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In this issue:

Putting Safety First

Servicing Your Mowers

Drug Testing

Herbicides in the Nursery

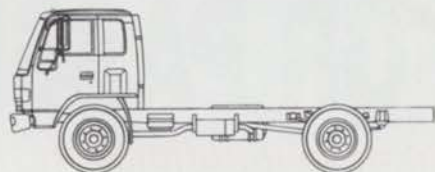
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USE READER SERVICE #41

Lawn & Landscape MAINTENANCE

VOLUME 14, NUMBER 7

JULY 1993

Cover Photo:
Larry Siegel,
Healdsburg, Calif.

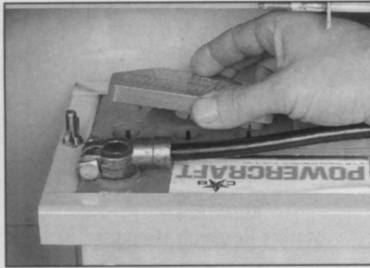
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In the 1970s, landscape firms nationwide reveled in high-water use while those in the San Francisco Bay area grappled with shortages. But those drought-plagued "pioneers" set today's standards for high-tech irrigation.

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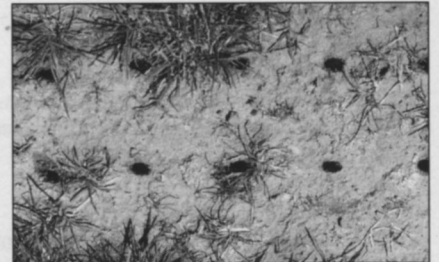
Private firms vie with communities for rights to offer composting and other specialty services. But faced with looming landfill regulations, longtime adversaries are learning to work together.

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Research on subsurface injection of pesticides is under way. While successful in controlling white grubs and mole crickets, the process is a long way from matching conventional application methods.

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Editor's Focus

BUSINESSES ARE started, labored over, nurtured and pampered, among other things, for profit. Personal satisfaction, a love for the business and success all provide a stimulus for such work, but the bottom line is still profit.

Consequently, many businesses spend a lot of time (or they should) trying to get a grip on costs. Expenses such as salaries and wages, health benefits, equipment costs, downtime and the like, are at the top of the list. But one cost rarely considered, and often difficult to calculate, is safety.

Safety is a relative concept. Some take it for granted, others leave safety to common sense; yet others accept on-the-job accidents as a cost of doing business. Yet when accidents do happen, employees and employers are immediately pitted against one another. The employee may get an attorney, demand to know his workers' compensation rights and the company work force ends up in turmoil. It may be weeks or months before the employee returns to work.

An aversion to dealing with these situations stems more from a fear of the unknown. More often than not, workers' compensation was and is viewed by small businesses as an unmanaged cost.

Many companies are now discovering, however, that workers' compensation costs can be actively managed rather than allowed to run wild. In fact, by incorporating some companywide changes — namely a philosophy called occupational injury management — costs will significantly decrease.

The philosophy subscribes to the theory that quality medical care is ensured to all employees, and those who are injured are returned to productive, gainful employment. The end result: soaring workers' compensation costs can be contained.

Construction industry figures show that workers suffer occupational injuries and illnesses at twice the rate of those employed in general industry. And it has been estimated that 6.7 percent of all dollars spent for construction go for accident costs.

While the green industry operates on a smaller scale, accident-related costs in the professional lawn and landscape maintenance industry must be addressed. Prior to developing this occupational injury philosophy and committing your firm to this fashionable concept, make sure you have an active safety and health program in place. Otherwise, the path may prove difficult.

Since it's not like adding an additional service, the program shouldn't be too expensive to incorporate. It's more like a new method of working together and better managing programs and employees; a matter of the employer organizing the business so employees receive quality medical care —



only as much as required — so they can return to work as soon as possible.

Management has to take an active involvement in managing workers' compensation and injury cases. Managers should be involved from the beginning in deciding: What procedures will be followed when an injury occurs? What kind of follow-up is necessary? What procedures are in place to put the employee back to work?

Go to your front-line supervisors. Ask them to make a list of legitimate, profit-making jobs they could accomplish if they had one more person under their supervision. Then keep this list on file in the event that an employee needs to be gradually worked back into the work force.

Such a philosophy involves continual communication not only between the company owners and managers and managers and employees, but between individual firms and their insurance companies. It's a cooperative effort in every sense of the word.

Rather than being leery of explaining the intricacies of workers' compensation to your employees, it should be explained to them, up-front, like any other company benefit. In fact, the occupational injury management program should become second nature to the entire firm.

The cost of incurring and recovering from accidents can sneak up on any business — big or small. But lawn and landscape firms don't have to sweep the workers' compensation issue under the carpet for fear that they have no control over it. Instead it's a cost of doing business that can and should be controlled.

Consult your insurance agent and get started today. — *Cindy Code* ■

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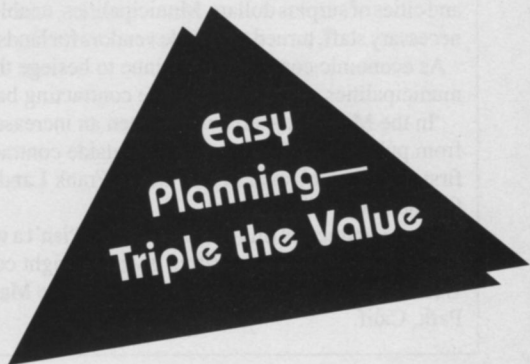
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Business Watch

STARTS, SALES UP. Housing starts and sales of existing homes both showed good growth in April. Housing starts advanced 6.7 percent to a new figure of 1,213,000 homes (seasonally adjusted), according to the U.S. Commerce Department Bureau of the Census. It was the biggest gain for housing starts in eight months. The figure had declined 3.6 percent in March, a dip blamed on bad weather. "We're back to normal," said David Wyss, an economist at McGraw-Hill in Lexington, Mass.

Sales of existing U.S. homes rose 2.7 percent to 3,460,000 homes (seasonally adjusted) in April, erasing the previous month's losses to winter storms, according to the National Association of Realtors. All regions of the country posted modest gains, although economists had expected a stronger recovery.

Additionally, the Conference Board reported that consumer confidence continued its steady fall during May from the peak Consumer Confidence Index of 78.1 that had been reached last December. May's Index registered at 61.5, down from April's 67.6.

CONSUMER PRICE INDEX*

FEB.	MAR.	APR.	MAY
+0.3	+0.1	+0.4	+0.1

*Percentage change from preceding month (seasonally adjusted).

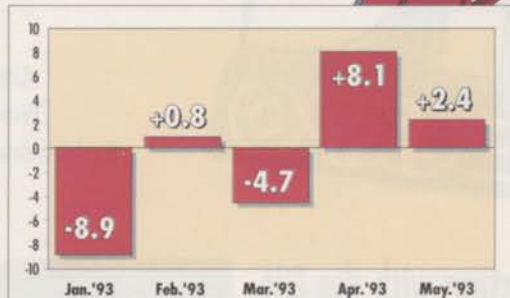
PRODUCER PRICE INDEX*

FEB.	MAR.	APR.	MAY
+0.4	+0.4	+0.6	0.0

*Percentage change from preceding month (seasonally adjusted).

THE COASTER RIDE CONTINUES...

It's been a wild ride for housing starts over the last five months.



Percentage change from preceding month

Source: Bureau of the Census

SALES OF EXISTING HOMES



Percentage change from preceding month

Source: Bureau of the Census

UNEMPLOYMENT RATE (%)



Source: Bureau of Labor Statistics

ECONOMIC REPORT: PUBLIC WORK

THERE'S A GROWING TREND among landscape contractors to delve into public work installation and maintenance as communities struggle to meet higher costs with reduced budgets.

"The public sector is by far and away the largest potential market in the landscape service industry. It owns the most property," said Ron Kujawa, owner of Kujawa Enterprises Inc., Milwaukee, Wis.

The trend toward public work most likely began in California in the late 1970s when the state rolled back property taxes, stripping counties and cities of surplus dollars. Municipalities, unable to maintain the necessary staff, turned to outside vendors for landscape services.

As economic constraints continue to besiege the nation, more municipalities are jumping on the contracting bandwagon.

"In the Milwaukee area we've seen an increase in requests for bids from public agencies considering outside contractor services for the first time," said David Frank, David Frank Landscape Contracting, Germantown, Wis.

Some contractors find that public work "isn't a windfall area of the business," but can be lucrative given the right conditions, said John Gachina, owner of John Gachina Landscape Management, Menlo Park, Calif.

"If you bid to cost and run an efficient organization, you can make good money at public work," Gachina said. "Some people undercut the value when bidding and that's a really dumb way to do it."

Contractors considering expanding into public work "need to develop a more competitive pricing model," Frank said.

The most difficult task is convincing the public sector it can't accept bids based only on price, according to Kujawa. "They're just not going to get quality service."

Contractors predict labor unionization may slow the trend in the Midwest and Northeast. Some large cities such as Boston already contract out, however. "There's a select group of contractors the city of Boston will accept bids from every year," said Doug Capoda, sales manager for D. Foley Landscape Construction Inc., Walpole, Mass. "Our company and other small companies really aren't in the position to do work for the city. We have the manpower and equipment, but would have some intangibles, such as quality issues and pricing, to consider."

In the Carolinas, small municipalities keep maintenance jobs in-house, but larger cities such as Charlotte, N.C., are beginning to contract out, according to Barry Reading, horticulturist for Environmental Landscaping Inc., Greenwood, S.C.

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NEWS DIGEST

RMRTA Awards \$32,000 For Turfgrass Research

The Rocky Mountain Regional Turfgrass Association awarded \$32,000 to the Rocky Mountain Turfgrass Research Foundation to fund research and provide scholarships.

RMRTA funded the grant through proceeds from its turf conference and trade show in December. The association has donated more than \$120,000 to the turfgrass research foundation over the past five years.

Norand Selects Syscan as Reseller

Syscan signed an agreement with Norand Corp. to resell NORAND automated route accounting systems, including the 4000 Series system and new PEN VIEW pen-based computer.

Under the agreement, Syscan will sell, install and service the Norand line of hand-held computers, software, printers and communications equipment.

Ciba Program Aids Nursery Growers

The 1993 Ciba Turf and Ornamental Products "Prescriptive Control Program" enables nursery managers to earn diagnostic tools and reference materials when they buy a minimum of \$750 worth of Ciba's ornamental products.

Managers meeting the minimum purchase requirement can receive a variety of goods, including Sticky Strips insect traps, reference books, disease detection kits, Macroscopic and cash donations. Each item is valued on a point basis.

To qualify for the program, managers must purchase Ciba's Award, Banner, Citation, Derby, Exhibit, Pennant, Princep, Sprint or Subdue ornamental products.

CGCM Tracks Pesticide Use

The Center for Golf Course Management has released a report tracing pesticide use patterns in the U.S. golf industry.

The "1993 Pesticide Usage Report" includes survey results on pesticide expenditures and lists more than 100 types of disease, weed, insect and other turf-related problems.

Superintendents surveyed rated how much damage each disease and pest caused, and the effectiveness of pesticides they used to treat the problems. The report is available from CGCM for \$2,500. Contact CGCM at 913/841-2240.

OPEI Study: Consumer Confidence Drops, Should Rise in 1994

CONSUMER CONFIDENCE slid in early 1993 after a strong fourth quarter surge in 1992, according to a study conducted for the Outdoor Power Equipment Institute.

The "OPEI Economic Indicators," a new service provided by the institute, shows unemployment rose and disposable personal income fell early this year, but that improvements are expected in 1994.

Existing single-family home sales in 1993 are forecasted to be 0.8 percent above 1992. Additional gains are expected for 1994.

Sales of existing single-family homes are running 9.4 percent above last year. That's the highest year-over-year comparison in five and a half years, according to OPEI's study. The recovery trend resulted in a 13.8 percent increase in home sales.

Single-family housing starts, hovering around 1.04 million, are expected to stay at that figure through first quarter next year. Cyclical indications have turned negative, indicating that the recovery trend is maturing.

The recovery trend has produced a mild (but normal) 28.3 percent gain since June 1991. Recovery was expected to peak in June and then drop mildly by year's end.

The U.S. Leading Indicator peaked at 152.9 in January, but stalled in later months. The indicator rose through the fourth quarter of 1992 due to high consumer expectations and stock prices. The indicator is not expected to tailspin, however.

The consumer price index fell steadily through 1992, plummeting to a low 3 percent annual rate of inflation in September and December. It rose back up to 3.2 percent in June and is expected to climb to 3.5 percent in December. Inflation is expected to heat up through 1995.

Long-term interest rates dropped 7.31 percent in September 1992, and then climbed up to 7.38 percent in June, slightly slower than normal. Quarterly interest rates (three-month moving average) are expected to be flat in the near term before becoming mildly positive later in the year.

The current low quarterly rate is expected to remain flat for this business cycle, and should prove the lowest quarterly rate for the next two years.

The February 1993 single-month interest rate, 6.98 percent, is the lowest seen in almost 11 years. OPEI's outlook calls for rates to stay flat to mildly positive through 1993.

Disposable personal income stretched to 2 percent in December, dropped to 1.5 percent in June and is expected to continue falling to 1.6 percent at year's end.

The 1992 gross domestic product, the sum of all goods and services produced in the United States, rose 2.1 percent above 1991's figure. Experts expect the GDP to stall in the third quarter, then ascend in the fourth quarter and into 1994.

The GDP for 1993 is forecasted to be a mild 1.3 percent above 1992.

DISPOSABLE PERSONAL INCOME:



Guidelines Simplify ADA Regulations

Ironsmith, a manufacturer of tree and trench grates, released guidelines and a fact kit including legal interpretations of the Americans With Disabilities Act regulations enacted in 1990.

Failure to comply with ADA deadlines could lead to court-ordered mandatory changes, plus fines up to \$50,000 for first

offense and \$100,000 for subsequent violations.

The free fact kit includes copies of Federal Register pages with regulations that apply, measures to take to avoid receiving any penalties and a color catalog on Irongate's tree grates that meet new guidelines. The company can be contacted at P.O. Box 1141, Palm Desert, CA 92261; 800/338-4766.

(continued on page 10)

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News

(continued from page 8)

Marketing Guru Keynotes GIE Show

Green Industry Expo officials have slated Ty Boyd, president of Ty Boyd Enterprises, as keynote speaker at the industry trade show Nov. 15-18 in Baltimore, Md.

Boyd, a leadership trainer and marketing consultant from Charlotte, N.C., will focus his speech on meeting challenges brought about by change. The 1990s promise to

present many changes that will affect families, the work place — all aspects of everyday lives, he said.

Boyd provides speeches and training for company clients. He has won the B'nal B'rith Anti-Defamation League's Human Relations Award and the Toastmasters Communications and Leadership Award. A charter member, past president and chairman of the National Speaker Associa-



Boyd

tion, he has won the organization's CFAE award for platform excellence and the CAVETT award.

Mitsubishi Doubles Warehouse Space

Mitsubishi Fuso Truck of America plans to add a 53,000-square-foot parts warehouse facility to its corporate headquarters in Bridgeport, N.J. The project, expected to be completed Jan. 15, 1994, will double MFTA's total parts inventory capacity.

The \$2 million investment will enable the company to handle its ballooning U.S. market, said T.E. Reimers, MFTA executive vice president and chief financial officer.

"We have exceeded 20,000 units now operating on our country's roads and



Mitsubishi's new parts warehouse will double capacity.

highways. The new facility will alleviate what was becoming a stretched parts distribution system," he said.

Reimers expects the facility to be fully operational early next year.

Senate Approves EPA as 15th Cabinet

The U.S. Senate approved and sent to the House Government Operations Committee an administration-backed bill to make the U.S. Environmental Protection Agency the federal government's 15th Cabinet-level department, according to the Responsible Industry for a Sound Environment.

In addition to elevating the EPA's status, the bill would delete the Council on Environmental Quality, a move favored by President Clinton, and transfer most of its

functions to the new department.

The bill faces numerous hurdles in the House. John Dingell, D-Mich., chairman of the House Energy and Commerce Committee, strongly opposes the bill, while Rep. Henry Waxman, D-Calif., hopes to add a

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provision addressing environmental equity and bureau of environmental statistics.

In other news, Sen. Joseph Lieberman, D-Conn., is expected to release his lawn care bill this summer without first holding public hearings. "It's getting too late to hold hearings. It wouldn't make sense to hold them in the middle of summer," said Tom Delaney, director of government affairs for the Professional Lawn Care Association of America.

Lieberman is likely to introduce the bill and refer it to the Superfund Recycling and Solid Waste Management subcommittee chaired by Sen. Frank Lautenberg, D-N.J. The subcommittee has jurisdiction over Superfund and Community Right-to-Know issues.

Lieberman hopes to attach the bill to the Emergency Planning and Community-Right-to-Know Act, a move repeatedly protested by PLCAA.

Another subcommittee member argued that the Emergency Planning act deals with hazardous spills and issues far removed from lawn care. The lawn care issue better fits into preemption legislation since it covers local control of pesticide exposure and the chemically sensitive citizen's right to avoid them.

The preemption bill, which has been referred to the Government Affairs committee, has only won two co-sponsors. There's little hope of the bill being considered this year, according to Allen James, executive director of RISE.

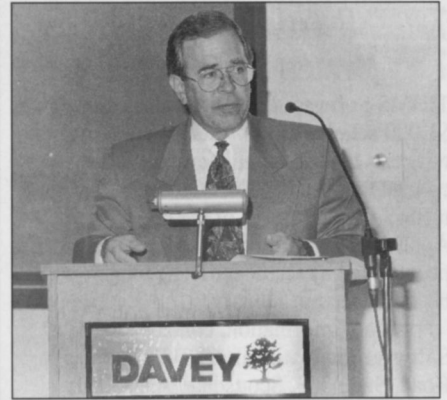
Federal Insecticide, Fungicide and Rodenticide Act hearings began in early June. The first hearings, covering department operations and nutrition, caused no major waves, Delaney said. The hearings will likely continue through this month.

Davey's Revenues Exceed \$200 Million

The Davey Tree Expert Co. reported \$208.9 million 1992 revenues, an 11 percent increase over 1991. This is the 14th consecutive year of record revenues for the company.

The company added several line-clearing contracts with electric utility companies, which drove up revenues for 1992, said Douglas Cowan, Davey president and chief executive officer.

"The ongoing recession affected us in the first half of 1992, as residential sales were dampened by the weak economy," Cowan said. "But sales rebounded strongly in the



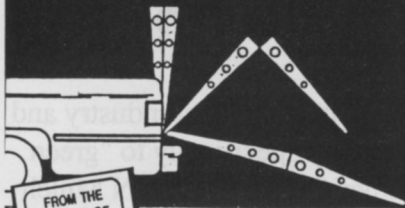
Cowan, Davey Tree president and CEO.

second half of the year in both residential and commercial markets."

The company also saw a continued increase in the number of employee shareholders. "At the end of 1992, more than 2,800 of our 5,000 employees were shareholders—an increase of about 300 since the end of 1991," said David Adante, vice president and chief financial officer.

Davey's long-term strategic plan, among other things, includes retaining outstanding employees and loyal customers and maintaining profitable growth and technical excellence, Cowan said.

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USE READER SERVICE #80

TRIMS Software Offers Turfgrass Scholarship

TRIMS Software International is offering a \$1,000 scholarship to students studying turfgrass management in any school or college that uses TRIMS Grounds Management Software as part of the curriculum. Applications for the scholarship must be postmarked by October 1. The winner will be announced in January.

For more information, contact TRIMS Software International, 6220 E. Thomas Road, Suite 303, Scottsdale, AZ 85251; 800/733-9710.

Lebanon Acquires Two Seed Companies

Lebanon Chemical Corp. acquired Seaboard Seed Co., Bristol, Ill., and Stanford Seed Co., Denver, Pa., suppliers of professional and retail grass seed.

"The combination of Lebanon, Seaboard and Stanford provides all three companies with a natural line extension for their existing customers and should be an excellent fit," said Katherine Bishop, corporate vice president.

Lebanon also formed a unified retail/

consumer division and separate marketing division for its Preen® products. Effective July 1, Lebanon's Greenview division merged with retail components from the company's professional division. The new division is called Lebanon Lawn & Garden.

Study Pinpoints Flaws In Pesticide Program

A California Environmental Protection Agency study calls for cutting by at least one-half over the next two years the average amount of time required between obtaining EPA approval and using new pesticide ingredients and products in California.

The study, conducted by Dr. Charles Benbrook for the state's Department of Pesticide Regulation, suggests basic policy changes and new long-term tactics for processing paperwork, including periodically removing backlogs from the system to help eliminate delays in reviewing pesticide applications.

The report also advises the EPA to focus more on pesticides considered high risk, and speeding up registration of low risk products.

U.S. Seed Companies Face Competition

Oregon's grass seed companies claim European competition is driving down seed prices and customer demand, according to the Oregon Seed Council.

Oregon's seed growers, suppliers to the state's \$750 million grass seed industry, blame increased importation of lower-priced, uncertified grass seed grown in the European Economic Community using government subsidies.

Europe requires all grass seed sold in its own market to be certified, whereas the United States accepts uncertified seed.

Recent changes in the EEC's subsidy structure have made importing grass seed more attractive than grain or oil, but has not damaged U.S. sales overseas, said Loyd Coonrod, spokesman for the U.S. Department of Agriculture's Foreign Agriculture Service. "While European subsidies have always affected U.S. farmers indirectly, Oregon has not yet lost market share overseas," he said. Increased sales of EC grass seed in the U.S. is a concern, he added.

Seed subsidies are paid on a volume-produced basis rather than on a per-acre system like other crops. ■



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USE READER SERVICE #79

Association News

THE **AMERICAN Association of Nurserymen** will hold its convention in conjunction with the **Texas Association of Nurserymen's TAN-MISSLARK** trade show Aug. 4-8 at the Dallas Convention Center, Dallas.

AAN plans to hold joint meetings with several state and regional associations.

"We're in an experimental mode. AAN will be forming partnerships with large regional groups over the next four or five years," said Kevin Morales, AAN's director of education and landscape services.

Next year's convention will coincide with the Maryland Association of Nurserymen Trade Show in Baltimore.

Keynote speakers at this year's convention will be Texas Gov. Ann Richards and George Gendron, editor of *Inc.* magazine. Other featured speakers include Tom Dickerson, Lone Star Growers, Texas; Dennis Burd, Country Market Nursery, Pennsylvania; Dwight Hughes, Dwight Hughes Nursery, Iowa; and Hank Guarriello, Nursery Supplies, Pennsylvania.

Additional events include tours of local wholesale centers, garden centers and commercial and residential landscapes.

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The TAN trade show offers more than 1,600 booths.

The North American Equipment Dealers Association and National Equipment Servicing Dealers Association

are considering merging to help improve dealer/supplier relationships, promote dealer education and advancement and safeguard the industry's consumers, according to Norm Beck, executive director of NESDA.

NESDA formed 12 years ago to enhance the dealer/supplier alliance while NAEDA was founded nearly 100 years ago, but only

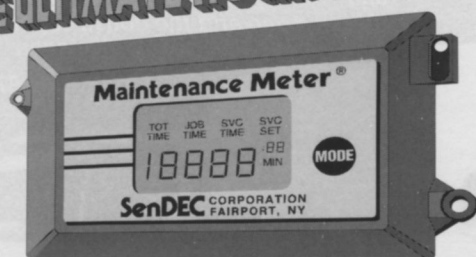
formed an outdoor power equipment division within the last decade. NAEDA provides members with equipment evaluation guides, hands-on training programs and other services.

Association officials plan to meet at the International Lawn, Garden & Power Expo in Louisville, Ky., to explore avenues for implementing an effective merger.

"The two organizations have agreed on issues over the years. We think the move will strengthen our services," said Tom Glaub, director of publications for NAEDA. "We don't yet know all of the ramifications, so we'll take it step by step."

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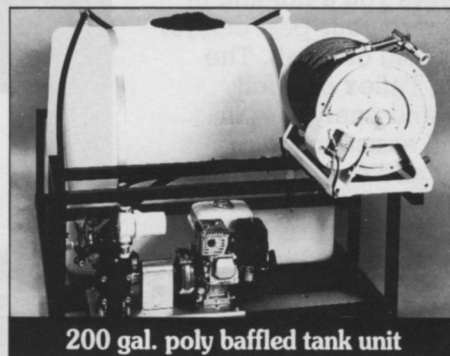
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USE READER SERVICE #83

John Yakubisin, golf course superintendent at Rolling Rock Club, Ligonier, Pa., was elected president of the **Pennsylvania Turfgrass Council**. He formerly served as golf course superintendent at Youghiogheny Country Club, McKeesport, Pa., for four years and the Nemaocolin Woodlands Country Club, Farmington, Pa.

Other newly elected officers include Michael Zedreck, Southpointe Golf Club Inc., Washington, Pa., first vice president; Samuel Snyder VII, Colonial Country Club, Harrisburg, Pa., second vice president; Barry Grote, The Scotts Co./Proturf Division, Pittsburgh, Pa., secretary/treasurer; and Charles Cadiz Jr., Eagle Lodge Country Club, Lafayette Hill, Pa., past president. Christine King, Bellefonte, Pa., serves as executive director.

The deadline for entering the **Professional Grounds Management Society's** maintenance awards program is Aug. 6.

The program recognizes excellent maintenance performance in 12 categories: industrial/office parks; condominiums, apartment complexes and planned communities; hotels, motels and resorts; amusement and theme parks; parks, recreation areas and athletic fields; schools and university

grounds; government buildings and complexes; shopping areas; hospitals and institutions; small sites (budget under \$8,000); residential landscapes; and cemeteries and memorial parks.

Awards will be presented during the PGMS annual meeting Nov. 14-18 at the Marriott Inner Harbor Hotel in Baltimore, Md.

The **Association of Professional Landscape Designers** will hold its annual meeting and conference Aug. 13-15 in Chicago.

Core events include the annual meeting, board of directors meeting and roundtable discussion. All three will take place at the Chicago Botanical Garden. Events surrounding the conference include tours of public and private landscapes.

Accommodations will be at the Sheraton-North Shore.

IN BRIEF...The **Pennsylvania Nurserymen's Association** appointed Richard Brown of Plymouth Meeting, Pa., its new executive director. Brown succeeds Patricia Schlusser who relocated to State College...The **Associated Landscape Contractors of America** released the "Commercial Value Brochure" to promote

the value of professional commercial landscaping and maintenance. The brochure serves as a marketing tool for landscape and maintenance contractors. Contact ALCA at 703/620-6363 to receive a copy...The **Florida Turfgrass Association's** Research Foundation received a \$6,000 contribution from the members of John's Island Club, Vero Beach, Fla. The money will be used to develop environmentally sound maintenance techniques, research new grass varieties for Florida and protect the state's \$5.2 billion golf industry...The **International Pesticide Applicator Association's** board meeting is slotted for Aug. 6 at Tri Cities Red Lion in Pasco, Wa. Contact: Cindy Maitland Deffe, 509/535-3591...The **Nevada Landscape Association** is seeking volunteer committee members to help prepare a publication on landscape maintenance and construction specifications guidelines. Criteria will be taken from established standards already set by the **International Society of Arboriculture**, the **Associated Landscape Contractors of America**, the **Irrigation Association** and the **Professional Lawn Care Association of America**. For additional information, contact Brian Dean, P.O. Box 70836, Reno, NV 89570-0836; 702/827-3403. ■

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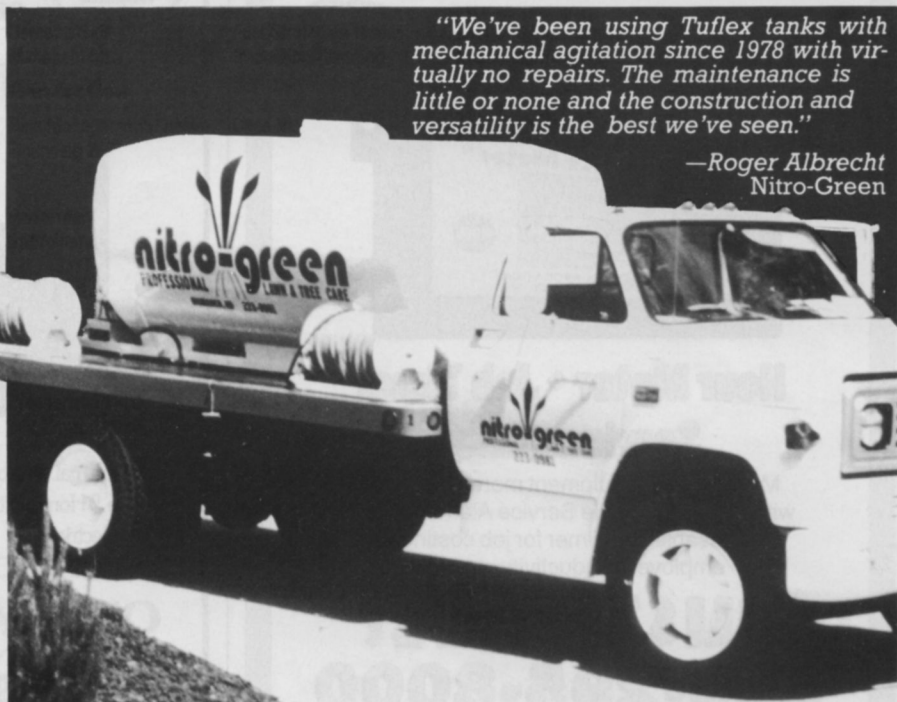
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USE READER SERVICE #40

Arid

Landscape News

SILVERDOME ROLLS OUT NATURAL GRASS — UNDER THE DOME

"BE CAREFUL what you wish for," the ancients warned. "It might come true."

Such was the case at the Silverdome in Pontiac, Mich. Officials had hoped to get at least part of the sports action when the World Cup soccer championship tournament announced it was coming to the United States for the first time. The largest sporting event in the world (much bigger than the Super Bowl), the World Cup is watched by more than one billion fans worldwide.

To the delight of Silverdome officials, they were named by the Federation International de Football to host four of the first round games for the event running June 17 to July 17, 1994. There was just one "but."

World Cup officials require a natural grass playing field. Growing vigorous turf inside a building whose fiberglass covering only lets in 10 percent of the available sunlight would be like trying to grow turf under the worst winter lighting conditions imaginable, or in a deep shade. It could be done, of course, but the roots would be shallow and the grass blades spindly. When teams hit the field, their cleats would tear the field to shreds.

"Our challenge is to build the Cadillac of soccer fields — a world-class athletic turf that will be as good or better than the premier soccer fields of the European and South American countries," said John "Trey" Rogers. Rogers, and fellow Michigan State turf expert Paul Rieke, told the Silverdome that they could, indeed, put natural turf into the Silverdome.

Trivia buffs may be objecting at this point. Didn't the Astrodome start out with natural turf in the 1960s? The answer, of course, is yes; but the Astrodome started out with a clear glass cover that let in all the elements needed to grow grass.

"I'd heard there was a problem with the players seeing the ball when they were looking up toward the glass cover," Rogers said. The cover was changed and they soon went to artificial turf.

Establishing a good, strong turf inside the Silverdome from ground up is almost impossible. Work began almost immediately not only to prepare for the tournament, but for an exhibition game held last month to promote the coming World Cup series.

"We grew the grass outdoors until it was strong, healthy and very well established," Rogers said. It was grown on a sod farm in California and last April the sod was cut, rolled up and shipped by truck to Michigan. It was then transplanted to hexagonal metal boxes 7 1/2 feet across, filled with 6 inches of top soil.

A few days before the exhibition soccer game, the hexagons of turf were moved into the Silverdome and packed onto the asphalt surface to form a playing field. "In addition to the hexagons, we used triangular and trapezoidal boxes," he said. "We put them on the borders to make a rectangular playing field."

Tom King, venue executive director for World Cup USA-1994, the Detroit-based group overseeing the Silverdome event, said it is impossible to estimate the total cost of installing the artificial turf. The cost of such items as lighting, soil, sod and trays and moving the grass into and out of the Silverdome won't be known until after the games conclude in 1994.

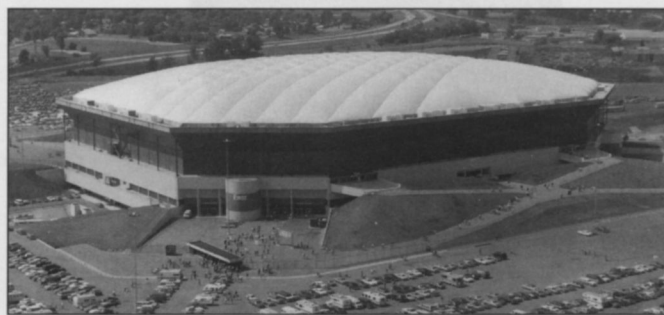
One of the tricky parts of the turf system is the soil. "You want soil that is easily drained but not easily compacted," Rogers pointed out. "You want it to resist compaction and you want a lot of pore space, but it still has to have stability. If the soil is too loose, it would be difficult to grow grass on it and it would be easy to tear up," he added.

The decision was made to go with a combination that is eight parts sand, one part native sandy loam and one part Michigan peat. King said the seed is a mixture of 85 percent Kentucky bluegrass and 15 percent perennial ryegrass — varieties chosen for sports and shade tolerance.

While it might not have been a big problem for the one-day exhibition game in June, the field will have to stay in good shape for nearly two weeks in 1994 when four tough games are played. The answer, in short, is to move as much of the beneficial growing conditions one would expect to find in Michigan in June indoors. The first adjustment is to provide artificial light.

"We'll mount a lighting system inside the Silverdome so we can cover the entire field with artificial light that simulates actual sunlight," Rogers said.

While there won't be much evaporation inside the Silverdome, turf managers will have to add some water. "We use over-the-top irrigation similar to that used on outdoor playing fields," he said. "We'll probably add some nitrogen and potash to



Natural grass will grow here — in spite of the fiberglass dome.

maintain soil fertility. We probably won't have to add phosphorous. Nitrogen is the most critical. It has to peak out at exactly the right time.

"We don't want the grass to be going into a heavy growth spurt just before a game. At the same time, the grass has to have enough nitrogen to recuperate quickly after the game," he said.

Plant growth regulators also will be used. Grass cells tend to elongate under shady conditions — that's why the blades become spindly. PGRs prevent cell elongation.

The Michigan State researchers are getting "practice" time in, too, before they put the turf to test. They built "Silverdome West," a 6,500-square-foot quonset hut covered with the same kind of fiberglass used on the Silverdome, and incorporating the same type forced-air suspension.

In the experimental dome, grass was grown in 4-by-4-foot wooden boxes. Each box was grown under slightly different conditions of moisture, fertilizer and plant growth regulators.

"We will also be testing the turf under various conditions by having athletes come in and run on the plots," Rogers said. "We already have a good start on our research because we had test plots in the Pontiac Silverdome over the summer of 1992. We deliberately stressed the grass to see what it would take. It looked bad when the trials were over, but it was a successful effort."

The researchers experimented with many of the variables they will be able to regulate. For one, they tried various quantities of light to see which would give the best results in terms of turf growth. They also played with various ways of fitting the hexagon boxes together so they didn't have any seams.

"We will look at the possibility of adding soil in the seams, but we don't think it will be necessary," Rogers said.

Curt Harler is a free-lance writer based in Strongsville, Ohio.



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REDWOOD LANDSCAPING

HEADQUARTERS: Santa Rosa, Calif.

BRANCHES: One in Fairfield, Calif. Plans include adding two more within five years.

FOUNDER: Bill Davidson

SOLE OWNER: Lebo Newman

PRIMARY SERVICES: Construction/full-service maintenance, including fertilization, pest control, irrigation and enhancement.

EMPLOYEES: 80 to 110

1992 SALES: In excess of \$4 million.

EXECUTIVE SUMMARY

THE CONCEPT: To provide construction and landscape management services to a vast range of commercial clients.

PROJECTIONS: Approaching \$5 million in 1993.

HURDLES: Coordinating input from multiple sources at large job sites.

COMPANY OBJECTIVES: To prove a leader in the industry and community through quality performance.

THE OWNER

LEBO NEWMAN

AGE: 38

FAMILY: Married; one son, one daughter

EQUITY HELD: 100 percent at present; managers will begin buying in this year.

WORK WEEK: 35 hours for business; about 20 community service hours.

PROFESSIONAL PHILOSOPHY: Whatever you do, do it with passion.

OTHER COMPANIES STARTED: None

LEBO NEWMAN believes that in any business the ability to interweave fun and hard work strongly contributes to a company's success. At Redwood Landscaping, Newman's construction/landscape management firm in Santa Rosa, Calif., that concept is achieved by infusing the company with people who care excessively about landscaping.

"That's one thing we look for in an employee — whether or not they love what they do," Newman explained. "Most of our employees are very passionate about what we do, and that's one thing that pushes the group."

Lebo Newman, the unconventional leader of Redwood Landscaping, enjoys his job. Photo: Lenny Siegel.

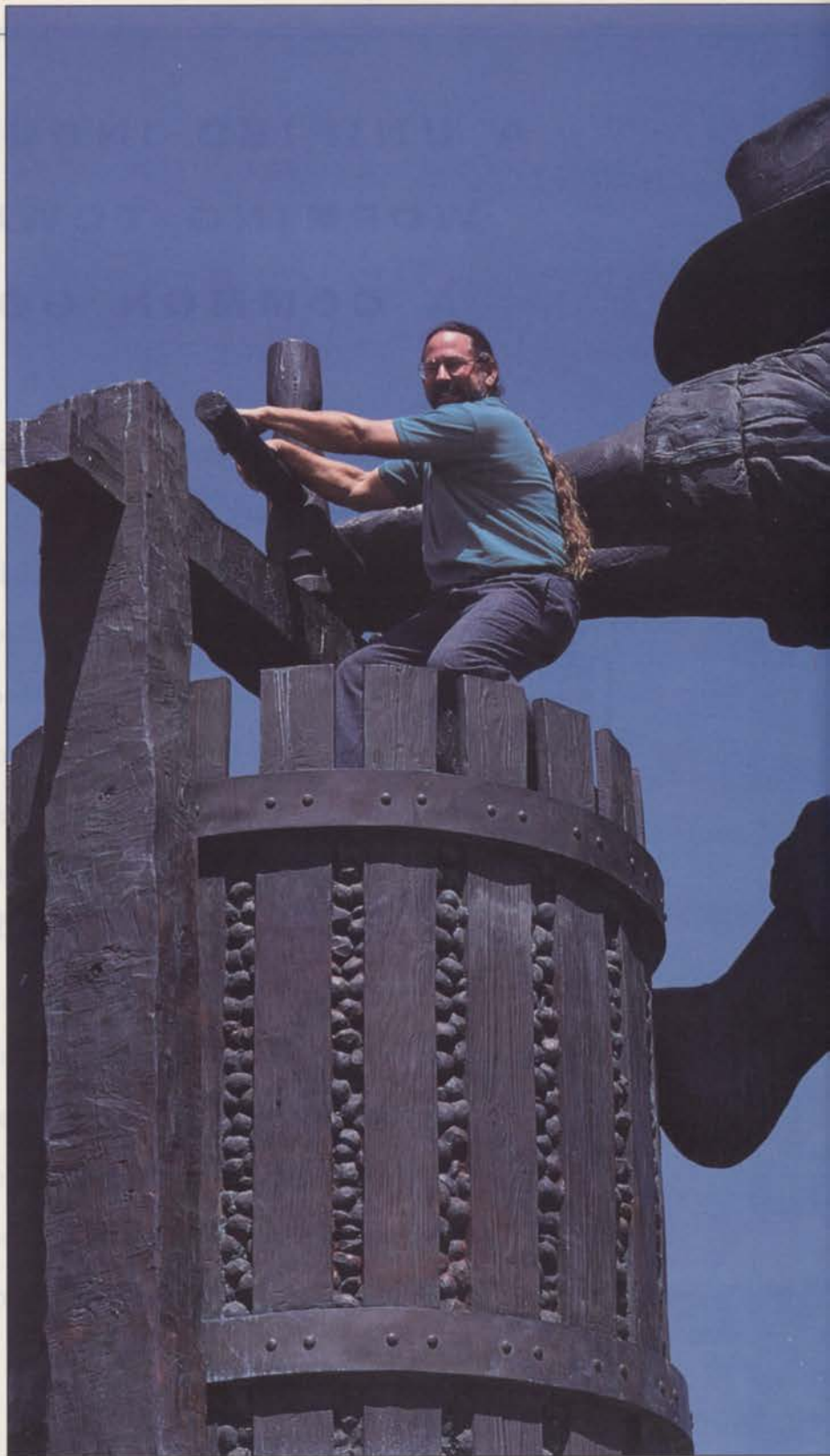
Newman brings a lot of his own passion to the company which lights the desire in others to achieve, according to Dave Penry, operations manager. The company owner encourages a free exchange of ideas, opinions and concerns among all employees, knowing that satisfied em-


ployees remain more productive. This, in turn, helps the firm become an industry trendsetter.

"Our whole intent, and one of our mission statements, is to be a leader in the industry and community. That doesn't mean just participating in associations. That means being the example of good

work," Newman contended.

The company instills additional measures to keep employees satisfied including a strong, albeit sometimes strange, incentive program (Penry once promised employees he would stand on a ladder in his underwear at the company's front gate if they





A Penchant for Passion

In the 1970s, landscape firms nationwide reveled in high-water use while those in the San Francisco Bay area grappled with shortages. But those drought-plagued "pioneers" set today's standards for implementing high-tech irrigation practices into their full-maintenance repertoires.

By Cathy Hoehn

at your business as providing for the futures of 110 families vs. just your own, then you treat it differently. I look at it as supporting the employees' families. If I do my job well then they'll support mine," he said.

The drive to promote job satisfaction, develop a familylike

environment and ingrain open communication has proven fruitful in shaping Redwood into a more than \$4 million firm.

GETTING STARTED. Bill Davidson, Newman's former partner, founded Redwood Landscaping in 1972 as a residential

construction firm in agricultural-based Sonoma County. Davidson, a landscape architect who has since pursued other interests, hired Newman as a field foreman in 1974, the same time Redwood began delving into commercial work.

The company serves four counties in what Newman calls the suburbs of San Francisco — on the north and east fringes of the Bay area — and one of California's top three growing areas. Santa Rosa has gone from 35,000 in population in 1972 to 123,000 in '93.

When the national recession struck in 1991, it squelched that growth, as well as most new construction. Redwood Landscaping struck back, whittling its construction installation division

from an almost \$2 million annual revenue source to a \$450,000 endeavor, and focusing instead on its maintenance division.

"We started out doing maintenance for construction projects that we installed because our clients were having a hard time finding somebody they felt would do the job right," Newman recalled. "The marketplace was not very mature at that point. We had to create standards for the area in order to improve the maintenance caliber."

Because the company customizes its services to a client's needs, it tackles an almost limitless range of maintenance jobs, "anything from a bank branch on the corner of a downtown urban area to a campuslike business park or a multisite contract with a city doing all of its miniparks, islands, frontages and

went 90 days without any lost-time accidents. Employees triumphed.), and an open forum for policy and strategy development.

Above all, Newman believes in maintaining a family atmosphere where everybody looks out for their fellow employees as well as clients' interests. "When you look

medians," Newman said. "Our contracts range from \$50 a month to \$20,000 a month for maintenance."

"We do all size jobs, but our forte is large-turf areas, large projects that have to be phased in over a number of months. We pride ourselves in how we can manage a job, carry it from start to finish, be responsive and truly "manage" a client's property."

Redwood has always shied away from design work, even though Davidson, the original owner, held a landscape architect degree.

"We felt that since we depended on landscape architects for a good percentage of our work we wouldn't compete with them," Newman said. "To this day we do very little design, other than for maintenance clients who want design enhancement to their property or renovation."

Newman, who began buying into the company in 1981 while Davidson slowly phased out, decided to continue Davidson's efforts to move out of residential work.

"We made the choice early on to not continue doing residential. In commercial it's very specialized — with soil preparation and grading people, irrigation people, planting people — that's all they do. Consequently, they are highly trained, very productive and very efficient. Whereas in residential, the job is so small, it doesn't pay to move different crews in and out," Newman explained.

"You could have three or four different crews working at the site in different stages of a job. It works out really well. The way we structure it, the equipment we use for commercial — tractors and trenchers — is much larger, so the capital outlay is a lot different."

The company has invested about \$700,000 in its equipment, which includes tractor loaders, a diverse range of mowers, articulating trenchers with backhoe units, dump trucks and trailers and a huge fleet of vehicles for the maintenance division. The inventory also includes 500 to 600 small pieces of equipment such as pruners, edgers and chippers/shredders. The company employs two full-time mechanics, and production managers determine equipment needs.



Newman projected a moderate 8 percent to 10 percent growth for '93. "We'll probably still be under \$5 million, but we're approaching it," he said. "Construction didn't have enough of a return on the investment to make it worth the risk, and maintenance is a very competitive industry as well, but we've made it worth our while."

Redwood maintains up to 110 employees, slightly less in the short off-season. About 15 percent of volume and people in the company do strictly construction. There are 10 full-time office staff and managers which includes production managers, the office manager, operations manager and a dispatcher. There are also 11 field managers. "There's a real high ratio of supervision to employees. No one has to manage too many people so we don't get strung out too far," Newman said.

In the field, the management team breaks down to eight area managers and three support managers. Area managers handle 30 to 40 accounts within a geographic area, except multisite owners and other "special profile accounts" which Newman oversees.

"All managers have a realm within the company that they run and are encouraged to treat like their own company," Newman explained. "They just happen to

have this nice sugar daddy of a bank that helps them out — that they have to perform for, but they also don't have to worry about payroll and taxes, equipment and overhead. They just worry about the client and the end result."

A year and a half ago, Redwood opened a branch in Fairfield, Calif., extending the company to better serve Solano, Napa and Marin counties. The branch now represents a fair share of total operations.

Future plans for the company call for continued growth on a controlled basis "as personnel and client desires allow," with a preferred growth of 10 percent each year. Newman hopes to add another two branch offices in the East Bay and Sacramento areas. Or even, he said, in Mexico and Hawaii.

EDGING COMPETITION. In California, like elsewhere, the recession has forced a sharp edge between maintenance firms, as well as companies from other industries taking on maintenance work to survive. Newman's company "chose to not participate" in the recession.

"We haven't laid any people off due to the recession, but we have definitely been affected," Newman said. "We have been challenged in our pricing and job

Redwood's specialized crews install and maintain commercial properties, but generally forgo residential jobs.

retention. Where we used to do substantial volume in installation, we had to replace that with maintenance."

Newman anticipates that firms picking up maintenance jobs for extra income will exit the industry as the economy stabilizes.

Budgeting is a key element in maintaining the company's competitive edge. "First of all, don't ever cut up the profit," Newman advised. "Always know what the profit is on every job. Know what your bottom line is. Because when you cut price, you are cutting your profit."

Redwood uses a "looped" budget process, in which sales are reviewed and projected based on the backlog, and overhead is determined based on those sales goals.

"We look at the reasonable growth rate based on historical variables — one-year, three-year, five-year patterns. Then we analyze that to see if it's attainable based on the marketplace. We loop through the budget — we have about 52 budget categories we allocate overhead to. We'll allocate overhead based on those sales goals, and come down to a profit line and see if that's acceptable.

"Also we take the profit level we desire and loop back through the overhead and come up with what sales figure it would take to reach the profit goals we want. Then we take those two loops and match them and come up with what we call an accepted budget. We really look for a return on investment and not just profit. But people need to be in double digits in profit to make this industry work."

LEADER OF THE PACK. Newman cited a number of other factors which help keep the firm competitive, including customer relations, community involvement and aggressive market positioning.

Customer relations plays a vital role in retaining existing accounts, he said. "You can't go out of your way enough. Even when you think you're treating a client absolutely tops, you've got to keep asking them what else you can do for them because whatever you're

(continued on page 26)

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USE READER SERVICE #42

Cover Story

(continued from page 24)

doing becomes commonplace.”

An integral part of that service is being able to coordinate input from all players in a key account, a hurdle which Redwood encounters mostly at multi-job sites. “You have to maintain a consistent relationship with key people. On construction jobs, you may have a developer that wants to get in and out of there. You may have sales staff for the developer that wants the place to look sparkling all the time. Then you may have the city or some other inspector on you for some other reason.”

Redwood hosts focus group meetings between clients and managers to ensure lines of communication remain open and to bring forth issues, concerns and ideas that may otherwise never surface.

“We take the approach that you have to have a strategic marketing alliance with clients. You have to be able to look at their property from their point of view. You

absolutely have to. If you’re looking at it just from your own perspective, you won’t have that person as a client for very long.”

Another important facet is customizing jobs to meet particular client needs.

“We try to be as low priced as we can possibly be on every job. We’re not always low priced though. Yet because of the fact we are modifying our services to meet our client’s needs, they can see the value of that, and they’ll buy that value.”

Though Newman claims to not like measuring the company’s success against other firms, he proudly points to the fact the company has won more than 50 industry state and regional

first-place awards in the last five years, including the CLCA best overall maintenance awards in 1987 and 1989.

Since Redwood does virtually no advertising, it counts on its community involvement, as well as referrals, for publicity. The company supports several non-profit programs, including a giving tree program for the Volunteer Center, local ReLeaf efforts and Big Brothers/Big Sisters bowlathons. Employees are encouraged to introduce new projects needing sponsorship or volunteers.

Like every landscape firm, Redwood encounters problems and client complaints, but an aggres-

sive team approach helps nip them in the bud. “We set up a regular schedule of assertive walk-throughs at the site with the client, so we can better explain the processes of what’s being done,” Newman explained.

“Problems occur, and conditions change because it’s a growing environment. We don’t have complete control over it. But how problems are handled shapes a client’s perception of how good you are.”

“Newman still actively oversees all day-to-day operations at Redwood, but may slowly let go of the reins as he pursues other interests. Future plans include allowing key employees to buy into the company.

TRAINING/INCENTIVES. Ongoing education is an integral component in Redwood’s infrastructure, and encourages employees to stay with the company. Redwood offers in-depth training for managers as well as laborers, strengthening the company’s position in the industry. In the fol-

Every one of your systems should be easy to work with. Clients shouldn’t see the hoops that employees have to jump through in order to take care of their needs.

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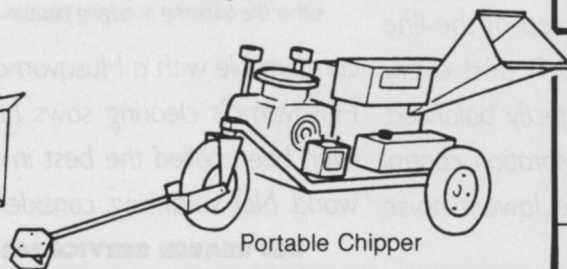
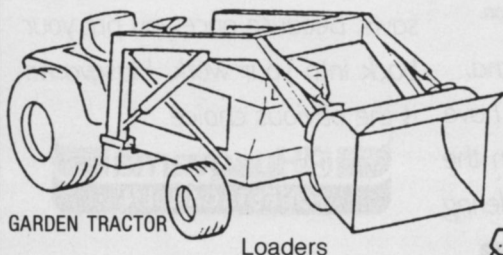
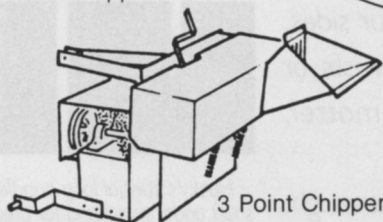
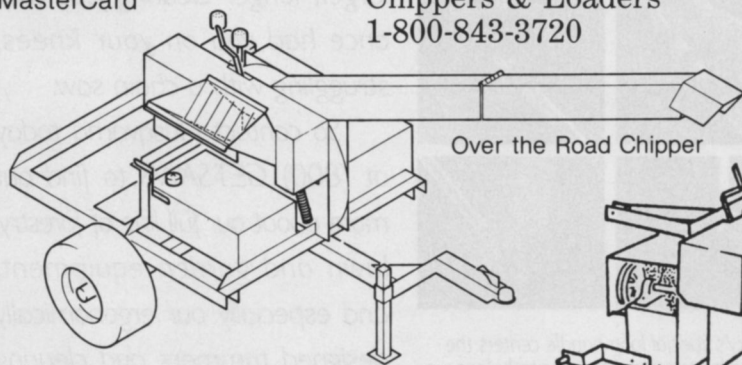
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USE READER SERVICE #82

lowing question and answer session, Newman describes how the firm's training and incentive programs enhance employee productivity.

Q: How does the company ensure employees are getting the best training possible?

A: We have a full-time trainer for new and existing employees. We review employees regularly on about 13 different areas of trade, industry and managerial skills. We also test the managers on how well they can train employees. The trainer is bilingual so he can work with the least English-proficient employee.

Q: Does employee turnover hinder your training program?

A: Actually, ongoing education is a big incentive for employees. They are encouraged to take classes — writing, math, English — that enhance their ability to do their jobs. If the area manager feels the course they want to take

is beneficial, we'll pay for it.

Q: What other incentives does Redwood offer?

A: We have quite a few field incentives for work done, meeting production goals via a percentage of profits. The safety program is highly laden with incentives. We also have two suggestion bonuses and a quality quest program.

The quality quest program is an all-inclusive program for quality management. If an employee makes suggestions or does certain things, they get quality pins.

In the safety program, if employees make suggestions, keep fellow employees from doing an unsafe act, correct an unsafe situation or make a suggestion to improve productivity, they get pins. At four pins, they go into a lottery for a \$50 certificate given out each month. Basically about 75 percent of our employees end up getting this over a period of a year. At eight pins, they go into a lottery for another certificate. Those

receiving more than 12 pins in a year go into the lottery for a \$1,000 dream vacation.

The other biggest motivator we have is that 30 percent of our profit goes into an incentive program which is based on performance. That is shared with about 60 percent of the employees depending on their work level. I live and die by that system. It allows people to really take advantage of the ownership we offer them. They can really see the benefit of, one, meeting the goals, and two, taking care of the client.

Q: How does Redwood ensure its incentive program is effective?

A: You have to go beyond just money. There has to be encouragement and recognition, it has to be fun and it has to feel good. It doesn't always have to be elaborate, or expensive, but it has to be there.

Q: What incentives keep you personally interested in the business?

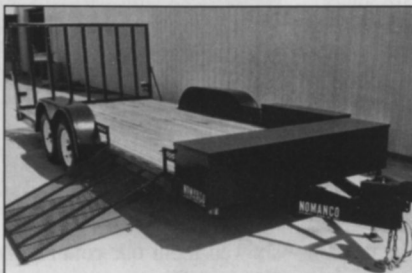
A: I love what I do. The industry

has an intrinsic value people don't recognize. I love being able to impact our environment, both literally, as far as the materials we use and how we safeguard it, and being real stewards of the earth. And also how we can transform it. There's not a road in this county that I can't point to a landscape that I worked on at some point, either installing or maintaining it. That's the best part.

Q: What do you dislike about the industry?

A: I'm frustrated with the industry itself and the public's perception of it. They think it's an easy field to get into and they're not willing to pay a true professional scale fee. And I think the industry undervalues itself...They underpay people. As long as that continues, none of us will be able to charge what our services are actually worth. ■

The author is Associate Editor of Lawn and Landscape Maintenance magazine.



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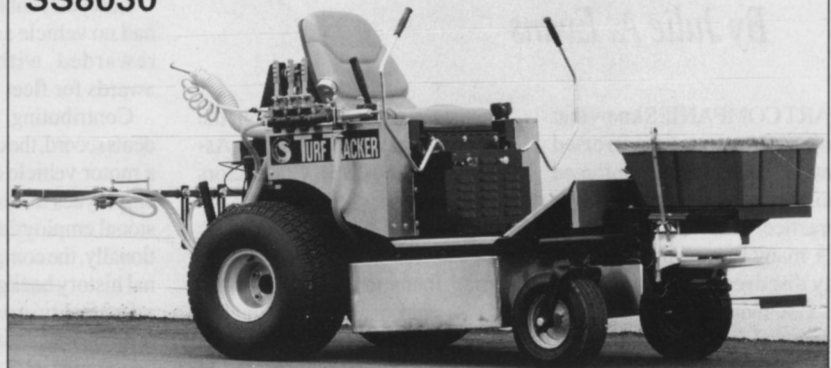


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USE READER SERVICE #75

Winning Examples: Landscape Firms Put Safety First

A strong safety plan can reduce workers' compensation claims, lower insurance rates and demonstrate to employees a concern for their well-being. Here's how leading companies demonstrate a commitment to safety.

By Julie A. Evans

SMART COMPANIES know that most accidents can be prevented through continuous and reinforced training, a little ingenuity and a lot of practice.

As many companies have already discovered, a strong safety plan can reduce workers' compensation claims, lower insurance rates and demonstrate to employees a concern for their well-being. Despite the obvious benefits, not all companies guarantee a safe work place for their employees.

To learn how leading companies minimize costly accidents and maintain a safe environment, *Lawn & Landscape Maintenance* magazine went to some of the top experts in the field — companies with strong safety histories who

consistently win awards from the Safety Award Contest of the Associated Landscape Contractors of America.

GET IT IN WRITING. "In the strong focus to cover details for clients and to produce quality workmanship and service for profit, it can be very easy to forget that a lack of safety is a major expense to a company," said Mark McCann, personnel manager and safety officer for Gibbs Landscape Co., Smyrna, Ga. "These costs can sneak up on you unless you continuously track where they occur and take steps to control them."

His company revamped and strengthened its safety program after experiencing an increase in

accidents and injuries in 1991.

"We decided that we needed to focus more attention on safety, from a company loss prevention standpoint and a workers' compensation standpoint," McCann explained.

For starters, the company assigned one person — McCann — to safety management. McCann works with a safety committee and the efforts of enlightened field employees who are made aware of what specific accidents cost and how they are caused. This total safety effort is encouraged and supported by top management.

"If safety is left to different managers or not watched by one person, then the details can slip through the cracks," he said.

The company now documents its entire safety program. Currently, there are 27 points of safety in writing, about half of which have been added since 1991. They include everything from recruitment of quality employees to the issuance of personal safety equipment. By listing the salient points of its safety program, the company now has a comprehensive document to present to its insurance carrier.

Last year, Gibbs Landscape Co. had no vehicle accidents and was rewarded with three ALCA awards for fleet safety.

Contributing to its zero-accidents record, the company requires a motor vehicle check on all new employees under a 90-day provisional employment period. Additionally, the company runs a criminal history background check and a personality survey, which among other characteristics, measures the new employee's safety awareness. Although the combined cost of the two tests is \$20 per employee, McCann said, the investment has proved its worth.

"The money you spend on safety returns many times over. One accident can cost \$1,000," he said.

Also, the company's insurance carrier took notice of its improved safety performance, McCann said. "These new programs really



showed them our commitment to safety. Our experience modifier for workers' compensation will probably drop this year, and we're likely to get a substantial decrease in our premiums — that's the long-term benefit.

"In the short term, we have higher morale and less people temporarily out of work due to injuries," he said.

INCENTIVE PROGRAMS. The safety strategy devised by Northwest Landscape Industries, Tigard, Ore., proves that safety programs can be fun as well as instructive. Two incentive programs offering cash and other rewards have proven to be effective for the company, according to Deirdre Conway, corporate controller. Conway also heads up safety concerns for the company.

In the first of two programs, employees are grouped into



Landscape firms should consider safety an important component of the job cost equation. Photo: W.E. Chapps

DRESS FOR SAFETY

ALWAYS DRESS properly for the job you are doing.

- Do not wear loose, torn or frayed clothing.
- Wear a hard hat when pruning — in the tree and on the ground.
- Wear safety goggles or a face shield when pruning, running string-trimmers and blowers.
- Always wear gloves when the situation calls for them, including: mixing chemicals (rubber gloves, not leather or cloth); pruning; and changing mower and edger blades.
- Always wear safety boots, not tennis shoes (high tops with steel toes are preferred).
- Wear ear protection when operating loud equipment.

— *Supervisor's Safety Handbook, Associated Landscape Contractors of America*

teams and can win "NLI Bucks," valued at \$10, for each quarter their team remains injury-free. NLI Bucks can be used to purchase a gift catalog, working tools, uniforms or other items, Conway said. NLI Bucks accumulate for up to one year, then expire if unused.

A second program pays even bigger dividends to accident-free workers. Employees are divided into teams according to geographic

area and company division — east side maintenance division, for example. A cash amount is rewarded for each six-month period that the team avoids a time-loss injury. The award caps at \$100 after 18 months.

The money cannot be cashed in and must be used for group outings, reinforcing the team concept. "We've had some groups use the money to go deep-sea fishing, white water rafting..."

The strategy appears to have reduced accidents considerably. The east side maintenance team, for example, has not had a time-loss accident in two years. A team comprised of office staff and mechanics has never had a time-loss accident.

"It's really had a substantial impact since we implemented the program," Conway said.

The numbers bear that out: Three years ago, the company's

workers' compensation modifier was 2.1; since then, it's fallen to 0.95. Insurance premiums have dropped from \$250,000 to less than \$100,000 annually. "That's a substantial return on our investment," she said.

In addition to incentive programs, the company also makes safety a critical component of new employee orientation and all company meetings.

Another critical component to safety and loss prevention is an early return-to-work program, Conway said. "If you have an injured worker who stays away more than two to three weeks, then you've lost them to the system. There's little motivation to get back into the system."

The company provides rehabilitating employees with a variety of physician-sanctioned jobs, from sifting through paperwork to filing, Conway said. Rehabilitation of an injured employee becomes a team

EQUIPMENT SAFETY

EQUIPMENT CERTIFICATION ensures that all employees have proven their ability to operate and care for equipment prior to use. It can be used as a selling tool for your company — clients need to feel secure that your employees are qualified to handle dangerous equipment on their property.

- Require your employees to attend classes on the proper operation and care of equipment.
- Administer a written test to evaluate employees' knowledge of the equipment.
- Have employees physically demonstrate their capability to operate a given piece of equipment.
- File all test results and certification dates in the employee's personnel file and use the information as part of the evaluation process during review time. Use equipment certification to justify or deny raises and/or promotions. — *Supervisor's Safety Handbook, Associated Landscape Contractors of America*

effort between the physician, insurance company, employer and employee, she added.

SELF AUDITS. As chairman of the ALCA Insurance Committee and a safety committee member for nearly a decade, David Frank of David J. Frank Landscape Contracting Inc., Germantown, Wis., has helped many members of the landscape industry improve their safety records. His own company's safety plan is constantly evolving, he said.

"Our safety program has been rewritten eight to 10 times in as many years as the company has grown," he said. "Our safety plan is a living thing. It identifies what we would like to see happen and how we go about that and who has certain responsibilities."

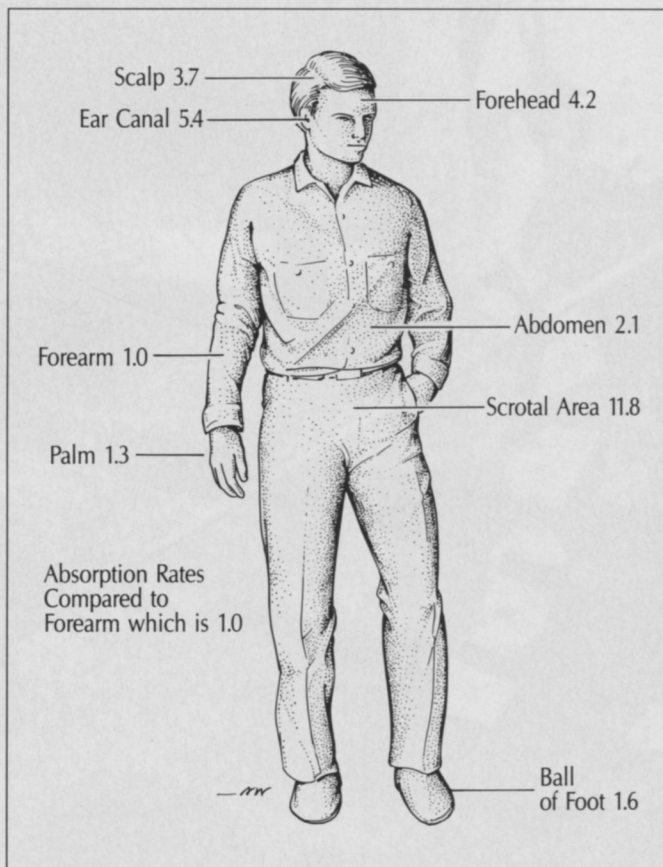
Safety begins with self audits. "We try to be proactive rather than reactive. We do a lot of safety reviews and identify safety hazards before they materialize into non-safe situations."

Certification is another key element to the company's safety

plan. "In God we trust, all others must have proof. We have a rule. No one operates a piece of equipment they're not certified on," Frank said.

The company also uses safety incentives, such as bonuses and contests, but Frank believes that communications is the single most important component of good safety. The company devotes one-third of every meeting to safety issues, and safety becomes an integral part of training. "We don't

When gearing up for pesticide applications, keep in mind that pesticides can enter the body through various routes of exposure, including dermal (through the skin), respiratory (through the lungs and respiratory system) and oral (through the mouth including absorption through the gastrointestinal tract). Pictured here is a comparison of penetration potential for pesticides exposed to human skin on various body regions, with the forearm given a rating of 1.0. Source: Mallis Handbook of Pest Control



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talk about safety apart from other training," Frank said.

Contrary to common practice, Frank refuses to assign one person to head up safety. "We removed that position because it had a psychologically undermining effect. Everyone thought, 'Joe is the safety officer, it's his job to worry about safety.' Everyone is a safety officer here," Frank said.

Throughout his years of industry involvement, Frank has seen a lot of changes in the way insurance companies and businesses interact on the issue of safety.

For one thing, insurance companies have become increasingly vigilant in their policing of safety programs. "Years ago, insurance companies would ask, do you have a safety program? That seemed to satisfy the underwriters. Ten years ago, they wanted to review our safety program. Three years ago, they wanted to see documentation for the safety meetings and any information that gave credibility that the program was substantial."

Also, smart businesses get more involved when accidents hap-

SAFETY BINGO

WORK PLACE SAFETY is a serious matter, as any safety manager will attest. However, many firms have discovered ways to make safe practices more enjoyable.

For example, take Minor's Inc. in Fort Worth, Texas. In addition to tailgate meetings and rigorous orientation sessions on safety, employees play "safety bingo." Here's how it works:

Each employee gets a bingo card. A bingo number is called for every accident-free day. The first person to reach "bingo" wins the designated prize and the game begins anew. However, any accident or injury will clear the board and end the game.

pen. "Years ago, when we had a loss the employer would step back and let the insurance company handle it. If you step back today, the legal and medical community will step in, and they do a poor job of containing costs."

Right now, Frank is enthusiastically backing Occupational Injury Management, or OIM, a strategy used to control costs. OIM is concerned with what happens after an accident; a strong back-to-work program is a key component.

"The objective of OIM is to identify an operating plan so that

injured employees are professionally and promptly allowed to return to work. It's designed to ensure quality medical care and manage soaring claim costs," Frank said.

Components include an operating plan, supervisor training in medical case management, a team coordinator and a vigorous communications program that includes medical staff, the insurance carrier and its claims department, the employer, injured employee and any other intermediaries.

Frank's company serves as a

reminder that even "safe" companies can have accidents. His company went 765 days without a loss-time accident, but accidents have cropped up lately as the company expands its labor force. The company did not win any ALCA awards last year.

"Safety is a real journey," Frank explained. "We all hope to work on something and get it finished, but that's not the nature of safety. Every day that you have someone coming to work for you, you have to worry about safety."

Note: The ALCA Safety Award Contest is open to all members. All companies who have had no loss-time accidents or no vehicle accidents are recognized in the areas of fleet and employee safety, as well as for most improved safety record.

For details, contact: ALCA, 12200 Sunrise Valley Drive, Suite 150, Reston, VA 22091; 703/620-6363.

The author is a Contributing Editor to Lawn & Landscape Maintenance magazine.

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USE READER SERVICE #25

Don't Take Preventive Maintenance For Granted

Manufacturers and contractors agree: aggressive maintenance helps avoid costly warranty problems.

By Bob Gitlin

"WHEN SOMETHING fails within a warranty period, the dealer looking at the failed part has to make that judgment call," said Gary Justus, manager of product support for John Deere in Raleigh, N.C.

Such is the relationship between a landscape professional and a dealer. Although sometimes volatile, the two sides can prevent a lot of headaches by setting maintenance parameters at the outset.

"Did it fail because it was defective or because of something that happened during the use of the product? We pretty much accept the dealer's call. We tell our dealers that if it's a gray area, we give the customer the benefit of the doubt — at least the first time."

However, he wishes more customers spent more time on preventive maintenance. "A grounds manager told me once — and it stuck with me for many years: 'Grease is cheaper than parts.'" Daily maintenance checks and proper lubrication can help commercial operators prevent down time.

Deere preaches to dealers the importance of communicating with today's diverse customer base. "Dealers I talk to," Justus said, "understand you've got to cater to the needs of the commercial operator differently. Sometimes you have to be there early in the morning, stay late or open on Saturdays."

In fact, said Virgil Russell, executive director of The Service Dealers Association, Austin, Texas, a

good word of advice to commercial mowing contractors is to find servicing dealers who really want that kind of business, with all its attendant quick-fix or emergency-turnaround needs. Not all mower stores want to be anything but homeowner shops.

The main servicing Deere does for commercial mowers involves common-wear items: belts, deck bearings, gauge wheels, etc.

"The warranty excludes normal wear, but it does include things that are defective," Justus said. "If we get a mower spindle bearing that fails after six months of use. Did it fail prematurely because of a defect, or because it had lived its normal life? Typically we will allow warranty on a premature failure like that."

EDUCATING THE FIELD. Jim Roche, technical service manager at Scag Power Equipment, Mayville, Wis., rues the fact that all too often the operator maintenance booklet sits in the hand of the owner rather than getting circulated among the people who run and/or service the mowers. The people who need the specific education are missing out on valuable maintenance procedures, fully charted and easy to read, about how long to wait before lubrication, changing oil, checking hardware and other standard preventive tactics.

A Deere is not a Scag is not a Toro is not a Buntun is not a Kubota. So when a manufacturer — or a dealer





By paying attention to details, professional mowing contractors should be able to minimize the effects of equipment breakdowns. For example, keeping deck covers in place should be encouraged among your crews. Photo: Excel.

—hears the complaint, “Hey, this spindle bearing broke. I had another machine and I never had to do anything with greasing the spindles,” it doesn’t hold water.

“We are open enough as a manufacturer to listen to the feelings of the commercial operator,” Roche said. “Sometimes, if you just read what was written on a warranty claim — belt failed, belt broke, things like that, which is the response we get on our claims — you don’t get the full picture.”

This appeals process at Scag is filed under “policy adjustment.” Quality of cut is a prime contractor concern. Scag stores will often be visited by users who need help adjusting the cut.

“The dealer cooperates,” Roche said, “takes a look, finds out exactly what is wrong. Bent blade. Loose spindle. Bad spindle bearing, letting the shaft drop down so the blade itself gets uneven. Whatever.”

Sometimes landscapers find it

does more harm than good to try to make certain adjustments.

“Sometimes if the landscaper tightens the belt, he pulls so much on the spindle that it bends,” Roche said. “That in turn bends the angle of the blade. All those kinds of things are easily covered by our warranty program.” Another commonly covered situation is the Scag unit’s tubeless tires popping a bead after hitting a curb too hard, he said.

“Overmaintain,” counsels Jim Wallace, marketing manager for The Toro Co. in Minneapolis. “Read the manual. If it said do something every 50 hours, and you’re running that engine in extremely dusty conditions, do it more often. Ten bucks worth of maintenance could save you \$100 worth of trouble.”

Toro designs its mowers to take heavy use — but not abuse.

“If somebody runs our mower into a wall and bends the housing inward, generally that’s not cov-

ered by warranty if it’s obviously damaged,” Wallace said.

Toro tries to bend over backward, to the point where even dealers accuse it of being too lenient at times, Wallace said. Toro has been known to issue overrules of dealer decisions, to cover repairs previously ruled out of warranty. Any dissatisfied customer can call the distributor or Toro directly.

“Unless you’re a huge operation with your own mechanic, finding a good service dealer will earn you lots of money,” Wallace said.

STOP THE ABUSE. Lawn care contractors try to avoid servicing hassles through proactivity both in the field and in the shop.

One such huge mowing operation is Maintain, out of Fort Worth, Texas. Production Manager Bruce McQuay has been able to skirt the high cost of engine wearout and replacement by exploiting the aftermarket for engine parts. En-

gine repair or replacement is the most costly servicing need of any mowing contractor.

Making mowers the personal responsibility of crew members helps a lot. Each Maintain driver loads his own equipment onto the truck every morning. And McQuay plays hardball with abusers.

“If something comes up missing, parts come up broken — like an axle, things like that — the questions are put to him. And he goes down the servicing/maintenance checklist to try to distinguish whether the engine locked up from lack of oil,” he said. “We go back to the records. It was serviced yesterday? Then why didn’t somebody put oil in?”

Maintain has a “payroll-deduct” policy in which that worker may well have bought himself a lawnmower, or a repair.

Most big lawn maintenance companies don’t want their people in the field doing repairs. That’s what the mechanics were hired for.

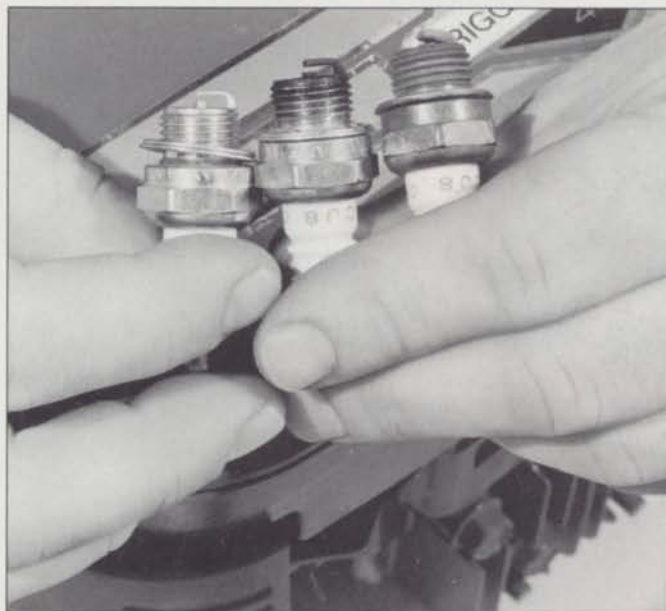
"We don't allow them to put a screwdriver to the carburetors to adjust them, give it more power or any of that stuff," McQuay said. "I have two supervisors that take care of each part of town. The foreman calls in to say a mower is down and we get him another mower or send a mechanic out to fix it."

Maintain's crews go through belts like crazy, so McQuay recommends stocking lots of them. "It'll be one of those deals where it'll be fine for a month and then next month you may go through three drive belts for some reason."

Equally militant about mechanics doing all repairs is Rob Zolezzi, co-owner of L&L Landscape Services, Santa Clara, Calif., another major contractor with hundreds of mowers and its own extensive servicing capability.

And yet each L&L crew member is expected to play mechanic for 1/2 hour at the start of each day.

If L&L is on a certain job number relating, say, to work at Apple Computer, the eight-hour designation will have built into it an actual work time of seven and a



half. One half hour, at the onset of the shift, will be devoted to standard preventive maintenance. This is what Zolezzi calls "a proactive approach."

There are three men for every such half hour. They go through the service on the equipment prior

to its leaving the yard. "We have a list of daily tasks that need to be done: check the oil, blow off the air filter and put it back on, sharpen and change blades, check nuts and bolts and screws, make sure everything's tight and in order."

L&L's four full-time mechan-

Keeping spark plugs free of combustion buildup can add years of life to the mowers in your equipment fleet. Photo: Briggs & Stratton Corp.

ics are on a floating schedule so they're not there only during the hours the crews work. "You always have one floating. When the crews come in at the end of the day, at 3 p.m., (a mechanic) is here for five hours," Zolezzi said.

Mowers that go down are met with immediate replacements. After the shift, the swingshift mechanic places them aside for next-day attention. For now he takes a truck and a trailer, pulls into the shop, spends an hour going down a checklist of maintenance tasks, pulls that truck back out and brings another one in.

"Every vehicle and mower is completely examined once a week for a little more than just the daily stuff," Zolezzi said.

It's working. Hardly any downtime takes place with L&L crews, and the only thing Zolezzi needs from his servicing dealers is parts.

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The company moved from 4 x 8-foot trailers to 5 x 10s, which better fit two 21-inch mowers, a staple of the L&L fleet. If one goes down, the spare is immediately implemented (if it's not also being used). This cuts down on downtime, Zolezzi said.

Crew personnel are held responsible for the mowers they use. "I lent it to this other guy and I never got it back" is no longer a valid excuse at L&L, he said.

RESEARCH YOUR NEEDS. Though Rich Gaffney, owner of Gaffney Landscaping in South Euclid, Ohio, doesn't view lawn maintenance from quite so grand a perch — his company runs 10 men in peak season — he echoes many of Zolezzi's viewpoints about aggressive cost-cutting and immediate attention to mowers' working innards. His fleet is a bit different from that of L&L's.

Gaffney's workhorse (for residential business) are Lawn Boys that cost mere hundreds of dollars, as opposed to the big riders that can run \$10,000. But his fear of expensive downtime is no less acute.

"A major thing to keep after are air filters," Gaffney said. "They have to be cleaned religiously. And grease fittings have to be regularly kept after."

A firm believer in high-pressure washing, he takes his equipment to a place that provides that. "Those will clean up the decks underneath very nicely."

He stocks every part that might wear out on a regular basis. "But with me, the best maintenance is constantly buying new equipment," he said. For the most part, his crews never push mowers more than two years old.

With a local store selling him Lawn Boys for \$200 a pop, it makes sense. He said the residential model has the same engine as the commercial, so he goes with what's cheaper, patching and fixing with his vast storehouse of parts to address problems related to the reduced ruggedness of homeowner models. His crews run a mix of homeowner and commercial mowers.

Some of Gaffney's mowers last four or five years, but usually they're committed to the garage to be cannibalized down the road, "if a magneto goes down on a functioning unit, or something like that," he said.

If you research your equipment before you buy, you won't have many warranty problems, he said. "And if you do, dealers will usually bend over backward for you. Because you don't have that problem very often with warrantied stuff. Most equipment is pretty good."

The author is a Contributing Editor to Lawn & Landscape Maintenance magazine.

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Do You Have the Right To Know?

Surveys reveal that work place drug testing is on the rise; is your firm among those that test?

By Julie A. Evans

AMID MORAL and ethical questions, work place drug testing has increased dramatically over the past decade. A recent member survey by the American Management Association found that 84.8 percent of respondents tested their employees for drug use in 1993, compared to 21.5 percent in 1987.

While other surveys cite less dramatic statistics, drug testing is indisputably on the rise. Reasons for testing vary, but employers typically cite safety and liability concerns — concerns which generally outweigh issues of employee privacy.

The AMA also attributes the rise in testing to:

- Department of Transportation and Department of Defense regulations which, along with local and state legislation, mandate testing for 33 percent of surveyed firms.

- The Federal Drug-Free Work Place Act of 1988, which requires all employers with federal contracts equaling or exceeding \$25,000 to certify that they will provide and maintain a drug-free work place.

- Court decisions that consistently recognize an employer's right to test both employees and applicants.

- Action by insurance carriers to reduce accident liability and control health care costs.

- Corporate requirements that vendors and contractors certify that their work place is drug-free.

Work place drug testing takes many forms including: preemployment; periodic (all covered employees undergo a drug test in a given period); random (a percentage of covered employees are selected at random); and for cause (i.e., following an accident).

The rise in periodic or random

testing among respondents has been especially dramatic, jumping from only 2.5 in 1987 to 33 percent in 1993 for a 1,200 percent increase. Much of the increase can be explained by DOT regulations instituted in 1989 that mandate periodic testing in specific job categories, including transportation.

INDUSTRY SURVEY. Recently, *Lawn & Landscape Maintenance*

magazine surveyed its readers to learn more about its drug testing practices. Results of the fax survey revealed that slightly more than half (53.5 percent) of respondents do not test their employees for drug or alcohol use.

Of those who do test, 76.9 percent engage in random testing; 61.5 percent, preemployment screening; and 46.2 percent, ongoing testing for cause. Further, the majority (84.6 percent) of those

who test apply it to all employees regardless of job rank.

If an employee tests positive, 27.3 percent will dismiss the employee immediately; 45.4 percent ask or require the employee to begin a rehabilitation program; and 27.3 percent establish a warning system that may result in dismissal.

Of LLM survey respondents who do not test their employees for drug use, 66.7 percent said they did not test because substance abuse is not believed to be a problem. Another 33.3 percent said testing is too expensive; and 25 percent said testing is intrusive and unethical. (Respondents gave more than one answer.)

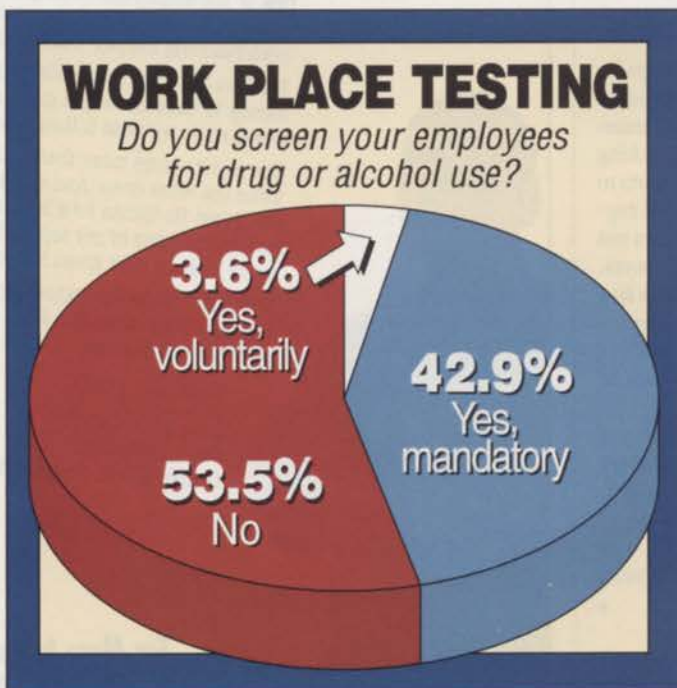
Lee Greathouse, owner of Greathouse Landscape Co. Inc. in Nashville, Tenn., was one of the survey respondents who tests employees for drug use. He implemented a drug screening program about three years ago due to suspicions about employee theft, drug-related accidents and other personnel problems.

"At the time we started, we were on a self-insurance program and there were accidents caused by people we knew were on drugs," Greathouse said. "By necessity, we implemented the program, much to the dislike of my managers and supervisors. Now they swear by it."

Drug testing was also required in order to do business with general contractors and certain clients. "We do work for DuPont, and prior to our program, we would have to go through their drug testing program before we could enter their gates," he explained.

Greathouse hired a lawyer to write the drug policy, which took

(continued on page 38)



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Drug Testing

(continued from page 36)

about six months. The lengthy legal process made Greathouse impatient, but it proved to be worth the wait, especially when a disgruntled employee quit the firm and contested the policy through the Tennessee Department of Employment Security. The case was thrown out.

"They found that the person didn't have a claim against us, and that we had a well-written, sound drug policy," Greathouse said.

Employees now are tested for drug use on a preemployment, random and post-accident basis. During job applicant screening, the test comes up positive "all the time," he said. Those applicants are not hired.

As for random testing, 20 percent of the company's employees — Greathouse included — are randomly selected every quarter. All employees are notified six weeks prior to the test. A few employees have tested positive

Drug testing is not common in the green industry. Photo: Wells Fargo Guard Services

for drug use and are given the option of a rehabilitation program.

"I think we've actually helped people get out of a problem situation," he said.

In Atlanta, Orkin Lawn Care has a comprehensive drug testing program that includes preemployment screening, periodic and unannounced screening. "We could do a drug test at any time," explained Steve Derrick, technical director.

Drug testing is an assurance to customers that Orkin employees are drug-free, Derrick said. Employees also benefit. "It's a deterrent and may discourage experimental use. And it's a benefit to employees to know that the people on their team are not going to be subject to the abuse of an individual who can affect the performance of the entire branch."



Employees who test positive for drug use are dismissed immediately. But help is available for employees who voluntarily admit their drug use prior to testing. "If they volunteer they have a problem, they don't lose their job the first time," Derrick explained.

As indicated by responses to the LLM fax survey, many landscape firms do not test their em-

ployees for drugs. Leisure Lawn in Dayton, Ohio, is one such firm. Doug Halterman, senior vice president, said low turnover rates and quality employees are two main reasons why drug testing has not been an issue for the company.

"We do not feel like we have a need for it," explained Halterman. "We also don't fall under DOT regulations and we're not (legally) mandated to test."

The company does run at least two motor vehicle checks each year to make sure that no employees have been arrested for driving under the influence. On or off the job, they will be fired if such an arrest turns up.

Personally, Halterman has mixed feelings about drug testing. "I understand an employee's right to privacy, but I also understand that these people are out there driving vehicles and are in the public eye. They need to have their faculties about them. If we saw a problem, we would have a policy."

Roger Albrecht, president of



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USE READER SERVICE #20

Nitro-Green Corp. in Fairfield, Calif., also does not believe his company needs to test employees for drug use. Most of the company's 41 franchises have small crews, ranging from one to 16 employees, and "if someone has a problem, you'd notice it."

But Albrecht said he hasn't ruled testing out for the future. "It's one of those issues on the horizon; I know more and more companies are doing it."

COST FACTORS. Work place drug testing programs do add expense to operating a business, but many employers say they realize a return on their investment. Greathouse estimated that he spends \$3,000 per year on drug testing.

"It's an added expense, but just part of operating a business," he said. The company saves money because its employees are more productive; and theft and other personnel problems have been drastically reduced, Greathouse added.

Actually, drug testing is not as costly an expense as one might expect, according to the AMA survey. Respondents reported an average cost of \$43 per testee.

Positive test results increase costs by raising the number of validation tests.

More than half of the respondent firms reporting costs spent

less than \$5,000 on testing in 1992; and more than half the firms grossing more than \$500 million spent less than \$25,000.

Studies find that drug testing can save an employer costs associated with employee drug use. Last year, the Journal of the American Medical Association reported on a survey of 2,533 Boston postal workers to estimate the costs and benefits of pre-employment drug screening. The survey found that preemployment drug screening would most likely save money for companies experiencing high costs associated with absenteeism and accidents among employees who use drugs.

The survey of postal workers also found that drug screening could save \$162 per new employee — but that number could vary according to the community in which drug testing is performed. For example, if drug use in a community was low or the cost of a urine test was high, any

(continued on page 42)

EMPLOYER RECOURSE

If an employee tests positive, what action is taken?

27.3%
Dismiss employee immediately

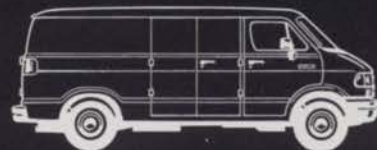
27.3%
Establish a warning system/
possible dismissal

45.5%
Ask/require the employee to enter
a rehabilitation program

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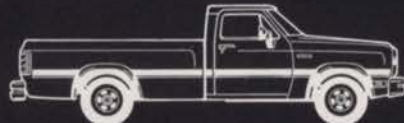
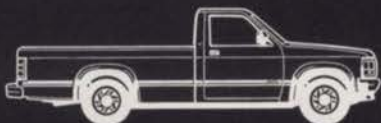
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USE READER SERVICE #84

Drug Testing

(continued from page 39)

such program would actually lose money. In addition, absenteeism, injuries and turnover in employment among drug users vary by industry and geographic region.

The survey of postal workers also attempted to answer whether the consequences of employing people who use drugs justify expenditures on drug testing programs. To do so, preemployment urine samples were tested for cocaine and marijuana; results showed that 7.8 percent and 2.2 percent of the applicants had

evidence of marijuana use or cocaine use, respectively. Then employee turnover, absenteeism, accidents, injuries and discipline were evaluated for all employees in the sample, including users, for an average of 405 calendar days.

Compared with non-user employees, drug users had an increased risk of job turnover (marijuana users, 1.58 times the risk of non-users; cocaine users, 1.15 times); accidents (marijuana, 1.55; cocaine, 1.59); injuries (for both drugs, 1.85); and disciplinary action (marijuana, 1.55; cocaine, 1.40).

Non-users had an absence-from-work rate

of 4 percent, while marijuana users had an absence rate of 7.1 percent and cocaine users, 9.8 percent.

The survey also found differences in drug use based on gender, race and other factors. For example, males were more likely to test positive for marijuana, and females, for cocaine.

Blacks, younger workers, cigarette smokers and mail handlers had a greater proportion of positive results than whites, non-smokers and workers in other job categories.

GETTING STARTED. Before an employer implements a work place drug testing policy, he or she needs to consider a number of legal restrictions, which may vary by state.

All of the key elements required for a drug testing program guaranteed to withstand legal

Compared with non-user employees, drug users had an increased risk of job turnover, accidents, injuries and disciplinary action.

scrutiny are too numerous to include here, but certain components are recognized as universally important. These include: notice to employees; consent to testing; use of an independent laboratory that specializes in drug testing and is certified by the National Institute on Drug Abuse; confidentiality of results; and a written, non-discriminatory drug and alcohol policy that sets forth the consequences of policy violations.

Employers should consult with legal aid or a work place consultant before implementing a drug testing policy. ■

The author is a Contributing Editor to Lawn & Landscape Maintenance magazine.

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USE READER SERVICE #43

Enterprising Composters Bridging the Gap

Private firms often vie with communities for rights to offer composting and other specialty services. But faced with looming landfill regulations, longtime adversaries are learning to work together.

By Cathy Hoehn

Facilities for composting are becoming more prevalent across the country. In the hastened desire to rid landfills of yard waste, those entering the compost realm need to ensure the proper manufacture of compost to establish business legitimacy.



IN THE REALM of yard waste composting, public and private sectors are learning cooperation is a pretty good way to ensure things get done.

Rather than battling over who gets to offer composting services or bickering about prices, many private firms are securing workable contracts with municipalities to compost yard waste and market the end products. And municipalities lacking the necessary land space, equipment, manpower and expertise prefer letting outside services handle their yard waste headaches.

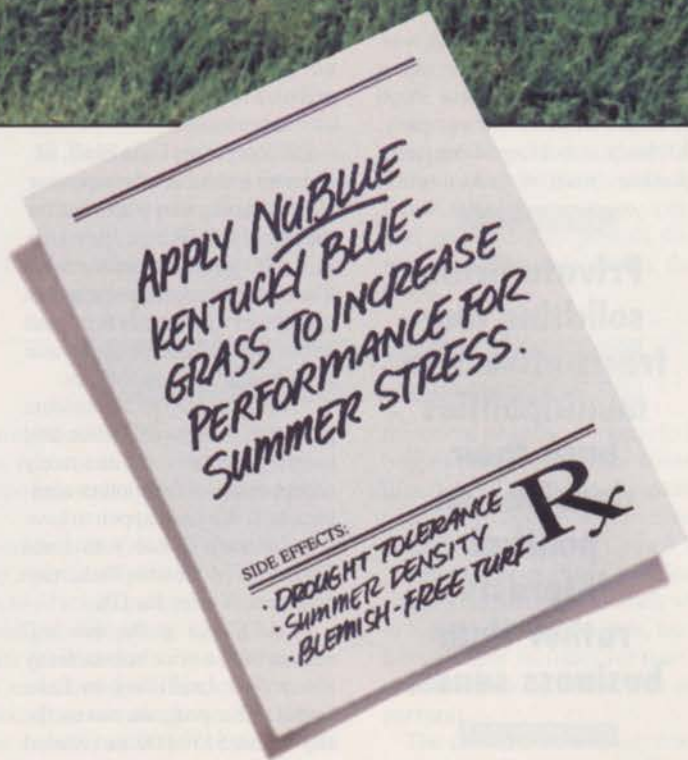
Facilities for composting — both municipally and privately run — are popping up across the country, concentrated mostly in the Midwest, Southeast and West, where communities race to beat pending landfill regulations.

"There is tremendous opportunity in midsize (composting) markets. Composting is not a new idea, but the pressure of the whole environmental and landfill issue has made it more cost efficient," said Daniel Skinner, owner of Landscape Services in Fort Wayne, Ind., which runs its own yard waste facility.

Many composting programs evolve due to "cost avoidance" of landfill tipping fees, said Ron Albright of Ron Albright & Associates, a composting consulting firm in Annapolis, Md. "Increases in landfilling costs provide the opportunity to charge higher tipping fees for composting, which gives private contractors the wherewithal to afford composting."

Municipalities setting up their own composting sites stir some grumblings from private firms that believe government-sponsored programs present unfair competition in the end market. But companies with public con-

(continued on page 46)



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Composting Ventures

(continued from page 44)

tracts tucked in their pockets boast happily of unprecedented cooperation with municipalities.

MEETING OF MINDS. One of the greatest obstacles in obtaining government contracts, particularly for small companies used to conducting simple business transactions, is muddling through red tape and political favoritism, according to many firms.

In instances where municipalities accept bids for contracts, red tape is less of an issue. But private firms soliciting contracts often find municipalities base their decisions on political interests rather than business sense.

Kreher's Poultry Farms in Clarence, N.Y., for three years sought to obtain contracts from Buffalo and four surrounding suburbs to compost yard waste to mix with and deodorize poultry manure. The company found the jobs usually went to companies that appealed to voters' interests. "We

didn't realize how political it was. We thought it would be like a business decision," said Brett Kreher, a partner in the company. Kreher's is holding off on composting "until it makes sense."

Private firms soliciting contracts often find municipalities base their decisions on political interests rather than business sense.

We're not planning on doing it right now."

Larger companies throughout the country claim joint compost-

ing efforts with municipalities are running smoothly, and several plan to expand facilities and/or market coverage.

DK Recycling, Lake Bluff, Ill., operates a number of composting sites including a two-acre site for the city of Lake Forest, Ill., taking in 20,000 yards of green material. The company recently reached an agreement with the city to expand to 6 acres, and accept yard waste from adjoining communities.

"This hopefully is a precedent partnership between public and private cooperatives. Cities rarely accept material from other communities. We just happen to have a good track record with Lake Forest," said Charlie Pick, vice president of sales for DK.

Tipping fees at the site will remain \$35, a price substantially lower than landfilling in Lake Forest. The program saves the city about \$150,000 in reduced tipping fees and hauling costs, and will produce "\$300,000 cold hard cash in the next three years," said Bob Gillespie, DK's president. "That's a fairly significant

amount of money even in this day of austerity."

On the East Coast, Earthgro Inc., Lebanon, Conn., which began taking in yard waste four years ago at its Lebanon and Long Island, N.Y., sites, is looking to add a new facility. "We're definitely in an expansion mode — geographically and expanding what we're doing in the current market," said Chris Field, vice president of compost services.

A composting company in Pittsburgh evolved out of a landscaping firm's need to "deal in a conscientious way with getting rid of organic debris," said Carla Castagnero, a partner in AgRecycle. Castagnero's partner, Dan Eichenlaub, owns Eichenlaub Inc., a full-service landscape contracting firm. The two joined forces three years ago to provide composting services for companies that yield excess yard debris.

AgRecycle handles composting for Pittsburgh and other, smaller municipalities. The cost for drop-off is \$8 a yard for landscape contractors and home-own-



Some tools require a lot of time and manpower ...

ers. That amount lowers slightly during season for leaf loads only, Castagnero said.

The end product is sold mostly to landscapers, nurseries, golf courses and homeowners. Finding markets for the finished material hasn't been a problem. "We are sold out. We cannot meet the demand. We could have sold four

times what we had available," Castagnero said.

Maribeth Rizzuto, recycling coordinator for Pittsburgh, said the public/private partnership works very well for the city.

"It takes a major burden away from the city. Dealing with companies that have expertise and make a product that is truly usable

is a big benefit," she said.

She conceded private firms that have experience in composting often produce higher quality compost than municipalities. "Around Pittsburgh, municipalities making their own compost will get a finished product that may not be usable across the board," she said.

O.M. Scott & Sons, Marysville, Ohio, two years ago won a five-year \$1 million agreement with Franklin County. The county owns another site, operated by Kurtz Bros, a Cuyahoga Heights, Ohio firm that started in the soil business in 1936 and began composting leaf humus in the 1970s. Today the company

EDUCATIONAL EFFORTS

MANY COMMUNITIES are fighting the clock to provide a means, via composting, to be rid of excess yard waste. More often they are turning to the professional landscape industry, a large contributor of lawn debris itself, to lend a hand.

In Michigan, for example, the Southeastern Oakland County Resource Recovery Authority formed a partnership with the Metropolitan Detroit Landscape Association to educate landscape contractors and homeowners on composting and grass recycling. SOCRRRA provides the landscape association with speakers and written articles outlining various composting options and alternatives. In exchange, MDLA offers SOCRRRA free exhibit space at trade shows, and members speak at recycling conferences on how landscape contractors use compost.

"There are no formal meetings between the two groups. We just meet on an as-needed basis," said Lillian Dean, coordinator of SOCRRRA's yard waste reduction program.

Lack of knowledge about composting on the part of material

providers presents an obstacle for compost facility operators. The biggest problem is all the contaminants that come with the raw materials. "Landscape contractors who use the end products particularly tend to be concerned about that," said Tom Richards, biological engineer at Cornell University, Ithica, N.Y.

Several composting operations host demonstrations, tours and educational seminars to teach what the process involves. Kurtz Bros, in Cuyahoga Heights, Ohio, has brought more than 2,000 people through their facilities for tours. The company is installing a 2 1/2-acre demo area to show how composted materials and mulches perform.

The city of Solon, Ohio, whose composting facility was voted number one last year in a nationwide search by *City & State* magazine and the National League of Cities, also offers a demo site for backyard gardening and composting. "We always have a good turnout. We get a lot of local professional landscapers as well as homeowners," said Ed Butler, Solon's solid waste program manager.

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.....Some don't.

takes in 50,000 tons, or 150,000 yards of compost a year.

The biggest obstacle, according to Kurtz Bros., has been readying enough end product for market demand. It takes about a year to process yard trimmings; the company only began taking the material about nine months ago.

"We have people that really want the product," said Sam Stimmel, sales/marketing manager for central Ohio operations at Kurtz. End markets will include golf courses, athletic fields and commercial landscapes. The company also will use the finished compost in its own custom mulches and top soil blends.

In Washington, private firms have developed longstanding relationships with municipalities, according to Jan Allen, general manager of Cedar Grove Composting, Seattle.

"The trend here is that municipalities contract with private composters. The private companies came forward and they get competitive bids. There's only one



municipal composting facility here and its processing costs nearly double that of a private facility's," Allen said.

Cedar Grove provides yard-waste and wood-waste composting for Seattle, King County, Snohomish County, and the cities

of Tacoma and Bellevue. Founded in 1989, the company takes in 100,000 tons of green material a year. It aggressively markets its end products, which include pure compost for soil amendments and potting soil, a sand/compost mix for top soil

Education efforts have been established in a number of cities to prevent contamination of reusable waste piles.

and a container soil mix.

Allen said the soil amendment, targeted toward professional

(continued on page 50)

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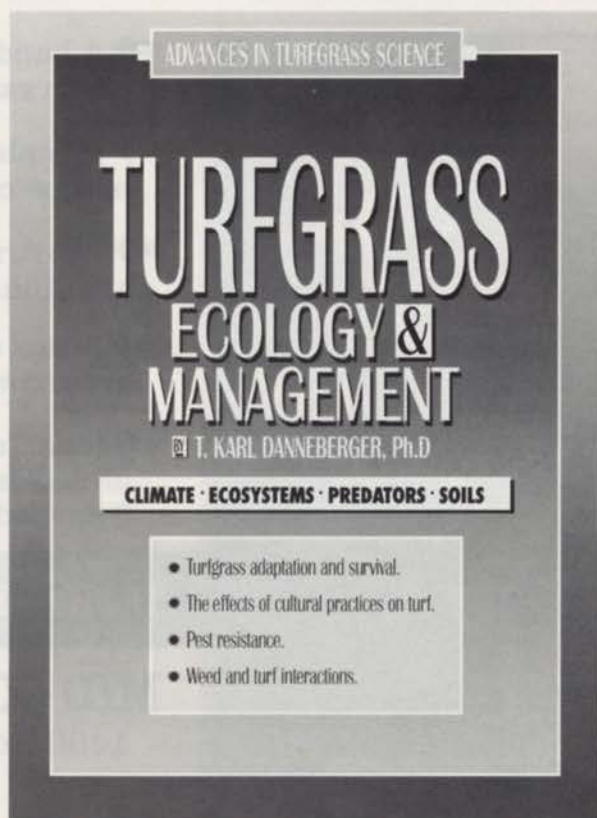
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Composting Ventures

(continued from page 48)

landscapers and homeowners, is very popular. "It resembles peat, but has some fertilized characteristics of manure," he said.

As part of its agreement with Cedar Grove, Seattle conducts education and testing for the company. The city recently published the "Compost User's Guide for Landscape Professionals."

"It's a well-developed partnership. It's working well, no confrontations," Allen said.

UNFAIR COMPETITION? One complaint private firms hold against municipalities setting up their own facilities is that they undercut private enterprise prices.

"If (a municipality) takes a product and markets it, the major issue is they are crossing the line for which laws in most states say public enterprises will not interfere with private markets," said Tom Glendinning, president of Wastek Inc., Pittsboro, N.C. "The government produces compost at \$8

to \$20 per cubic yard. I manufacture and market mine at \$25 a yard. At that rate, I don't make money, but it's high quality. Some municipalities practically give compost away, selling it at \$8 a yard."

Some cities and towns do, in fact, almost give away the end material just to be rid of it. "They don't do business as a private firm would," Pick said. "Private companies depend on end market sales to sustain them. Municipalities were forced into composting to meet environmental concerns. They didn't get in the business to make money."

Wastek is at a disadvantage to many of the newer firms in North Carolina, having gotten into composting 19 years ago, before landfill concerns developed. The company doesn't receive tipping fees for raw composting material. Glendinning said he attempted to obtain some municipal contracts five years ago but the timing was bad. "The local governments in North Carolina are of the mind that they can

perform these tasks themselves," he said.

DK Recycling hasn't felt the effects of municipal competition. The closest municipality doing

in the landscape market. The greater the population density — the more sites — the greater the competition with municipalities."

Pick did maintain that municipalities tend to charge lower tipping fees, again because their first objective isn't to make money.

"Municipalities can get away with that. They're not in this as a business. Private companies can't take material too cheap. They have to either raise their rates or go out of business."

Glendinning also claims government-run facilities can take equipment and manpower from another city or county department and use them in composting, or rearrange a budget to cover composting costs.

"Local governments choose to spend more per operation unit than private operations, and can justify it," he said. ■

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

"Private companies depend on end market sales to sustain them. Municipalities were forced into composting. They didn't get in the business to make money."

its own composting is 20 miles away, Pick said. "We compete a little bit with the village of Winnetka. But they're not really

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TURFGRASS RESEARCH is continually focusing on improvements in the efficiency of pesticides. In general, anytime the effectiveness of a pesticide can be improved, potential risks can be reduced. The more effective the pesticide application, the more likely a minimum rate can be used and/or the number of treatments be reduced.

Improving the efficacy of a pesticide makes sense both economically and environmentally. Subsequently, any new application equipment reducing environmental risk during and after a pesticide application is welcomed by the maintenance industry. This depends on the equipment being both practical and cost-effective.

In recent years, subsurface application equipment has provided the industry with improved insecticide technology. Subsurface application is, of course, directed at the control of soil insects such as white grubs and mole crickets. The below ground nature of these pests makes them more difficult to control than surface feeders, and they often require higher pesticide rates. Getting the pesticide to the insect has always been a concern.

Research on subsurface application equipment has been conducted at several universities for more than five years. Some early



A typical design for a slit-seeder modified to inject granular formulations of insecticide. Photo: R.L. Brandenburg

equipment models are already being used by custom applicators or as part of the overall pest management program on some golf courses. Most early models are just modifications of equip-

ment originally designed to do something else. In the past few years, however, some manufacturer interest has surfaced in developing equipment specifically for subsurface placement.

LIQUID INJECTION. Two basic types of systems are available. One is a high-pressure liquid in-

jector for spray solutions. The process uses high pressure generated by nozzles with extremely small orifices. This force results in soil penetration by a spray solution to a depth of 1 inch or more in sandy soil.

Nozzle placement may be 3 to 4 inches apart resulting in a series of "streaks" or bands of

EXPLORING SUBSURFACE TECHNOLOGY

OVER THE PAST several years turf managers have begun to hear a lot about subsurface placement of pesticides. Several new kinds of technology have been developed to enable turf managers to apply pesticides below the surface of the thatch, so that materials are applied directly at the soil/thatch interface, or at least further into the thatch than with a conventional surface application.

Some of the earliest field efforts of subsurface injection were conducted on warm-season grasses with equipment delivering up to 1,000 psi through nozzles placed just above the turf. These units were developed in the early 1980s and were tested on white grubs and mole crickets in a variety of turf and pasture settings.

Further refinements at the Cross Equipment Co. in Albany, Ga., in the mid-1980s led to equipment which delivers liquid formulations at pressures up to 2,000 psi. These units have nozzles at two- or three-inch spacing, placed just above the turf and aligned over drag bars.

The orifices of the nozzles are extremely small, enabling the system to deliver extremely high pressures. The units do not slice the turf in any way, but simply drive the material into the thatch at high pressures. The Cross Equipment unit delivers a steady stream of material at a constant pressure.

The use of high pressure to apply liquid formulations has been expanded recently. The Toro "Hydroject" unit, which was initially designed to fracture the soil and serve as a liquid aerator, provides penetration of the soil to depths of several inches. This unit delivers pulses of liquid at high pressure. While the Toro unit is not currently configured to handle pesticides, other companies are looking at developing units which can generate similar levels of pressure (up to 5,000 psi) to penetrate the thatch and soil.

For example, the Rogers Innovative Co., Saskatchewan, Canada, has developed a unit that can handle pesticides of various liquid

Will Subsurface Placement Revolutionize Insecticide Applications?

Research on subsurface injection of pesticides has been under way for several years. While it's been successful in controlling white grubs and mole crickets, there is still a lot to learn before the process matches up to conventional application methods.

By R.L. Brandenburg

pesticide through the soil. Another version of the equipment uses much lower pressures, but instead has a mechanical, spiked wheel that penetrates the soil with an internal nozzle to deliver the insecticide into the soil.

Such an application, in principle, offers several advantages. First is that most of the insecti-

cide is applied directly to the site of insect activity. This should result in less tie-up in the thatch and reduced surface residue. Since the nozzles ride just over the surface or are driven down into the soil, spray drift is virtually eliminated.

Some studies using high-pressure liquid injection on mole

crickets in North Carolina show improved pesticide efficacy. In fact, studies indicate the potential for excellent control at rates lower than those typically used for broadcast sprays. Rates at one-half the labeled rate often result in equal to or better control than the standard full rate application to the surface followed by irrigation. These observations all lead to a positive future for such application equipment.

Liquid injection reduces risk in both the aforementioned ways. The insecticide efficacy is improved so lower rates (and possibly fewer treatments) can be used. Direct site application may reduce potential detriments to non-target organisms (beneficial insects and spiders). In addition, the insecticide is applied more to the target site and less on the turf surface which leaves it exposed to people, pets and wildlife.

While post-treatment irrigations can virtually eliminate the

risk of surface residue, runoff and puddling from such watering can be a serious environmental concern. Strict attention to the irrigation process can help avoid this, but the subsurface application appears to be an added safeguard.

Several companies are currently manufacturing such equipment for turf use. There are also a number of manufacturers with prototype models ready to hit the market. (See sidebar.) However, as with any piece of new equipment or technology, there are often a few disadvantages.

In general, this equipment is developed to do one thing. But since it's quite expensive, it may be cost prohibitive for some lawn service companies. Current models are often directed toward the golf course industry, and are too large and unmaneuverable for lawn maintenance. Some companies are developing smaller models with lawn maintenance in mind.

Some high pressure liquid injector units are priced at more than

formulations and deliver them through nozzles into the thatch and soil. Some of these units, which like the Toro unit operate by delivering pulses of high pressure, are capable of providing penetration 2 inches into the soil.

Right now there is a certain amount of uncertainty concerning the value of subsurface placement equipment. Most turf managers can see the value of placing materials directly at the soil/thatch interface, at least when they are trying to control soil insects, such as white grubs or mole crickets. There is also evidence that the technology might be useful for improving the control of some root diseases, such as summer patch. Recent studies in Massachusetts showed that the use of high pressure liquid injection reduces the surface residue of some insecticides 30 percent to 80 percent compared to conventional applications.

While subsurface technology appears to reduce surface exposure,

and may reduce surface runoff following heavy rains, there is concern regarding the possibility of increased leaching. Studies at Penn State, which so far have included a few of the commonly used turf pesticides, seem to suggest that leaching potential is not increased significantly under normal rainfall or irrigation conditions.

However, these studies have not been conducted on many of the pesticides which will ultimately be used, and have not been conducted over the variety of moisture conditions which occur during a normal growing season. As a result, there are many unanswered questions regarding the environmental feasibility of subsurface placement of pesticides.

Preliminary studies look very promising, but people in areas which are particularly "sensitive" want to see more data or testimonials before they commit to the technology. — Patricia Vittum, University of Massachusetts

\$20,000. That's relatively expensive unless the equipment offers definite advantages over conventional application equipment. On the other hand, if such equipment could improve pesticide effectiveness, it might well pay for itself over several years.

Other disadvantages include a relatively slow speed of application. Some equipment runs as slow as 1.5 mph, making it detrimental on relatively large turf areas. Lawn service operators know time is money. If the equipment rendered treatments so effective as to eliminate callbacks, however, other time savings could be realized.

The nature of some equipment models makes them more prone to plugged nozzles, and may increase maintenance time. Future engineering may solve these maintenance headaches.

GRANULAR INJECTION. Granular pesticide formulations can also be applied through subsurface injection. This equipment is based on a modified slit-seeder or

SOME POTENTIAL ADVANTAGES AND DISADVANTAGES OF SUBSURFACE PLACEMENT EQUIPMENT

Advantages

Reduced surface residue
Reduced drift
Improved efficacy
Reduced insecticide rates
Some units act as aerators
May reduce effects on non-target organisms (beneficial insects)

Disadvantages

High cost of equipment
High maintenance
Speed of application
Difficult to calibrate
Initial cosmetic damage
Some equipment damaging to sprinkler heads, etc.

overseeder device. The concept is the same as the liquid injector in that the insecticide particle is placed below the soil surface. This is done mechanically for granular formulations. Equipment techniques vary, but each slits the ground for pesticide injection.

In a slit-seeder, a specific quantity of pesticide is delivered from a hopper box by gravity. Rate is dependent on speed and orifice adjustment from the hopper, and early models or unmodified versions were difficult, if not impos-

sible, to calibrate. New prototype units improve ease of calibration and accuracy. Some units include a flow meter that compensates for ground speed and provides consistent rates.

The discs or coulter wheels that create the slit vary significantly. Some use a single wheel to cut a slit; others use a double-wheel arrangement oriented in a "v-shaped" fashion. Another model uses a PTO operated dethatcher or cutting blades to create slits which are immediately followed by a single coulter

wheel and drop tube for the insecticide. An even newer model uses a large disc-wheel mounted with an injection tube. Air drives the granules down the tube into the soil.

The mechanical nature of this placement means turf and soil will be disrupted. Some units are much more "damaging" than others, while some effectively dethatch during application.

Turf damage in warm-season grasses is often less than in cool-season grasses because of the spreading nature of varieties like bermudagrass that rapidly cover slits. Generally, any and all signs of application are gone within a week or two. The PTO-driven equipment can be destructive to sprinkler heads operated by a less than observant driver, while many of the other units have spring-loaded coulter wheels that ride over such objects.

The benefits of such a system are the same as listed for the high-pressure liquid injector. Disadvantages also exist.

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maintenance and breakdowns are no more frequent than for other turf equipment. Some units are difficult to calibrate. This issue must be addressed for good insect control and pesticide stewardship.

REDUCING TIE-UP. Both the liquid and granular subsurface equipment attempt to place the insecticide below the thatch. This avoids a major site of pesticide binding. Some claims of placing the insecticide 1 1/2 inches into the soil may not be totally accurate, but positioning pesticides simply below the thatch appears to be an improvement.

Applicators using granular formulations seem to do the best job of placing the insecticide in the slit, but also must run at the slowest speed. In some situations it can still be questioned if this is truly subsurface application.

My observations indicate that under some conditions, little of the product is truly applied subsurface. If the soil is moist, many granules adhere to the coulter

wheel and are simply thrown out the back. In essence, it becomes just a surface broadcast treatment.

Once again, these are most likely problems that can be overcome with refinements in engineering. I have observed significant variation in the level of control with high pressure liquid injection, and believe this is a reflection of soil moisture and compaction.

Keep in mind that the engineering and use of this equipment is still in the early stages. Experience will play a major role in future designs. The equipment available five years from now may not even resemble current models.

Studies in other states show similar success for mole cricket control with subsurface application. Other experiments indicate possible use for white grub and other soil insect control in turf. As more studies are conducted, the refinement of the application equipment and its use will undoubtedly improve.

HOW EFFECTIVE IS IT? Another area not well understood is the characteristics of all pesticides when applied subsurface. In fact, a study in North Carolina found one pesticide was less effective when applied subsurface. So even though the concept of placing the insecticide closer to the pest sounds good in theory, pesticide chemistry may affect how well a particular product responds.

Modes of action, water solubility, granular composition and other factors may all be important in determining subsurface efficacy. It is important to remember that these products were developed for surface application. And post-treatment irrigation is usually required to stay within label guidelines and to begin activation.

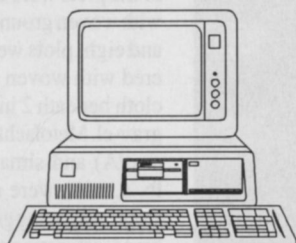
This new equipment certainly does not automatically outdate conventional equipment. It may provide benefits for some users, including cost savings and improved insect control in comparison to more standard approaches.

Subsurface applicators will not revolutionize control. Nor will they mysteriously render the use of insecticides in the turf environment risk-free.

Only a few pesticide companies have pursued specific subsurface application labels for their products. Many unknowns continue to exist in subsurface equipment technology, but industry observers eagerly anticipate new discoveries.

In summary, the development and use of subsurface application equipment for use in turfgrass is well under way. It appears to benefit the turfgrass manager who constantly deals with soil insect pests. Carefully read and study equipment information before committing to either contracting for a service or buying the equipment. Exciting future technology could make turfgrass soil insect management a little bit easier. ■

The author is an extension entomologist at North Carolina State University, Raleigh.

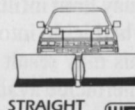
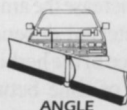
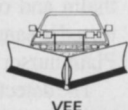


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Controlling Herbicide Loss In Container Production Sites

Nursery operators can manage the potential for herbicide runoff in container sites by monitoring the timing of herbicide and irrigation applications.

By Gail Mahnken and Walt Skroch

HERBICIDE LOSS in surface runoff from row crop production sites has been extensively researched; however, little attention has been given to herbicide loss in surface runoff from container production sites—until recently.

Some practices used in container nurseries may make these sites vulnerable to herbicide loss in surface runoff. Overhead irrigation may be applied several times a week during the summer months, so a herbicide application is often closely followed by irrigation. The greatest herbicide concentrations in runoff from row crop fields are usually found when the first precipitation event occurs within two weeks of a herbicide application.⁴

The short time between the application of a herbicide and the application of water decreases the effects of such processes as volatilization, photodegradation, chemical degradation or biological degradation on herbicide loss from the treated area. However, the soil beneath the containers may be covered with a ground cloth, gravel or plastic which may limit infiltration of water and herbicide into the soil profile. This may result in more water and herbicide available for loss through surface runoff.

Several herbicide applications may be made to container production sites during a growing sea-

son. A survey of nursery owners in Alabama found that an average of 2.9 to 3.2 applications were made per year.² Frequent applications increase the frequency of herbicide detections in runoff water and may increase the amount of herbicide detected depending on the persistence of the herbicide and the length of time between applications.

Some research on herbicide runoff losses from container nurseries was recently initiated. Keese

et al³ analyzed runoff water from nurseries in the Coastal Plain and Piedmont regions of South Carolina. Pendimethalin was detected in samples from the Piedmont nursery; and oryzalin, pendimethalin and oxyfluorfen were detected in samples from the Coastal Plain nursery.

The detections appeared related to the time elapsed between herbicide application and sample collection. In a study conducted at an Alabama nursery, oxyfluorfen was

detected in water leaving container pads and water leaving the nursery property soon after oxyfluorfen application.¹

The objective of this study was to determine the losses of metolachlor and simazine from a simulated container production site. The study was conducted in Raleigh, N.C., using 16 plots on a 2 percent slope. Eight of the plots were covered with woven ground cloth, and eight plots were covered with woven ground cloth beneath 2 inches of gravel. Metolachlor (4 lb. a. i./A) and simazine (1 lb. a. i./A) were applied by broadcasting granules, broadcast spraying or adding granules to individual containers. Check plots were also included in the study.

The plots received 1 to 1.25 inches of water per day through overhead irrigation. Runoff was collected in polyethylene barrels, and runoff volumes were measured and recorded daily. Samples were collected 0, 1, 2, 4, 8, 16, 32 and 56 days after application. Samples were extracted using C18 solid phase extraction cartridges and were analyzed using gas chromatography with nitrogen detection. Detection limits were 0.001 ppm (ug/ml) for simazine and 0.01 ppm (ug/ml) for metolachlor. The herbicide runoff experiment was conducted in

(continued on page 58)



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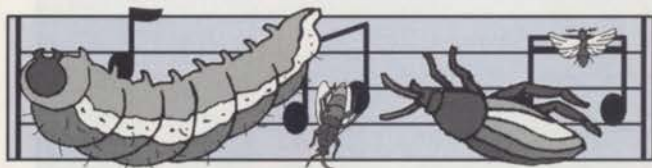
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Nursery Management

(continued from page 56)



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1990 and 1991. During the study period, two herbicide applications were made per year.

RESULTS AND DISCUSSIONS. The concentrations of metolachlor and simazine in runoff water from the first irrigation were relatively high following herbicide application, especially in treatments in which herbicides were broadcast applied. When an average was taken across ground covers, metolachlor concentrations were 4.95 ppm in the broadcast granule application and 6.02 ppm in the broadcast spray application. Simazine concentrations were 0.32 ppm in the broadcast granule application and 1.92 ppm in the broadcast spray application.

For both herbicides, concentrations in water from the per container treatments were 3 to 4 times the detection limit concentrations. The much higher concentrations from the broadcast applications may have been the result of two factors. Approximately 80 percent of the plot area was not covered by containers so that much of the herbicide applied to the broadcast plots fell in this space.

Herbicide that fell between containers may have been easily removed by surface water running from the plots resulting in higher concentrations in runoff from these treatments. Secondly, the plots receiving per container applications received only 1/5 the herbicide applied to the broadcast-treated plots since application rates were calculated on a treated-area basis.

By the fourth day after treatment, concentrations of metolachlor and simazine had decreased significantly in the broadcast application plots, and in the per container treatment, metolachlor concentrations were below the detection level. By the 32nd day after application, simazine was detected at low concentrations in plots receiving the broadcast treatments, and metolachlor was below the detection level concentration in all treated plots.

INDUSTRY SIGNIFICANCE. Data from studies such as this may help nursery operators manage herbicide runoff losses more effectively. The study shows herbicide runoff from container production sites may occur, with the highest concentrations detected following application.

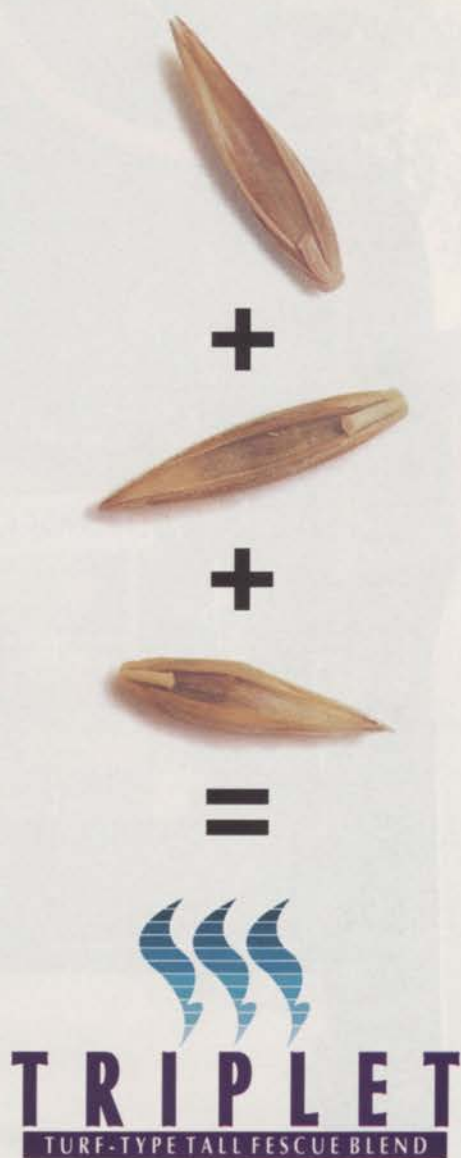
In nurseries where irrigation water is recycled, the presence of herbicides in recycled water might pose a hazard to susceptible, non-target species located in other areas of the nursery. Nursery operators who recycle water need to dilute it so that phytotoxic concentrations will not be present, or operators must develop other treatment strategies so that herbicides present in recycled water will be degraded before the water is reused.

A per container application decreases the possibility of herbicide injury to sensitive species through recycled water. — *The authors are researchers at North Carolina State University and presented their findings at the SNA Research Conference in Atlanta, Ga.*

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The study indicates that herbicide runoff from container production sites may occur, with the highest concentrations detected in the first runoff.



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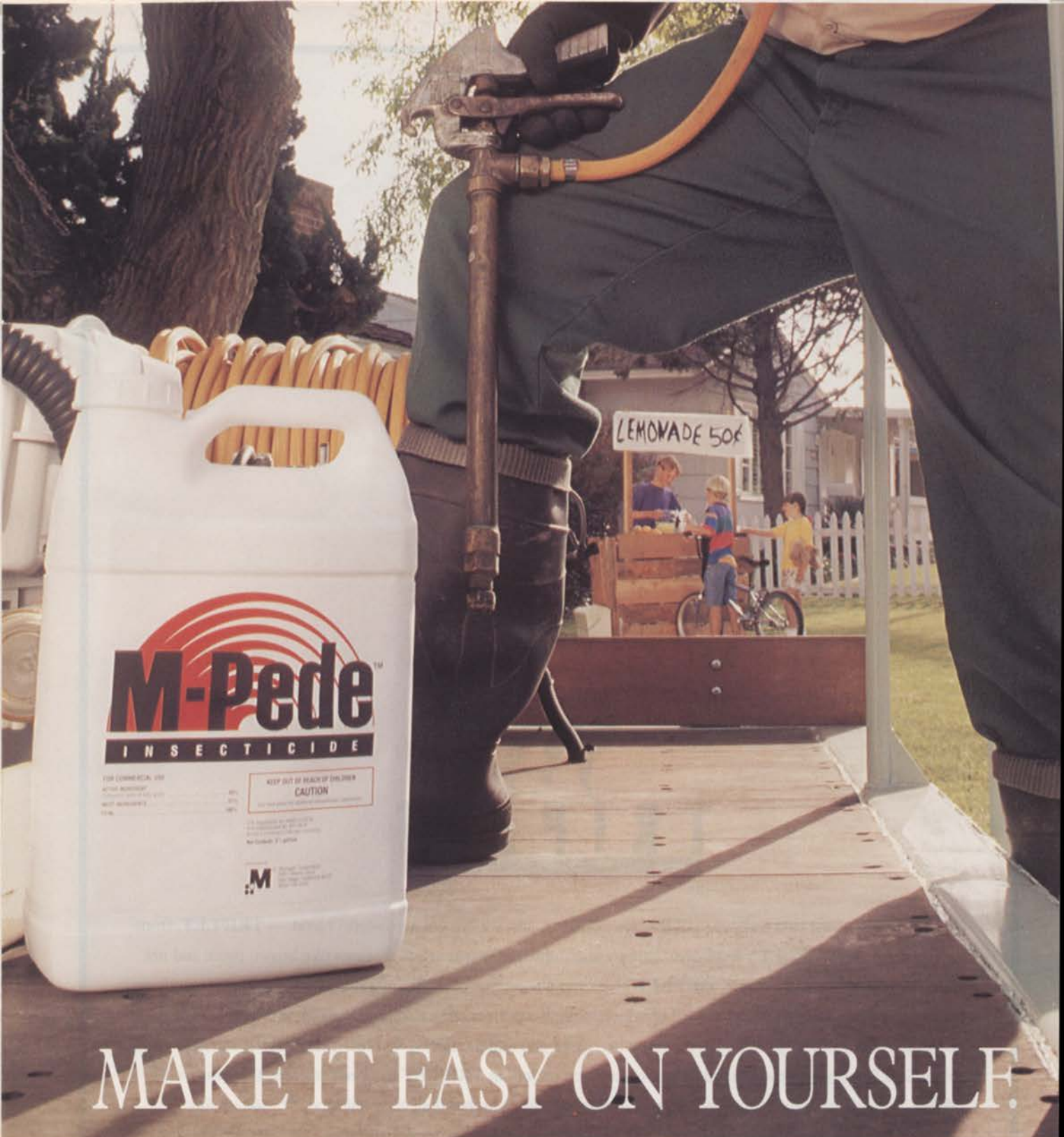
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IRRIGATION
TRAINING SERIES

INSTALLING IRRIGATION SYSTEMS

Control and delivery systems are vital components of an irrigation scheme. In the first of a two-part series, the installation of control systems including controllers, valves and sensors, will be discussed.

By Larry Keesen

THIS ARTICLE and the next will give you some guidelines for the correct installation of irrigation system components. System components are divided into two major categories: control systems and delivery systems. Control systems is the topic for this month, with discussion centering around valves, controllers and sensors.

Proper installation of system components is critical for a cost-efficient, easily maintained, water conserving, long-lasting system. Safety and reduced liability are also dependent on good installation practices.

Before beginning an installation job, check the water pressure and the size of the water supply to verify that design conditions are the same as actual site conditions.

Photo: The Landmarks Group, Atlanta, Ga.

VALVES. Install the zone control valve with the flow control completely open, and the top of the flow control 4 inches below finished grade. This allows the valve box lid to clear the valves while providing good access for maintenance work.

Place a resilient, seated gate valve, like the Nibco T-22, upstream of the zone control valve for easy repair and maintenance of the control valve as well as for emergency shutoffs. If quick couplers are needed, place these within the valve box so they can be easily located in the future.

Place 4 to 6 inches of clean, washed gravel under the valve boxes for good drainage. Install filter fabric under the gravel and attach it to the valve box with duct tape. This fabric keeps the soil from working its way up through the gravel, or silting in along the pipe and forming a mud hole.

Install the valve boxes flush with the finished grade and lightly compact the adjacent soil to prevent settlement. Always install sturdy valve boxes to withstand pressure from mowing and maintenance equipment.

Many rectangular valve box lids are difficult to remove and replace because the two longest walls cave in when excessive pressure is placed against the

wall. A piece of rigid PVC pipe can be placed within the valve box between these two walls to brace them and prevent a cave-in.

Never install valves in low areas where water can collect, or close to driveways or sidewalks where automobile damage and pedestrian safety is a concern.

Brand all valve box lids with the control valve number, or other appropriate identifiers such as MD for manual drain or IV for isolation valve. Plastic identification tags can be attached to the valve in case the lids get switched.

Coil 2 to 3 feet of control wire around a 1-inch diameter pipe prior to connecting it to the solenoid to allow for valve bonnet removal, and to protect the solenoid from electrical surges. For better performance, the drip emitter valve assembly should be installed as follows:

If possible, install the filter first to keep the rest of the components clean. The filter should have a pressure rating of 125 to 150 psi if installed upstream of the pressure reducing valve, and a rating of 75 to 100 psi if installed downstream of the pressure reducing valve. Install the strainer with an easy access flush valve on the top.

Next install a fixed-rate pressure reducing valve upstream from the zone control valve. If installed downstream, pressure surges can occur within the amount of time the regulator

takes to set itself after the water is turned on. These surges can blow emitters out of the lines as well as blow apart pipe and fittings.

A 1/4-inch outlet tee with an air valve placed downstream of the control valve will help diagnose future system problems using a pressure gauge.

Isolation valves are necessary in larger systems to shut down portions for repair without shutting off the entire system. Isolating portions of the system will make pressure testing for leaks, and leak detection, much easier.

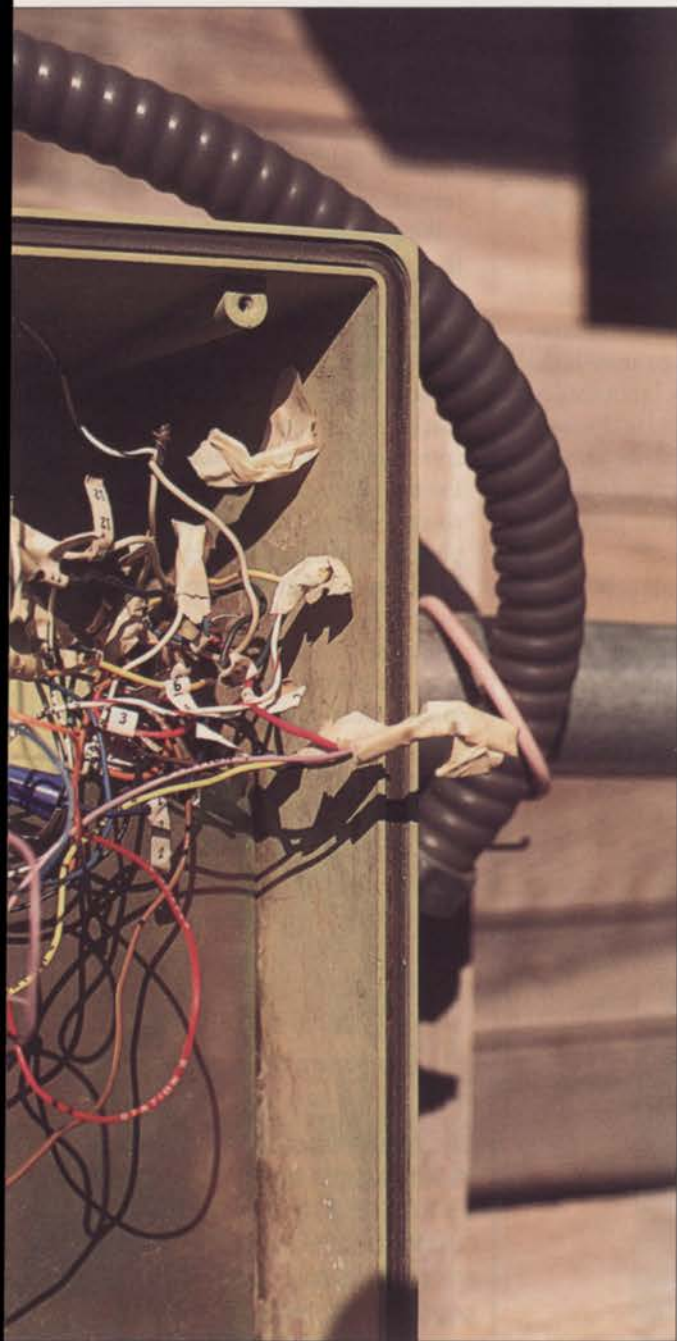
Quick coupler valves should be securely attached to 2-inch by 2-inch by 30-inch treated wood stakes driven into the soil. This will support the valve when the coupler key is inserted, and prevent damage to the pipe and fittings.

Any valve, other than the control valves, installed below grade should be installed in a 4-inch to 6-inch diameter PVC pipe access sleeve for valve con-



When a valve is installed too high in the turf, the lid won't properly fit the system. Photo: Larry Keesen

A look inside a controller in which a contractor incorrectly substituted masking tape for wire nuts to make a connection. Photo: Larry Keesen.



erator and set it vertically with a 10-inch round valve box. The larger size sleeve makes it much easier to vacuum or pick stones out.

Backflow preventers should be set inside buildings or in shrub beds screened with planting whenever possible. If the backflow preventer is installed in a turf area, pour a 4-inch thick concrete pad that is 12-inches greater than the backflow and/or preventer enclosure to act as a mowing strip.

At Keesen Water Management, we include backflow preventer enclosures on every project we design except single family homes. They prevent kids from shutting off valves, opening petcocks and breaking valve handles by hiding the temptation from view.

For protection,

backflow preventers close to driveways or streets should have enclosures and/or 4-inch or larger diameter, galvanized pipe filled and set 30 inches deep in concrete with a diameter of 24

inches. Insulated enclosures will protect the backflow preventer from freeze damage in the early spring and late fall.

Most flow sensors and meters require a minimum straight pipe length equal to 10 times the nominal diameter of the pipe on the upstream side, and up to 5 times diameter on the downstream side. If valves or fittings are too close to the sensor, the accuracy will lessen due to the turbulence in the pipe.

An air valve should be installed downstream of every pressure reducing valve to aid in adjusting the PRV and checking pressure.

CONTROLLERS. Be safe. Always ground the controller by using an Underwriters Laboratory (UL) approved 3/8-inch by 8-foot copper grounding rod and proper ground clamps. Each controller should have its own ground rod. See last month's electrical article for additional information.

Install a protective conduit around wire exposed above ground level. This will protect the wiring as well as provide a better looking installation. Controllers and electrical equipment need to be protected from vandals and snow removal equipment, but installed in a manner that can be easily accessed by maintenance crews.

To save time on the installation and maintenance of an irrigation system, include an outlet plug for a hand-held radio remote control device. This allows easy operation and testing of the system anywhere on the site.

Pedestal-mounted controllers should be installed on a concrete pad similar

trol. Pipe should be cut out on one end to better fit over the pipe/valve and prevent the sleeve from shifting away from the valve.

Center the sleeve on the valve op-

to the pad for the backflow preventer. Two sweep elbows should be used, one for the 24-volt wires and another for the 120-volt wiring.

Avoid the installation of controllers and other electrical equipment below grade, unless the vault is well-drained and well-ventilated with fans. The high humidity that develops in vaults can cause corrosion, and greatly reduce the life span of the electrical equipment.

Controllers that are installed outdoors should have watertight enclosures except in desert climates where ventilation and cooling of the controllers are more important. In addition,

avoid installing the controller close to an irrigation head and keep it out of turf areas if at all possible.

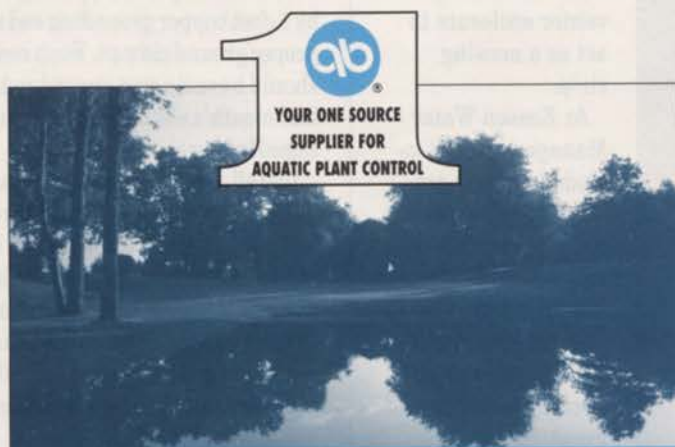
Controller charts are reduced size, as-built drawings containing zone numbers with the zone coverage areas highlighted in different colors, laminated in 20-mil plastic and mounted in the controller door. This is helpful in identifying problems and when trying to determine which zone serves what part of the landscape.

All wire connections made below grade should be removable, insulated wire nuts installed in a reusable, watertight, plastic container filled with a gel and installed in a valve box for fu-

ture access.

Wire should not be pulled through the ground as this may cause the wire and insulation to stretch and eventually break. Wire can be laid with a cable plow or installed in an open trench. Tape and bundle the wire at 15-foot intervals when installing in a trench. If the wire is installed with the mainline, place it to one side and several inches below the top of the pipe. This will help protect the wire from damage that may occur from future excavation.

Provide a 24-inch expansion loop for wire whenever a change of direction is greater than 40 degrees as well as in



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situations where the length exceeds 300 feet. Wire that is tightly stretched in a trench may separate within its insulation as soil temperatures cool down.

SENSORS. Some sensors are sensitive to the effects of electromagnetic fields and require shielded cable and connectors between the sensor and the controller.

The 24-volt wiring should be buried at least 12 to 18 inches deep to better protect the wire, and 120-volt wiring should be buried 24-inches deep according to the national electrical code. All wire should be UL approved for direct burial.

Several years ago, I did some consulting for an irrigation contractor in Kentucky. I recommended the use of a shutoff device for his systems, but several months later he called to say the rain sensor was not working correctly and the turf was burning up. I was scheduled to be in Kentucky that week so I arranged to look at the shutoff installation with the contractor.

The rain sensor was mounted on an 8-foot high fence in the back yard. When the system came on, the rotor heads hit the sensor and shut off the system. Rain sensors are best installed above the spray height of the system, away from trees. A good location is at the roof line of a building.

Next month, Lesson 14 will look at the delivery system including the installation of the mainline, laterals and sprinkler heads.

The author is vice president of Keesen Water Management, 10700 E. Bethany Dr., Suite 103, Aurora, CO 80014; 303/695-7711.



IRRIGATION QUESTIONS

1. Why is the fabric installed under the valve box?
2. What degree of compaction is required around valve boxes?
3. Is a 2-inch sleeve adequate for an isolation valve?
4. How are flow sensors installed?
5. What should be installed downstream of every pressure reducing valve?
6. Should wire be pulled into the ground with a pipe puller?

Answers appear on page 78 of July LLM.

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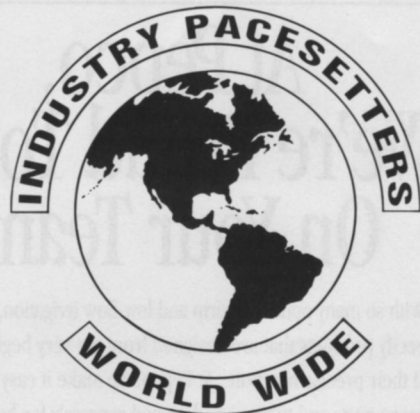
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MAY 1993

Seed News

MIXING TALL FESCUE WITH KENTUCKY BLUEGRASS

THERE WAS A time when mixing tall fescue with other grasses was considered taboo. Long-time professional turf managers silently snickered as newcomers attempted to mix tall fescue with Kentucky bluegrass, knowing from years of trial and error the resulting stand would be a patchy mess.

Recent experiments with improved tall fescue varieties, however, are disproving the theory stated in 1984 by Jack Harper, retired extension specialist at Penn State, that "under no circumstances should other grass species be seeded with tall fescue."

Tall fescue of yesteryear was a broad-bladed, stemmy, upright-growing bunch grass. Kentucky 31, the popular variety at the time, was actually a forage and pasture grass selected for high topgrowth yields. Never tightly regulated, Kentucky 31 yielded little if any certified seed.

Today, improved varieties of tall fescue are flooding the market. These varieties differ so strikingly from Kentucky 31 that trained botanists might even mistake them for another species.



Tall fescue has changed from a coarse, stemmy, upright species into a dense, low growing, disease-resistant turf.

Improvements in tall fescue include a slower vertical growth rate, darker green color, increased compactness and density, better disease resistance and a generally more leafy and less stemmy growth habit. Moreover, the new fescue varieties are available as uniform, certified seed.

Turf breeders have developed an entirely new class of high-density tall fescue varieties. These elite fescues have such a high-shoot density they compare favorably

with the densities of Kentucky bluegrass and perennial ryegrass.

As tall fescues continued to improve, I wondered if it was time to re-examine the concept of mixing tall fescue with Kentucky bluegrass. Had plant breeding come far enough that tall fescue would make a viable mixing grass? I decided to conduct an experiment to find out.

MIXING RATIO. Early mixture experiments with tall fescue and Kentucky bluegrass were performed on common-type varieties. None of the studies tested improved varieties' performance in mixtures.

Early studies found ratios of 90 percent tall fescue and 10 percent bluegrass, by weight, to be optimal for the two species. At ratios below 90 percent, the common tall fescue tended to become bunchy and coarse in appearance and segregate into unsightly patches; at ratios above 90 percent, there wasn't enough bluegrass to be useful.

Studies of the new fescue cultivars indicated that their seed ratio was more flexible than the older, common types. The

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90 percent fescue/10 percent bluegrass ratio seemed more critical with common tall fescue than with improved varieties. Ratios of 50 percent and 75 percent could be used satisfactorily.

Plots seeded to the lower fescue percentages (50 percent to 75 percent) had better turf color, texture, density, uniformity and quality than plots at the higher fescue percentages — results quite contrary to previous findings. Mixtures across the board produced better looking turf than fescue seeded alone. The addition of even a small amount of bluegrass perked up the appearance of the fescue; it seemed to fill in some of the tiny "pits" in the fescue stand, giving it an even, manicured look.

From the results of this experiment, I feel confident in recommending a broader window of choices of species ratio — from 75 percent to 90 percent fescue. Until I have the opportunity to monitor the 50/50 mixture over the long term, I'm going to hold off recommending it. But two-year data looks strongly promising.

Eight months after planting the study, I took plugs from each plot to count shoots of both species. I found that the species shoot ratio in the turf closely followed the seed ratio, give or take 10 percent.

These results were quite different from perennial ryegrass/Kentucky bluegrass mixtures. With ryegrass-bluegrass mixtures, the fast germinating ryegrass tends to obliterate the bluegrass. A 50/50 ryegrass/bluegrass seed mixture often yields a 99 percent ryegrass stand.

Not so with tall fescue. Although the fescue germinates quicker than the bluegrass, the bluegrass is not crowded out. Growth rates of tall fescue and Kentucky bluegrass seem more similar than with ryegrass and bluegrass.

SEEDING RATE. The entire experiment was planted at two different seeding rates to gauge the overall effect of frequency on the results. Depending on which book you refer to, seeding rate recommendations for tall fescue (seeded alone) range from 6 to 10 pounds per 1,000 square foot. I chose a high and low seeding rate for the experiment and duplicated all treatments at the two rates.

The higher seeding rate had the advantage of getting the stand established more quickly. The greater quantity of seed helped the stand fill in faster.

Even throughout the second growing season, distinct effects of seeding rate on

the stand were still noticeable. Plots at the higher seeding rate were finer textured, more dense and uniform, with better turf quality than those at the lower rate. The difference across plots averaged a full quality point higher on the 1 to 9 rating scale. Turf color, as you might suspect, was unaffected by overall seeding rate.

PRACTICAL APPLICATION. Sod producers were the first to use tall fescue/Kentucky bluegrass mixtures. To harvest sod of tall fescue, a non-rhizomatous grass, it is necessary to use nylon netting to bind the sod together. A rather clever sod grower got the idea to use the rhizomes (underground runners) of Kentucky bluegrass to bind tall fescue sod, thereby eliminating the cost of the netting.

Lawn service operators are now using the mixture, particularly in the more progressive market areas. Tall fescues are advantageous because they germinate rapidly. Moreover, new varieties closely resemble Kentucky bluegrass. Mixtures of the two species form a compatible combination for a diversity of turf users. ■

Doug Brede, Ph.D., is director of research for Jacklin Seed Co., Post Falls, Idaho.

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People

SELLICK EQUIPMENT announced the following appointments: **Jan Olejarz** as engineering manager; **Ron Wood** as operations manager; **Marv Crow** as sales representative; **Mark Hertel** as service manager; **Ron Peters** as service manager assistant; and **Milford Mertz** as technical and service adviser.

ISK Biotech named **Stephen Denys** Ontario sales supervisor and **Alex Hawkins** supervisor of product registrations. Denys formerly served as advanced sales representative with Hoescht Canada. Hawkins was previously administrator of pesticide use for the Kansas State Board of Agriculture.

Richard Garrett joined Ecogen Inc. as product manager of *Bt*-based bioinsecticides, responsible for product positioning, advertising and marketing.

Terra appointed **Larry Pfliederer** professional products manager for its Eastern division. Pfliederer will be responsible for sales in Michigan, Ohio, Pennsylvania, Illinois, Indiana and New York, and additional Eastern states as Terra expands.

Hunter appointed **Joe Silva** and **Mike Kearby** regional sales managers and promoted **Charles Huston** to director of

sales and marketing. Silva serves as Eastern regional sales manager and Kearby as Western regional sales manager for residential, commercial and golf products. Huston, filling a newly created position, is responsible for developing and introducing new products, handling corporate communications and continuing to direct sales activities worldwide.

Allan Davidson is now sales manager/Canada for Ball Seed, responsible for developing and implementing sales and marketing programs. He also oversees rooting stations throughout Canada and manages the Canadian supplier network for plant products.

Jacobsen named **Steve Nelson** manager of parts and accessories supply. Nelson formerly held managerial positions at Massey-Ferguson and now directs administrative and operational elements of Jacobsen's service parts business.

Yazoo Manufacturing promoted **Robert Morgan** to sales manager, responsible for developing distributor and dealer sales; and **J. Chris Sharp** to marketing manager, in charge of developing alternative markets, customer service and advertising,



Danner



Huston

as well as assisting in sales support and distribution.

Gary Danner joined Alamo as new products and marketing manager, responsible for researching and assisting in the engineering, development and marketing of new products. Danner formerly served as president of Coastline Ford Tractor.

The Scotts Company Professional Business Group announced the promotions of nine technical representatives: **Jim Diley**, **Wayne Horman** and **Mark Jones** to executive technical representatives; **Fred Anderson**, **Jim Boesch**, **Dave Loutitt**, **Mike Peterson** and **Rick Styer** to senior technical representatives; and **Jeff Cain** to manager of new professional service centers in the Washington, D.C. area.

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Products

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A combination steel-vinyl cab, power



PRODUCT SPOTLIGHT

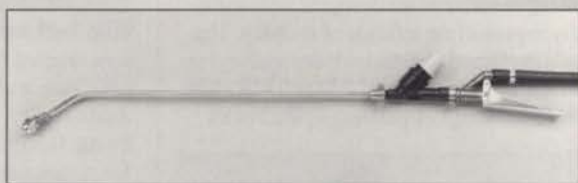
The Hudson® Calibrator™ Spray Management Valve from **H.D. Hudson Manufacturing Co.** is designed for compression, backpack, boom or low-volume power sprayers to reduce spray output by up to 25 percent.

Available in three models, the valves continuously and automatically calibrate the spray, providing constant pressure and flow control. One model sets pressure at 15 psi, one at 30 psi and the third at 45 psi.

On compression and backpack sprayers, the valves attach between the hand shutoff valve and spray wand, or in-line on the spray hose.

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Circle 125 on reader service card



dump box lift, turn signals, front hydraulic disc brakes, emergency flasher, hour meter, windshield washer and wiper and tilt flat bed are optional.

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Elvex Corp. offers a range of safety equipment and clothing for the outdoor power equipment market, including chainsaw protective chaps, leggings, vest, loggers hard hat and face protectors.

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Brillion



New 12' Turfmaker

124-34

USE READER SERVICE #12

The Elvex ProVest protector for shoulders and chest contains eight layers of Prolar fiber which jam the saw chain on contact. The Elvex ProChaps contain flexible, lightweight protective pads and are designed asymmetrically to protect the left side of each leg. The line's ProGuard System includes a safety cap with ear muffs that meet 24dB or 27dB noise reduction ratings, depending on the model,



and a nylon mesh face protector that can be flipped up or removed without tools.

Circle 127 on reader service card

Banner® broad-spectrum fungicide, from **Ciba Turf and Ornamental Products**, is now labeled for use on home lawns by lawn care and landscape professionals. Additionally, the product is now registered by the Environmental Protection Agency for zoysia patch control and for new uses for dollar spot control.

Ciba's new recommendations for dollar spot control include tank mixing with another EPA-registered fungicide with a different mode of action when Banner is applied at the 0.5-ounce rate, and limiting consecutive applications to three at 1- to 2-ounce rates before rotating to another EPA-registered fungicide.

Circle 128 on reader service card

Bio Grounds Keeper's 7500 Dry Formula Thatch Reducer adds humic acid, selected microorganisms and natural nutrients to the soil, where they help existing microorganisms decompose the dead roots, stolons and rhizomes which make up thatch.

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Kubota's F3620 front-mount flail mower, compatible with the F-Series front mowers, features a 60-inch cutting width, 152 fine-cut knives, adjustable cutting height ranging from quarter-inch to 4 inches, 6.375-inch ground clearance, pneumatic gauge wheels, full-width roller and outboard-mounted



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Product Profile

MAXIMIZING PYTHIUM CONTROL WHILE MINIMIZING RESISTANCE

PENNSYLVANIA STATE University researcher Pat Sanders has a problem that most turf managers only wish they could complain about. A leading researcher studying fungicide resistance in the Pythium fungus, Sanders finds that the relatively cool summers of central Pennsylvania often make it hard to get the disease to develop for the purpose of studying it.

Nonetheless, her 30 years of research have produced significant insight into ways that turf professionals can effectively manage Pythium blight while minimizing potential for fungicide resistance problems.

Pythium blight appears as small blighted spots and most commonly emerges during hot, humid conditions. As patches of the diseased turf expand and merge, they form irregular or elongated areas in which growth slows and plants become thinned or discolored. These patches most commonly occur in the wettest areas of turf.

Primary characteristics of Pythium blight infections include slow-growing, thinned or blighted turf and a general decline of the turf stand. Pythium blight is sometimes referred to as "grease spot," because affected leaves appear greasy and feel slimy when rubbed between the fingers.

As turfs become drier during the day, these leaves appear dry and shriveled, thus the name, "spot blight." When humidity remains high, collapsed leaves may get matted and covered with a fluffy mass of white fungal mycelium, so the disease is also known as "cottony blight."

In order to study Pythium blight outside of her laboratory, Sanders had to develop special dome-shaped chambers to place over test plots to create the correct environment needed for disease emergence. The frame of each chamber is constructed of plastic PVC pipes covered with plastic sheets



Pythium blight is generally regarded as a hot weather disease.

at night to maintain necessary temperatures for Pythium blight development. In addition to acting as a frame, the PVC pipes are used to channel water to intermittent mist sprays inside the domes to produce a high-humidity environment.

Because the effects of Pythium blight can be devastating, turf researchers are constantly searching for better ways to fight the disease. Sanders' work has led her to the belief that it is absolutely essential to use fungicides properly to achieve effective control of Pythium blight while minimizing the potential for resistance.

"It takes careful planning, but by thinking ahead and using the available products in a responsible manner, I believe fungicide resistance can be avoided," Sanders said. "It just isn't sensible to use systemic fungicides by themselves repeatedly."

The researcher also believes that because each control product has its own unique properties, each should be used in a way that takes those qualities into consideration. "If a fungicide's single site of action is controlled by a single gene, then it is easier for fungi to develop resistance to it," she said. "So it is important not to use that

type of fungicide exclusively."

Sanders explains that resistance to single-site fungicides most commonly appears when a mutation occurs that allows a fungus to "short-circuit" the action site and circumvent control. Fungi are less likely to develop resistance to fungicides acting at multiple sites, or to fungicides where single action sites are controlled by multiple genes because more than one adaptive mutation is required.



Pythium blight pathogens survive in soil as root parasites of turf and by saprophytic invasion of soil organic matter.

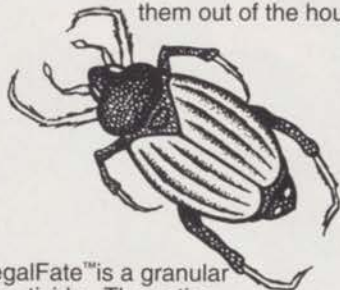
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USE READER SERVICE #31

Research has shown that preventive control for turf susceptible to Pythium blight is important, but care must be taken to avoid fungicide resistance. While one option is to alter cultural management techniques, this is not always a perfect solution.

As a result, intervention with fungicides is often necessary. Because multisite inhibitors have less potential for developing resistance, many experts believe that turf professionals will yield better results in the long run using this type of fungicide.

Through the years, Sanders has spent a lot

of time researching the effects of various fungicides on Pythium blight. One such product she has tested extensively is CHIPCO Aliette brand fungicide from Rhone-Poulenc, a systemic fungicide exhibiting both upward and downward movement. As a result, the fungicide provides protection to the entire plant as it moves throughout the crown, roots and foliage. Sanders found that this quality plays a primary role in determining the product's effectiveness on turf.

"This systemic chemistry provides an

advantage because it will translocate downward," she said. "Not only will you get efficient uptake, but both upward and downward movement."

That's an important quality, according to Sanders, who said the use of a fungicide that can move downward into root systems is valuable during a full-blown Pythium blight infection.

"Petri dish studies show that CHIPCO Aliette has a direct mode of action," she explained. "But I also believe that the product may have an indirect mode of action, which could be one of the factors that make it less likely for fungi to develop resistance to it in the field. I don't know if there is some interaction between the plant and the chemical."

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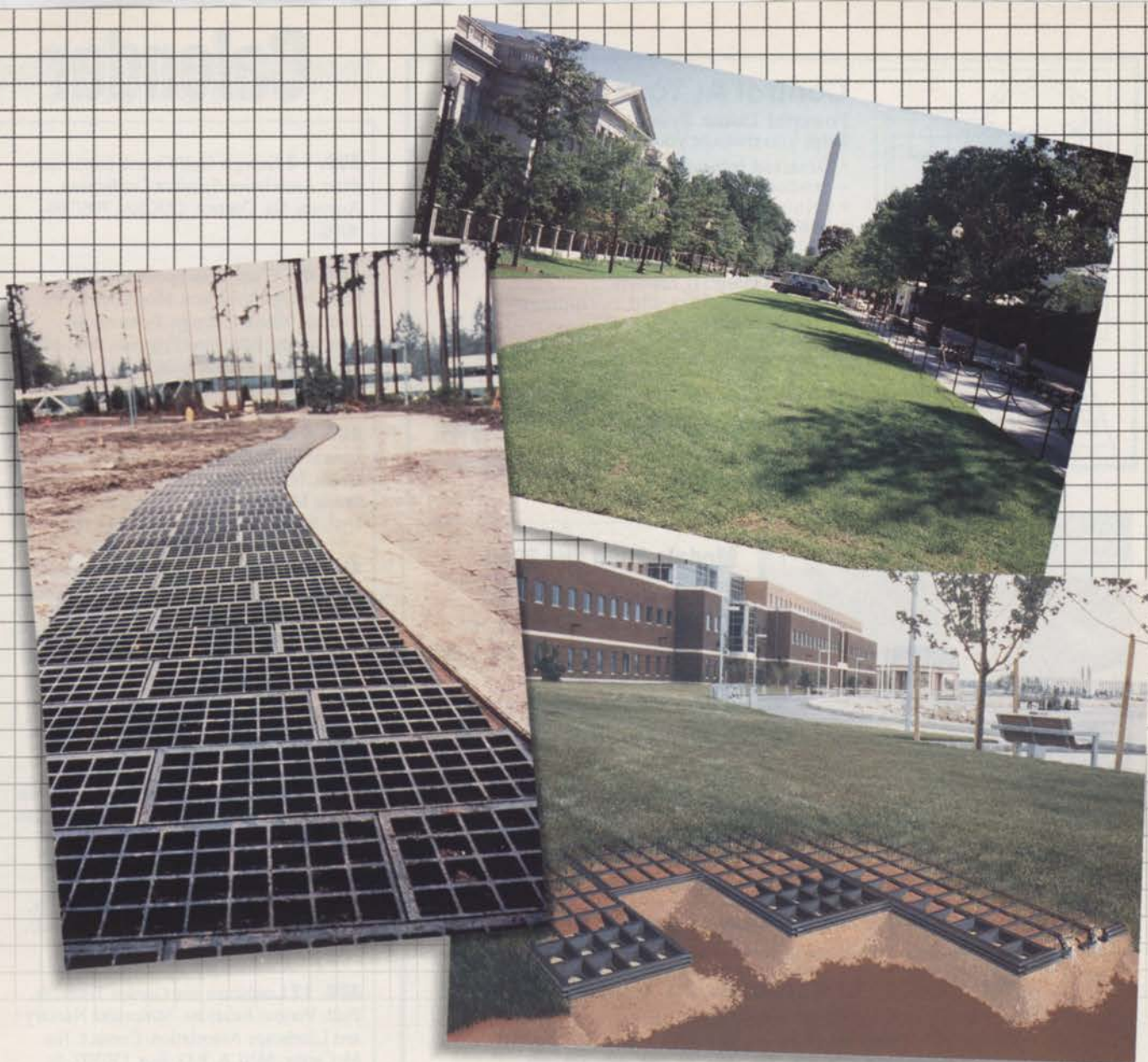
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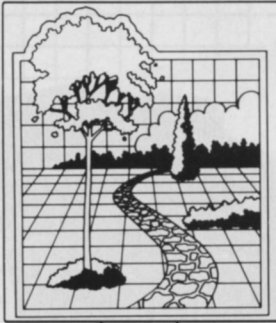
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AUG. 4-6 Compost Management Short Course for Professionals, Cornell University, Ithaca, N.Y. Contact: Lauri Wellin, Cornell Waste Management Institute, 466 Hollister Hall, Ithaca, NY 14853; 607/255-1187.

AUG. 4-8 1993 AAN Annual Convention/TAN trade show, Dallas Convention Center. Contact: Kevin Morales, AAN, 1250 I St. NW, Suite 500, Washington DC 20005; 202/789-2900 or TAN, 7730 IH-35, Austin, TX 78745-6621; 512/280-5182.

AUG. 5 National Turfgrass Evaluation Program Turfgrass Research Field Day, USDA Beltsville Agricultural Research Center-West, Beltsville, Md. Contact: Kevin Morris, USDA-BARC-West, Bldg. 001, Rm. 333, Beltsville, MD 20705; 301/504-5125.

AUG. 8-11 International Society of Arboriculture Conference and Trade Show, Bismark Convention Center, Bismark, N.D. Contact: Jerri Moorman, 217/355-9411.

AUG. 12 Landscape and Garden Tours, St. Paul. Various locations. Minnesota Nursery and Landscape Association. Contact: Jim McCarthy, MNLA, P.O. Box 130307, St. Paul, MN 55113; 612/633-4987.

AUG. 12-13 Invasive Exotic Plants: Contemporary Issues and Options conference, Virginia Tech, Blacksburg. Contact: J.C. Gordon, Donaldson Brown Continuing Education Center, Virginia Tech, Blacksburg, VA 24061; 703/231-5241.

AUG. 17 Wisconsin Turfgrass Field Day, O.J. Noer Turfgrass Research and Education Facility, Madison, Wis. Contact: Dr. Frank Rossi, 608/262-1490.

AUG. 17 Ohio Turfgrass and Landscape Horticulture Research Field Day, The Ohio State University, Columbus. Contact: Phyllis Selby, 614/292-2601, or Dr. Karl Danneberger, 614/292-8491.

AUG. 17 Golf Course Design/Construction and Golf Day, State University of New York, Delhi. Contact: New York State Turfgrass Association; 800/873-TURF or 518/783-1229.

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IRRIGATION TRAINING SERIES LESSON THIRTEEN

Answers to questions on page 65.

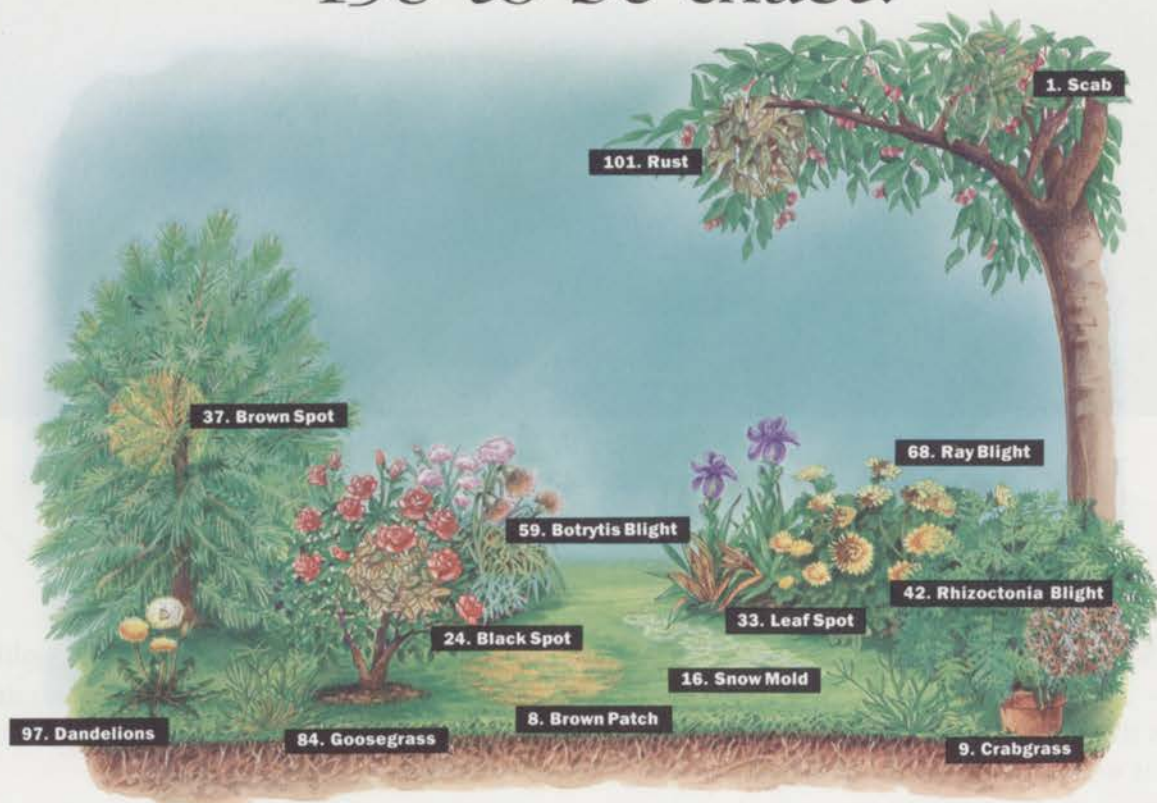
1. The fabric keeps the soil from working its way up through the gravel.
2. Light compaction similar to adjacent soil.
3. No, sleeve should be 4 inches to 6 inches in diameter.
4. With a minimum straight pipe length equal to 10 times the nominal diameter of the pipe on the upstream side, and up to 5 times the diameter on the downstream side.
5. Air valve or pressure gauge.
6. No, use a cable laying device or install in a trench.

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* Denotes regional advertising

Use the Turf Care® Pros for any number of growing problems. 138 to be exact.



Professionals count on the Turf Care Pros. To treat diseases, Daconil 2787® fungicide is the cornerstone of your management program. The broadest-spectrum fungicide on the market, it controls 18 disease-causing organisms on turf and 55 major ornamental diseases. And there's never been a documented case of disease resistance to Daconil 2787.

For pre- and post-emergent herbicide control of annual grasses and broadleaf weeds, it's Dacthal® and Daconate® 6. On pesky broadleaf weeds, use 2 Plus 2.

And round out your program using Frigate® with Roundup® to control perennial and annual weeds. Together with Daconil 2787, they all create a complete professional management program.

When it comes to turf and ornamental care, count on the Turf Care Pros. And count out labeled diseases and weeds — 138 to be exact.



Always follow label directions carefully when using turf chemicals.

ISK Biotech Corporation, Turf & Specialty Products Division, 5966 Heisley Road, P.O. Box 8000, Mentor, OH 44061-8000.

*Roundup is a registered trademark of Monsanto Company.

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Jacklin Seed Company found the mother plant of its NuStar Kentucky bluegrass in the unlikely place — a roadside in eastern Washington 40 miles from civilization. An environment so arid that less than ten inches of precipitation fell each year. NuStar was green — all other plants around it were brown from drought.

After years of official testing at Rutgers University, NuStar passed with flying colors. In fact, this moderately dense, dark green bluegrass ranked in the top ten out of 228 varieties in overall turf quality during the Rutgers trials. NuStar received top marks against powdery mildew and summer patch, plus excellent resistance to leafspot, melting out and leaf rust. NuStar also scored high against wilting due to drought.

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