

# LAWN AND LANDSCAPE MAINTENANCE

JULY 1989 • \$2.50

## Fullcare Targets Multi-Property Clientele

*Commercial/Industrial  
Accounts the Mainstay  
of this Louisville  
Maintenance Company*

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HOW MANY LAWN AND LANDSCAPE maintenance businesses really know what it costs to perform their mowing services? Or any service for that matter?

It can be a tricky procedure, but one vital to any successful operation. A lack of understanding in the area of total service costs, i.e., equipment, manpower, insurance, inflation, replacement equipment, etc. is probably the leading contributor to the rampant underpricing found in most lawn and landscape maintenance markets.

Before starting out, business operators must be aware of every cost they will incur, from the initial cost of the mower to workmen's compensation insurance. Unfortunately, this sort of knowledge isn't prevalent in our industry.

"I don't know how many people I've seen come into this business, wear out their equipment, can't get new ones and go out of business," said David Fuller, president of Fullcare, Louisville, Ky.



"You've got to understand that stuff will wear out and be able to calculate when it's going to start costing you more money than it's worth."

To reverse this lack of understanding,

education is needed. In this issue, R.K. Reynolds from Virginia Polytechnic Institute and State University, shares some procedures every business operator can use to get a good estimate of mowing costs. Examples of how to estimate equipment and labor costs are included.

Mowing costs won't be the same for any two companies. It's up to each individual operator to find out what his true costs are; it's probably more than you think.

\*\*\*

Beginning with this issue, *ALA/Maintenance* will be known as *Lawn and Landscape Maintenance* magazine. The fine-tuning of our name coincides with the rapid pace in which the industry is expanding into the full-service market.

*Lawn and Landscape Maintenance* will continue to serve the industry as it has for the last 10 years bringing our readers timely business and technically oriented information. — *Cindy Code*

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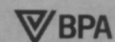
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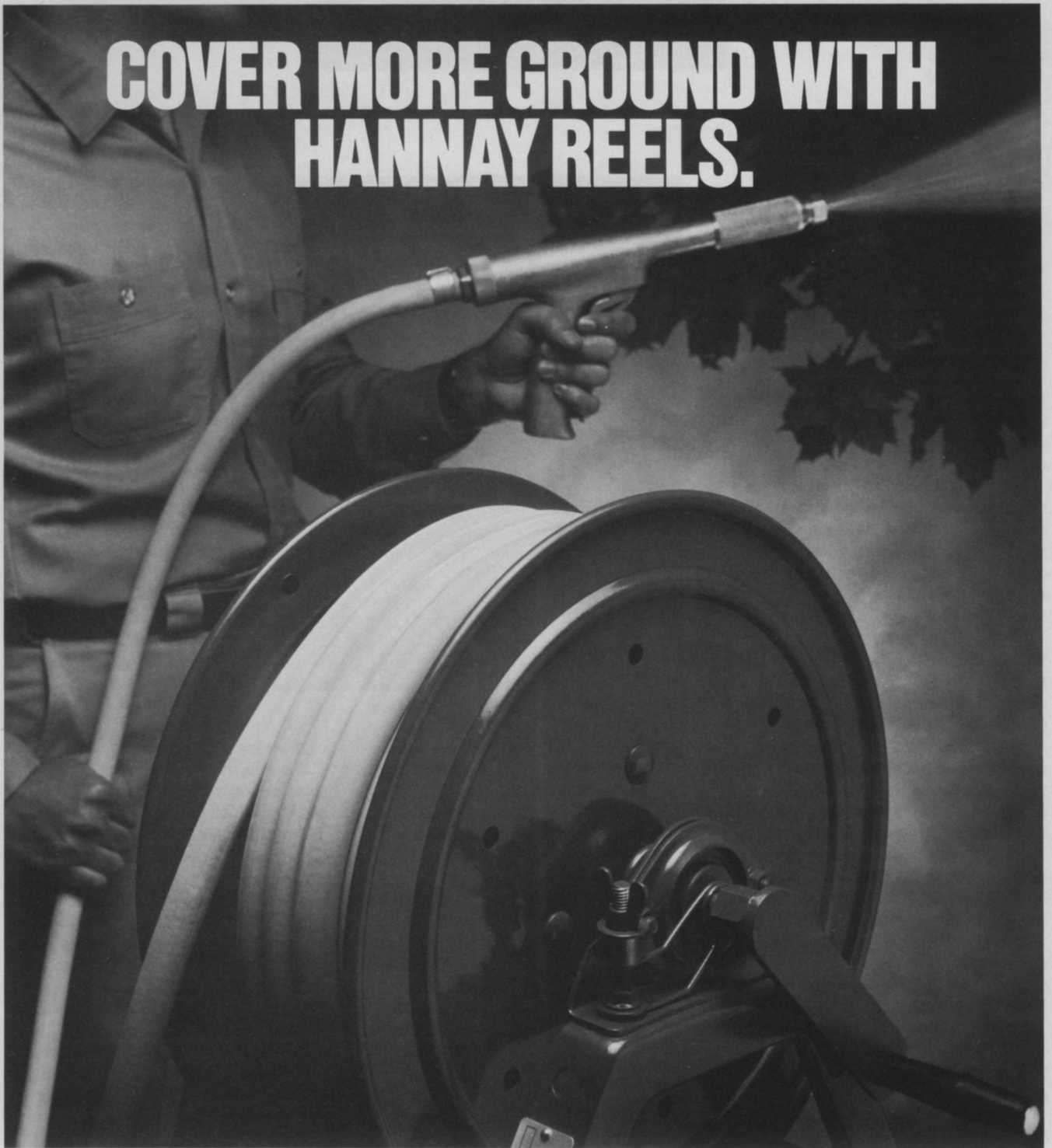


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## MULCHING VS. BAGGING: 3-YEAR STUDY UNDER WAY

Bolens Corp., Port Washington, Wis., and the Rodale Research Center, Kutztown, Penn., have begun an extensive three-year test program to measure the nitrogen and nutrient soil levels after repeated grass cuttings.

The test will also determine the nutrient benefits of returning grass clippings to the soil with a mulching mower vs. the collection and bagging of clippings with a conventional walk-behind mower.

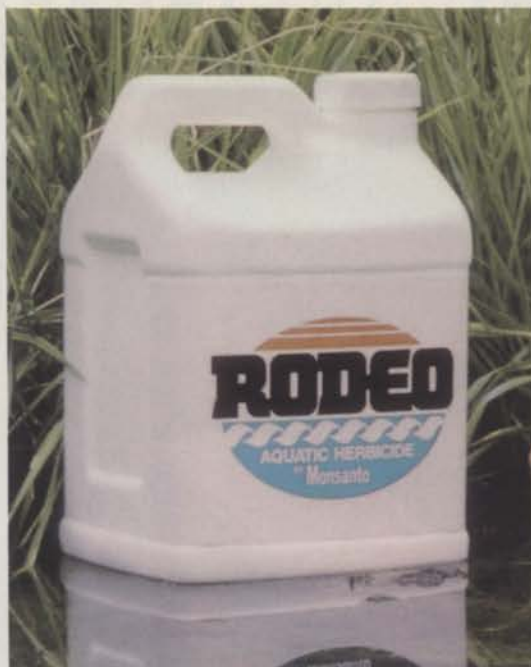
"Bolens and Rodale have agreed to run this experiment because the disposal of grass clippings has become a major environmental concern for communities all across the country, and we both believe a mulching mower can offer a very viable and effective solution," said Tom Wellnitz, Bolens product manager. "We wanted to objectively and quantitatively verify previous assertions that mulching returns increased nitrogen and nutrients to the soil."

Bolens introduced the first mulching mower more than 20 years ago. Many of the findings about the benefits of mulching have been based on a Michigan State University study conducted in 1972-74. Those tests revealed that mulching produces a generally greener and healthier lawn because mulch particles decompose and are absorbed by the grass root system within 14 days. It was found that mulch returns nutrients to the soil and allows evaporation at the soil level without adding to thatch buildup.

The tests will be held at the research center's 305-acre facility in Kutztown, Penn. They will be monitored for three growing seasons.

Two identical grass-covered plots have been set aside for the program. They will be mowed (the grass cut at specific heights) on a weekly basis — one with a Bolens walk-behind mulching mower and the other with a Bolens walk-behind rear bagging model, with its collection bag attached. Intermediate and deep soil cores will be taken before and after each growing season and analyzed for leaching, nitrogen and other mineral and nutrient activity levels by the center staff and by Pennsylvania State University.

Progress reports will be issued periodically. Results of the test are expected to provide the industry with more definitive information on the use of mulching mowers.



EPA restriction lifted from Rodeo® herbicide.

"We want to find out what happens to the soil at different times and under different conditions," Kauffman said. "Nitrogen is a very volatile element and is always changing. Therefore, we will monitor the test results at different times of the year. We also want to know if a mulched lawn is better at withstanding a drought than a lawn with clippings removed."

Industry sales figures show that mulching mowers are again gaining popularity.

According to Bolens, a lawn mower designed for mulching must have a deep mowing deck and use a specially engineered multi-pitch blade. The blade and deck combine to create air suction to hold grass upright and, once cut, to suspend the clippings in the mower chamber while repeatedly chopping them into finer particles. These smaller particles are then blown deep into the turf near the soil level where they decompose quickly.

A conventional side discharge mower, on the other hand, blows clippings horizontally onto the lawn rather than forcing them down into the turf.

## EPA LIFTS RESTRICTION FROM RODEO HERBICIDE

The restriction for applying Rodeo® herbicide to estuaries has been removed from the label by the Environmental Protection Agency.

Agency.

Rodeo can now be used in areas where fresh water, such as a river, runs into sea water. Studies show that there are only minute residues of Rodeo in edible shell fish that grow in estuary situations.

Rodeo, made by Monsanto Company, is designed to control most emerged grasses, broadleaf weeds and brush growing in and around aquatic sites.

## GALLERY REGISTERED FOR BROADLEAF CONTROL

Gallery™ 75 Dry Flowable from Elanco Products Co. has received federal Environmental Protection Agency registration for use on certain broadleaf weeds and annual grass in established warm and cool season turf.

The selective preemergence herbicide contains a new chemical compound called isoxaben which controls annual grass and 44 broadleaf weeds, including chickweed, henbit, plantain, purslane, oxalis, spurge and white clover.

Gallery's dry flowable formulation mixes easily with water and is compatible with many other turf chemicals, so it can be tank mixed for control of species listed on the respective labels. Recommended use rates vary depending on the weed species.

Gallery is stable on the soil surface, but must be activated by ½ inch of rainfall or irrigation within 21 days. Application should be made in the spring or in the fall before weed emergence.

Gallery is also labeled for use on trees, ornamental shrubs and ground covers. Refer to the label for the ornamental species where Gallery can be applied.

For more information contact Elanco toll-free at 800/352-6776.

## SHORT VICTORY FOR N.Y. PESTICIDE APPLICATORS

The recent court victory for lawn maintenance operators in New York was short, as pesticide applicators now find themselves subject to several notification

(continued on page 8)



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requirements.

Shortly after State Supreme Court Judge Paul Cheeseman struck down controversial pesticide notification regulations, he signed an amended order enacting two regulations which he had previously deemed illegal, according to Tom West, an attorney representing the green industry in New York.

The two regulations reinstated were: signs posted after applications must meet specific sizes varying with the distances they are posted, and cover sheets which must contain specific information on the pesticides being applied must be provided.

The two regulations apply only to the lawn maintenance industry, not the structural pest control market or the agricultural industry, two of the industries which had united with the turf industry in its fight against the Department of Environmental Conservation.

Signs posted within 75-foot intervals must be 5½ by 8½ inches; within 100-foot intervals must be 8½ by 11 inches; and within 150-foot intervals must be 12 by 12 inches. All signs previously measured about 4 by 5 inches.

Cheeseman had originally ruled that the DEC had exceeded its legislative authority in promulgating the regulations, going beyond the authority extended by the law. He said the notification regulations "would not in any way enhance public safety."

The about-face, however, came as the state tried to work out a settlement agreement with Cheeseman, resulting in the partial rescindment of his decision. According to West, the judge felt the two provisions were relative to the lawn maintenance industry and deemed them legal.

All was not lost, however. "One major victory was maintained," West said. "Under the original notifications, the lawn care industry had to comply with the general and specific requirements. Now they no longer have to comply with both."

### NOTIFICATION REGULATIONS APPROVED IN OHIO

Notification regulations for commercial pesticide applicators in Ohio are now in effect. Homeowners and do-it-yourselfers are not included in the legislation.

The regulations were adopted by the Ohio Department of Agriculture after one

year of public hearings and meetings with pesticide applicators, environmental groups and government officials. The regulations went into effect June 1.

Major provisions of the new regulations require applicators to:

- Post signs of any size and construction in residential yards following treatment.
- Must notify abutting property owners — only those who specifically request such notice — of an application one business day prior to the application.
- Must leave certain information with their customers, including the brand name and type of pesticide, the application rate and the date and time of the application. ■

### CLARIFICATION

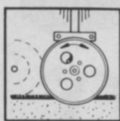
The optimum time of year to fertilize trees is in the spring or fall when active root growth is taking place. At other times, roots may not be actively growing, but are still able to absorb the nutrients from fertilizers, except when the soil is frozen, according to The Davey Tree Expert Co. In many cases, Davey Tree fertilizes year-round rather than specified time periods as was reported in the May issue.

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Right Angle Blade

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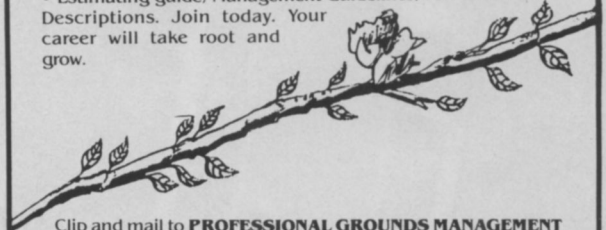
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# Gateway to the '90s

Join the landscape professionals at the 1989 Green Team Conference and Trade Show, "Gateway to the '90s." This four-day event is your entree to a two-day exhibition of the industry's finest products and services. "Gateway to the '90s" is sponsored by the Associated Landscape Contractors of America and the Professional Grounds Management Society and features three full days of educational programs that:

- give you the most up-to-date information on horticultural practices, management techniques and business matters.
- examine in detail subjects ranging from landscape design/build and hydroseeding to sales and contract techniques.

It's four days filled with opportunities to learn — to socialize — to exchange ideas — to see and enjoy. Plan to attend.

## Green Team Conference and Trade Show

November 9-12, 1989 ■ St. Louis, Missouri  
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*Need more information on the 1989 Green Team Conference and Trade Show?*

Contact

**ALCA**

Associated Landscape Contractors of America  
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*See You In St. Louis!*



JOSEPH BAIDY, ACACIA COUNTRY Club, Lyndhurst, Ohio, was re-elected president of the **Pennsylvania Turfgrass Council**. Baidy has been the golf course superintendent at Acacia Country Club since 1986. He has been a member of the board of directors since 1982, and has served as first and second vice-president.

Dennis Watkins, Lords Valley Country Club, Hawley, Penn., was re-elected first vice-president. Watkins has been the golf course superintendent at Lords Valley since 1985. He has been a member of the board of directors since 1983.

Charles Cadiz Jr., Eagle Lodge Country Club, Lafayette Hill, Penn., was re-elected second vice-president. Cadiz has been the golf course superintendent at Eagle Lodge since 1981. He has served as a member of the board of directors since 1980.

R. William Marberger, Lebanon Total Turf Care, Lebanon, Penn., is the past-president. Marberger served as president of the council from 1986-87.

Sixteen colleges and universities from across the country participated in the **Associated Landscape Contractors of America's** 13th Annual Student Field Days at the Milwaukee Area Technical College.

The three-day event featured 21 competitive events in which more than 200 students from across the country participated.

The hosting college for next year's ALCA Student Field Days is Colorado State University located in Fort Collins, Colorado. The dates are April 6-8.

John Cable, Valley Crest Landscape Inc., is the 11th landscape professional to receive Colorado's coveted Bob Cannon Award. Cable was recently honored at an excellence in landscape awards banquet in conjunction with the **Associated**

## Landscape Contractors of Colorado Landscape Industry Conference and Trade Show.

According to members of the selection committee, at least two dozen individuals were considered for the distinction. Cable was chosen, among other reasons, for his honesty and integrity.

Cable is a vice president of the Valley Crest Landscape Corp., headquartered in California. He also functions as branch manager of the Colorado branch of Valley Crest, located in Parker. As manager, Cable oversees all operations for one of the largest landscape contracting companies in the state.

ALCC's award is named for the late Bob Cannon, first president of ALCC and one of the organization's founders.

**The Indiana State Lawn Care Association** will hold its first conference and trade show Nov. 14-15, at the Indiana State Fairgrounds, Indianapolis.

The show will offer both formal indoor exhibit space as well as a large outdoor demonstration area. Seminars for all segments of the turf industry will be scheduled. An auction will also be held to raise money for turf research at Purdue University.

Established in 1987, the association now has more than 170 active member firms.

Beginning this month, the association will conduct a series of three related seminars addressing the problem of employee retention and turnover. These seminars will concentrate on employee motivation, management skills, installation incentives and proper recruiting.

One of the few states to do so, the association has been active in training new turf pesticide applicators. Indiana requires commercial applicators to pass a workbook examination be-

fore being certified to apply pesticides. The ISLCA conducts regular training and testing sessions throughout the state in cooperation with the Indiana State Chemist.

The annual Arbor Day dedication of a sugar maple tree at the Governors' Grove was recently held at the executive mansion, Albany, N.Y.

Representatives of the state Department of Environmental Conservation, the **New York State Arborists Association** and the **New York State Nurserymen's Association** attended the ceremony.

The International Society of Arboriculture Gold Leaf Award was presented to Margaret Herbst, longtime executive secretary of both NYSAA and NYSNA. The idea for the Governors' Grove and the dedication ceremony began with Herbst more than 10 years ago.

The Oldest Identified Arbor Day Tree in New York State Award was presented to officials of the Chatham School District. A red oak, planted at the high school on Arbor Day in 1902, has been identified as an official Arbor Day tree.

The Landscape Industry Show celebrated its 10th anniversary with record high temperatures and a record number of exhibitors at the Long Beach Convention Center, California.

This year's show, sponsored by the **California Landscape Contractors Association**, included 22,000 added feet of space (more than 65,000 total), housing 50 percent more booths than in 1988. More than 1,800 people were registered during the first two hours on opening day, bringing the first day's attendance to nearly 3,000. Attendance dipped the next day when convention center access roads were closed due to a conflicting event in the area.

Weather-Matic of Dallas, Texas, was deemed "Best of Show" in the exhibit judging which took place on opening day. Other category winners were: Haws Ornamental Stone, Berkeley (10-by-10 feet); de Santana Fountains, Redwood City (10-by-20 feet); Hillcrest Trees, Corona (20-by-20 feet); Solatrol, San Diego (20-by-30 feet); and Pacific Equipment and Irrigation, Industry (30-by-30 feet).

The 1990 show will be April 26-27. ■

## FOR MORE INFORMATION...

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## NORTH AMERICA'S FIRST LANDSCAPE DESIGN CENTER TO OPEN MIDSUMMER

THE FIRST OUTDOOR LANDSCAPE design center in North America will open this summer in San Diego, Calif.

The two-acre facility will initially hold 75 permanent exhibits set in a permanent system of pathways and waterways. It has the potential to hold 150 exhibits in which manufacturers and service providers among others can display their products and services.

The Landscape Exposition offers year-round exposure to qualified professionals. A grand opening celebration is tentatively scheduled for mid-October.

The center will serve as an adjunct to the soon-to-be-opened San Diego Design Center which will house 75 showrooms, three stories and 342,000 square feet.

The \$45 million San Diego facility features furniture, fixtures and fabric showrooms and will represent a focal point for Southern California's architecture and interior design specifying communities. The Landscape Exposition will occupy land adjacent to the Design Center.

"We've received an enthusiastic response from landscape architects and contractors as well as from professional associations and manufacturers," said Barbara Pressman marketing director of Landscape Exposition. "It's a one-stop method

for specifying products. Everything's under one 'roof'; you can compare products from many different companies."

The Calabasas, Calif.-based landscape architecture firm is designing the outdoor center in collaboration with McKellar Development of La Jolla.

Before planning the landscape design center, The L.A. Group conducted a market study to test potential interest. The idea was later presented to leading landscape architects, contractors and other industry representatives.

It's estimated that between 1,500 and 2,000 landscape architects and contractors live within an hour's drive of the center.

"It's a one-of-a-kind design center and San Diego is a spot attractive to people," she said. "Statistics indicate that the world's largest concentration of landscape architects are in Southern California."

Three types of exhibits will be available: window displays, kiosks and parterres. Display areas will be separated from one another by landscaped buffers and plantings.

The six feet by eight feet by 18-inch window display will enable exhibitors to graphically promote products or services that may not lend themselves to in-ground displays. The kiosks, which can

be triangular or square with side panels averaging about three feet by eight feet, give the exhibitor an opportunity to present a graphic display or video tape — whichever they prefer.

The parterres, which can take on a variety of shapes and sizes, give the exhibitor the most leeway in designing a unique space for their product. This space must contain 30 percent planted material. Exhibits can be changed as often as the exhibitor likes although the design is subject to approval by Landscape Exposition to avoid hurried-looking exhibits.

The cost of a window display runs from \$275 to \$300 per month, kiosks run from \$375 to \$550 per month and parterres run from \$500 to \$1,000 per month over a three- to five-year term.

Nearly 20 percent of the project's first phase is already reserved and that number is expected to double by midsummer, Pressman said. In fact, the center is already sold out of the \$500-range parterres.

Early exhibitors include those offering paving, lighting, edging, irrigation and site furnishings among others.

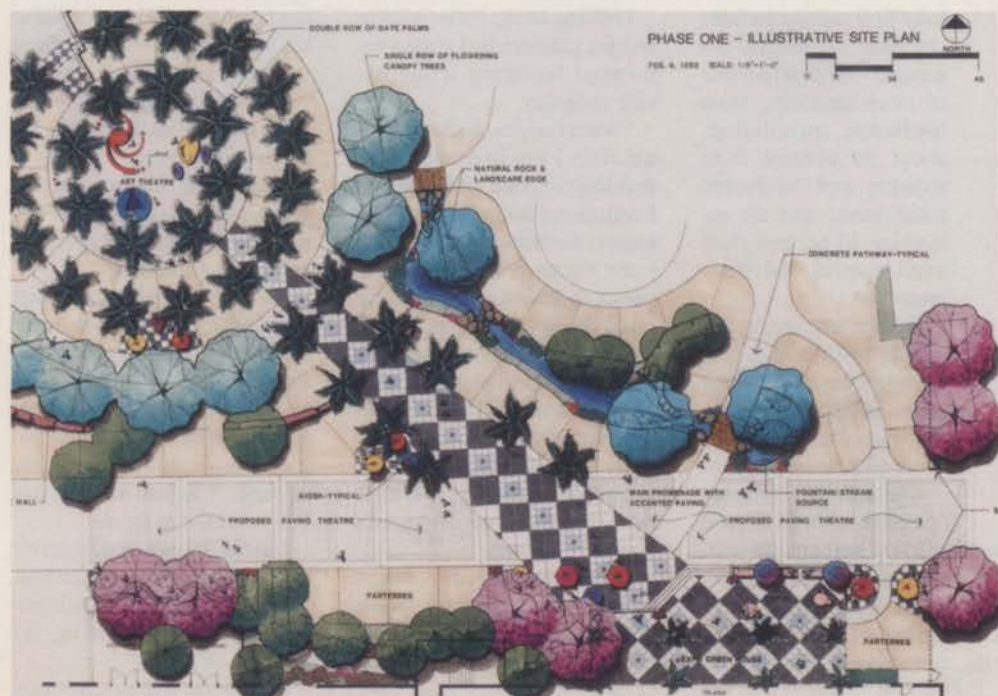
Other activities at the Landscape Exposition include: professional seminars, continuing education for students and professionals, quarterly events in the design center atrium and new product introductions/demonstrations.

Themed garden theaters featuring garden art and outdoor sculptures by well-known artists will be featured throughout. The temporary theater areas will consist of exhibits ranging from artwork and streetscaping to paving and waterscaping. They will be changed quarterly. One theater will be devoted solely to artwork and will be changed monthly.

The Landscape Exposition's professional service team, and a unique acoustic guide system, eliminate the need for individual staffing of exhibits.

For more information contact: Barbara Pressman, Landscape Exposition, 4764 Park Granada, Calabasas, Calif. 91302; 818/999-2095.

**125 on reader service card**



An illustrative site plan of the soon-to-be-opened Landscape Exposition.



# Commercial/Industrial Accounts Fullcare's Mainstay

**D**AVID FULLER NEVER harbored "illusions of grandeur." All he wanted was to work in the industry he had such passion for. His current professional status stems from a medley of background experiences, but it was his need to be challenged that pushed him full force into the lawn and landscape maintenance industry.

Ten years ago, Fuller was employed by South Central Bell as an energy coordinator in charge of building and lawn maintenance for more than 500 buildings in Kentucky.

Today at the age of 43, he is the full-time president of Fullcare Inc., a Louisville, Ky.-based lawn and landscape maintenance company and is completing his second full year on the board of directors of the Professional Lawn Care Association of America.

The company reached a lofty \$1.9 million in sales last year — despite the drought — with 60 percent of sales stemming from landscape installation, about 30 percent from mowing and landscape maintenance and the remaining 10 percent from weed control and snow removal.

The previous year's sales were \$900,000, a 35 percent increase over 1986. At that time, landscape maintenance accounts represented about 50 percent of sales.

Although the company completed about \$200,000 worth of irrigation work last year, the work was done through subcontractors. It may, however, be the company's next in-house service, according to Fuller.

Fuller first ventured into the lawn and landscape maintenance

industry in 1979 when he paid \$5,500 for M & D Spraying Service, Scottsburg, Ind. After renaming it Fullcare Chemical Lawn Service, the firm quickly doubled its customers and expanded to serve four nearby cities. A year later, the firm purchased Bluegrass Lawn Care of Louisville.

The flavor of the company began to change in 1981 when Fuller brought in two partners who maintained ownership interest and ran the company while Fuller remained with South Central Bell.

Next, the business trio purchased Lawn-Aid Inc., Louisville. It was an acquisition designed to make them more full-service oriented through the addition of mowing, landscape maintenance and snow removal — a buy out which complemented Fullcare's steady lawn fertilization business.

Looking back, Fuller said he and his partners had always anticipated becoming a full-service company.

"When I worked for South Central Bell, I was in charge of the building program for Kentucky; I contracted for building maintenance services for the state. So I saw the need for larger companies to have a contractor that could do more than one thing," Fuller said. "The more services he could perform adequately, the more attractive he'd be to a bigger company. That was my theory then, and it still is, that we develop a company here that's going to serve a lot of needs to a small number of clients."

Today, Fuller's client list ranges from 100 to 120 companies. Some of these are locations that are multiply owned by an individual or partnership.

The relatively small client list,

however, demands a lot of attention. Our Lady of Peace Hospital, about 83 acres, is one of the company's largest and most difficult to maintain because a large part of the property is on steep slopes. Another large property, a manufacturing facility in Shepleyville, runs about 60 acres.

Other clients include Blue Cross Blue Shield of Kentucky, Hannan Oldsmobile, Hillcreek Manor Nursing Home, Jefferson Mall, Mallgate Apartments, PepsiCo and the Xerox Building.

"We just don't have a big client base as compared to a chemical lawn care company where 5,000 accounts would be mediocre," he said. "We want to be able to do more things for the same customer."

The young company continued to grow until April 1982; Fullcare was struggling and Fuller's partners had left the firm. For the next 12 months, Fuller operated the company while maintaining his full-time job with the phone company.

Eventually, Fullcare won Fuller's complete interest and he left his job at the phone company to try and make his maintenance company a success. In June 1983, he joined Fullcare as president and general manager.

Shortly thereafter, the firm bought the assets of Nationwide Lawn Care Co., a division of Nationwide Pest Control Co., Louisville. Fuller expected this to generate more than \$60,000 in gross sales annually on the strength of its two vehicles and 500 fertilizer accounts.

Instead, he was faced with extremely dry weather conditions, not unlike what most of the country experienced during the Drought of 1988.

Despite the weather, revenues for 1983 were \$371,000, an in-



## FULLCARE INC.

Headquarters:  
Louisville, Ky.

Founded: 1979

**Owners:** David Fuller and six outside investors.

**Primary Services:** Lawn and landscape maintenance including mowing, trimming, fertilization, weed control, aeration, seeding, insect and disease control and edging; landscape design/installation; snow removal; tree removal and vegetation control.

**Employees:** 60 to 80 during peak months.

**1988 Sales:** \$1.9 million.





crease of 83 percent over the previous year. Scorching heat accounted for more than \$75,000 in lost revenues.

In 1985, Fullcare decided to get out of the residential lawn care business and concentrate on its fledgling commercial business. Fuller sold all his residential accounts to Farison Lawn Service. An overall sales increase of 53 percent gave the company its first significant profits.

In addition to corporate business landscapes, Fullcare now maintains properties for residential associations. "There's 88 different incorporated cities within the boundaries of greater Louisville. That's a fairly good size portion of what we do," Fuller said.

As the environment for business becomes increasingly complex, the challenge of building a successful company is becoming more formidable.

Fullcare, for instance, has taken on six outside investors from affiliated businesses to broaden its base of services as well as its capital. The investors primarily offer excavation, paving and heavy highway construction.

"What it's done is broaden their base of services by adding landscape to what they do and of

course vice versa," Fuller said. "It gives us the capability of doing the heavier site work for our customers."

The investment relationship grew out of working together in a 50,000 square foot building. Fullcare occupies about a fourth of the building. Depending on the job, Fullcare will subcontract for excavation business from one of his partners or vice versa.

The Drought of 1988 and a lack of snowfall were the leading reasons behind the move for financial backing. Fullcare is the largest private contractor for snow removal in the state, but its 18 plows sat idle last winter as the city recorded the least amount of snow ever. Coupled with the drought, profitability last year dropped considerably.

"I don't dwell too much on percents and profits and that kind of stuff because I don't think it's relevant. But the drought definitely did affect us," he said.

Fuller doesn't anticipate reaching the sales volume the company generated last year, but said profits will do better. Last year's sales were boosted by the two largest landscape jobs in the state. "The chance of that repeating is just not there," he said.

"We're looking at about \$1.4 million or \$1.5 million this year. I don't know quite how to analyze the effects of this new relationship. There's going to be a fair amount of work coming from that. We kind of re-started the clock here in the middle of May when we closed this deal."

During its peak, the company employed close to 80 people in 1988.

Fullcare's mowing revenues were probably hardest hit by the drought. The company contracts for about 24 cuttings a year on each property, but completed an average of 18 last year.

"We were probably running around \$25,000 to \$26,000 per cut last year. We dropped six of them; your talking some pretty serious dollars," Fuller said.

Fullcare's mowing equipment consists mainly of Excel and Bunton mowers. The company maintains about 25 intermediate walk-behinds — 36- and 52-inches. The company also gangs Bunton units enabling them to mow a 21-foot-wide path.

Fullcare mows about 800 acres a week, with the average property size two acres. Mowing crews fluctuate between three- and six-man crews based on the job.

*Fullcare's full-service offerings include the installation of plant material and the care of annual flowers. Photo: Ron Bath*



"We're pretty selective about the properties we mow because of the turnover of ownership and that sort of thing," Fuller said. "We try to tie-in certain condominiums or other commercial/industrial properties because we see it as an opportunity to get installation contracts. Sometimes people think if you're in the maintenance business you're going to do a better job planning. When we put a job in we plan to live with it for a long time."

In the following interview, Dave Fuller shares his insights into the industry as a whole and more specifically, the mowing and landscape maintenance business.

**Q:** The services offered by Fullcare have completely changed since you first started in 1979?

**A:** You're right. We sold our residential business and now contract out those services. We have a subcontractor that does our sterilization, a subcontractor that does our fertilization/weed control and another subcontractor who does our tree and shrub fertilization and our insect/disease control program.

We're basically out of the chemical business — in-house — at this point.

Our chemical business probably represents \$150,000 to \$200,000 of revenue a year, but it's just not enough in our opinion to justify meeting all the requirements. Our facility is completely set up for storing pesticides and fertilizers. It has a pumping system and a loading system for trucks. We've got everything we need, but in our opinion, we do only four applications a year and it creates a real problem from a labor standpoint.

**Q:** Hospitals and malls are some of your major clients. Don't they have in-house groundskeepers to do that work?

**A:** Yes, but we maintain several hospitals and we've replaced in-house crews. That's really one of our big selling points here. We do a cost analysis for a customer to find out what it's costing them to have their own crews.

Shopping malls are another big customer of ours that traditionally have in-house people. We can show them a significant savings

in overall costs by contracting vs. doing it in-house.

I used the same analysis when I worked for the phone company. When I first went to the phone company virtually everything was done in-house and we converted over a 15-year-period almost all contracts, saving millions of dollars.

There's just a lot of benefits to contracting. You've got more flexibility with the work force. They're only there when they need to be there. If you look at the true cost of an employee — the supervision, the benefits, the vacations and all the true costs of having an employee and the costs associated with equipment, it's very expensive.

**Q:** How are your services packaged and billed?

**A:** We've actually got three methods of billing. We can bill on an annual estimated frequency all the functions we do and come up with an annual cost. We can give them a prorated price over a 12-month period. We offer that same prorated price over an eight-month period, which is better for us because we can collect that April through November.

Then we can bill just for the services that we perform on a monthly or twice monthly basis. That's kind of a neat concept that we came up with.

**Q:** What advice can you give lawn and landscape contractors just starting out?

**A:** I have a laundry list. The biggest factor, I think, is you have to know what your costs are, and

you have to be able to calculate the replacement of your equipment.

I don't know how many people I've seen come into this business, wear out their equipment and go out of business. You've got to understand that stuff will wear out and be able to calculate when it's going to go or when it's getting to a point where you're putting more into it in maintenance than it's worth to replace it. You also have to calculate replacement costs. You can't use what you paid for it today. You've got to calculate what it's going to cost you in three years or whenever you say it's going to wear out.

Other considerations are inflation and interest rates. Those haven't been big problems lately, but when we first started, they were major problems. All those things have to be figured.

Your employee costs are obviously your biggest; you've got to identify them all: pay, benefits, days off, uniforms, it just goes on. You should know what your overhead and fixed costs are. Once you add the fixed and the variables together, you can put in a profit margin. That will tell you what you have to be charging.

I can't tell you how many people are in this business that don't know how to calculate their costs. That's why they come and go.

**Q:** How can individuals become better educated? Who's job is it to make this information available?

**A:** I think it has to come from the associations, and let the uni-

versities provide the technical background. It needs to come from local, state and national associations. I can't emphasize how important it is for people to associate with other people in their industry.

There's so many people just interested in learning what you charge per hour. That's really immaterial. Instead they should be concentrating on how efficient they are per hour.

That's how we do it. We're 84 percent productive. You could charge the same rate per hour that we do and go out there and not schedule or whatever and get a 60 percent productivity rate and lose money. Rates per hour are different for everybody. I have no problem at all if we compete with somebody who's more efficient than we are, can do a better job, do it in less time and for less money, that's fine. That's what makes business work.

**Q:** Can you make your mowing division any more productive than it already is?

**A:** In the mowing business, we're probably as efficient as we can be. We use a bonus incentive program and we've tracked every job we've ever done from day one, including the number of men on the job, how long it took them and how long the travel time was. We now have seven or eight years of numbers to tell us about how long it takes to do a particular job.

Last year we established a bonus incentive program setting a level crews need to obtain to reach base productivity. Anything they complete over that level they get as much as 60 percent of whatever they save, or whatever their efficiency is on a job.

We pay the bonus to them separately each month. We've got some guys whose bonus is probably half their pay. We penalize them a little bit if they go into overtime.

The mowing crews average somewhere around 80 percent productivity for every hour on the clock, which is next to phenomenal. We use an incentive system to save on landscape jobs too.

**Q:** Are other areas of your company, landscape installation in



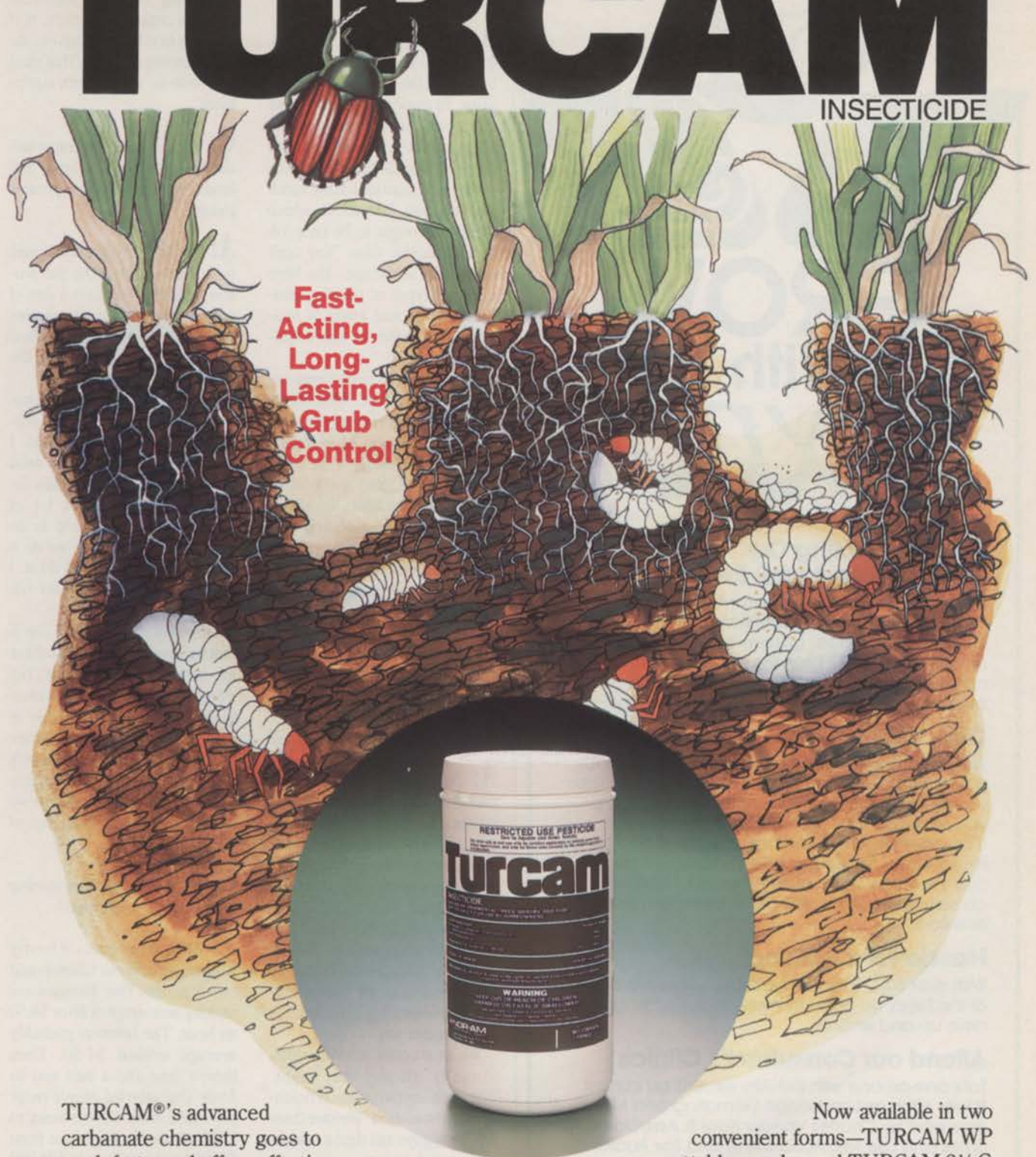
Fullcare's lawn and landscape maintenance team. Photo: Ron Bath

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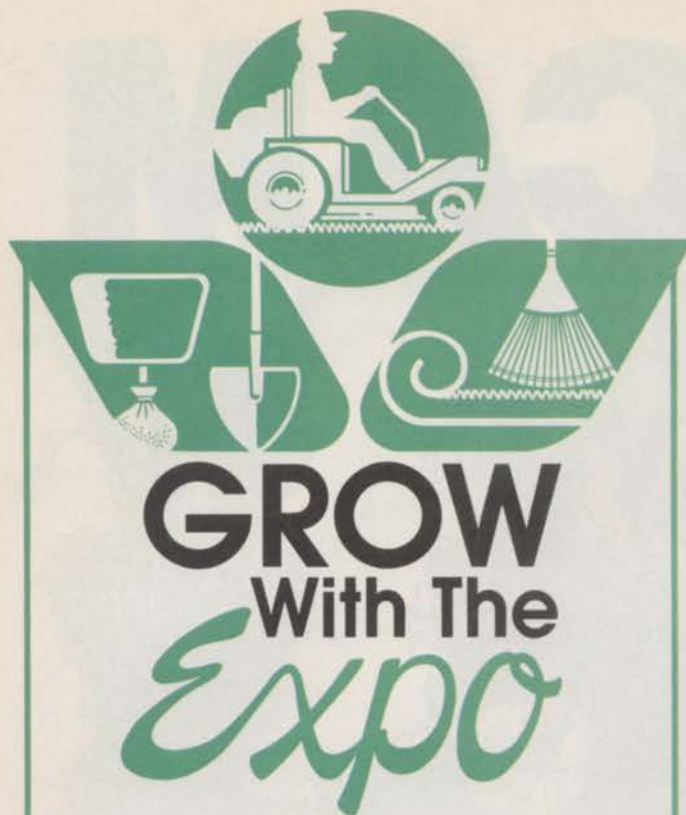
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## Fullcare

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particular, as efficient?

**A:** That's a different situation. It's hard to track production in a landscape job because no two are alike. In mowing, you can mow that same piece of property 24 times a year. And we've mowed some of those 24 times a year for eight years. I can look at my watch and tell you just about where somebody ought to be on a job at a particular time. You can't do that in landscape. You have different types of planting conditions, different kinds of materials and different site conditions.

Landscaping is just a completely different concept. We come up with a number of labor hours and make that our target. Most of what we do in landscape is on a bid situation. We don't do a lot of negotiating. We have to be within budget and low enough to get the bid. But it's strictly a cost of materials and labor hours. It goes right back to the same theory: you have to know what your costs are. It's hard to evaluate hours on a landscape job because there's a lot of preparation time.

**Q:** What measures do you take to prevent excessive down time?

**A:** Our shop operation here is probably one of the most efficient operations we have. We maintain a full maintenance crew here that can do everything from changing a spark plug to replacing an engine. They probably promote the efficiency of this company as much as anyone. If these guys don't have good serviceable equipment to work with every day, it makes a big difference in their production.

We have crews working shifts virtually all day and night. They're a key part to the efficiency of the operation. We have three full-time guys and then a student that does clean-up.

We wash our supplies every night, the equipment especially, and every blade is sharpened daily. It takes more than four hours to sharpen all the blades.

You have to have a good shop crew when you only have nine months to make money. You can't have equipment down for any

length of time and you can't afford to have an abundance of spares. Our theory on virtually everything except a transmission, an engine or a truck, is if it comes in at night it goes out the next morning repaired. That's just how intense we are with equipment.

**Q:** What is the most important challenge facing the lawn and landscape maintenance operator today?

**A:** I think the biggest challenge is probably to improve the professionalism. We have a tier of companies at the top, a large mass of companies at the bottom and then companies like ours in the middle.

We need to continue educating and promoting the professionalism of this business. I don't think we're where we need to be today. It's a fairly new industry compared to a lot of things. I'm pretty proud to do what we do at the level we do it and the quality that we do it. I think there's vast room for improvement, however.

One of the problems I see is that we're not getting kids in these university programs; there's not a high level of interest. Obviously there's a reason for that, they're making more money in other fields. You've got to compete with the other industries. That means more money and that means we have to get more money out of what we do.

**Q:** What is the average starting pay for your employees?

**A:** We have two levels of hourly people; we have our laborers and our foremen. Our foremen are making an average of \$6 or \$6.50 an hour. The laborers probably average around \$4.50. Then there's time and a half and so forth. Our salaried people range anywhere from \$350 a week to \$500. Probably anywhere from \$16,000 or \$17,000 up to \$26,000 or \$27,000 a year.

**Q:** What do you think are your best qualities to run a successful business?

My persistence. I just don't quit. I think anybody that's getting into something like this has to do that. You have to have a

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## Give grubs an inch and they'll take a whole yard.

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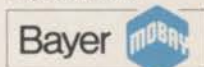
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# Regular Maintenance Prevents Need for Urgent Repair Service

**T**HE DEMAND FOR qualified irrigation maintenance and service contractors is on the rise.

Whether your company currently specializes in landscape contracting, mowing and maintenance or chemical application, the maintenance and service of existing sprinkler systems offers you an opportunity to fill a need in the rapidly growing irrigation industry.

By offering fixed-fee service contracts and service at hourly rates, as well as making replacement parts available for sale directly to end users, the irrigation maintenance portion of your company, if well managed, should be seen not only as an opportunity to expand your company's scope of services, but as a chance to have a positive impact on your bottom line.

In addition, maintenance and service are excellent ways in which to get in on the ground floor for consideration on larger projects and new installations, for it is an industry acknowledged principle that if a contractor performs well in the area of service, he/she is "The kind of person I want on my project."

This article will point out the major factors that are likely to affect an irrigation maintenance division. These include the type of system, geographic area and system wear and tear.

It should be recognized up-front that irrigation maintenance and service require a good basic knowledge of irrigation troubleshooting along with a small but diversified inventory of irrigation products, both whole goods and



parts. Keep in mind that your local irrigation wholesaler will be more than happy to work with you in setting up a division of your company for irrigation maintenance and service.

Most distributors conduct educational seminars on a regular basis covering the topics of basic irrigation design, installation, selling and marketing, as well as service and troubleshooting. Distributors will also be able to advise you concerning any permits or licenses that may be required to do irrigation maintenance in your area. These wholesalers can usually be found in the local yellow pages or exhibiting at a landscape supply trade show.

**COMPONENTS OF A SPRINKLER SYSTEM.** An irrigation system is a network of pipes, wires, valves and sprinkler heads, the function of which is to move water from a source to a point of consumption (the sprinkler) so that the water may be applied evenly to the soil to compensate for the loss of moisture through evapotranspiration (the combination of evaporation and transpiration).

If it is considered that the controller is the "brain" of the system,

then the water source would be the heart (the pump), the wiring is the nervous system, the piping network the veins, etc. The function of the maintenance and/or service technician is to keep this sometimes complex mechanical system in a state of good repair, finely tuned and working in concert with the needs of the landscape.

This can be quite a challenge because the installation of an irrigation system requires that we take some very sensitive equipment (valves, sprinkler heads, wiring connections, etc.), place them in a very harsh environment (the ground) and expect them to perform flawlessly. We expect much, and we are usually not disappointed. However, the need for regular maintenance and occasional service is always with us.

**COMMON PROBLEMS.** Many landscape and maintenance contractors are routinely asked to perform what the owner considers to be "very minor" repairs. What to some may seem "minor," to others can at times seem quite baffling. How often have you heard, "Oh, Bill, there's a sprinkler head missing somewhere out in the

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**Your company profitability can increase through a regularly supervised irrigation maintenance program.**





middle of the backyard. Can you have one of your men take care of it before you leave today?" or "One of these valves just won't go off. Do you know what to do?" or "I think the sprinkler system is running too much. Can you do something with that green box in the garage?" These are but a few of the everyday challenges the typical green industry contractor faces on a regular basis.

The number of times you have heard about these problems, or spotted them yourself, is a small indication of the opportunity that awaits your attention. The simple fact is that the irrigation industry has grown so rapidly in the last decade, that there is a real need for qualified, conscientious maintenance and service contractors. It will benefit you to become adept at handling these situations: learn how to replace or install a missing or damaged sprinkler head, repair a broken pipe and flush the repaired pipe, troubleshoot a malfunctioning valve and program an irrigation controller, etc. These are services of value to your clients. Not only that, but it is "your" landscape that is depending upon the sprinkler systems operating properly.



*Set all sprinklers to grade from an aesthetic as well as performance standpoint. (p. 20) Adjust sprinklers so the water is distributed only on the landscaped areas eliminating wasted water and runoff. (above) Backflow preventers should be checked once a year for loose connections and leaking seals. (far left) Repair damaged sprinklers as soon as possible to avoid liabilities and wasted water. (left) Photos: David Wheeler and Brian Vinchesi.*

**TYPES OF SYSTEMS.** Regardless of the type of irrigation system, regular maintenance is the best insurance against the need for urgent service. The most common maintenance procedure is to simply do a "walk-through" while the system operates through an irrigation cycle.

To accomplish this, the controller should be set to a minimum time (two, three or five minutes per zone) and allowed to cycle (a hand-held remote control device which can be used to advance the controller will be a great help in speeding up the process).

The technician will walk through the system during the test cycle, flagging or marking problems and adjusting heads for arc and distance. After required repairs are made, the repaired zones should be cycled and checked. The maintenance schedule will vary depending on the type of system. The types of irrigation systems requiring maintenance

include: residential, commercial, athletic field and municipal (highway, park, golf or cemetery).

Athletic fields require the most frequent attention to ensure that no major damage will be done to the playing surface due to the sprinkler system. Broken or damaged sprinkler heads must be replaced or repaired quickly to reduce the possibility of damage to turf areas and to assure a safe playing surface. The importance of athletic field heads being set to finish grade cannot be over-emphasized.

An athletic field irrigation system should be checked on a weekly/biweekly basis for proper operation. Scheduled watering should not take place before mowing as wet grass will hamper mowing operations. If there are qualified grounds maintenance personnel involved, they will probably have their own ideas regarding water scheduling. It is a good idea to see to it that they



## GENERAL MAINTENANCE BASED ON AGE, TYPE OF SYSTEM

GENERAL MAINTENANCE OF A system varies with the type of system as previously mentioned. You, the contractor, must decide if the system should be checked weekly, monthly or yearly. Your decision will be based on a number of factors.

1. *Age of the system.* The older the system, the more frequently it may need to be checked for component wear and failure.

2. *How well the system was originally installed.* If the system was designed and installed correctly, it will not require checking as frequently.

3. *Use and traffic.* The more traffic (people, equipment, etc.) the system and area is subject to, the more often the system will require checking.

4. *The customer.* The more particular the customer, the more often the system should be checked. Make sure this is covered in your fee.

During periodic work at the site, al-

ways check to see that the system is operating properly. Additionally, on a yearly basis check that all sprinklers and valve boxes are set to grade, all sprinklers are adjusted properly for arc and distance and all nozzles are clean and free of debris. Should a pipeline require repair or a sprinkler require replacement — especially if the system has cycled since the break — the importance of flushing the entire line must be recognized.

Remove sprinkler internals and flush as though this were the initial filling of the pipelines with water. Verify that the controller batteries, reset contacts and fuses are clean, intact and functioning. Also, check the backflow preventer connections and test the backflow device if required by state or local code. Make sure the rain shut-off is working by filling or wetting it down with a glass of water. Also check for proper operation of moisture and freeze sensors if present.

General maintenance is best perform-

ed by simply observing the system during operation and looking for problems as outlined earlier. As you walk the property pay attention to your footing. Soft areas in the lawn usually indicate leaks or over watering.

To simplify your irrigation maintenance program, keep a small amount of stock of each sprinkler manufacturers' equipment and parts. Proper inventory of various sizes of pipe and fittings will also make intake repairs easier. A small, but diversified inventory will save you the trouble of running to a supply house everytime you come upon a different type of system.

Special equipment should include a voltage meter, wire tracer and a small manual pump. Large pipe installation equipment is not usually necessary for irrigation system maintenance. If needed, it is most cost-effective to rent a small trenching machine on a short-term basis.

are well instructed in the programming of the controller, and that they understand how much water the system is capable of applying to the turf per hour. They should also be advised of the necessity of flagging the sprinkler heads prior to aeration and/or spiking operations.

*Commercial systems* should be checked at least monthly as these systems are usually set to operate at night when no one is present. Therefore, problems may go unnoticed by the owner. These sites are best maintained by a landscape contractor or landscape maintenance firm who can easily check the system every few weeks after mowing.

*Residential systems* require the least maintenance from a contractor's point of view. Usually, the homeowner spots a problem with the system and calls for repairs. Service contracts for residential customers can be profitable if sold and handled correctly.

Along with the type of system, the kind of system control is an important factor in the maintenance schedule of the irrigation system. Manual system problems are usually identified immediately as there is someone present to turn the system off should a problem arise. Automatic systems may run damaged for weeks or months without discovery due to their off-hour watering sched-

ules. It is important to check automatic systems on a regular basis to ensure proper operation.

Some irrigation systems have special maintenance considerations built into them. For example, micro-irrigation (drip/trick-

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**Commercial systems should be checked at least monthly as these systems are usually set to operate at night when no one is present.**

le) systems require filtration for proper operation. The filter should be checked, cleaned or changed on a regular schedule. The frequency of cleaning will depend upon the amount of use, the quality of the water and the size of the filter. Systems that operate regularly and with marginal water quality may need cleaning as frequently as once per week.

Drip system emitters should also be checked on a regular basis to see that they are not clogged.

This can be easily accomplished during the day as the emitters are plant specific and located at the surface. Systems employing fertilizer injectors should be thoroughly examined before use to check for proper calibration and leaks as well as for approved backflow prevention.

**GEOGRAPHIC FACTORS.** Geographic location of a sprinkler system can affect many aspects of system design and influence the maintenance schedule. Three areas and types of irrigation system piping are usually recognized: the North, Middle and South.

In the Northern states (areas subject to hard ground freezing), contractors primarily use polyethylene pipe for residential and small commercial projects.

These systems are seasonal in their use and usually operate from May to September, October or November of each year. Due to the seasonal nature of their operation and the pipes being installed above the frost line, these systems must be "winterized" each year.

Winterization is usually accomplished by evacuating all or at least the majority of the water from the pipes using air pressure generated by a tow behind air compressor.

Adequate volume and proper pressure are important factors in

the use of compressed air. Blow the system out with an air pressure of 60 to 80 psi. High pressures (more than 90 psi) can cause damage to the piping system and equipment and therefore should be avoided. The recommended minimum air compressor volume is 60 cubic feet per minute (CFM). A lower CFM will displace only small quantities of water allowing the air to ride along the top of the remaining water inside the pipe, leaving water to freeze and possibly damage the pipeline.

Depending upon the size of the system, winterization times will vary dramatically. Average residential systems will take 30 to 45 minutes to winterize while large commercial systems may require an entire day. You may have heard of contractors who claim they can blow out 20 or 30 residential systems a day. You can be sure that they are not doing the job properly. Also remember to charge a price that will show a reasonable profit from blowing out 10 to 15 residential systems per day.

Always have one zone on whenever the compressor is operating to protect the system from damage. It is important to recognize that although water is not compressible, air is, and can build up high pressures if not handled correctly. Blow out the farthest

(continued on page 24)



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## Irrigation Systems

(continued from page 22)

zone first so that the majority of water in the mainline piping will be evacuated; this may take quite some time on larger systems. Make sure you run through each zone at least twice. This will ensure that maximum water is removed and put less stress on the system. High parts of the system should also be blown out first to keep water from running back into the mainline.

Heat build-up with larger and older compressors is an important consideration. The longer the compressor runs the hotter the air will become. As the hot air enters the system the heat may actually begin to soften the plastic piping. Major damage can occur from too much airborne heat. To help dissipate the heat, use long air hoses even if the distance from the compressor to the blowout assembly is short. Also, using a metal blowout assembly such as a quick coupler and key will help absorb and dissipate more of the heat.

For winterization, in addition to blowing out the system, the controller should be shut off, unplugged and the battery removed. However, if the controller is outside or is installed in an area where moisture is present, leave the controller plugged in so that the heat generated by the transformer will help keep the inside of the cabinet dry. Remember to set the watering times to zero.

Don't forget to shut off the irrigation supply valve before blowing out the system. If the valve is an older brass gate type, make sure that it is tightly closed. Many older brass gate valves will "weep" allowing water to slowly enter the irrigation mainline and backflow preventer. You should consider replacing these valves with new resilient seated ball valves before problems occur.

Remember that it is less expensive to replace the gate valve than the backflow preventer. Do not use the backflow preventer service valve as the shut-off valve. Also, backflow preventer test ports may *not* be used as blow-out points.

If the system includes a rain shut-off of the catch type make sure the sensor is removed or inverted for the winter.

Manual and/or automatic drains may also be used to winterize. Some auto-drains, if not installed properly, may clog and become a maintenance problem. Water hammer is also a consideration in systems with auto-drains. Most importantly, in an age of water conservation, irrigation systems with auto-drains may be seen as water wasters because they drain the lateral pipelines after each cycle of the system. While many systems equipped with auto drains need not be blown out, you should be sure to run through all zones for a minimum of five minutes each to ensure maximum drainage. Check the mainline for manual drains and leave them open for the entire winter.

Some feel that it is not necessary to winterize systems that use polyethylene piping. This is a fallacy. These systems may survive through a few seasons without being winterized but the pipe

is being stressed during this time, not to mention the valves, sprinkler heads and fittings. Consequently, damage is being done to all components each year and eventually major problems will develop in the system.

General maintenance is less for Northern systems due to their short operating season. However, snow plowing operations along with sand and salt applications can do substantial damage to the system over the winter months. Spring start-up contracts will ensure that the system is thoroughly checked at the start of each season.

Contractors in the middle states use a combination of both PVC and polyethylene piping. The middle states have longer seasons which may require more maintenance and, depending on weather, may require winterization. If the below ground irrigation pipes are not subject to freezing, winterization is not required; however, outdoor booster pumps and above-ground components should be drained. In

(continued on page 26)

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## Irrigation Systems

(continued from page 24)

these areas, you should be careful not to operate the system during freezing temperatures. This can be accomplished automatically using freeze sensors. These devices are usually set to inhibit operation when the outside temperature drops below 45 degrees Fahrenheit.

Contractors in the Southern states predominantly install PVC pipe for both main and lateral lines, and winterization is not required. However, these areas will need more general maintenance due to their year-round operation.

The geographic location of a system as it relates to the need for winterization may be tied more closely to the "hardiness zone" in which it is installed — a designation most landscaping trades are familiar with — rather than to a strict "North/South" reference. Hence, zone seven and the North (areas where temperatures will drop to zero degrees Fahrenheit to 10 degrees Fahrenheit) war-

rant a full winterization procedure; zones eight and nine (winter lows likely to be in the 10 degrees Fahrenheit to 30 degrees Fahrenheit range) will require freeze sensors, drainage of pumps and drainage of above-ground components. Zone 10 areas and the South should not require winterization except for changing of the watering schedule.

**CONTROLLER PROGRAM CHANGES.** As part of any irrigation maintenance schedule the controller operating program requires adjustment as the seasons and weather change. The northern and middle states should have a minimum of three operating schedules; spring, summer and fall (spring and fall may have very similar schedules). As the days grow longer and hotter and evapotranspiration increases, the number of days of operation and/or the run time for each zone should be increased. It is important *not* to have the same watering schedule throughout the irrigation season. This not only promotes over watering and un-

der watering of lawns and landscapes, but also wastes water. Even Southern areas will have a reduced winter watering schedule as plant water requirements decrease.

When programming the controller it is important to take into

.....  
**It's important  
not to have the  
same watering  
schedule  
throughout the  
irrigation  
season to avoid  
over and under  
watering.**

consideration soil conditions and the maturity of plant material. Also, use controllers that are designed for maximum flexibility during times of water restrictions and/or bans. If water restric-

tions are a possibility in your area, you may find a lucrative business opportunity in replacing outdated irrigation controllers with state-of-the-art units. An ideal controller features both *flexibility* and *user friendliness*. The addition of rain shut-down devices or moisture sensors to existing systems is another area to consider.

**CONCLUSION.** Irrigation system maintenance requirements vary widely depending on the location, age and how well the system was originally designed and installed. However, once you have a basic knowledge of irrigation troubleshooting and a reputation for fast and efficient service, the irrigation maintenance aspect of your business can prove to be a substantial addition to your bottom line. — *Brendan Lynch and Brian Vinchesi* ■

*The authors specialize in irrigation consulting with Eastern Irrigation Consultants Inc., in Beltsville, Md., and Pepperell, Mass.*



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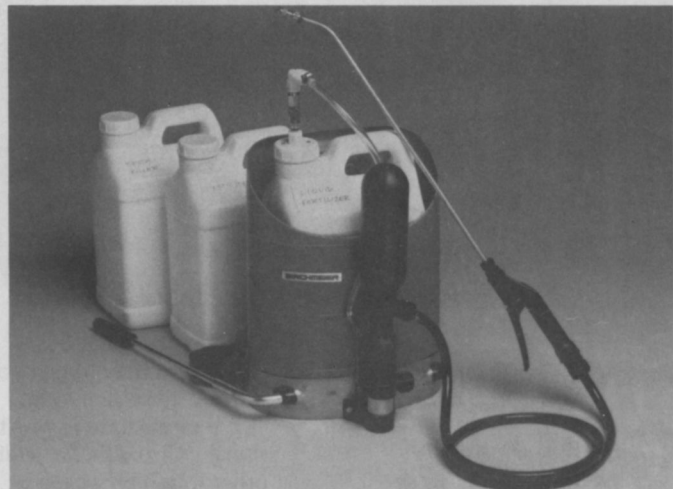
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# Landscape Lighting Creates Artistic Image

**T**HE OUTDOOR LANDSCAPE is a dynamic, growing and changing environment. Unlike commercial buildings and other architectural structures, the landscape allows a physical interaction and viewing from a variety of locations.

Beautiful gardens by day used to disappear into the darkness after sunset, leaving only a "black-mirror" of reflection from windows in the evening. With landscape lighting, indoor space can be expanded to provide depth and views of the landscape at night, providing a transition of space and blending into one.

Two goals which should be kept in mind while formulating your landscape plan include the artistic challenge being posed and the application of your art to its specific project.

With most homeowners gone during the day, the evening view of their landscape becomes important. Outdoor landscape lighting, not unlike the landscape plan, requires use of the design process with the landscape lighting designer and client communicating together to determine the desired lighting effect.

One rule to remember is that the client is always right. The landscape lighting designer should not alter the thinking of the client. Instead, the communication process should be open, with the client doing most of the talking. The importance of *listening* is invaluable to any sales or design-oriented person. The finished lighting design can only satisfy the client if it meets their needs.

**DESIGN PROCESS.** Adherence to the following design process guidelines will help you to achieve a completed project which will satisfy the owner. The key phrase

to remember during the design process of landscape lighting is to "see the effect, not the source" of the lighting project.

The design process includes the basic elements of analysis, research, synthesis, design and evaluation. The initial client/designer communication should occur during this analysis stage. The desired "effect" which the client wishes to "see" must be determined by listening and asking the right questions.

The lighting needs and wants of the client, security, safety and aesthetics must be well-defined. Research and synthesis allow the designer to become aware of the techniques and tools available to provide the specified lighting requirements. Research supplies the lighting designer with a variety of lamp sources and fixtures from which to choose.

The proper choice of lamp source to meet the needs of the client (how to provide the effect) is the real design phase of the project. Before selecting a lamp (bulb) source, and subsequent fixture to house (hold) the source, a synthesis, or gathering of research data, will allow you to review all the methods available. Lamp source selection and fixture identification — the design phase — will provide the effect.

**LAMP SOURCE.** A brief discussion of lamp source selection will help the lighting designer in his selection of "tools" (fixtures) to be used in the creation of the lighting effect. Lamp source selection is critical in that it relates to project cost, long-term maintenance and operation efficiency, color, function and aesthetics.

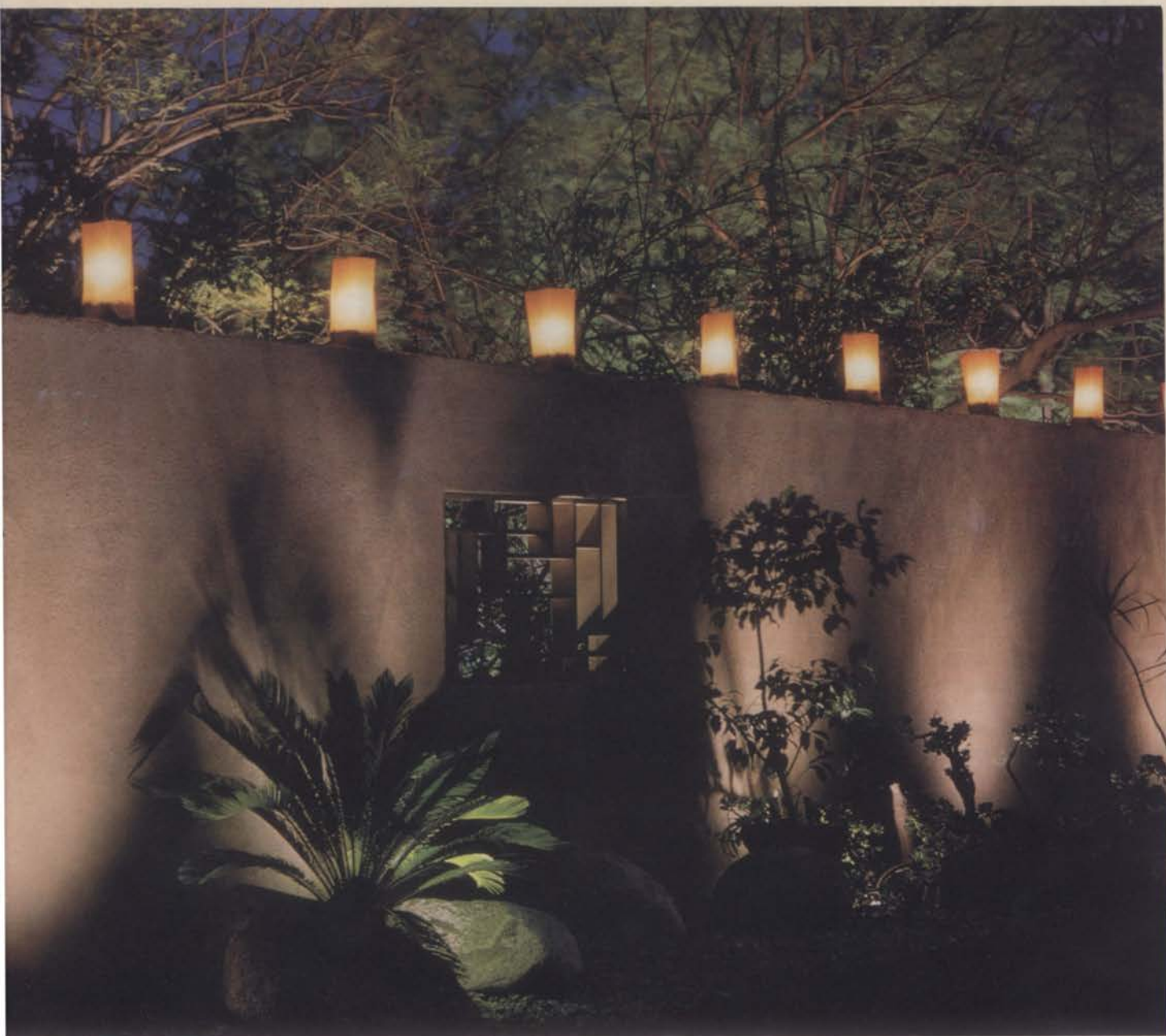
Incandescent lamps, those typically seen in the home, are a very warm color source. The



"yellow" light emitted does not enhance the green color of lawns and plant material. Incandescent sources, however, are initially very inexpensive to purchase and install. The life (time of operation) is very short, usually less than 1,000 hours. Incandescent, therefore, can be summarized as having inexpensive initial project cost, expensive long-term maintenance (frequent lamp replacement), relatively poor color rendition for landscape plants and therefore less than optimum aesthetic value.

If incandescent must be the selection, the use of daylight blue lenses or blue-white lamps is recommended. These limit the yellow spectrum of light and therefore provide better color en-





hancement for foliage. The inefficiency or short-term lamp life remains poor.

Low-voltage lamps are the next step in efficiency and color rendition. The low-voltage lamp generally offers 30 percent to 40 percent more light efficiency, longer life and whiter color. The whiter color allows better color rendition for plant material. Fluorescent, especially the new compact twin tube lamps, offer yet more efficiency and lamp life in the 10,000-hour range. Color rendition can vary from warm selection to very cool, offering excellent landscape enhancement.

"Mercury vapor lamps, specifically clear mercury vapor lamps, emit a light that is in the blue-green end of the spectrum,"

said Lloyd Reeder, vice president/sales, Greenlee Landscape Lighting Manufacturing, Carrollton, Texas. "They complement the natural color of foliage. Your client also gets the benefit of long lamp life (20,000 hours plus) and energy efficiency."

The initial cost for purchase is several times higher than incandescent, low-voltage, or fluorescent, but the long lamp life and energy efficiency rapidly make up the difference.

Metal halide lamps are more efficient than mercury vapor and also do not provide as cool a source. The low wattage lamps currently becoming available make metal halide an excellent lamp source selection for the landscape.

High-pressure sodium (HPS) lamp sources are extremely warm (yellow) in appearance, but very efficient. They have a terrible color rendering effect on plant material. The yellow source tends to make the greens look brown and dead. HPS lamps should be avoided when lighting landscape material.

"If you are lighting signs, walls, statues or architectural features, metal halide or HPS can do a better job than mercury," Reeder said. "Some people choose to use incandescent or quartz lamps rather than HID lamps. The warmer tones of incandescent lamps do a good job on statues and fountains."

In addition, incandescent lamps have the advantage of low-

*Through low-to-the ground mountings, uplighting enhances your landscape with effects ranging from dramatic to enchanting.*  
Photo: Loran Inc.



er installation costs. However, the trade-offs — lamp life and operational and maintenance costs — are higher than those associated with HID light sources, he said. Light and efficiency levels are lower on incandescent lamps than they are on HID.

Lamp selection, like fixture selection, should depend on the color of the object you are trying to illuminate.

**EVALUATION.** Evaluation, a critical stage in any design process, allows the designer and client to review the completed lighting design project, meet the client's needs and answer the question "Can we see the effect and not the source?" If these steps are accomplished then a quality project should result.

Today's residential lighting design must include security lighting. Security lighting can and should be an integral part of the aesthetic lighting. Just as in landscape design, however, the form (aesthetics) must follow the function. The functional requirements include such items as light to safely move through the landscape, provide security and allow conversation to occur.

The first rule for security lighting is that the light must look like someone is home, or is expected to be home at any moment. The typical 150-W Par 38 floodlight under the eaves of the house is not security lighting. This creates an extremely high contrast between the brightly lit area of the floodlights (which is desirable for lighting signs, but not residential grounds) and the dark area adjacent. It actually creates areas for an unwanted guest to hide.

Security lighting must be general in nature, without the extremes of high-level light and no light at all. The use of the following lighting techniques should always provide a function while achieving aesthetic results.

**LIGHTING TECHNIQUES.** Landscape lighting techniques, the actual methods available to provide the desired effects, are easily defined. A variety of architectural features, planting and sculpture can be lighted by different light sources. Light source refers to lamps which provide different color temperatures and intensities of brightness. They all employ



Lighting creates an image for the landscape. Photo: Site Illuminations.

some form of the following techniques. The effect of different light sources can range from broad, soft cool-colored moonlight, to controlled precise warm spots to highlight sculpture or specimen plants.

Uplighting is simply locating lighting fixtures on or in the ground to uplight the foliage of specimen ornamentals, large deciduous trees, building facades or sculptures. When lighting is to be viewed from only one direction, it is less critical to conceal the source. Above-grade fixtures with minimal glare control can allow the observer to view the uplighted object without interacting between the source and object being lighted.

Fixtures used for uplighting can be concealed behind proposed or existing plant material. However, most landscapes allow for interaction and thus provide all-around viewing. Well lights and deeply concealed lamp fixtures become the logical choice. Below-grade fixtures can be louvered to the help in the reduction of "seeing the source."

Uplighting the trees near a walkway with concealed fixtures can hide the source of the light from the viewer and vandals while providing reflected light onto the walk. The trick is to find ways to hide the source of the light while still providing the necessary amounts of illumination.

Downlighting is another simple term indicating the use of a fixture mounted in a tree or on an architectural feature, shining down onto the landscape. The most common and efficient technique for creating the effect of sun or moonlight is to use con-

cealed light sources placed on poles, buildings and trees, aimed straight down to highlight plant material or create patterns on surfaces to bring out their texture. Fixtures located above eye level provide efficient lighting for recreation, safety, aesthetics and security.

Moonlighting is simulating the effect of moonlight filtering through trees. It is both aesthetically pleasing and extremely functional in nature. Both up- and downlighting is used to create this effect.

With fixtures properly placed in trees, both the trees and ground are beautifully illuminated. Even casts of illumination eliminate harsh shadows and bright areas. The effect of light on the ground plain provides security and safety. It is the most desired method of ground lighting since pathlights provide physical obstructions and often glare. Who hasn't noticed the "landscape strip" effect of pagoda style fixtures lining a driveway?

Silhouette lighting is the technique by which trees and shrubs with interesting branch structure can be dramatically backlit against a wall or building facade. The fixture is located between the reflecting wall and specimen being viewed. The combination of landscape level lighting and facade lighting provides additional security near the building.

Spotlighting illuminates special objects such as statues, sculptures or specimen shrubs. Since our two natural sources of light, the sun and moon, are located high above shining down, we want to create realism in spotlighting. Mount fixtures overhead on eaves or trees

to eliminate glare and fixture distraction while providing shadows to fall down naturally. If ground-mounted fixtures must be used, conceal them with plant material and don't overlight the object. Allow shadow patterns to remain to provide depth.

Path lighting and spread lighting are very similar methods of lighting the ground plain. Fully shielded path lights or spread lights produce the best visibility on the ground by eliminating glare that could cause difficulty in recognizing obstacles or steps. Glare control is the major obstacle to overcome in this lighting technique. Remember, "see the effect, not the source."

The increase of outdoor landscape lighting requests is growing steadily, as evidenced by the number of fixture manufacturers and associated products. Landscape designers must be able to include quality lighting plans within their overall landscape master plan.

#### **PROSPECTIVE CLIENTELE.**

The landscape contractor has a tremendously large field of prospects from which to choose. Developers, building contractors, pool contractors, electrical contractors and end users make up a sampling of the prospective clientele list.

The acceptance of lighting as a part of the overall master plan is already in place. It is up to the landscape architect/designer to make sure it is included. Installation of wires and conduits must be installed prior to final grading of a landscape. This will allow fixture installation at a later date if the budget does not allow a first phase installation.

The new technology involved in the landscape lighting industry includes a variety of changes. A major change is the perception of landscape lighting as an "addon" item. Rather than considering it an extra, landscape lighting should be designed and incorporated in the original master plan.

Smaller and more efficient lamp sources are paving the way for small scale fixtures which are easy to hide. New lamp sources are also becoming more efficient and offering a wider range of color temperature. As the consumer becomes more familiar with the benefits of proper lighting, the

(continued on page 71)



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Majestic	5.0
Bonnieblue	6.0
Adelphi	6.5
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# What Does It Really Cost Your Company to Mow?

**WHAT DOES IT** really cost to mow? When this question arises in a group of lawn and landscape

maintenance professionals, you get lots of different answers.

Some seem a bit weird and many have very little foundation.

The response will range from reasonably good "guesstimates" to comments such as: "Probably a lot more than I think," "I wish

I knew" and "If I had a better idea of what it cost, I would have a better idea of what to charge for my mowing service."

To begin with, not two lawn and landscape maintenance businesses are likely to have identical mowing costs. Some may be fairly close to others, and many will be significantly different. The detailed costs that comprise total mowing cost, in all likelihood, will vary widely from one lawn or landscape business to another.

This article will provide a process to use in estimating, with reasonable accuracy, what it costs your business to mow.

There are two major costs that cover the total mowing cost:

- mower cost
- operator cost

There are also a number of detailed costs that encompass each of these two major costs such as: depreciation, interest, gas and repairs with regard to mower cost; and wages of salary, social security and insurance with regard to operator or labor cost.

Therefore, if mower and operator costs are basically what comprise the total cost to mow, you need a method for doing the best job you can in estimating these costs for your business. Let us first look at a tool for estimating mower cost. With regard to a mower, you are likely interested in arriving at an hourly rate that can be used in estimating the cost of particular mowing jobs. (See Figure 1.)

Next, let's consider the operator cost. Since operator cost or labor cost is often comprised of something more than straight wages such as: the employer's share of social security, unemployment insurance, workman's compensation insurance and perhaps fringe benefits, we need another tool that will permit a

## LABOR COST ESTIMATING WORKSHEET

DATE: Jan. 2, 1989

NAME: Joe Handyman

COST ITEM:	COST TO EMPLOYER	INCOME TO EMPLOYEE
<i>Direct wage costs:</i>		
1. Total Regular Hours: (Hrs./wk 40 x No. wks 52) =		2,080 hrs.
Overtime: (Hrs./wk ___ x No. wks ___) =		
2. Cash Wages (line 1 x rate/hr \$6.50 =	\$13,520	
3. Overtime Wages (No. ___ x rate ___) =		
4. Cash Bonuses (\$ ___ or %4%) =	540	
5. Total adjusted cash wages ..... = (total lines 2 through 4)	\$14,060	
<i>Mandatory Wage Costs:</i>		
6. Employer's share of Soc. Sec. 7.51% =	\$1,056	\$ XXX
7. Federal unemployment insurance =	56	XXX
8. State unemployment insurance =	175	XXX
9. Workman's compensation =	582	XXX
10. Other _____		
11. Total value of mandatory costs = (total lines 6 through 10)	\$1,869	\$
<i>Value of Fringe Benefits:</i>		
12. Insurance — Life =	\$240	
Dental =		
Health =	\$1,128	
_____ =		
_____ =		
13. Retirement (business contribution) =		
14. Uniform (purchase/rental/cleaning) =	120	
15. Educational expense =	150	
16. Transportation (mi./day ___ x No. day ___ x rate ___) =		
17. Other _____		
18. Other _____		
19. Total value of fringe benefits = (total lines 12 through 18)	\$1,638	
20. Total labor costs: = (line 5 + 11 + 19) ..... =	\$17,567	
21. Hours paid for but not worked = Holidays (48 hrs); Vacation (40 hrs); Sick leave (96 hrs)	184 hours	
22. Total hours on the job (line 1 2,080 — total line 21 184) =		1,896 hours
23. Total Costs per hour on the job: = (line 20 divided by line 22)	\$9.27	\$

Figure 2.



## JOB COST ESTIMATE FORM

Mowing (Four customers; same street. Lawn = 40,000 sq. ft.)

MACHINERY	COST PER HOUR	HOURS USED ON JOB	MACHINE COST
1. 36" s. prop. mower	\$2.41	x 6	= \$14.46
2. Pickup truck	\$.35 cents/mi.	x 32mi.	= \$11.20
3. Trailer	\$2.81	x 1	= \$2.81
4. Weedeater	\$.70 cents	x 1.3	= \$0.91
5. Total machinery cost (add lines 1 through 4) =			\$29.38

LABOR	COST PER HOUR	HOURS ON JOB	EFFICIENCY FACTOR	LABOR COST
6. Mowing	\$9.27	x 6	x 1.2	= \$66.74
7. Trimming	\$9.27	x 1.3	x 1.2	= \$14.46
8.				
9. Total labor cost (add lines 6 through 8) =				\$81.20

MATERIALS	QUANTITY	UNITS	PRICE PER UNIT	MATERIALS COST
10.			x	=
11.				
12.				
13.				
14. Total materials cost (add lines 10 through 13) =				
15. Total direct cost (add lines 5 + 9 + 14) =				\$110.58

OVERHEAD AND CONTINGENCIES	OVERHEAD COST
16. General Overhead (15% of direct costs)	= \$16.59
17.	=
18. Total overhead cost (add lines 16 and 17) =	\$16.59
19. Total job cost estimate (add lines 15 and 18) =	\$127.17
20. Job cost per hour of mowing (for this job) =	\$21.20
21. Mowing function cost per hour (mower and operator) =	\$11.68

Figure 3.

reasonably accurate estimate to be made of true labor cost per hour. (See Figure 2.)

Now, the sum of the mower and operator costs, as derived through the process shown here, will provide a reasonably accurate hourly estimate of the mowing function. In the example, the mower cost of \$2.41 per hour plus a labor cost of \$9.27 per hour shows a total cost of \$11.68 per hour to perform the mowing function. These numbers are critical to estimating mowing job costs.

To make reasonably accurate and reliable mowing job cost estimates requires additional cost considerations such as: the cost to get men and equipment to the job site, and some share of the

business overhead expenses such as, utilities, advertising and office rent and supplies.

The job cost estimate procedure

in Figure 3 provides a way to pull all costs together to arrive at a cost estimate for a particular mowing job which is, of course, greater

than the cost of the mowing function alone. (See Figure 3.)

**CONCLUSION.** Factors that impact significantly on the mowing function cost:

- Purchase cost of mower.
- How long mower will last (related to level of use and operator abuse).
- Interest rate used for capital recovery.
- Wages paid (remember that cheap labor can be very costly in other ways).
- Fringe benefits provided labor.

• Actual hours worked per year.  
Factors that impact significantly on mowing job cost:

- All of the above.
- Distance to job.
- Level of overhead costs.

So, to answer the question, what does it really cost to mow? It is likely different for each lawn and landscape maintenance business, but try the process shown here and estimate your own. —  
R. K. Reynolds

The author is an associate professor emeritus of agricultural economics at Virginia Polytechnic Institute and State University, Blacksburg, Va.

## ESTIMATE OF ANNUAL MACHINE COST

36-INCH SELF-PROPELLED MOWER

Line	Amount
1. Purchase cost	\$2,500
2. Salvage value	\$ 0
3. Cost to be recovered (line 1 minus line 2)	\$2,500
4. Estimated years of life	3
5. Units of estimated annual use (hours, acres, miles, etc.)	900 hrs.
<b>Fixed or Ownership Costs:</b>	
6. Cost recovery and (12%) interest factor	0.4163
7. Cost recovery and interest (line 3 x line 6)	\$1,041
8. Interest on salvage value (line 2 x interest rate percent)	0
9. Insurance, taxes, housing (line 1 x 4 percent)	\$100
10. License	0
11. Total fixed cost (add lines 7 through 10)	\$1,141
12. Fixed cost per unit (line 11 divided by line 5)	\$1.27
<b>Variable or Operating Costs:</b>	
13. Fuel (.67 gallon /hour x 900 hours x \$1.00 price/gallon)	\$603
Unit No. Units	
14. Oil, grease, anti-freeze	\$75
15. Repairs (including service labor), tires, etc.	\$350
16. Total variable cost (add lines 13 through 15)	\$1,028
17. Variable Cost per Unit (line 16 divided by line 5)	\$1.14
18. TOTAL ANNUAL MACHINE COST (line 11 plus line 16)	\$2,169
19. TOTAL COST PER UNIT (line 18 divided by line 5)	\$2.41

Figure 1.



# Louisville Expo Plans to Emphasize Commercial Market

**T**HE SIXTH ANNUAL Louisville EXPO has been sold out for about a month, preregistration is substantially up and show management is enjoying an explosion in power equipment interest due partly to increased commercial equipment participation.

All of this will culminate in the International Lawn, Garden & Power Equipment EXPO, July 31 to Aug. 2 at the Kentucky Fair & Exposition Center, Louisville. The show is sponsored by the Outdoor Power Equipment Institute.

More than 550 manufacturers and suppliers will exhibit their wares in 270,000 net square feet of space. Attendees can also personally test the equipment as nearly 100 of the manufacturers will demonstrate their products in the 450,000-square-foot outdoor demonstration area. EXPO's outdoor demonstration area equals 13 football fields.

Total attendance at EXPO 88

was 22,349, but it's expected to increase significantly this year. According to Show Chairman Warner Frazier, preregistration is up more than 25 percent over last year.

"Our real limit is our space. We keep getting bigger and better," he said. Frazier is president and CEO of Simplicity Manufacturing, Port Washington, Wis.

Indoor trade show hours will be held Monday and Tuesday, July 31 and Aug. 1 from 9 a.m. to 5 p.m. On Wednesday, Aug. 2, the indoor trade show will be open from 9 a.m. to 3 p.m. Show attendees can visit the outdoor exhibits Monday and Tuesday from 8 a.m. to 5 p.m. and Wednesday from 8 a.m. to noon.

According to *Tradeshows Week* magazine, EXPO is the fourth largest trade show in the United States. And it's growth may surge beyond any imagined limits as the EXPO stands to benefit from an increasing attendee interest in commercial products.

For the first five years, the show highlighted the retail rather than the commercial market.

With 44.2 percent of those responding to a post-EXPO survey indicating that they would like to see more commercial products as well as tools and service equipment, show management is working to attract even more manufacturers of those products for EXPO 89. The survey was conducted shortly after EXPO 88.

At the 1988 show, there was such a large percentage of dealers handling commercial products that two registration categories were added to this year's program: commercial distributor and landscaper.

"Interest in the commercial products is a gray area for us. Many dealers of consumer products are also selling into that market," Frazier said. "We saw interest in the commercial end growing three to four years ago and it's been increasing ever since. There's definitely a broader

audience for more commercial equipment."

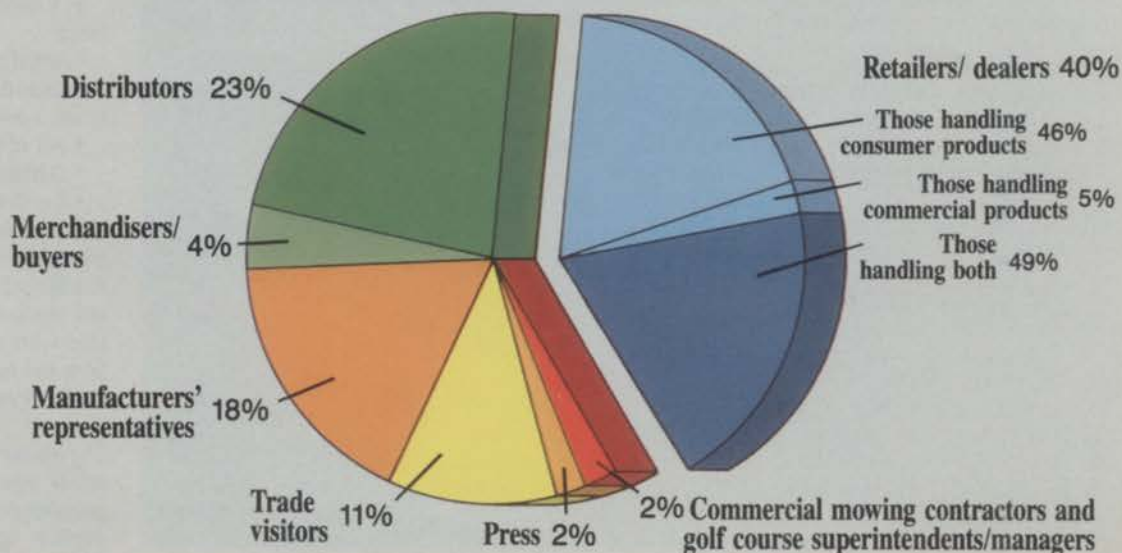
Frazier said EXPO is trying to fill the commercial gap as best they can, but they don't currently have adequate space to accommodate a much larger show. That may change in the next few years, however, as the Kentucky Fair and Exposition Center is planning a two-phase program to expand its grounds.

Show Director Warren Selrs said the center will add about 150,000 square feet in 1990. Show management hasn't decide, however, if they will make that space available to exhibitors or special show features. It all depends, he said, on how much space will be added in phase two of the expansion.

Results of the independent survey conducted last August show that the vast majority of EXPO 88 attendees planned a return visit to the Louisville show in 1989.

(continued on page 36)

## PERCENTAGE OF EXPO 88 VISITOR REGISTRATION



Forty-nine percent of the retailers/dealers attending EXPO 88 handled both commercial and consumer products. Source: OPEI.



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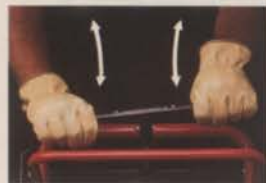
Until recently, mower operators had only one choice for steering their walk-behind commercial mowers. Pistol grips.

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With so many advantages, it's not surprising that users favor our patented steering system 8 to 1 over old-fashioned pistol grips. Or that our mid-size walk-behind mowers with T-bar steering have become the preferred choice of commercial cutters.

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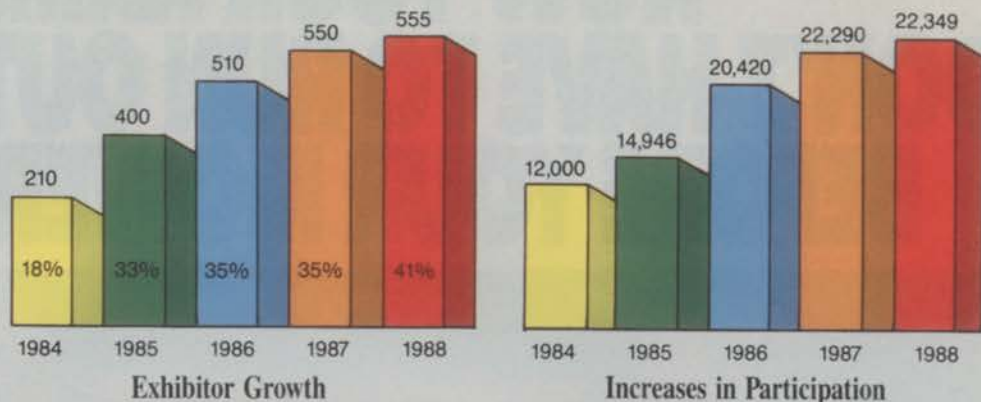
"It's convenient to come to this show. Other than the golf course show, no other show has the variety of equipment on display," Frazier said.

Increased interest from overseas buyers and exhibitors has also boosted attendance at this show. More than 1,000 attendees and exhibitors are expected this year — more than double that of three years ago.

In the random survey, 1,000 of the EXPO 88 buying audience was surveyed. Here are some of the results:

- More than 78 percent of the survey audience were planning to return to this year's EXPO. About 51 percent made that decision while attending the 1988 show.
- Twenty-nine percent of those responding were first-time EXPO attendees; the others were well-distributed over two to five years of attendance. The survey also indicated that one-fifth of the audience has attended EXPO

## 1984-1988 PARTICIPATION



\*Percentages indicate nonpower representation

Exhibitor and attendee participation has grown substantially since the show's inception in 1984.

every year since its premiere in 1984.

• The annual attendee survey showed that new products were again the number one attraction for the retailers, distributors, manufacturers representatives and others who attended. About 45 percent indicated that new products was their primary reason for attending.

• The purchasing power of EXPO attendees was demonstrated by the fact that 83.3 percent of the attendees are a buying influence, compared with 78 percent in 1987. Fifty-eight percent of these have the final say in purchasing products. Others specify suppliers and make recommendations.

• The estimated total dollar value of purchases ordered by

firms as a result of attending EXPO 88 was almost \$400 million.

• Top-selling product lines at the 1988 EXPO were: mowers; mowing accessories and attachments; power equipment replacement parts and supplies; trimmers and accessories, sweepers and vacuums; engines; generators and supplies; chain saws and accessories; blowers and ac-

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cessories; shop tools and equipment; and brushcutters.

• One of the most popular features of EXPO is the outdoor demonstration area where attendees can try products before they buy. Eighty-five percent of those responding to the survey visited the outdoor demonstration area.

Louisville continues to be an inexpensive site for the trade show. Excluding products purchased at the show, 30.5 percent of the respondents said their trip to Louisville cost less than \$250. Fifty-three percent estimated the business trip cost less than \$500.

It's estimated, however, that EXPO uses more than 20,000 hotel room nights in Louisville. In addition, Louisville's largest trade show generates an estimated \$17,000,000 for the city.

Some of the new products to be displayed at EXPO 89 include: a weed control fabric from Agri-Tex Inc.; a 15-h.p. compact V-belt-driven truck debris loader from Billy Goat Industries; 44- and 60-inch hydrostatic drive

riders from Exmark Manufacturing; a 15-h.p. power mulcher from Goossen Industries; an eight-cubic-foot twin bag catcher from The Grasshopper Co.; a seeder dethatcher and a self-propelled drop spreader from Salsco Inc.; a chain saw from Shindaiwa Inc.; and rotary valve carburetors from USA Zama Inc.

While attendees never seem to get enough of new products, show management is hoping that seminar interest will increase. The seminar schedule has been juggled somewhat to avoid conflict with other show events. For instance, many of the seminars have been moved to the afternoon rather than the morning when many attendees prefer to visit the outdoor demonstration area before it gets too hot, Frazier said.

This is also the first year that some seminars have been exclusively designed for the commercial end of the business in recognition of attendee interest, he said.

This year's seminar schedule includes: "Increasing Sales to the Commercial Market," sharing

with the audience 10 specific, low-cost things retailers can do to draw or increase commercial market sales; "Panel on Co-Op Advertising;" "Automating Your Office for Efficiency and Profit;" "Climatic Changes and Their Effect on Lawn & Garden Business," in which the editor of a national newsletter dealing with the long-term effects of climate will share information industry professionals will need to know to withstand the possibility of another drought and other climatic changes; "Merchandising for Maximum Sales and Profits;" and "The Customer is Always Right," the keynote speech.

EXPO's keynote speech will be held Wednesday, Aug. 2, from 11 to 11:50 a.m. Keynote speaker Stew Leonard will discuss his remarkably successful grocery store which has been featured in *The New York Times*, *International Herald Tribune*, *Success* magazine and on the PBS special, "In Search of Excellence."

Today, Leonard's store serves 100,000 customers weekly — many of whom drive as far as 50

miles to shop regularly at the store. Leonard's employs more than 550 people with sales approaching \$100 million in a single location. He attributes much of the business' success to an ingrained concept of listening to the customer.

The keynote speech is planned for the final day of the show to help maintain attendance over the three-day period. In fact, next year's show will be held Sunday through Tuesday rather than Monday through Wednesday, according to Sellers.

It's predicted that the Sunday start will better spread attendance over the three-day show, bringing some visitors in on Saturday and others in on Monday, he said.

The program schedule also includes an "All-American Engine Repair Championship," a 30-minute written test for participating dealers and technicians. The event will be offered about four times throughout the trade show. Sightseeing tours of Louisville, the Kentucky Derby mu-

(continued on page 71)

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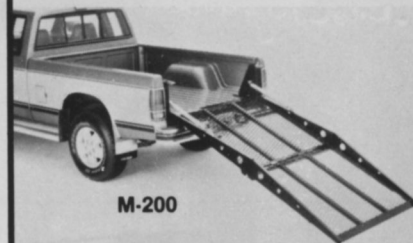
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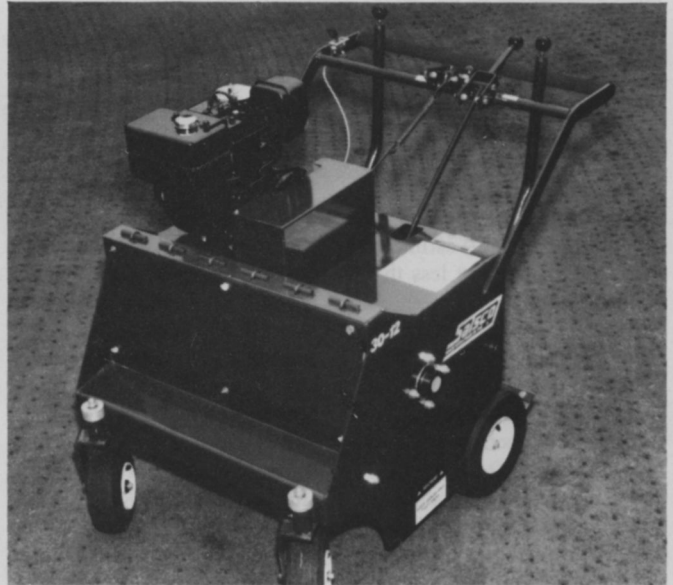
# PROFIT



## 30-6S CORE AERATOR

Combining speed and finger-tip maneuverability, the 30-6S is capable of aerating 25,800 square feet per hour, with a hole depth of 4". That can translate into 12 to 16 average lawns each day.

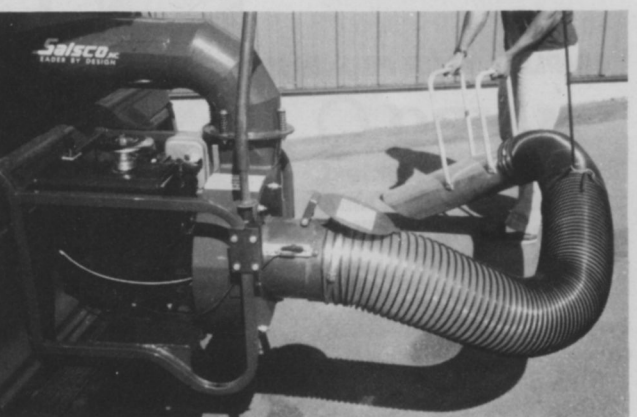
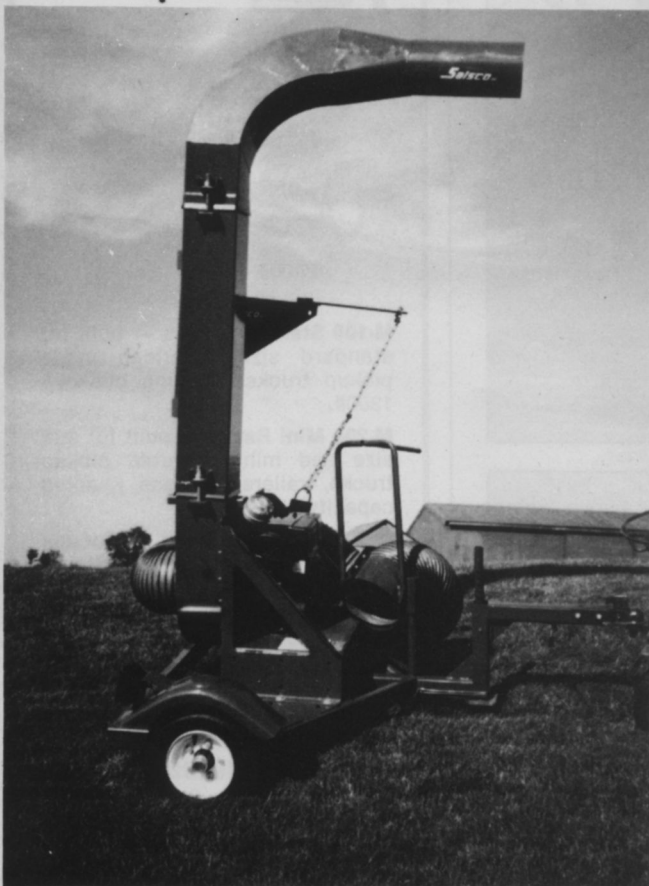
Manufacturer's suggested list price: \$3,999.99\*



## 30-12 CORE AERATOR

The premier greens aerator on the market, the 30-12 is capable of coring 13,900 square feet per hour, turns in a 15" radius while aerating, and cleanly penetrates to a depth of 4".

Manufacturer's suggested list price: \$4,799.99\*



## 708 TAILGATE TRUCK LOADER

Powered by an 8 h.p. Briggs & Stratton engine, the 708 channels leaves through a heavy-duty 8" hose into a 4-bladed impeller with 1/4"-thick steel blades. Swivel discharge chute allows loading and unloading. (Kawasaki engine option).

Manufacturer's suggested list price: \$1,249.00\*

## 716 LOADERVAC TRUCK LOADER

The 716 (and 720 option) is designed for those big clean-up jobs. Powered by a 16 h.p. Kohler, the 3/8"-thick steel impeller blades make leaf removal easy and efficient. Great options are available to make the 716 an independent trailer unit.

Manufacturer's suggested list price: \$2,822.99\*



# BY DESIGN



## 355 SLICER SEEDER

Powered by a big 10 h.p. Briggs & Stratton engine, this rugged machine can seed 18,000 square feet per hour. For maximum efficiency, the 355 seeds a 20" swath on 2" centers.

Manufacturer's suggested list price: \$3,799.99\*



## 380 SEEDER/DETHATCHER

With a 4-wheel drive for outstanding traction, the 380 is capable of seeding 22,500 square feet per hour. Just one lever lowers cutters, sets cutter depth, activates cutters and turns seed on.

Manufacturer's suggested list price: \$2,879.00\*



## 452 DROP SPREADER

With a big 50"-wide hopper, the 452 is the largest of the 450-Series Self-propelled Drop Spreaders. This fast, maneuverable machine can cover 57,200 square feet per hour.

Manufacturer's suggested list price: \$1,633.99\*



## 375 DEETHATCHER/909 HOPPER

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## Are They Really Doing What They're Cut Out to Do?

**O**N THE SURFACE, the business of string trimmers and edgers is humming along. The market is growing, at least for trimmers, and manufacturers can point with justifiable pride to several technical improvements in the evolution of these products.

Yet many landscape contractors are not as happy with this equipment as might be expected, and there are some other potholes in this market that should be approached with care.

Trimmers and edgers represent a relatively new aspect of the landscape industry. Six-blade edgers have been in existence about 40 years, but the first prototype of the nylon-line grass trimmer did not come along until 1972.

It was invented by a Houston entrepreneur, George Ballas, who called and trademarked his contraption a "Weed Eater." Poulan/Weed Eater of Shreveport, La., still retains the proprietary trademark, but the term "weed eater," now improperly carries a generic connotation for string trimmers in general, which are now produced by about a dozen different companies.

The current commercial edgers and line trimmers are one- to four-horsepower gas engine machines used to put the finishing touches on landscape or lawn maintenance jobs. The main difference between the two is that the edger has a blade which spins vertically and is used to cut the turf or grass at the edge of a sidewalk, while a trimmer cuts horizontally around fence posts and trees.

Bert Thompson, director of marketing, The Toro Company, Minneapolis, Minn., estimated that the commercial trimmer market has doubled in size over the past five years with current annual sales pushing close to two million units. The edger market, however, is pretty flat, with annual sales of about 250,000 units.

The reason for this discrepancy, Thompson explained, is that "edgers tend to last a long time, but commercial trimmers are used so much they're usually shot by the end of the season."

Thompson said there are a wide variety of models on the market, but there are distinguishing features which set off a quality product from the others. "Look for models with a straight rather

than a curved shaft, with a centrifugal clutch, as well as a primer which makes it easy to start."

Bill Chambers, vice president/marketing, HMC/The Green Machine, Long Beach, Calif., maintains that, for all practical purposes, technical perfection for trimmers has already been reached.

"I think ultimately the only area that may someday improve would be in some type of fuel-injection," he said. "But there have been, in the past three or four years, major improvements through the introduction of the lightweight, high-powered engine, with the advances in carburetion and electronic solid state ignition which makes the units very easy to start. They require relatively low maintenance.

"I think it's just a matter that the users finally beat them up and wear them out. I mean physically beat them up by throwing them in and out of trucks and that type of thing. There's no real technical innovation that's going to be introduced on trimmers that I've seen anywhere."

Although Chambers said that quality has already peaked in the past three or four years, from a sales standpoint, trimmers haven't reached their peak at all. "They're growing at the rate the landscaper force is growing. So we're looking at somewhere in the 12 percent to 15 percent growth rate."

While he doesn't see any new technical innovations on the horizon, Chambers sees as a major trend (which will help stimulate the increasing growth rate) the combination of different functions, such as that of a trimmer, edger, blower or cultivator all within the same unit.

The Green Machine has pioneered this type of versatility, but Chambers indicated that other



*It's estimated that the commercial trimmer market has doubled in size over the past five years. Photo: The Toro Co.*





## TRIMMING TIPS FOR MAINTENANCE OPERATORS

BEFORE TRIMMING, CLEAR THE IMMEDIATE AREA of loose objects. Gravel, sticks and debris can become hazardous projectiles in the path of a high-velocity cutting line or blade.

Whether you're clearing brush or grass, keep people and pets at a safe distance. Preferably 30 feet or more away.

As you work, keep a firm grip on the machine with both hands and make sure the harness is securely fastened. If tangl-

ing becomes a problem, turn off the power and remove excess cuttings by hand.

If trimming near vulnerable young trees or easily damaged structures, use the shortest line length and reduce operating speed to midrange rpm.

Avoid impact-shock cutting with pounding blows. This can end or break a steel blade and result in possible harm.

*Illustration: Shindaiwa*

manufacturers are already jumping on the bandwagon.

But doesn't this complication of a basically simple machine increase its potential for breaking down as well as require more maintenance?

"Well, what happens is that the engine itself sees more uses because not only is it used as a trimmer application, it's also now being used as a blower or an edger," Chambers responded. "So it's perceived life by someone may be that it didn't last. But he forgets that he's using it for so many items. The maintenance itself is less of a problem and less expensive than each individual machine. An edger can cost close to \$350, but we're talking about an attachment for \$90. You're seeing a substantial savings when you can buy a complete system for around \$550."

Turco Manufacturing Inc., Minneapolis, Minn., produces edgers, but has generally stayed away from trimmers. However, as Advertising Manager George Kinkead explained, the coming trend is for edgers to become more multi-purpose machines. These will include a right angle blade to give a sharp edge around flower beds or trees, a disc blade used as a conventional edger and a V-blade to provide a nice trench along the sides of a sidewalk.

"Landscapers are going to get tired of having solitary equipment, and will look for multi-purpose machinery," Kinkead said. "He'll find he is better able to compete by providing more and more services."

Kirby Mitchell, vice president/

operations, Maruyama U.S. Inc., Redmond, Va., said his company has developed two new engines for trimmers which increase durability, are lighter and have lower vibrations through the use of high tech bushings and bearings in the gearhead and shaft. Mitchell, however, agreed with Chambers in that there are no major changes taking place in this market.

Yet he points to what might constitute a very significant change in the future. "I'm speaking of the noise and pollution factor," he said. "California will force us to make changes. It's not a big factor at the moment, but it will be. The whole industry is wondering how it will meet this challenge."

It would be an irony if the "weed eater," which began as an electric product, were to return to that state rather than its current gas-powered status. "We're looking to see if there's a niche for an electronic product," Chambers said. "California, and I understand Montgomery County, Md., are implementing regulations concerning noise problems. Anywhere you have condos and people trying to sleep while landscaping is going on, you're going to have limits on the use of power equipment. Even lawn mowers."

Lawn and landscape maintenance contractors have a problem, however, with the electric unit because of its cord. But within five years this alternative will be feasible, Chambers said. "We've actually built prototypes that we're testing now. (Their use) is going to be dictated in some markets, not from user demand,

but legislation."

Still yet another industry issue surrounds the quality of foreign vs. domestic brands. The same factors which impact everything from automobiles to semiconductors also impact landscaping equipment.

"What the top commercial import manufacturers have noticed over the past couple of years is that with the dollar weakened against the yen, domestic manufacturers have chosen to compete by downgrading quality, by using quality as an expendable item," said Greg Imus, marketing director, Shindaiwa Inc., Sherwood, Ore.

When asked whether this situation might reverse now that the dollar has started to skyrocket, Imus replied, "It will have to do a lot of skyrocketing before it gets back to where it was two to three years ago."

In any event, Imus's contention seemed to have some support from industry contractors.

Tom Mann, president, The Caretakers Inc., Twin Cities, Minn., said he can't comment on foreign brands, since he hasn't used them, but said he has tried virtually every American make of trimmer.

"Trimmers are the weakest link in the machinery chain," he said. "We use them an awful lot and I've never felt they were really reliable. We used to buy the expensive type, but now have decided it's better to buy the inexpensive type and throw it away at the end of the season, since we'd have to throw the expensive model away anyway."



"One unit we had to keep adjusting with a screwdriver to keep running. And I remember another which worked well with a choke until it was replaced with a primer. Now we're having carburetor problems. If American manufacturers want us to keep doing business with them, they'd better start putting out a better product."

On the other hand, Mann said, he's had no problems with domestic edgers, but added that edgers in the Midwest are not used that much, especially when compared to California, whereas his trimmers run close to five hours a day.

Chris Pompeo, vice president/operations, Landscape America, Warren, Mich., is another who doesn't use foreign models, but has a similar story as Mann to tell concerning domestic brands.

"It seems that these machines, line trimmers and edgers, are being manufactured as cheaper and cheaper products. For instance, it used to be that the wheels had a metal rim, but now they're plastic, and we're always going through new wheels," he said. "I have to believe that this market is so competitive that manufacturers are cheapening their products to keep costs down. It's so frustrating for a commercial user to see innovations go backward instead of forward. It seems that manufacturers are more attuned to the residential user, who will pull out the unit once a week to use for one or two hours, as opposed to someone like me, who will use it eight hours a day five days a week."

Pompeo recognized there are manufacturers who are putting out commercial grade mowers which are more durable, but said they're still not durable enough. "We're not getting more bangs for the buck."

Neville Croft, general manager, Urban Thickets, Hamilton, Ohio, said the solution his company has come up with, in terms of edgers at least, is not to use them. "We do edging by hand and can do it almost as quickly," he said.

He explained that part of the problem is that it takes a skilled operator to get the most out of that type of equipment, and that employee pay scales in this industry don't nurture that kind of talent.

An edger from The Toro Co. (right). The new reciprocator from RedMax. (below)



But the other part of the problem, he said, "is that we've gone through blades at a hellish rate. Except for long stretches of straight sidewalk, we just don't find them cost-effective. I'm sure manufacturers could do more to make the units more mobile, require less maintenance and be easier on the blades."

Steve Grace, manager, Cedar Landscape, Hillsboro, Ore., has tried both foreign and domestic brands. He said that all have improved in some respects.

"For instance, at one time you had to let the machine cool down before you could start it up again. But now generally all are easier to start, even if they're warmed up." He added, however, that "The foreign ones seem better. They're lighter and are better engineered. Domestic brands have carburetor problems which make them flood out and not run as well."

Grace added that one difficulty he has with foreign models is getting parts in a timely fashion. "I don't like to wait to get parts from Japan."

But "Pete" Chandler, a Lawn Doctor franchise owner, Knoxville, Tenn., has any potential part problems taken care of through a local distributor who keeps the parts for her foreign manufacturer on hand. "We've tried several brands of trimmers," she said. "The foreign brand we chose is more durable from an owner's point of view, and the employees seem to like it better."

Kip Lankenau, vice president,



Lankenau-Damgaard & Associates Inc., Dallas, Texas, said string trimmers generally "could be better engineered. The line spins so fast you can't tell how far it's going out. There needs to be some sort of guide to allow you to see limits and to trim more accurately."

However, Lankenau maintained that "The reliability of the equipment has increased over the past two to three years. There might be two to three dozen brands of trimmers and edgers on the market, but only four or five brands make their own motors. There used to be a problem in power, but transmissions have improved across the industry."

In terms of domestic firms lagging behind in this improvement, Lankenau said, "I don't agree with that at all. The serviceability of our equipment has improved. It's been a gradual improvement. In terms of plastic vs. metal wheels, I don't have a problem with plastic wheels so long as they can be replaced."

The biggest problem, in Lankenau's terms, is "the common parts available for most dealers. There is a considerable variance of service among dealers in different parts of the country. This is probably the weakest link in the chain. How well or poorly dealers stock parts can make or break a market for a particular manufacturer. What manufacturers need to do is choose dealers more prudently and carefully."

There is a puzzling inconsistency to this business of trimmers and edgers. On a theoretical level, there is an obvious distinction between a commercial and a consumer product. However, in practice, these distinctions often seem to blur. A partial cause may be that the first trimmer, the "weed

eater," started out as a homeowner product, and manufacturers have regarded the commercial machine as a variation of this first, and still primary market, rather than as something entirely different in terms of intended use.

And, a more specific cause might be that many of the smaller lawn and landscape operators start out with the more inexpensive residential machines and gradually evolve into the tougher models.

There may very well be other and more important causes. Nevertheless, what does seem clear is that although manufacturers have made impressive strides in improving their machines during the relatively brief history of their existence, the users generally see the need for much more improvement.

The single most glaring need that remains is one which manufacturers and landscape contractors agree on: commercial trimmers last only a single season while edgers seem to last longer because they're not used nearly as much.

Manufacturers tend to place the blame on the users, saying they're too careless with the machinery, especially in terms of loading it and unloading it from the trucks. However true this may be in isolated instances, it's hard to believe that landscape contractors across the board are so careless that they allow their expensive equipment to be destroyed in such an ongoing and thorough fashion.

In short, if there is, or is to be, a thoroughly professional category of commercial trimmers and edgers, the durability of the products should be the number one priority. — Michael Major ■

The author is a free-lance writer based in Port Townsend, Wash.



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# White Grubs: The Most Troublesome Turfgrass Pest?

**W**HITE GRUBS ARE the larvae of scarabaeid beetles, the adults of which are known as May or June beetles. Several species of white grubs can be found throughout the United States.

In the East and Midwest, the most troublesome species is the Japanese beetle, *Popillia japonica* Newman (Tashiro 1987). Other pestiferous species can also be found such as the European chafer, *Rhizotrogus majalis* (Razoumowsky); the Oriental beetle, *Maladera castanea* (Arrow); the Northern masked chafer, *Cyclocephala borealis* (Arrow); and the black turfgrass ataenius, *Ataenius spretulus* (Haldeman).

In contrast, the white grub complex in the West is composed of several species in the genus *Cyclocephala*. Among those are *C. hirta* Le Conte, *C. pasadenae* Casey, *C. longula* Le Conte, *C. melanocephala* (F.) and *C. immaculata* (Oliver).

The pestiferous status of white grubs is of a dual nature. First, the perennial turfgrass ecosystem is conducive to pest population buildup and perpetuation especially in mild climates which allow for turfgrass growth throughout the year. This undisturbed habitat with a continuous supply of food has the potential of sustaining grub populations on a seemingly year-round basis.

The second aspect contributing to the grubs' pestiferous status is the nature of their life cycle and feeding damage. When adults emerge in May and June, they mate and lay eggs in the turfgrass root zone. First instar grubs hatch and start feeding on the roots, they molt twice, and by late summer third instars cause the majority of the above ground damage symptoms. The problem, therefore, stems from the discrete

feeding by the younger instars. This damage is usually inconspicuous and tends to go unnoticed until it is too late to rectify the situation.

At present, white grubs are controlled with insecticide applications once, and often twice, per season. In 1985, approximately 40,000 pounds (18,200 kg) of pesticides were applied on turf in California alone.

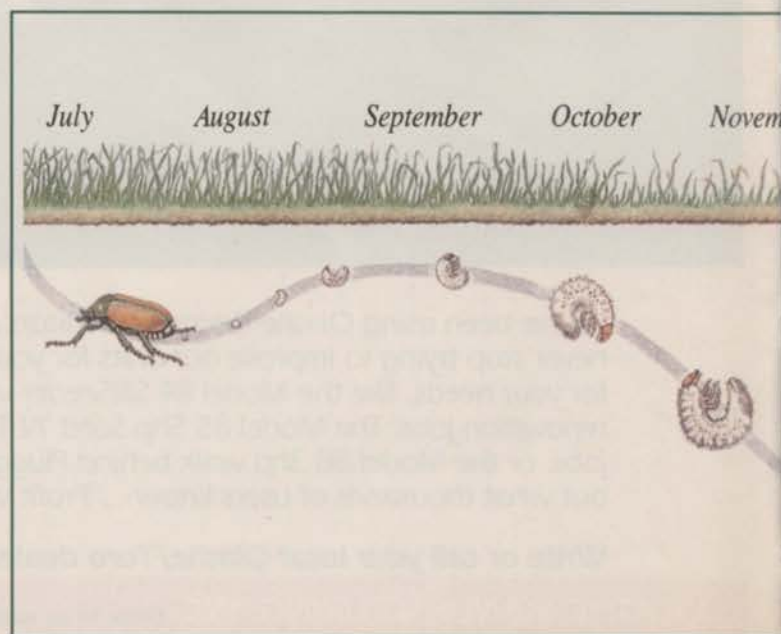
Despite one recent introduction of an insecticide for grub control, the overall availability of effective insecticides is continuously diminishing due to the slow rate at which new commercial products reach the market.

The development of resistance to both old and new insecticides is also an issue of major concern. The older chlorinated hydrocarbon insecticides such as aldrin, dieldrin, chlordane and DDT have become obsolete partly because of environmental concerns, and partly because of resistance development.

Several epigeal pests such as webworms, *Crambus sperryellus* (Klats) and *C. bonifatellus* (Hulst.); billbugs, *Sphenophorus parvulus* (Gyllenhal); and chinch bugs, *Blissus leucopterus hirtus* (Montandon) and *B. insularis* (Barber), have developed resistance to the chlorinated hydrocarbons (Reinert 1982; Reinert and Niemczyk 1982). Other pests such as the greenbug aphid have been shown to possess resistance to yet another extensively used class of insecticides, the organophosphates (Reinert 1982).

Fortunately, insecticide resistance has not developed as widely in white grubs or in other hypogaeal insects.

According to Harris (1982), the ideal turfgrass soil insecticide has to be moderately persistent, moderately soluble in water and moderately volatile. None of our commercially available insecticides at present possess all three qualities. Additional factors responsible for inconsistent results





with turf insecticides include short residual activity, inadequate distribution of deposits, soil pH, moisture and temperature. Even under optimum conditions of low thatch and high soil moisture, Sears and Chapman (1979) reported a rapid degradation of a commonly used insecticide after two weeks, resulting in a soil concentration less than 1 percent of the initial amount applied.

Biological control of white grubs may be accomplished through the use of parasites, predators or pathogens. The majority of studies addressing this subject have been conducted on Japanese beetle populations in Japan; however, data is unavailable regarding its current distribution to cause substantial reductions in Japanese beetle populations in Japan; however, data are unavailable regarding its current distribution and impact in the U.S. (Klein 1982).

The use of predators to control white grubs can provide adequate

results inasmuch as a predator, unlike a parasite, can consume large amounts of grubs in a relatively short period of time. An example of this is the successful introduction of the giant toad, *Bufo marinus*, into Puerto Rico for June beetle and mole cricket suppression (Coppel and Mertins 1977). This approach to controlling grubs is limited, however, by the fact that the majority of vertebrate predators are considered pests in landscape settings. Birds, skunks and racoons usually tear up the sod while excavating for grubs, thus resulting in damage that is much more serious than that by grubs.

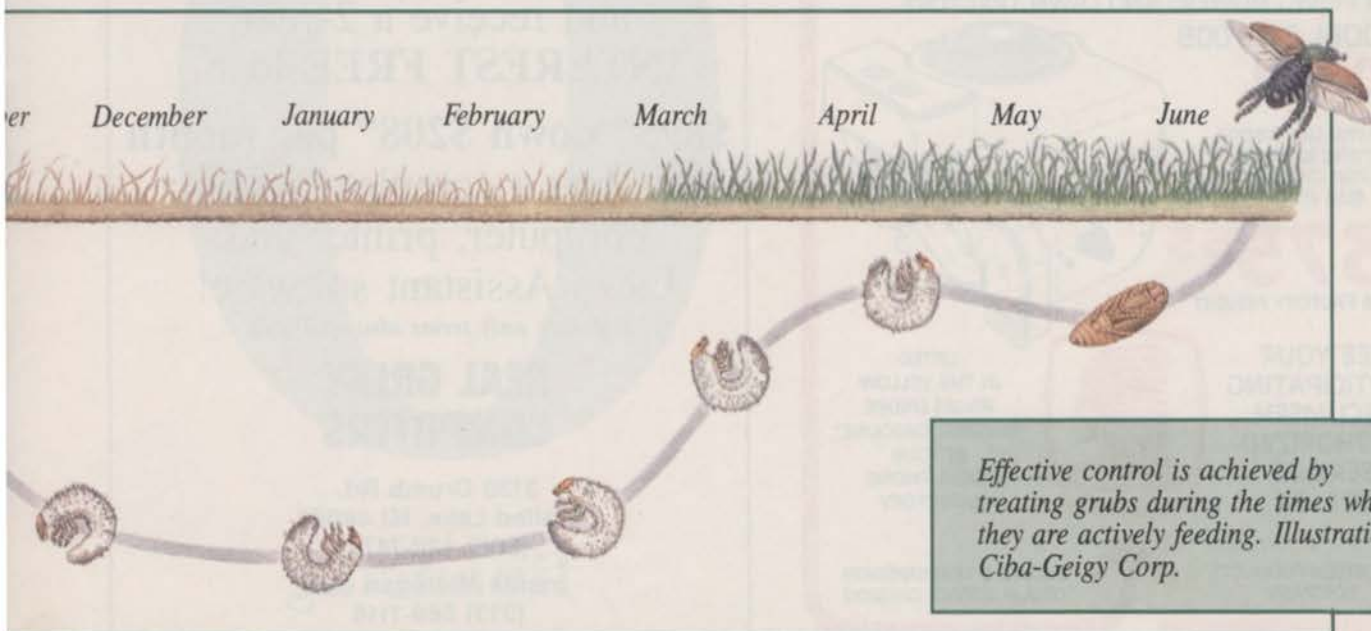
Two potentially promising biological control agents of white grub populations are the bacterium *Bacillus popilliae* and the entomogenous nematodes. Pursuant to passive injection by the grubs, the bacteria reproduce and release a toxin which kills the host. Nematodes, on the other hand, actively seek their host



Illustration:  
Ciba-Geigy Corp.

(pest insect) and penetrate the body either through natural openings (mouth, respiratory openings, anus) or through the cuticle (skin). The nematodes kill their hosts through the action of their symbiotic bacteria such as *Xenorhabdus nematophilus* and *X. luminescens*.

Two nematode families seem to offer the greatest potential for biological control (Kaya 1985). The first is Steinernematidae with the species *Steinernema glaseri* and *Neoplectana carpocapsae* (= *S. feltiae*), and the second is Heterorhabditidae with species in the genus *Heterorhabditis*.



Effective control is achieved by treating grubs during the times when they are actively feeding. Illustration: Ciba-Geigy Corp.



As with other biological control agents, once successfully established, the bacteria and nematodes should continually sustain their numbers on the white grub populations. Since moisture is the most critical factor to nematode survival (Moore 1973), it is likely that the optimal edaphic moisture levels in well-maintained landscapes and golf courses will be conducive to nematode persistence.

Therefore, a single timely application of either bacteria or nematodes, properly conducted may result in multi-season control of white grubs. This, in turn, will lead to a reduction in labor and maintenance costs as well as reduced exposure hazards to people and pets.

The bacterium *B. popilliae* is the casual agent of milky spore disease in Japanese beetle grubs.

These bacteria are commercially available and have been used in the East and Midwest (USDA 1973, 1976). The high degree of specificity between the bacterium and its host incurs an added benefit through the elimination of

exposure hazards to non-target organisms.

The earliest work reported on the use of nematodes for grub suppression was by Glaser and Farrell (1935). These authors reported successful control of Japanese beetle grubs with the nematode, *Neoapectana glaseri*, both in small and large field plots in New Jersey. Additionally, they reported that burying the nematodes at depths of three to four inches provided a better method of introduction and resulted in longer persistence than spraying them on the soil surface.

Wright et al. (1988) reported greater than 90 percent control of third instar Japanese beetle grubs with *Heterorhabditis* spp.

A recently completed study by the author documented the field efficacy of nematodes against thatch-inhabiting insect pests of turfgrass (Ali et al. 1988). Cutworms infesting a sod farm were treated with selected rates of *N. carpocapsae* and *H. heliothidis*. Evaluations conducted four days after treatment revealed up to 70 percent cutworm mortality

due to *H. heliothidis*. The significance of this is twofold. First, control levels achieved with the nematodes were comparable to those by currently registered insecticides. Second, and more importantly, is the safety aspect which renders these biological control agents a superior and more desirable alternative to insect pest management.

**GREENHOUSE STUDIES.** Studies were conducted in the spring and summer of 1987 at the University of California, Riverside, to determine the influence of selected nematodes on white grub mortality in the greenhouse. The nematodes investigated were *Neoapectana carpocapsae*, 'All' strain; *Heterorhabditis heliothidis*, 'NC' strain; and *Heterorhabditis*, sp., 'Hp 88' strain. One gram of tall fescue 'Hound Dog' seed was sown in individual six-inch (15.24 cm) pots filled with stream sterilized soil containing 1:1, UC mix: sand.

Third instar grubs of *C. pasadenae* were collected from a golf course and held for seven days to

establish their nematode-free status. Ten grubs were then placed in each pot. The pots were placed in a greenhouse located at the UCR Citrus Research Center, Riverside. The nematodes were acquired from Biosys, Palo Alto, Calif.

The nematode species *N. carpocapsae* and *H. heliothidis* were applied at four rates 5 X 10<sup>3</sup>, 5 X 10<sup>4</sup>, 5 X 10<sup>5</sup> and 5 X 10<sup>6</sup> nematodes/pot to each of six pots. Total drench volume was 500 ml (17 oz.) per pot. Grub mortality was determined two and four weeks after application. Both species provided acceptable grub mortality.

*Heterorhabditis heliothidis* resulted in slightly higher mortality averaging 95 percent and 100 percent, after two and four weeks, respectively. Due to mite contamination and high grub mortality in the untreated check, the study was repeated in the summer of 1987. Similar procedures were followed with three modifications. *Heterorhabditis heliothidis*, 'NC' strain was substituted by *Heterorhabditis* sp., 'HP 88' strain;

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each treatment/rate combination was applied to three, instead of two pots; and *C. pasadenae* grubs were substituted by *C. hirta*.

*Heterorhabditis* sp., 'HP 88' strain, provided greater control than *N. carpocapsae*. There were highly significant ( $P < 0.001$ ) linear relationships between percent grub mortality (Y) and the log concentration of *Heterorhabditis* sp. (X). These relationships can be illustrated by the regression equations:  $Y = -74.5 + 29.8 X$  ( $R^2 = 0.78$ ), and  $Y = 76.9 + 35.9 X$  ( $R^2 = 0.61$ ), for the two and four week counts, respectively.

Results from these studies in California confirm the superior performance of *Heterorhabditis* species in controlling grubs as shown by Villani and Wright (1988) in New York state. Studies are planned to document the practicality of using those nematodes in actual field situations for white grub control.

Results from those studies as well as from similar studies by researchers in Ohio and New York will be used to economically incorporate the use of entomo-

genous nematodes into an overall integrated pest management strategy for white grubs in turfgrass. — A. D. Ali ■

*The author was formerly an extension entomologist at the University of California, Riverside.*

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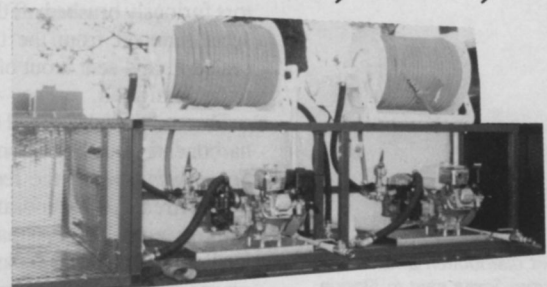
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# The Rapacious Insect Ravages its Way Across the South

**T**HE TWO AGRICULTURAL inspectors at the California-Arizona border weren't eager to crawl deep into the jam-packed moving van from Fort Lauderdale, Fla., that had just pulled in. But the truck's manifest listed a dozen large plants rooted in tubs of soil, and California bans such items: the soil may harbor a crop-threatening nematode. The plants would have to be removed and burned.

But as the tubs were jarred and jostled, the inspectors were confronted with something more directly threatening than a plant parasite. Swarms of tiny red ants boiled over the tubs and spilled out into the truck and onto the inspectors' bodies, going to work with their pincerlike jaws and venomladen stingers. The inspectors furiously brushed off the insects, jumped from the truck, sealed it, and sent it out of state to be fumigated.

Three of the tubs turned out to harbor entire bustling colonies of *Solenopsis invicta*, the red imported fire ant, with thousands of workers, eggs, larvae, pupae and fertile queens. The ant ranks high among the potential scourges on

California's hit list: *S. invicta* is insatiable, aggressive and frightfully fruitful, and it can devastate valuable citrus trees. So it's not surprising that California makes the effort to inspect the millions of vehicles that enter the state each year.

Yet, although officials won a small battle by stopping those ants in the moving van, it's only one battle in a war they believe they will likely lose. Since its accidental importation from Brazil in the 1940s, *S. invicta* has spread across much of the South, and it's continuing to expand its range. Arizona inspectors recently found fire ants in such unlikely conveyances as a truck loaded with frozen chickens and another carrying — of all things — drums of pesticide.

"The best we can hope for is a delaying factor," said Dick Brown, a biologist for the Pest Exclusion Branch of the California Department of Food and Agriculture. "I doubt we'll be able to keep the thing out in the long haul." Indeed, last August the state's first infestation as found in a Santa Barbara nursery; the ants were probably trucked in

hidden nursery stock. Eradication efforts began immediately.

One reason for the pessimism is that *S. invicta*, which is already a remarkably rapacious colonizer, appears to be developing a new trait that could allow it to overwhelm even the most intense control efforts. Until recently the fire ant was known to live just as most of the other 8,803 ant species do, in small colonies centered on a single queen. A decade ago the typical infested pasture would have some 50 mounds poking an acre, with a lone queen in each mound capable of producing a swarm of worker ants and young winged females that would fly off and make new colonies.

"Now we've really got a problem," said Roger Mulder of the Texas Department of Agriculture's pest management program. Over the last several years agricultural and fire ant specialists across the South have found single colonies that accommodate many fertile queens instead of just one; some house 500 or more queens, all of which are busy reproducing.

This makes controlling the ants considerably more difficult than it already was. "It used to be you'd knock out one queen and you got rid of the mound," said entomologist Michael Mispaigel of the University of Georgia.

"Now there may be hundreds of queens in the mound. Even if you knock out 99 percent, you still have a mound."

Whatever prompted the change is a mystery. Even in the ants' home range in South America researchers have found no multiple-queen behavior. It's wild, weird, wonderful stuff," said B. Michael Glancey, who has been studying the ants for the U.S. Department of Agriculture for 30 years. "We're seeing evolution in

Fire ant distribution and activity from Texas east to Florida. Source: Maag Agrochemicals, Inc.

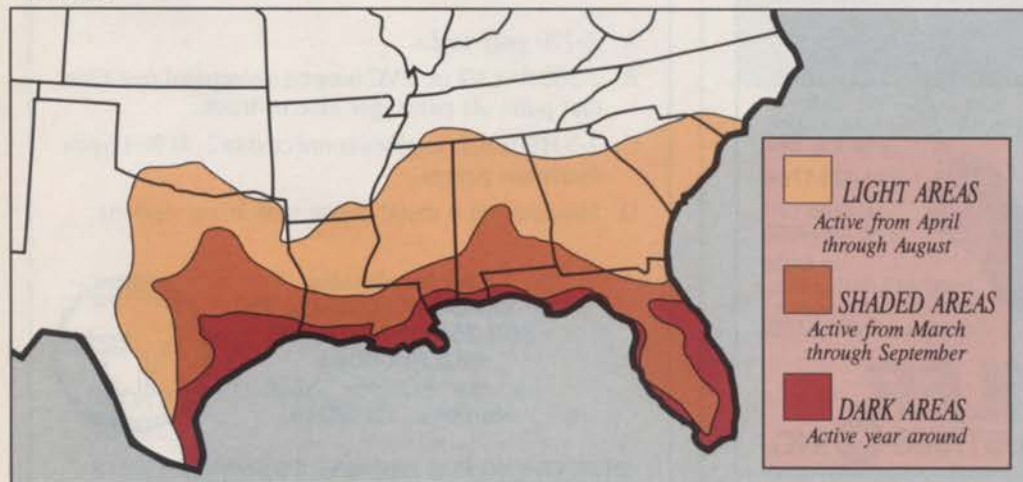






Illustration: Maag  
Agrochemicals, Inc.

action. There are only two places in the world where you can see that: bowerbirds in Australia and fire ants in America." But bowerbirds aren't wreaking havoc; fire ants are.

They have been known to damage almost everything they encounter, whether animate or inanimate. Biologists have reported bird nestlings being devoured and, in the drought of last year, thirsty ants reaping germinating seed in the field before it could sprout.

From North Carolina come reports of roadbeds that subsided and crumbled when fire ants built mounds beneath them; the ants, which apparently are attracted to electric current, have been damaging airport runway lights, burning out electric outlets and short-circuiting traffic lights as dozens of the insects cram into the control boxes and eat through insulation.

And in Ellis County, Texas, future home of the multibillion dollar Superconducting Supercollider, architects will have to design underground components and wiring to deter the ants, which infest the site.

Farmland is especially vulnerable. *S. invicta* cuts soybean yields, kills seedling orange trees and stings farm workers and animals; and since calves and fawns tend to stand still when frightened they can be killed as a marauding swarm envelops them.

The ants build cement-hard, foot-high mounds that catch the

sun's rays to keep the colony running on cool days. That's all well and good for the ants, but the damage the mounds cause to farm equipment costs U.S. farmers several hundred million dollars each year.

And then there is the pain factor. Here is an insect with pinching jaws and a beelike sting, but which tends to attack in far greater numbers than bees do. When you get stung by a red fire ant, Glancey said, "you absolutely know you've been had by Mother Nature. *S. invicta* is a real pistol." The potent alkaloid venom produces an itching sensation that builds to a persistent burning as small pustules erupt.

Between 67,000 and 85,000 sting victims a year see doctors or go to emergency rooms for allergic reactions to fire ant stings. Occasionally the ants kill people. Among the millions of stinging victims each year are a small fraction who are highly allergic to the ant's venom. Just a year ago a 16-month-old girl in Pensacola, Fla., was pushed by her dog onto a fire ant mound. A swarm overran her, stinging her hundreds of times, and she died of anaphylactic shock.

*S. invicta* originated in the Pantanal, a large region of floodplains in western Brazil inundated each year by the waters of the Paraguay River. The regular flooding may have led to the evolution of the species' remarkable ability to colonize virgin terrain; after floodwaters subside, the ant that oc-

cupies a clean-swept area first has a clear advantage over other species.

The single-queen fire ant spreads as each colony produces wave after wave of winged, sexually active females and males. And fire ants produce far more of them per colony than almost any other ant species — one of the reasons for their success as colonizers. In spring and summer, usually around 11 a.m. on the morning following a rain, a swarm of males rises to an altitude of 300 to 800 feet and hovers. Although researchers have never observed the ants actually copulating, it appears that the females fly up through the cloud of males; at some point each couples with a male; the male passes along a packet of some 12 million sperm, then drops dying to the ground, its one brief purpose in life achieved. Workers below scavenge the bodies for food.

The females, now considered queens, also descend. Some of the fallen queens are killed by workers from established single-queen colonies. But over the next four hours the survivors shed their wings and dig burrows; within two days they'll turn all their energy to the task to which they will devote the rest of their life: laying eggs. The first few eggs are infertile and will serve as food for the offspring. The next 15 or 20 eggs are crucial, for they produce a first generation of workers, without which a queen would soon starve.



To feed the growing larvae, the queen metabolizes the muscles and other tissue once used for flying and regurgitates a rich liquid.

In a behavioral adaptation that seems to ensure the survival of new single-queen colonies, as many as 20 queens — each many times larger than even the largest worker — will sometimes cluster together and begin to lay eggs. Fire ant queens can lay several hundred eggs a day, fertilizing them with sperm held ever since the once-winged queen went on its nuptial flight; the queens are somehow able to keep the sperm alive for several years. All the queens but one eventually die, leaving a larger brood of workers to serve the remaining queen.

It is presumed that *S. invicta* first made its way to the United States in the hold of an anonymous ship that docked in Mobile, Ala., some 40 years ago. Its cousin *Solenopsis richteri*, the black imported fire ant, had arrived in the same port in 1918. Yet despite its earlier arrival the black ant was quickly dominated by the red newcomer.

*S. invicta* has since remained undaunted by North America's indigenous ants, which include several less aggressive fire ant species. "The imported fire ant is such an unusually prolific, weedy species," said Harvard biologist E.O. Wilson, who has studied the ants since the 1940s. "It spreads with astonishing swiftness."

In defiance of one of the largest, most expensive and most ill-conceived eradication experiments in the annals of insect control (an effort that Wilson calls the "Vietnam of entomology"), *S. invicta* spread throughout the South as it hitchhiked in the roots of nursery stock or in shipments of sod. From 1957 through 1977, at a cost of some \$200 million, converted World War II bombers powdered millions of acres with the insecticide Mirex. It has since been shown that Mirex can degrade into a compound harmful to wildlife and humans. In addition, researchers have found that areas temporarily abolished of all ants by nonselective toxicants are often recolonized faster than ever by *S. invicta*.

In one experiment at the University of Florida at Gainesville, entomologists applied a



Venom from a fire ant sting produces an itching sensation that builds to a persistent burning as small pustules erupt.

nonselective insecticide to an area where the total ant population was just 1 percent fire ants and 99 percent other ant species. After four years, the relative proportions were exactly reversed, with fire ants constituting 99 percent of ant inhabitants.

Red fire ants now occupy 400 million acres of pastures, playgrounds, orchards, parks and city streets, from the Florida Keys to the Carolina coast, from southern Texas to southern Oklahoma and Tennessee. In the past two years 14 more Texas counties have fallen as the ant moves westward at a rate of 10 to 15 miles a year. Until last year it was moving about twice as fast; the dry Southwestern desert seems to be slowing *S. invicta*'s westward progress. It's too early to know if the multiple-queen lifestyle will accelerate the ants' spread, but most entomologists believe that it will.

The multiple-queen phenomenon was first found in 1972 by Glancey, in the town of Hurley, Miss. — now known in fire ant circles as Queen City. Glancey noticed an unusually dense pattern of mounds on a dirt bank running along the edge of a ditch next to the town's garbage dump. When he turned over a shovelful of one mound, amid the familiar churning of tiny red workers he could

easily discern dozens of queens, their oversized bodies rising like islands in a red sea. "I took out maybe a hundred queens," he recalled.

For almost a decade the startling find was assumed to be a fluke, perhaps a consequence of the abundant food provided by the dump. But around 1984 reports of such mounds started coming in from Georgia, Louisiana, Texas and Florida. Only in the last three years have entomologists concluded that the phenomenon is no fluke after all, but a fundamental and baffling change in the ant's behavior.

Besides being far more prolific — thanks to the tremendous number of queens — the multiple-queen colonies are also packed much more closely together, with as many as 500 mounds per acre where there was previously a maximum of 50. In one closely studied field in Marion County, Fla., that is infested with multiple-queen colonies, entomologists have found an average of 7,809,300 ants per acre. That works out to 179 ants per square foot. And some parts of the field had more than 22,569,400 ants an acre, or 518 a square foot.

Not only are the mounds more numerous; hundreds of them seem to be part of a single close-

knit community of ants — a "supercolony," as some entomologists call it. While the single-queen colonies are antagonists, the multiple-queen colonies all seem to be socially linked, Mispagel said. "The single-queen colonies are totally independent," he added. "If you put a worker ant from one mound onto a nearby mound, the ants fight. But with the multiple-queen colonies, things are completely different. There seems to be a lot of communication among mounds. If you put one ant onto another mound, the ants don't fight."

The connection between mounds may in fact be more than just social. Recently researchers at Texas A&M University have found some multiple-queen colonies to be connected by tunnels.

Wherever the new style appears, it soon dominates the landscape. Multiple-queen supercolonies easily outcompete not only other ants but also the good, old-fashioned single-queen fire ant that was once considered such a terror. "Now in Florida you can hardly find a single-queen pasture," Glancey said, who works in the U.S. Department of Agriculture's Insects Affecting Man and Animals Research Laboratory in Gainesville, a lab complex devoted almost exclusively to fire ant research. Glancey has watched as fields of single-queen mounds in central Florida — including the fields surrounding his lab — have been swamped with multiple-queen *S. invicta* in the space of a year or two.

"This has enormous implications," Mulder said. "Once you get these multiple-queen colonies, the only thing left out there is fire ants. No more birds, lizards, mice or other insects. Just fire ants." In multiple-queen territory, which is so densely carpeted with workers, overall diversity of ecosystems appears to be reduced, said S. Bradleigh Vinson, a longtime fire ant researcher at Texas A&M. The ants kill and eat anything that they can gather or immobilize. Said Vinson, "If any animal out there makes the slightest mistake — doesn't jump or isn't on its toes all the time — it's a goner."

Because it has proved to be such a pest, the fire ant has become the most closely studied ant species in the world. And for decades people ranging from



huge agricultural chemical company researchers to government scientists to backyard inventors have been trying to come up with a sure-fire weapon. More than 8,000 chemicals have been screened to see if they kill the ant. Generally, though, insecticides have failed to work. Many were simply ineffective. Others were shown to cause tumors in humans. Tests of such contraptions as the wind-powered McCoy Ant Stomper show that mechanical solutions aren't any better.

The focus of research now is on biological weapons, including natural pests from *S. invicta*'s South American home and the ants' own pheromones, or airborne chemical attractants. Pheromones can be used to develop enticing toxic baits that are carried deep into a mound by foraging workers. The bait then poisons the ants or upsets their physiology — in one case, preventing a queen from laying eggs — and causes colonies to fall apart.

Much of the work is being done at Glancey's home base in Gainesville. Inside a cluster of

small buildings, floor-to-ceiling racks hold dozens of uncovered white plastic trays, each containing thousands of fire ants. The workers swarm around their food, which they digest and then regurgitate to feed the queen and developing larvae. (It's often said that a colony has a "communal stomach" because of the endless sharing of food.) Each tray holds half a hard-boiled egg, a small cup of honey and a pile of dead houseflies — insects are an indispensable component of the ants' diet; without them their exoskeletons soften. The raised sides of the trays are painted with a Teflon-like paint that prevents the eversearching workers from getting a grip on the walls and escaping. At the core of each colony is a petri dish with a damp plaster base that provides essential moisture for the development of eggs, larvae and pupae.

But the ants aren't limited to the laboratory. All around, the lawns and fields are pocked with sandy, spongy spots marking the presence of fire ant mounds — multiple-queen, of course. A

quick kick to a mound will elicit a flood of red dots. Several fields have been set aside as outdoor laboratories.

Along with their main duty, which is to find a chemical or biological means to stop the ants, Glancey and his colleagues are addressing some of the fundamental biological puzzles raised by the insect. "It's a joy to work with an enemy that's not a wimp," said Glancey, eager for the fight. "Compared with the fire ant, the roach is a wimp." They are decoding the ants' complex chemical communications system, by which the ants tell friend from foe, identify their queen, and lay trails to mark the presence of food.

Glancey reels off just a few of the unanswered questions: How is it that in multiple-queen regions, the ants of one mound — which are normally hostile toward any neighboring queen or her horde of workers — appear completely comfortable around their neighbors, exchanging food, touching antennae and moving on? And what prompted the change in behavior — some en-

vironmental factor, lack of competition from American species a new hybrid?

Wilson said the change must at its root be genetic — the expression of some previously dormant gene or a new combination of genes, or an entirely new mutation. But why has the change popped up independently around the South? It's not as if some chance mutation occurred in a single queen and then slowly spread from a single location as her offspring dispersed. That's another mystery.

One of the only things that is clear is that the change works. "Whenever a species is able to maintain a denser population in a stable manner," Wilson said, "it tends to prevail over other species in competition."

No one knows just how large a multiple-queen colony can get, although an experiment at the Gainesville lab reveals they can get very large indeed. Fluorescent dye was mixed with food and fed for four days to ants in a single mound in a half-acre field filled with multiple-queen fire ant

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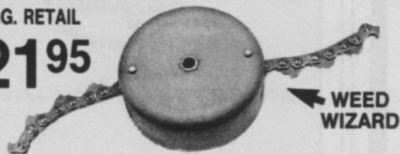
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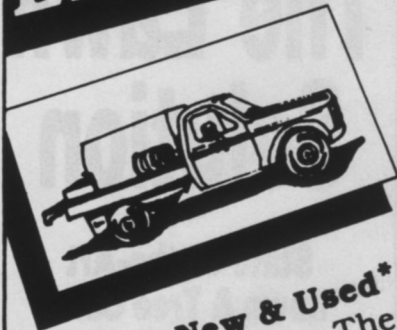
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mounds. One week after the last feeding, hundreds of ants were taken from mounds all around the field and examined for the dye. Sure enough, the dye showed up in ants from mounds as far as 114 feet away.

The Gainesville lab is also attempting to determine where the extra queens come from. There is speculation that they may cluster together right from the start — although that would hardly account for the hundreds of queens found in some mounds. The group recently published a report showing that newly mated queens can be adopted by prowling workers, brought into a mound and somehow accepted and nourished and their brood cared for. The experiments that led to that conclusion, however, initially failed.

"We collected a number of newly mated queens," Glancey said, "and painted one hundred of them orange, one hundred yellow and one hundred white, then released them in areas around the lab." After a week colonies at the points of release were dug up. Not a

single painted queen was found. Thinking that the paint may have been groomed off the ants or worn off, the researchers repeated the experiment with a new marking system: tiny metal bands slipped around the ants' narrow "wasp" waists. They got the same result: no queens were found. When 300 banded queens were introduced to multiple-queen colonies reared in the lab, all were killed within a week. So much for the adoption theory.

Or so they thought. Ten months later, while working on an unrelated experiment, the entomologists dug up 15 mounds in a pasture a short distance from the laboratory. "Lo and behold, we found in one of the mounds four of our orange-marked queens," Glancey said. The pasture was 65 yards from the spot where the ants had originally been released.

In evolving a supercolony, the fire ant appears to be following in the footsteps of three of the most successful and widespread ant pests in the world, the Argentine ant, the pharaoh's and one called *Pheidole megacepha-*

*la*, all of which thrive in massive colonies tying together myriad nests.

Wilson has noted that a single colony of pharaoh's ants commonly occupies an entire building. "It's a serious pest in hospitals," he said. "Worker ants track across all sorts of septic material and open wounds." The Argentine ant and *P. megacephala*, he said, are locked in a "titanic struggle" for dominance of dry, temperate and subtropical regions around the world. "Sometimes one wins, sometimes the other. In Bermuda today, for example, they divide up the island between them."

Meanwhile, the red fire ant is tightening its grip on the Southern United States. Many entomologists believe that the northward spread of *S. invicta* will be halted at the Mason-Dixon line, beyond which winter's cold may impede it. But Glancey points out that carpenter ants and other species common to temperate climates don't seem to be bothered much by winter.

Moreover, fire ants have displayed a remarkable ability to im-

provise and adapt; in the recent drought the moisture-seeking ants frequently moved their colonies inside homes. And they're not just a pest of rural fields and suburban lawns; fire ant nests have been found deep in the downtowns of many Southern cities.

Where eradication was once the watch-word of federal officials and politicians from fire ant states, control is now the most hopeful word on people's lips. And when pressed, those familiar with fire ants wonder whether even that can be achieved. Addressing the 1988 Imported Fire Ant Conference, Georgia State representative Henry Reaves stated what may well end up as man's credo for dealing with an entrenched antagonist: "Down my way, we have more or less accepted them, work with them, kill a few and get stung." — *Andrew C. Revkin* ■

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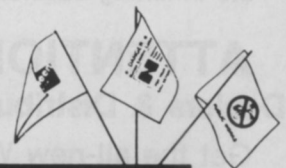
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### KENTUCKY BLUEGRASSES COMMON STAPLE IN NORTHERN REGIONS



Widely adapted to the northern cool-humid climatic (CHC, CHW) region; with some cultivars doing well in the transition (T) and semi-arid (CSA, TSA) regions.

BLUEGRASSES ARE THE BASIC turfgrass throughout the cool humid regions of the United States and Canada for a variety of reasons, but mainly because of its foliage color, texture, growth habit and spring greenup.

Some cultivars of the turfgrass also do well in the transition and semi-arid regions, particularly if they're irrigated. Southward extension, however, is limited by disease and heat stress.

The bluegrasses are widely adapted, but prefer moist, well-drained, fertile,

medium-textured soils with a pH of 6 to 7. Some are better adapted to soil conditions which limit iron availability.

The foliage color of bluegrass is generally medium to very dark green; its foliage texture fine to medium with excellent uniformity; its density of cover is considered high with uniform cover; its growth habit is low; its low temperature color is considered excellent; and Kentucky bluegrasses are said to carry good characteristics for mowing, shade tolerance, cold, heat and drought tolerance.

Bluegrass is an excellent sod forming grass because it develops from spreading rhizomes and consequently heals rapidly following injury.

Other characteristics of bluegrass include:

- Widely adapted within cool humid regions.
- Grown under most soil conditions, it performs best on fertile, non-acid reacting soil.
- Low growing grass with a large amount of foliage remaining below a normal one- to two-inch mowing height.
- Forms turf of high density and vigor — these are assets in warding off weed invasions.

• New cultivars have improved disease resistance compared with common or natural Kentucky bluegrass.

• Where use of irrigation water is restricted, bluegrasses enter a normal, safe growth recession and summer dormancy much like their winter dormancy. Upon return of normal rainfall, they greenup again.

• Rate of fertilizer use varies with cultivar from two to four pounds of actual nitrogen per 1,000 square feet per year. Use a standard turf fertilizer to supply this.

• Bluegrasses are slow to germinate and establish, as a result, a fine-textured seed bed covered properly with mulch will aid in developing a uniform stand.

Seed Standards:

- 95 percent pure.
- 80 percent germination.
- 1,300,000 seed per pound.
- Two pounds seed per 1,000 square feet seeding rate for 18 potential plants per square inch.

For sports fields, Kentucky bluegrass should be fertilized at a rate based on soil testing in one to two applications per growing season. For lawns, parks and cemeteries, fertilizer should be applied up from one-half to one pound per 1,000 square feet in one to two applications per growing season.

Sports fields should be irrigated as needed to prevent visual wilt, and immediately after each game. In the absence of rain, it's recommended that areas such as lawns and parks be irrigated deeply — six to eight inches soil depth — one to two times per week.

Recommended mowing frequency for Kentucky bluegrass sports fields is two to three times per week. Once a week, however, is generally sufficient on lawns, parks and cemeteries.

Cutting heights vary according to regions, but 0.7 to 1.2 inches is an accepted standard on sports fields. Home lawns and parks, however, will perform well at heights of one to two inches. — *The Lawn Institute*

### 1989 COMMON, PROPRIETARY BLUEGRASS FORECAST

THIS YEAR'S COMMON Kentucky bluegrass crop should see a significant improvement over last year's, however, the proprietary Kentucky bluegrass crop will remain about average.

There is a reported 15 percent to 20 percent increase in the total common Kentucky bluegrass acres. There is some damage in Washington due to cold temperatures and winter-kill, however, the Idaho common acres are reported to be about average overall. Quality is expected to be good.

There will be selected shortages on some of the lower seed yielding varieties, as new acres are becoming more difficult to obtain because of competing commodities, according to

Jacklin Seed Co., Post Falls, Idaho.

Some competing crops include wheat, corn and other grain products.

Even with average predictions, acreage of proprietaries will be sufficient if there is no major increase in demand, according to LESCO Inc., Rocky River, Ohio. Weather through winter and spring has been somewhat dry, but recent rains have improved growing conditions.

Prices should remain relatively stable barring any unforeseen problems i.e., weather related — rain, severe heat, drought, etc., — between now and harvest.

And despite misconceptions people have had about blue-

grasses in recent times, a new generation of bluegrasses is expected in the next two to three years. While sod growers have remained devoted to the bluegrasses in recent years, many lawn or landscape operators have turned to other varieties before spending the money for quality bluegrass seed, according to industry experts.

As a result, the newer perennial ryegrasses and turf-type tall fescues have been readily accepted — not just as an alternative, but because of their good adaptability and fine performance in many areas.

Industry observers agree, however, that maintenance professionals will return to the bluegrasses as prices fall and new varieties become available.



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# FOCUS ON: LAWN MAINTENANCE

## CUSTOM-MADE PROGRAMS OFFER CUSTOMERS PERSONALIZED CARE



Maintaining effective weed control is just one service offered by this successful company.

FOR GARY COOPER OF VIRGINIA Beach, Va., retirement from the military marked the beginning of a full-time career in lawn maintenance. This former Marine Corps Lieutenant Colonel is now owner and operator of Cooper's Lawn Aeration Service, a successful, quality-oriented turf operation in the Tidewater area.

With the help of his family and seven part-time employees, he offers his customers a unique brand of personal attention that encompasses such services as aeration, fertilization, seeding, soil testing and pest control.

"When we made lawn care our full-time profession, we decided that whatever services we offered would represent the best or the 'cutting edge,'" Cooper said. "We offer a personal approach that's

oftentimes lacking in the service industry."

Cooper admitted that compared to other lawn maintenance companies his services are not inexpensive. "But we give good personal care. It's what we call the custom approach." With a customer attrition rate of under 4 percent, this technique obviously yields excellent results.

Today, Cooper has 345 full-service clients with more than 90 acres of lawns to service. About 90 percent of his customers are located in the Virginia Beach area with most having fescue lawns. He may add 25 more customers to his list before the end of the 1989 season, but he will not sacrifice quality for volume.

"There are two ways to increase business: increase your customer base or increase the types of services offered," he said. "We have chosen to raise our revenue through additional services." This year, he has added shrub and ornamental tree fertilization to his list of ever-expanding enterprises.

His full-service program includes 10 or more monthly visits, extending from February or March through December. The initial visit entails a close inspection of the lawn to see how well the grass has fared during the winter months. A personalized letter which lists the recommended treatments for spring and summer follows.

Each customer receives a second letter in August, which recaps treatments over

the past six months and evaluates the necessary steps to prepare his or her lawn for winter dormancy.

Cooper initiates his total lawn maintenance program with carefully timed weed control treatments. For preemergent crabgrass control, he uses Team® with fertilizer in March, then applies Chipco® Ronstar® brand herbicide with fertilizer in May on his commercial accounts.

As another preventive weed control measure, Cooper uses certified seed when planting new lawns or replacing established lawns. "Since using certified seed, less than 10 percent of our customers have experienced weed problems, compared to an 85 percent rate with non-certified varieties," he said.

With his summertime fungicide treatments, he adds liquid iron to the application because it helps the grass survive better during stress periods. It also gives an instant greenup following treatment.

A variety of sources help keep Cooper updated on new products and general information relating to the turfgrass industry. Each year, he attends the Virginia Turf Conference and Virginia Horticultural Conference, where researchers present the latest available data.

Cooper shares his pool of knowledge with his customers, who also provide useful feedback on the efficacy of control materials. He said his customers see the day-to-day conditions of their lawns and the company educates them on what products they are using.

His seven-man work team consists of active duty coast guardsmen, sailors, marines and college students. Cooper structures service calls to accommodate his employees, who work for him mostly on weekends and in the afternoons.

For a man who once dreamed of becoming a sergeant in the military and the owner of a small family farm, Cooper's reality has surpassed his expectations. — Andrew Seckinger

The author is a product manager for Rhone-Poulenc Co.



Kevin Cooper (foreground) and his father, Gary (background), treat a customer's lawn for weeds. Photos: Rhone-Poulenc Co.



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"I first used AQUAGRO about seven years ago on a bluegrass lawn with thatch-bound roots. Over a three year period I saw a 50-75 percent reduction in the thatch layer from the bottom; the roots penetrated the soil about three inches and I eliminated the hot-spots. About 90 percent of my customers are on an AQUAGRO program, which I often combine with verticutting. As tough as this summer was, the difference in appearance between treated and untreated lawns was obvious...and that keeps my customers happy."

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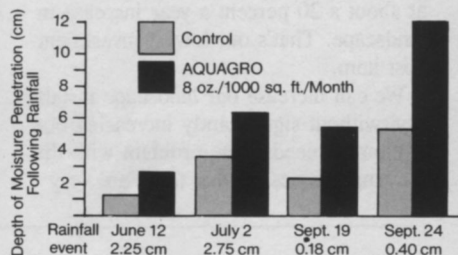


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"I am using AQUAGRO Spreadable on about 80 percent of my jobs. Drought conditions have made my customers more interested in products that can both reduce water use and keep their lawns alive. It's clear to me that the wetting

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## Fullcare

(continued from page 18)

strong will and be persistent because it's tough. You have to be flexible; you have to be able to come up with plan B immediately.

I've had probably 10 opportunities to fail for every one I've had to succeed. You have to set goals and keep sight of where you're going because it's awfully easy when you're driven by things that you can't control, to get frustrated. And there's so many things in this business that you can't control. So if you have a big, big ego, it's not the place to be.

**Q:** What long range goals do you have for Fullcare?

**A:** Our long range, five-year plan is to grow the landscape business at about twice the rate that we're going to grow the maintenance business. We're looking at about a 20 percent a year increase in landscape. That's our lowest investment cost item.

We can increase our landscape installation without significantly increasing our equipment needs. The problem with the mowing business is that there are very

few economies to scale. If you increase the number of jobs, you have to increase equipment and people.

I guess the other major problem with the mowing business is that it takes about one-third more equipment to operate in the spring than it does in the summer and fall. Maybe not quite a third, but it's going to be 20 percent to 30 percent more because you're mowing on shorter cycles. Our guys average 50 to 55 hours a week in the spring, but there's no way around it.

**Q:** What can you do to increase your profits based on the market's current pricing level?

**A:** We have to develop a client base that's not totally price sensitive. We've tried to develop a client base that's willing to pay a little bit more in order to have the dependability, the quality, the reliability, the backup, the supervision and all those things that cost more money.

We base all of our charges on costs. In mowing we go by an hourly cost. Your labor is hourly, your equipment is going to wear out on a somewhat hourly basis. We take what we consider the life of the mower and convert that to hours and come up with a cost per hour. You have to fac-

tor into that the original cost. If you finance it, you have to put interest in it. So we come up with an hourly cost on the machine. We come up with another cost to maintain it, a cost to operate it along with fuel, maintenance and other operation costs.

**Q:** Do you have any regrets about entering the lawn and landscape maintenance industry full-time?

**A:** It's been a tremendous struggle, there's no question about it. It's probably the hardest thing I've ever done and ever will do. But I don't look back; it's just very rewarding.

It's definitely frustrating, there's no question. You can be the best manager there ever was on earth, and Mother Nature can out-manage you any day of the week. But it's that uncertainty; that's my style of management more so than being in a real predictable calculated environment.

There are times when I wish it wasn't as unpredictable as it is, but I think I'm more suited to that. I've never been bored. —  
*Cindy Code* ■

*The author is Editor of Lawn & Landscape Maintenance magazine.*

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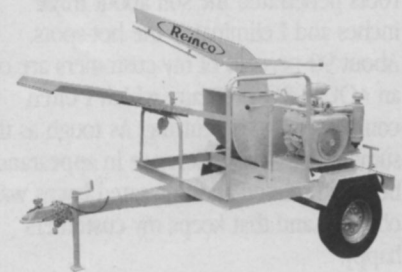
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The revolutionary Lawnaire 28 combines the technology and precision of golf course aeration with the demands of lawn maintenance. Its reciprocating, crank mounted tine arms feature a vertical coring action similar to larger Ryan aerators. Tines penetrate straight in to a depth of 2½ inches, and come straight out. The results are a more professional-looking job, better root development, greener lawns, and more satisfied customers.

## Make more money by the yard.

Because time is money, the Lawnaire 28 is designed to cover big jobs quickly — up to 24,000 sq. ft. per hour. But because not every job is big, it's also compact and maneuverable. Just 34 inches wide, the Lawnaire 28 easily fits through yard gates. The unique tricycle front wheel gives the unit a zero turning radius while aerating!

Even the tightest spots are no problem. And because it's a Ryan, you can rest assured that the Lawnaire 28 will keep you on the job and out of the repair shop for years to come.

Check out Ryan's reliability in your own backyard. Contact your Ryan dealer and ask for a free demonstration today. Or call toll free: **1-800-228-4444**.

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Circle 60 on reader service card



## BENEFITING FROM AN IRS APPROVED, TAX DEDUCTIBLE HOME OFFICE

MANY LAWN AND LANDSCAPE maintenance professionals operate their businesses from their homes, or at least maintain an office at home. The tax deduction for home office expenses is one of the most difficult to justify — but also one of the most popular.

Whenever a lawn or landscape maintenance professional works from an office in his or her home, the expenses of maintaining that home, such as mortgage interest, insurance, utilities and repairs become tax deductible — at least to the extent that they can be tied in with the business use. Unfortunately, this tax deduction is limited and a deduction is allowed only for the portion of the contractor's home that is used regularly and exclusively:

- as a place to meet with customers or suppliers;
- as the principal place for carrying on his trade or business; or
- in connection with his trade or business (in the case of a separate structure not attached to the contractor's home).

What's more, the Tax Reform Act of 1986, added even more restrictions. First, all deductions relating to the leasing of a portion of the taxpayer's home to his employer are now barred completely. This rule also extends to an independent contractor who leases to the individual for

whom he performs services.

Under that same 1986 tax law, the home office expense deduction for expenses allocable to the use of the home is limited to the excess of the gross income of the home office business activity over the sum of the expenses that are allowable whether or not the home is used for business — i.e., mortgage interest, taxes and casualty losses and the business expenses that are not allocable to the use of the home i.e., wages, supplies, etc. Of course, any deduction not allowable because of this limitation may be carried forward to the next tax year.

Put another way, certain expenses such as mortgage interest and taxes are tax deductible regardless of whether there is any business usage of the home. If the home office does not generate sufficient income to cover both the ordinary business-related deductions related to the home and those that are business related regardless of where the office is located, home office expenses can't be deducted.

Confusing, but not enough to make anyone completely ignore the home office deduction. A good illustration of just how an unwitting landscaper can become caught in the home office expense trap is provided by the tax law's definition of "dwelling unit."

How many contractors have constructed

a separate shop or office building to house their lawn or landscape maintenance business? Unfortunately, under the home office rules, a separate structure may actually fall into the category of a "dwelling unit" without being designed as such. After all, the tax law states that the term dwelling unit includes a house, apartment, condominium, mobile home, boat or similar property — and all structures or other property "appurtenant to" such unit. The U.S. Tax Court has stated that one thing is appurtenant to another thing if it is directly related to the latter.

Imagine the surprise of one landscape contractor who had gone to the trouble of constructing a separate office building in his backyard expressly to house his contracting business. Unfortunately, the tax court ruled that the separate office building located in the backyard was appurtenant to his residence, and thus subject to the home office restrictions.

Obviously, the rules governing tax deductions for the expenses of maintaining a home office are both restrictive and potentially confusing. The reward, however, of taxes saved make this one tax deduction deserving of more study.

Consider, for example, the requirement of "exclusive use" for purposes of the home office deduction. This merely means that the room or portion of the house for which the landscaper is claiming the home office deduction must be used solely for the purpose of carrying on the trade or business. However, this rule does not apply where a portion of the home is the sole, fixed location of the taxpayer's retail or wholesale sales business and is used to store inventory.

The expense of operating an office in the home, whether as an adjunct to the principal place of business or even as the principal location of the lawn or landscape maintenance operation, are legitimately tax deductible. But, there are restrictions and limitations. — Mark Battersby ■

The author is a tax and financial adviser in Ardmore, Penn.

### LIMITATIONS ON HOME OFFICE DEDUCTIONS

CONSIDER STEVE SMITH, a teacher who operates his landscaping business from his home. Further assume that 25 percent of the general expenses

of his home are allocable to the home office. Steve's gross income and expenses from the landscaping operation are as follows:

Gross Income .....		\$25,000
Home office expenses:	Total	Allocable to office
Interest and property taxes	\$8,000	\$ 2,000
Insurance, maintenance and utilities	2,000	500
Depreciation	6,000	1,500
Total home office expenses .....		4,000
Expenses allocable to the activity (supplies, compensation paid, etc.) .....		\$24,000
Total expenses .....		\$28,000

Steve must apply both the deductions allocable to his activity and the deductions for taxes and interest allocable to the business use of his home (\$26,000) against the gross income from his landscaping activity (\$25,000) to determine the limitation on the home office deduction. Because the limitation amount (-\$1,000) is zero or less, he may not deduct his home office expenses for depreciation, insurance, maintenance and utilities. Thus, he has a business loss of \$1,000 from his landscaping activity and he must carry forward the unused \$2,000 of home office expenses to a succeeding tax year.



# PROFESSIONAL LAWN CARE ASSOCIATION OF AMERICA SPECIAL 10TH ANNIVERSARY CONFERENCE & SHOW NOVEMBER 6-9, 1989



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Professional Lawn Care Association of America, Suite C135  
1000 Johnson Ferry Rd NE, Marietta, GA 30068-2112    ALA    DIR

• **CELEBRATE!** PLCAA's Conference and Show is always the lawn care industry's event of the year, but PLCAA/Las Vegas '89 will be something special — the official 10th Anniversary celebration of the founding of the Professional Lawn Care Association of America. You won't want to miss the exciting 4-day round of special events planned to mark this milestone in lawn care history.

• **EDUCATE!** Three tracks of education will help you "Plan Your Business" into the '90's, with discussions of employment, water, finances, government regulations, and pesticide safety. Ample opportunities will allow for informal information exchange among colleagues.

• **EVALUATE!** The latest in lawn care products and technology await your inspection. Over 160 manufacturers, suppliers and distributors will be on hand, eager to answer your questions and demonstrate the tools you need to keep a competitive edge.

Each morning of the Conference and Show we will present a New Product Expo. Learn what will be state-of-the-art in the 1990s and how your business can profit from new technology and new chemistry.

• **PARTICIPATE!** This 10 year celebration of lawn care comes around only once, so don't miss it! Don't wait to hear about it from your friends, be there to experience for yourself what all the excitement is about. Experience Las Vegas, spectacular showplace of America where the Stars come out to play every night.

Watch your mail in early summer for registration information, or call PLCAA for information 1-800-458-3466, and mark your calendar for a trip to Las Vegas!





## All Spray Pattern Indicators are not Created Equal. Even Ours.

There's a good reason. And that's why we make two. **Dy'on** and **Dy'on 'W'**. Dy'on is the original spray indicator . . . the first to show where you sprayed . . . a temporary dye that can be scrubbed off, bleached off, or will slowly fade away in sunlight. Dy'on is also recommended as a pond and lake dye. Other diluted products are worth far less.



Dy'on 'W' (washable) is not a dye but a temporary colorant that needs no scrubbing or bleach to remove. It is equally easy to see as Dy'on yet will rinse off hands, driveways and walkways quickly and easily.

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Mills



Perz

RAIN BIRD RECENTLY NAMED **KEN Mills**, vice president/sales and marketing of its turf division. Mills will oversee the sales and marketing activities of commercial and residential irrigation products sold nationwide.

Since joining Rain Bird in 1964, Mills has served as irrigation systems designer, district manager, golf irrigation specialist, sales manager, product development manager and director of sales and marketing for both the ag and turf divisions.

Jacobsen Division of Textron recently appointed **Dave Buchanan** as marketing communications writer and **John Ruffolo** as Midwest dealer sales manager.

Buchanan will be responsible for public relations and the writing of promotional and marketing materials. Ruffolo will handle the promotion and sales of Jacobsen commercial mowing equipment through the company's dealer network in eight Midwestern states.

**Ben Fisher** was named regional sales manager for Weather-matic's South Central region. He will be based at the corporate headquarters in Garland, Texas, and will support and assist distributors, contractors and specifiers in the Dallas/Fort Worth area, northeast and western Texas, New Mexico, Oklahoma and Arkansas.

In related moves, Weather-matic appointed **James Goodrich** as technical services manager and **Don Cooper** as product manager.

Goodrich, previously South Central regional sales manager, will now handle customer technical assistance, development of service manuals, technical service seminars, warranty administration and technical bulletins.

Cooper, formerly technical services manager, will now work with sales, engineering and manufacturing in new product development.

**Bill Perz** was recently appointed tech-

nical service representative for Ransomes Inc. Perz is responsible for Ransomes national technical assistance program, product training for distributors and dealers, as well as general assistance in the field.

He has nine years experience in technical service of turf maintenance and has also served as president of Turf Equipment Service Technician's Association in Florida.

Monsanto Agricultural Co. recently appointed **Robert Rudow** as national accounts manager for its Lawn and Garden Business Group. As national accounts manager, Rudow will manage selective distributor accounts and coordinate marketing activities with key retailers for both Roundup® and Greensweep® product lines.

**Larry Kujovich** joined The Toro Company as vice president and general manager of Irrigation Products, Riverside, Calif. He joined Toro after 17 years with the Xerox Corp. He will now have responsibility for all activities relating to the engineering, manufacturing, sales and marketing of the company's line of irrigation sprinklers, valves and controllers.

The Dow Chemical Co. recently made several appointments and promotions.

**Jeff Reimer** was promoted to marketing resources manager of industrial and specialty markets for Dow.

He joined the company in 1980, previously working as a product marketing manager for industrial insecticides and turf herbicides. He will now be responsible for all marketing communications and research activity for the industrial and turf insecticide markets and the industrial and range herbicide markets.

**Mike Shaw**, turf market product technical manager, joins Dow's Industrial Insecticides and Turf Herbicides Group in Midland, Mich. He joined the company in 1986 and was previously senior development biologist for field technical service and development in Indianapolis, Ind.

**Neil McNeill** has been appointed sales specialist in the Industrial Insecticides/Specialties District, St. Louis, Mo. He was formerly in Dow's St. Louis Ag Crops District. He will be serving the lawn care and pest control industries in Iowa, Missouri and central and southern Illinois.

Sales Representative **Jim Rice** has been transferred to Birmingham, Ala., and will be responsible for the pest control market in Alabama. ■



# PRODUCTS

THE NEW GEAR DRIVEN TURBO J2 sprinkler from **Weather-matic** features an exclusive arc adjust ring. Located on the nozzle riser, the arc adjust ring permits quick adjustment of arc size from 40 to 360 degrees, even with water turned on.

Designed for use on residential and commercial turf areas, the TJ2 comes with a set of nine field changeable nozz-

les that match precipitation rates and adapt performance to site conditions. The flow tube design permits lower pressure loss through the sprinkler and allows for optimum nozzle performance.

**Circle 101 on reader service card**

THE NEW MODEL T-27 FROM **SHINDAIWA Inc.** features a 27.2 cc Shindaiwa

two-cycle engine offering 1.5 h.p. at 8,500 rpms. The drive shaft is one-piece steel and splined at both ends. It's fully dampened from vibration, well-balanced and comfortable to operate. The Model T-27 weighs 12.3 pounds.

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**AQUATROLS HAS CREATED THE**

advantage pellet, a solid formulation of AquaGro soil wetting agent. The pellet, applied through a special hose-end unit, allows turfgrass managers to spot treat localized dry spots, syringe and perform touch-ups as a supplement to their regular AquaGro program.

The AquaGro advantage system — consisting of the pellet and applicator — makes applying AquaGro convenient and safe for turf under any

## PRODUCT SPOTLIGHT

THE NEW FLOWABLE FORMULATION of Morestan 4 Ornamental Miticide from **Mobay Corp.** has been accepted by the EPA.

The new water-based flowable formulation is registered for use on flowers, shrubs and trees for control of mites and mite eggs. The water-based for-

mulation is free of solvents that can burn plants. The liquid flowable formulation is convenient, easy to measure and its general physical characteristics allow for greater efficacy.

The smaller particle size in the flowable formulation allows for more thorough distribution on the leaf surface, resulting in

better coverage and control. This formulation eliminates the problem of visible residues on practically all leaf surfaces.

Morestan 4 is available in quart containers and carries a "Caution" label. The product is available everywhere except California.

**103 on reader service card**

## MAKE MONEY DURING SLOW-SEASON DOING DRIVEWAY MAINTENANCE!



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Add big profits by adding driveway maintenance to your service package with the NEW MAX4 Multi-Purpose Power Pump Sprayer/Applicator from JEVCO!

MAX4 is also an ideal backup sprayer for lawn chemicals and fertilizers. MAX4 pumps fluids, powers air tools, acts as a blower, sprays paint, fills cracks, spreads coatings and much more!

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weather conditions. Each pellet treats as much as an acre.

The advantage applicator features a hose quick couple and comes complete with fittings for a one-inch hose and an adapter for a 3/4-inch hose.

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INCREASED SAFETY IS THE HALLMARK of **The RedMax** Reciprocator/SGC220DL, featuring revolutionary reciprocating blades.

The two reciprocating blades each contain 20 teeth that easily cut through heavy weeds or brush. The blades make for safer operation by eliminating the danger of debris becoming projectiles, eliminating the kickback from striking fixed objects and eliminating the possibility of a fractured blade becoming a projectile. The blades stop immediately when the engine is switched off. A solid state, electronic ignition assures quick starting of the high-performance, 22.5 cc engine. Weighing 14.1 pounds, the unit is lightweight and handles smoothly in those hard-to-reach areas. The cutting blades can be submerged to trim under water.

**Circle 105 on reader service card**

The Grasshopper Co. has added an 8-cubic-foot, slide-in twin bag option to

its Quick-D-Tatch® vacuum grasscatcher line. One person can easily dump clippings directly into a pickup bed or container.

Grasshopper also offers an 8-cubic-



The twin-bag option from Grasshopper Co.

foot, slide-in single bag catcher and a 13-cubic-foot lever-actuated metal hopper model. All Quick-D-Tatch units are deck-driven and can be removed in seconds, by simply pulling one pin.

**Circle 106 on reader service card**

RECYCLED CELLULOSE HYDRO-seeding mulch from **Applegate Mulch** is now available nationally. Applegate mulch has a low clay/ash content which allows for greater seed germination and offers a moisture content of about 7 percent, giving it greater coverage per tankful. In addition, Applegate is now adding a soil conditioner to all of its mulch.

**Circle 107 on reader service card**

**THE GREEN MACHINE'S** EXPAND-It System "Estate" (Model 2800) comes with a four-inch Tap-For-Chord trimmer head with brush cutter capability. It also has the ability to be interchanged with a variety of tools with the adjustment of a single wing-nut on the shaft.

Available tools include a weeder/cultivator, edger, power blower and snow thrower. Also available are an eight-point brush blade and nine-inch saw blade fixed line head for heavy-duty cutting. All tools are sold separately.

**Circle 108 on reader service card**

**THE WEED WIZARD™** PROVIDES the solution for cutting through the toughest of weeds, briars, grass and all types of rough vegetation.

The long lasting Weed Wizard is made of two 3 1/2-inch pieces of specially made saw chain which are held in place by tempered lock pins. Designed to fit most gas trimmers, it can be installed in minutes. The only thing that varies is the plated steel center nut.

This precision designed trimmer head is so versatile that it can be left on your trimmer all year round, cutting everything from light grass to weeds and light brush.

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## Attn: Lawn Care Professionals... Expand your business with Finn!



Become a part of one of the nation's fastest growing industries — the lawn establishment industry — by adding a **FINN T50 HydroSeeder** to your fleet. You already have your contacts with the builders; extend your services to them by providing the initial seeding of the lawns. Then, follow up with regular lawn maintenance. Hydroseeding is a natural companion to your existing services. Put a **FINN T50 HydroSeeder** to work for you.

### Standard T50 features include:

- Seed, fertilize and mulch up to 7,000 square feet per tank load.
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## EXPO Preview

(continued from page 4)

seum, Shelbyville and the star of Louisville lunch cruise are also available.

"An Evening with The Fabulous Judds" is another show highlight. They will perform Tuesday Aug. 1, from 6:30 to 9:30 p.m. Tickets are \$30 per person for dinner and the concert.

New show features include: the Hall of Yesteryear, the Innovative Products Award, the Ultimate Garden Tool Give-away and 1989 Exhibit Awards.

The Hall of Yesteryear provides the perfect contrast to the new technology on display inside the exhibit halls. The vintage equipment on display will run the gamut from rakes, hand tools and lawn vacuums to sprinklers, chain saws and early tractors.

The innovative product award will highlight the most original, beneficial and imaginative new product designs at the show. On Monday July 31, after reviewing the entries, a panel of judges will announce 10 award recipients and one overall winner.

As visitors tour the exhibit floor they will be able to see which products were chosen "best of show" on the basis of their designs and potential impact on the industry.

Exhibit Awards '89 will highlight the most creative, exciting exhibits at this year's show. Representatives of the Louisville Chamber of Commerce will be the impartial judges for this new feature. Winners will be announced Tuesday, Aug. 1.

Dealers will learn how to stage a grand opening in the popular Model Store, sponsored by the North American Equipment Dealers Association. The model store will also illustrate design and merchandising concepts and a parts and service area for specialized computer systems for parts inventory.

Seminar attendance and pre-registration for the trade show are free. Registration at the gate is \$5.

In addition to the OPEI, the following associations participate in the show's planning: Outdoor Power Equipment Distributors Association, Portable Power Equipment Manufacturers Association, Engine Service Association, North American Equipment Dealers Association and the National Equipment Servicing Dealer's Association.

For information on attending the International Lawn Garden & Power Equipment Expo, contact: EXPO 89, P.O. Box 70465, Louisville, Ky. 40270; 800/558-8767. Outside the U.S. or in Kentucky call 502/582-1672. — *Cindy Code* ■

*The author is Editor of Lawn & Landscape Maintenance magazine.*

## Night Lighting

(continued from page 30)

importance and presence of an effective lighting plan will continue to add a special dimension to the overall landscape architecture of your projects.

The landscape designer must keep an additional important consideration in mind. I quote from Bill Locklin, president of Loran Inc. "People expect good outdoor lighting to be expensive. Don't disappoint them. Charge enough for your services so that you will spend the time necessary to make a true lighting design

with practical applications. There is no more lucrative area for a lighting designer to express himself than the outdoors. Design and sell light—not fixtures.

An artistic challenge well met and an honest art well applied are the two goals which we as lighting designers can use to guide us. And nowhere are these goals more true, and more rewarded, than in the art of outdoor lighting." — *Richard Tomko*

*The author is president of Site Illuminations, Cleveland, Ohio. The company specializes in lighting design and sales.*

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# CALENDAR

## JULY 19

Facilities Management Workshop, University of North Carolina, Asheville, N.C. Contact: PGMS, 12 Galloway Ave., Suite 1E, Cockeysville, Md. 21030; 301/667-1833.

## JULY 25

1989 Midwest Regional Field Day, Purdue Agronomy Farm, West Lafayette, Ind. Contact: Barb Meyer, 317/494-7221.

## JULY 31 to AUG. 2

International Lawn, Garden and Power Equipment Expo, Kentucky Fair and Exposition Center, Louisville, Ky. Contact: Expo 89, P.O. Box 70465, Louisville, Ky. 40270; 800/558-8767.

## SEPT. 20-22

1989 Nursery, Landscape & Equipment Expo, Atlantic City, N.J. Contact: New Jersey Nursery & Landscape Association, Building A, Suite 3, 65 S. Main St., Pennington, N.J. 08534; 609/737-0890.

## SEPT. 22-24

Bonsai & Orchid Expo, Hyatt Orlando Hotel, Kissimmee, Fla. Contact: Bonsai & Orchard Expo, 26 Pine St., Dover, Del., 19901; 302/736-6781.

## OCT. 4-6

International Pesticide Applicators Association Annual Convention and Trade Show, Salishan Lodge, Glenden Beach, Ore. Contact: John Landon, P.O. Box 247, Clackamas, Ore. 97015; 503/222-3161.

## OCT. 8-11

Florida Turfgrass Association Annual Conference and Show, Curtis Hixon Convention Center, Tampa, Fla. Contact: FTGA, 302 S. Graham Ave., Orlando, Fla. 32803; 407/898-6721

## OCT. 10-13

The Associated Landscape Contractors of America Interior Plantscape Division Conference and Trade Show, Boston Park

Plaza, Boston, Mass. Contact: ALCA, 405 N. Washington St., Falls Church, Va. 22046; 703/241-4004.

## NOV. 6-9

The 10th Annual Professional Lawn Care Association of America Conference and Trade Show, Las Vegas, Nev. Contact: Jim Brooks, 1000 Johnson Ferry Rd. N.E., Suite C-135, Marietta, Ga. 30068-2112; 404/977-5222 or 800/458-3466.

## NOV. 7-10

New York State Turfgrass Association Annual Conference and Trade Show, Rochester Riverside Convention Center, Rochester, N.Y. Contact: Beth Seme, P.O. Box 612, Latham, N.Y. 12110; 518/783-1229.

## NOV. 12-15

Irrigation Association Annual Conference and Show, Anaheim Convention Center/Marriott, Anaheim, Calif. Contact: R.C. Sears, 1911 N. Fort Myer Dr., Suite 1009, Arlington Va. 22209-1630; 703/524-1200. ■

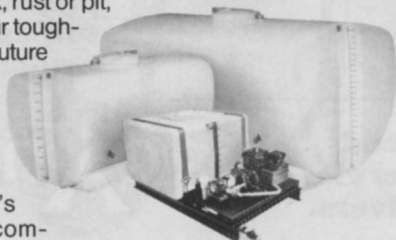
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## ACQUISITIONS

### WANTED TO ACQUIRE

Lawn care companies of all sizes in U.S. and Canada being sought by national corporation. Complete buy out or stay and grow with us. If interested please call me directly: Don Karnes, Senior Vice President, Tru Green Corp., 404/442-8700. Strict confidentiality maintained.

### WANTED TO BUY

Lawn care companies of all sizes anywhere in U.S. wanted to purchase by national corporation. If interested please respond to: *Lawn & Landscape Maintenance*, Box 329, 4012 Bridge Ave., Cleveland, Ohio 44113. Strict confidentiality maintained.

## FOR SALE

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