\$64.95) to Progress Products, P.O. Box 29018, Thornton, CO 80229 or phone (303) 289-7740.

FLOWER STUFF... The Flower Council of Holland's catalog of horticultural reference materials is free for the asking. Included in the full-color catalog are photo descriptions, garden plant photo identification books, posters, training kits and videos. Send your request to Public Relations Marketing, P.O. Box 749, Glenwood Landing, NY 11547.

TREE ROOTS... "Root Injury and Tree Health" is a video (and companion booklet) from the International Society of Arboriculture. It is ideal for arborists to use to promote proper practices to homeowners associations, developers, builders and garden clubs. Price is \$35 (\$25 for ISA members) plus \$5 shipping in the U.S. Fax Visa/Mastercard orders with expiration date to (217) 355-9516 or phone Robbin Kopp at (217) 355-9411.

ENTREPRENEURIAL SUCCESS... Decision-making for the entrepreneur is discussed in a new book from Merritt Publishing. "Make Up Your Mind: Entrepreneurs Talk About Decision-Making" describes common themes and recurring patterns in what 60 entrepreneurs said about their own strategic decision-making, including keys to success like "standing up for what you believe in" and "seeing change as normal." The 374-page book is \$19.95. To order, phone (800) 638-7597.

BUSINESS PLANS... The American Association of Nurserymen is selling "The Successful Business Plan: Secrets & Strategies" for just \$18 (\$22 for non-members) plus \$3.50 shipping. One hundred fifty-nine tips from 15 insiders are included, along with worksheets, sample plan guides and the Abrams Method of flow-through financials. Write AAN, 1250 I St., NW, Suite 500, Washington, DC 20005 or phone (202) 789-2900.

A new powder paint being used by **Ransomes America** will reduce waste and air pollution as it is applied to mowers and other Cushman/Ryan equipment. Ransomes has also announced that it has become a primary supplier to the National Golf Course Owners Association's "Smart Buy" program. The NGCOA is the fastest-growing trade association in the golf industry.

Pursell Industries and the **J.R. Simplot Co.** have joined together to manufacture and market fertilizers for the turf-grass and nursery markets. The two companies will offer products to the western U.S., Hawaii, western Canada, Mexico and Pacific Rim countries including Australia and New Zealand.

Events

NOVEMBER

Rain Bird, whose irrigation systems are used at seven of *Golf Digest's* top 10 golf courses in America, adds Wendi Abrams as national sales manager. She will be responsible for all domestic sales in Rain Bird's Golf Division.

Tony Chatman is new engineering services manager at Snapper. He will be responsible for engineering computer systems, the company's personal computer network and peripheral gear.

The new product manager for Briggs & Stratton's Large Engine Division is David Mauer. He will develop product plans and be product liaison between engineering sales divisions and customers.

Hunter Industries adds Neil Struikmans as regional sales and service representative for central California and Cita Berthelsen as regional sales and service rep for the west central Plains states. Hunter, based in San Marcos, Calif., sells irrigation products in 32 countries.

Griffin Corp. reports that nursery products treated with the company's Spin Out root growth regulator are now available to landscape contractors. The company says plants treated with the product establish quickly in the landscape and become fuller and healthier in less time. Spin Out inhibits the growth of the root tips when they reach the sides of the treated container, promoting lateral and secondary root growth.

9-10: Northern California Golf Superintendents Institute, Doubletree Hotel, Santa Rosa, Calif. Phone: (916) 626-0931.

12-15: Carolinas Golf Course Superintendents Conference & Show, Radisson Resort at Kingston Plantation, Myrtle Beach, S.C. Phone: (800) 476-4272 or (803) 653-3617.

13-Dec. 1: Accident Prevention/OHSA Compliance seminars, Toledo, Cincinnati, Columbus and Cleveland, Ohio; Baltimore, Md.; Arlington and Virginia Beach, Roanoke and Richmond, Va.; Charleston, W.Va. Phone for dates: (800) 821-3919 or (913) 345-2140.

16: Integrated Pest Management in Landscaping, Holiday Inn, Toms River, N.J. Phone: Deborah Smith-Fiola, (908) 349-1246.

16-18: Tree Care Industry Expo, Indiana Convention Center, Indianapolis. Phone: (800) 733-2622.

16-19: International Golf Show and Golf Course Europe, Pabellón de Cristal, Madrid, Spain. Phone: (011) 34-1 350-1564.

21: New Jersey Environmental Seminar, Fiddler's Elbow Country Club, Bedminster, N.J. Phone: Ilona Gray, (201) 595-7172.

27-29: North Central Turfgrass Expo, Pheasant Run Resort, St. Charles, Ill. Phone: Illinois Turfgrass Foundation, (312) 201-0101.

28-Dec. 15: Bargaining with Vendors and Suppliers seminars, Akron, Cleveland, Columbus, Cincinnati and Toledo, Ohio; Richmond and Virginia Beach, Va.; Washington, D.C.; Baltimore; Atlanta; Charlotte and Research Triangle Park, N.C.; Columbia, S.C. Phone for dates: (800) 255-4141.

29-30: Rhode Island Turfgrass Show & Conference, Rhode Island Convention Center, Providence. Phone: Melissa Herman, (401) 847-7666.

DECEMBER

1-7: National Arborist Association Regional Workshops, Atlanta, St. Louis and Portland, Ore. Phone: NAA, (800) 733-2622.

2: Profit Producing seminar, Holiday Inn, Rockville Centre, N.Y. Phone: Greenpro Services, (800) 645-6464.

4-5: Environmental Reporting and Recordkeeping, San Francisco, Calif. Phone: Government Institutes Inc., (301) 921-2345.

4-7: Georgia Turfgrass Conference, Atlanta. Phone: Dr. Gil Landry, (404) 228-7300.

5-8: Ohio Turfgrass Foundation Regional Conference & Show, Columbus, Ohio. Phone: (614) 261-6750.

6-7: Developing a Golf Course Community, Crystal Sands Crowne Plaza Resort, Hilton Head Island, S.C. Phone: (212) 661-8740.

6-8: Rocky Mountain Turf Conference & Trade Show, Currihan Hall, Denver. Phone: Julia Marie, (303) 688-3440.

8-9: Southern Turf & Landscape Expo, Central Florida Fairgrounds, Orlando, Fla. Phone: (800) 853-5593.

10-12: Restoration (landscape preservation) Conference, Hilton & Towers, San Francisco. Phone: (617) 933-9699.

11-13: Texas Turfgrass Conference & Show, Houston. Phone: Shirley Duble, (409) 693-1656.

11-13: Environmental Audits Course, Santa Fe, N.M. Phone: Government Institutes Inc., (301) 921-2345.

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The Model GC2 has several options: a grass catcher, a detachable control panel, a programmable auto backflush unit and a high-volume pressure wash station. Its H.I.P. Multi-Media filter is designed to safely absorb herbicides, insecticides and fungicides. Its flow rate is up to 16 gpm with a 750-gallon built-in polytank.

Circle 191



Power mulcher needs no technical adjustments

The easy-to-operate, patented direct drive design of the TM7-30 Power Mulcher from Reinco eliminates the need for the operator to make adjustments to belts or clutches.

The machine replaces manual distribution of straw and hay with an automatic discharge in ranges of up to 60 feet. The discharge chute rotates 360 degrees to assure even distribution of up to five tons per hour of any quality straw or hay. It features a heavy duty construction that is mounted onto a steel frame with a convenient lift ring, locking bracket and nest for easy transport.

Circle 193

Boom mower has new hydraulic system that's efficient, powerful

The Machete is the new generation of boom mowers, claims its manufacturer, Alamo. It is built stronger and has more power than any boom mower on the market today, Alamo says.

By using a closed-loop hydraulic system (rather than open-loop hydraulics), the entire system is more efficient and produces less heat. The piston pump and motor will achieve 96 percent efficiency, Alamo contends, because more energy is transmitted to the system's mechanical elements and less oil is lost to slippage.

The Machete's blade bar is reinforced with three 7/8-inch thick leaves, and the spindle housing is attached to the deck with eight 5/8-inch bolts.

The operator can control all boom movements with a single joystick and dipper arm. Other features: Teflon impregnated bearings, heavier hydraulic hoses, 1 1/2-inch chrome-plated pins at all pivot points on the boom and 17-gallon hydraulic fluid reserve tank.

Circle 192



Mower does slopes, 20 other work functions

The Power Trac 184 riding rotary mower, equipped with an 18 hp Briggs IC 2-cylinder gas engine, can mow up to a 30-degree slope with its 48-inch cutting deck.

Other features:

- More than 20 different attachments that can be changed within seconds using quick-change pins and hydraulic couplers. Attachments include: snow blade, trencher, post-hole digger, stump cutter, power sweeper, fertilizer and salt spreader, rake, tiller, 18-inch disc edger.

- Hydraulically-powered arms controlled by a joystick for lift and tilt functions.

- Two-toe treadle that controls forward and reverse functions. Hydrostatic breaking is applied when the treadle is in the center position.

- Ability to articulate 45 de-

grees in each direction and oscillate 12 degrees in each direction, ensuring that the wheels remain grounded, even in rough terrain.

Circle 194



Engine feeds power-hungry attachments to tractors

Bigger mowing decks, lawn vacuums, mulching mowers and snow blowers are just a few of the power-hungry attachments today's commercial tractors are being made to carry. Kohler's new vertical shaft Command 25 hp V-Twin engine is designed to

feed these increasing demands, without the overpowering bulk of a diesel or liquid-cooled engine.

The air-cooled Command 25 vertical is a blend of the Command 25 horizontal and the Command 22 vertical technologies.



The 725cc Command 25 vertical produces 39.5 lbs. ft. of torque (at 2500 rpm) and features Kohler's Power-Bore cylinders that give longer cylinder life, increased power, superior oil control and reduced exhaust emissions.

A specially-designed oil cooler helps maintain the lowest possible oil temperature, reducing oil breakdown during lengthy duty cycles and extending oil change intervals.

Circle 195



New aerator is faster and wider

Turfco Manufacturing's new Pro Series Aerator is wider with eight rows of tines to give you excellent hillside stability. Yet the balance and controls make it easier to operate, Turfco says.

The Pro Series has sealed bearings, solid steel axles, covered chain, box frame and

separate throttle/clutch controls. Chain maintenance is reduced to twice a season, and the self-aligning bearings are ag quality for long life.

The Pro Series Aerator has the most dense aeration pattern for an aerator of this design.

Circle 196

Correction

In the August product announcement for the Lady Bug all-purpose turf and ornamental spray machine, two errors were made.

First, application rates can be attained by changing nozzles, pressure or speed (not "speed of spray"). Second, quick engine checks can be made by removing the rear reel (not the rear wheel).

LM regrets any inconveniences these errors may have caused.

>PRODUCT REVIEW

Ten ways to add vertical shaft power, quick starts, proper speeds



All 10 models Centura Power Plus vertical shaft engines from Tecumseh Products feature a quick-start fuel primer and an electronic capacitor discharge ignition system for quick starts with lower pulling speeds. A mechanical governor adjusts mowing speed to cutting loads.

In addition, the Centura line offers these features on specific models:

Model 35 includes a conical paper air filter system.

Model 38 features an automotive style oil fill tube, dipstick and trim ring.

Models 40 and 40 Special have a

ramp compression release. Model 40 also has a deluxe styled recoil trim ring. Models 40DX and 45DX have a retractable pin compression release, special dipstick anastylized fuel tank.

Models 50 and 55LX have a two-stage paper oval air cleaner system and a sculptured 1.5-quart wrap-around fuel tank with high oil fill and dipstick.

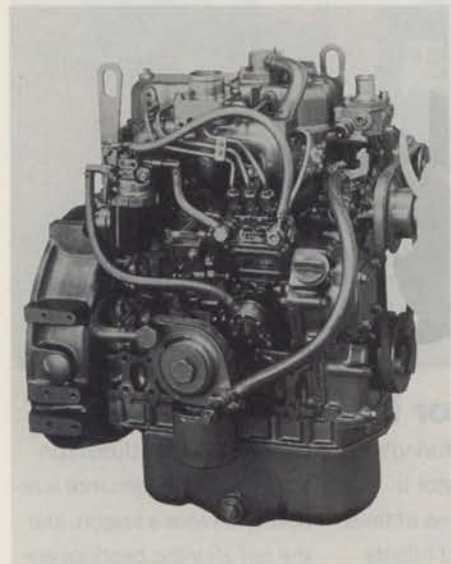
Models 50 XL/C and 55XL/C are extra-life commercial models. The LEV inverted port engines have a cast iron cylinder sleeve and a three-stage air cleaner with poly foam pre-cleaner.

Circle 197

Clean, quiet engines environmentally safe, even with high horsepower

A complete series of advanced design industrial diesel engines named Clean and Silent (C&S) is manufactured by Yanmar Diesel America.

The new TNE series engines were developed to meet the environmental requirements of the 1990s. Based on the company's



former TN diesel range, the TNE series consists of 10 different bore-and-stroke, four-cycle, water-cooled families with horsepower ranges from 11.7 to 62 and speeds from 3000 to 3600 rpm.

The complete TNE range delivers both low levels of exhaust and noise emissions; all models under 25 hp are certified to

1995 CARB emissions standards. Low weight-to-horsepower ratios are another feature, along with a 10 percent increase in output per cylinder over TN engines.

To achieve the improved, certifiable levels of emissions performance, increased power density and low noise levels, Yanmar's

engineering teams made major design changes. Result: noise emissions reduced more than 3 dB(A) on the predominantly direct injection engines.

Circle 198

Competitively-priced irrigation controller powered by old Sol

The all-new Trope-M solar-powered irrigation controller is a six-valve control that is now priced competitively with standard AC units.

Only three rotary knobs permanently set all watering functions. The hybrid design also incorporates a digital readout for

time and time remaining for watering. Among the knob selections are odd/even days; water, wait, water (WWW) and budgeting.

The Trope-M is stocked by selected irrigation distributors nationwide.

Circle 199



Tough terrain off-road hauler a great runabout

The J-93 Hauler from Kimball Products is designed for tough-terrain hauling and maintenance work. It's an ideal run-about vehicle for race tracks, parks, campgrounds and construction sites, the company says.

The J-93 is powered by a Briggs & Stratton 16 hp overhead valve twin engine coupled to a three-speed transmission with infinite speed ranges in all three gears.

The machine has a 49x40x11-inch deep dump box capable of handling up to 700 lbs. The double-acting dump box tailgate extends for longer loads, opens for faster unloading. An optional power dump is available.

Options include all-weather vinyl cap, dozer blade, utility winch, all-terrain Stryker tires, Turf Buster tires for lawns and golf fairways, re-coil starter and internal, front-expanding hydraulic drum brakes.

Circle 209



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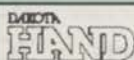
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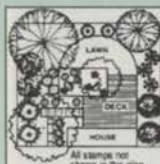
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Hillenmeyer Nurseries, a premier 150 year-old landscape company located in beautiful Lexington, Kentucky is in need of a top-notch floriculturist to design imaginative color beds, and oversee planting and flower maintenance. A floriculture or related degree and 4 years experience with annuals, perennials and ornamental grasses is desirable. Send resumes to Bruce at 2370 Sandersville Rd., Lexington, KY 40511. EOE 12/95

Atlantic Landscapes Opportunities: We are currently seeking key people to work interior and/or exterior. We offer competitive salary, excellent benefits and unlimited opportunities in our: Richmond, VA; Hampton Road, Virginia Beach, VA; and Research Triangle, Raleigh, NC offices. Please call, fax or mail us a resume. Atlantic Landscapes, 1400B Nowell Rd., Raleigh, NC 26717. Phone 919-233-2930. Fax 919-233-2941. 11/95

MAINTENANCE MANAGERS & SUPERVISORS: One of the nation's largest and fastest growing full service landscape companies has an immediate need for experienced maintenance managers and superintendents, as well as entry level maintenance supervisors in the Midwest, Southwest, Mid-Atlantic, Northeast and Southeast states. The company seeks energetic, team oriented college graduates with proven leadership, communication and interpersonal skills. The company offers full-time positions, excellent advancement opportunities and exceptional compensation and benefits with an industry leader celebrating more than 50 years of uncompromising customer service. For immediate confidential consideration, please send or fax your resume to: The Brickman Group, Ltd., Corporate Office, 375 S. Flowers Mill Road, Langhorne, PA 19047, 215-757-9630, EOE 11/95

MAINTENANCE SUPERVISORS, ACCOUNT MANAGERS; One of the nation's largest landscape management companies looking for experienced maintenance and irrigation supervisors in No. California market. We're seeking energetic, creative, team oriented people. Excellent growth opportunities and benefits package. Please mail or fax resume to: Environmental Care, Inc., 825 Mabury Rd., San Jose, CA 95133. Fax (408)437-1817. 11/95

Landscape Maintenance Foreman-KT Enterprises, Inc., a large Northern VA landscaping firm, is currently seeking highly qualified individuals to supervise within our commercial maintenance division. Candidates must have strong supervisory skills, solid horticulture background. CDL licensing and certified pesticide applicator license. Excellent wages, complete benefit package, 401(k) retirement plan and unlimited advancement. Submit resume with salary history to: Human Resources Department, 4001 Westfax Drive, Chantilly, VA 22021. (703)222-0449, fax (703)222-0578. EEO/AAP 11/95

LANDSCAPE DESIGN Come join Hermes Landscaping and be among the best. Our designers have been providing top quality design services for residential and commercial properties in Kansas City for over 30 years and we are currently seeking talented individuals to join our team. Responsibilities include all aspects of design, sales and project management. Excellent earning potential plus full benefits. If interested please call or send resume to Tracy Strohm at Hermes Landscaping, Inc., 12421 Santa Fe Trail Drive, Lenexa, Kansas 66215. (913)88-2400 EOE. 11/95

Landscape Installation and Maintenance Award winning regional based company seeking quality supervisors and foremen with leadership skills for our Columbus branch. Experience in grounds maintenance and/or installation a must. Small engine repair knowledge, lawn and tree care license, or irrigation experience a plus. These year round positions are available for immediate start. We offer top pay, medical and dental benefits, 401k and more. Send resume to **PROLAWN PROSCAPE**, 11488 Deerfield Rd., Blue Ash, Ohio 45242. 11/95

Looking for the right opportunity? Join a winning team in Cleveland and Columbus, Ohio. If your expertise is Landscape Architecture, Design or Maintenance Sales, Estimating or Supervision, send us your resume or call (216)357-8400. Yardmaster Landscape Architects and Contractors, 1447 N. Ridge Road, Painesville, Ohio 44077. 12/95

Wanted: Turfgrass specialist or qualified salesman with more than three years sales experience to cover the Midwest for a leading nationwide turfgrass company. Serious inquiries write or fax Rick Myers at 1490 Industrial Way, S.W., Albany, OR 97321-3372. (503)926-0665. 11/95

Searching for the right employee? Time for a new position? Contact **Florapersonnel, Inc.,** international search and placement firm for the landscape, irrigation industries and allied trades. **Confidential. Fee paid by employer.** Florapersonnel, Inc., 2180 W. 434, Suite 6152, Longwood, FL 32779-5008. Phone: (407)682-5151 Fax: (407)682-2318. TF

Reserve Ad Space in The Next Issue by calling Stephanie Stiggers-Smith: 216-891-2670

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I would like to receive (continue receiving)

LANDSCAPE MANAGEMENT each month: Yes no

Signature: _____ Date: _____

1. MY PRIMARY BUSINESS AT THIS LOCATION IS: (check only ONE in either A, B or C)

A. LANDSCAPING/GROUND CARE AT ONE OF THE FOLLOWING TYPES OF FACILITIES:

- | | |
|--|---|
| 0005 <input type="checkbox"/> Golf Courses | 0040 <input type="checkbox"/> Private/Public Estates & Museums |
| 0010 <input type="checkbox"/> Sport Complexes | 0045 <input type="checkbox"/> Condominiums/Apartments/Housing Developments/Hotels/Resorts |
| 0015 <input type="checkbox"/> Parks | 0050 <input type="checkbox"/> Cemeteries/Memorial Gardens |
| 0020 <input type="checkbox"/> Rights-Of-Way, Maintenance for
Highways/Railroads & Utilities | 0055 <input type="checkbox"/> Hospital/Health Care Institutions |
| 0025 <input type="checkbox"/> Schools, Colleges & Universities | 0060 <input type="checkbox"/> Military Installations & Prisons |
| 0030 <input type="checkbox"/> Industrial & Office Parks/Plants | 0065 <input type="checkbox"/> Airports |
| 0035 <input type="checkbox"/> Shopping Centers, Plazas & Malls | 0070 <input type="checkbox"/> Municipal Government/Municipal Facilities |
| | <input type="checkbox"/> Other (please specify) _____ |

B. CONTRACTORS/SERVICE COMPANIES/CONSULTANTS:

- | | |
|--|---|
| 0105 <input type="checkbox"/> Landscape Contractors (Installation & Maintenance) | 0125 <input type="checkbox"/> Landscape Architects |
| 0110 <input type="checkbox"/> Lawn Care Service Companies | 0130 <input type="checkbox"/> Land Reclamation & Erosion Control |
| 0112 <input type="checkbox"/> Custom Chemical Applicators (Ground & Air) | 0135 <input type="checkbox"/> Extension Agents/Consultants for Horticulture |
| 0120 <input type="checkbox"/> Tree Service Companies/Arborists | 0140 <input type="checkbox"/> Irrigation Contractors |
| | <input type="checkbox"/> Other Contractor or Service _____ |

C. SUPPLIERS:

- 0210 Sod Growers, Turf Seed Growers & Nurseries
0215 Dealers, Distributors, Formulators & Brokers
0220 Manufacturers

2. WHICH OF THE FOLLOWING BEST DESCRIBES YOUR TITLE? (check ONE only)

- 10 EXECUTIVE/ADMINISTRATOR: President, Owner, Partner, Director, General Manager, Chairman of the Board, Purchasing Agent, Director of Physical Plant
20 MANAGER/SUPERINTENDENT: Arborist, Architect, Landscape/Ground Manager, Superintendent, Foreman, Supervisor
30 GOVERNMENT OFFICIAL: Government Commissioner, Agent, Other Government Official
40 SPECIALIST: Forester, Consultant, Agronomist, Pilot, Instructor, Researcher, Horticulturist, Certified Specialist
50 OTHER TITLED AND NON-TITLED PERSONNEL: (please specify) _____

3. SERVICES PERFORMED: (check ALL that apply)

- | | |
|---|--|
| A <input type="checkbox"/> Mowing | I <input type="checkbox"/> Landscape/Golf Design |
| B <input type="checkbox"/> Turf Insect Control | J <input type="checkbox"/> Turf Weed Control |
| C <input type="checkbox"/> Tree Care | K <input type="checkbox"/> Paving, Deck & Patio Installation |
| D <input type="checkbox"/> Turf Aeration | L <input type="checkbox"/> Pond/Lake Care |
| E <input type="checkbox"/> Irrigation Services | M <input type="checkbox"/> Landscape Installation |
| F <input type="checkbox"/> Turf Fertilization | N <input type="checkbox"/> Snow Removal |
| G <input type="checkbox"/> Turf Disease Control | O <input type="checkbox"/> Other (please specify) _____ |
| H <input type="checkbox"/> Ornamental Care | |

4. WHAT IS YOUR ANNUAL BUDGET FOR EQUIPMENT, CHEMICALS, SUPPLIES? (please check one)

- 1 Less than \$50,000 4 \$250,001-\$500,000
2 \$50,000-\$100,000 5 More than \$500,000
3 \$100,001-\$250,000

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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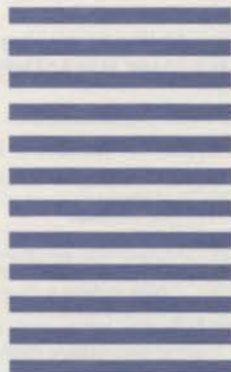
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HAVE A SALES REP CALL ME 18 (A)

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Signature: _____ Date: _____

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