

cont. from page 34

southeast, especially Florida. Other uses include commercial and industrial parks and street medians. Due to its poor wear tolerance, St. Augustinegrass is not used in play or park grounds. **Pests:** The most destructive insects are the chinch bugs, especially in Florida. Other insect pests include white grubs and sod webworms. St. Augustinegrass is susceptible to such diseases as brown patch, gray leaf spot and rust.

Cultivars: Common, Floratam, Bitter Blue, Seville (dwarf), FX-10 and Palmetto

BAHIAGRASS

(*Paspalum notatum*) is native to subtropical, eastern South America. It is a coarse-textured grass with tufted appearance due to its short and stout rhizomes and stolons. Bahiagrass is grown in Florida for low maintenance purposes. It can

maintain a low level of cultural intensity. Mowing height should be between 1.5 to 2.5 inches. Mowing should be conducted regularly in the growing season to eliminate the long, profuse seed heads. Sharp mower blades must be used to provide a smooth cut of the tough, fibrous leaf blades. Annual fertilization may be as low as 1-4 lb N/1,000 sq ft/yr. Watering is not necessary as Bahiagrass has excellent drought tolerance. Thatching is seldom a problem. Propagation is primarily by sod. Bahiagrass seed is available and germination will be enhanced through scarification.

Use: Bahiagrass can be found in home lawns lacking irrigation systems. Its greatest use, however, is in roadside rights-of-way, airports and other low maintenance sites.

Pests: The major insect problem is caused by mole crickets. Diseases are not frequently en-



Bahiagrass can grow in a wide variety of soil types, but does best in droughty, coarse-textured, infertile soils with a pH of 6.5-7.5.

It grows in a wide variety of soil types, but performs best in droughty, coarse-textured, infertile soils with pH 6.5-7.5. Bahiagrass has good to fair salt tolerance, good to fair shade tolerance and superior traffic tolerance.

Culture: Bahiagrass can survive with a mini-

mum level of cultural intensity. Mowing height should be between 1.5 to 2.5 inches. Mowing should be conducted regularly in the growing season to eliminate the long, profuse seed heads. Sharp mower blades must be used to provide a smooth cut of the tough, fibrous leaf blades. Annual fertilization may be as low as 1-4 lb N/1,000 sq ft/yr. Watering is not necessary as Bahiagrass has excellent drought tolerance. Thatching is seldom a problem. Propagation is primarily by sod. Bahiagrass seed is available and germination will be enhanced through scarification.

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Pests: The major insect problem is caused by mole crickets. Diseases are not frequently en-

BERMUDAGRASS

(*Cynodon dactylon*) is native to east Africa, but has been widely distributed throughout the subtropical and tropical regions of the world. It is an aggressive, medium- to fine-textured grass with a creeping growth habit from both rhizomes and stolons. Bermudagrass can grow in a wide variety of soil types and a wide range of pH conditions (5.5 to 7.5). It has good salt tolerance, poor shade tolerance and excellent traffic tolerance.

Culture:

Bermudagrass requires a medium to high level of cultural intensity.

Mowing should be

conducted with a reel mower, and the recommended cutting height is .5 to 1 inch. Mowing at higher levels results in upright growth, with a tendency for increased thatch accumulation and scalping. The fertilization requirements can be as high as 0.8 to 1.8 lb N/1,000 sq ft/growing month. Bermudagrass has good drought as well as submersion tolerance. If grown under high maintenance conditions, verticutting (dethatching) will be necessary to remove thatch and improve air, water and nutrient penetration to the roots. With the exception of the common variety, which can be propagated from seed, all other improved hybrids are propagated vegetatively by sprigs, plugs or sod.

Use: Both common and hybrid types have a wide variety of uses including lawns, cemeteries, parks, institutional grounds, airfields, athletic fields, fairways, greens, tees, roughs and roadside rights-of-way.

Pests: This grass can be damaged by a variety of insect pests including mole crickets, sod webworms, grubs, armyworms, fruit flies, Rhodes-

Watering is critical in the early stages of establishment to prevent desiccation of the sprigs, which are portions of plant stems.

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grass scale and Bermudagrass scale. Bermudagrass mites can be a problem on common Bermudagrass. Several diseases infect Bermudagrass including brown patch, dollar spot, Pythium sp., Fusarium patch, Helminthosporium spp., rust and take-all patch. Nematodes also can be damaging to the roots in sandy soils.

Cultivars: Common, and several hybrids including Tiflawn, Tifdwarf and Tifway among others.

ZOYSIAGRASS

(*Zoysia* spp.) is native to tropical eastern Asia, but has been introduced to the warm, humid and transitional climates of the world. It is a medium-to fine-textured grass with a creeping growth habit from both rhizomes and stolons forming a thick dense cover. Zoysiagrass can grow in a wide variety of soil types, but is intolerant of poorly drained soils. It performs best in well-drained, relatively fine-textured, fertile soils with a pH of 6 to 7. It has good salt, shade and traffic tolerance in the growing season.

Culture: Zoysiagrass requires a medium level of cultural intensity. Mowing should be conducted with a reel mower, and the recommended cutting height is .5 to 1 inch. The fertilization requirements can be as high as 3 to 6 lb N/1,000 sq ft/yr. Zoysiagrass needs irrigation during periods of drought. If grown under high maintenance conditions, verticutting (dethatching) will be necessary to remove thatch and improve air, water and nutrient penetration to the roots. All improved hybrids are propagated vegetatively by sprigs, plugs or sod. Seeds may be available for one species, *Z. japonica*, however, they must be hulled in order to improve the extremely poor germination.

Use: The most common use is for lawns. If the slow growth rate can be tolerated, then other uses may include parks, airfields, athletic fields, fairways, tees and playgrounds.

Pests: This grass is less susceptible to insects and disease than other warm season grasses. However, it can be damaged by a variety of insect pests including the hunting billbug, mole crickets, sod webworms and armyworms. Diseases which can be encountered in Zoysiagrass include brown



St. Augustinegrass thrives best in sandy loam, well-drained, fertile soils with a pH of 6.5

patch, dollar spot, *Helminthosporium* spp. and rust. Nematodes can be quite damaging to the roots of Zoysiagrass.

Cultivars: The 3 commonly used species include the Japanese or Korean Lawngress, *Z. japonica*; Manilagrass, *Z. matrella*; and Mascarenegress or Korean Velvetgrass, *Z. tenuifolia*. Some improved hybrids have been developed such as Meyer, Emerald and El Toro, among others.

CENTIPEDEGRASS

(*Eremochloa ophiuroides*) is native to southern China, hence the name Chinese Lawngress. It is grown in limited areas in the southern US. Centipede grass has a medium texture and spreads by short, thick, leafy stolons which have short internodes. It likes acidic soils with pH 4.5-5.5. Centipede grass has poor salt tolerance; good shade tolerance; fair to poor traffic tolerance.

Culture: Centipede grass can survive with a low to medium level of cultural intensity. Mowing height is between 1 and 2 inches; although not as frequently required as with other warm season grasses. Annual fertilization may be as low as 1-2 lb N/1,000 sq ft/yr. Iron chlorosis is frequently a problem, especially after a nitrogen application. A

foliar application of chelated iron will be needed to maintain good color. Watering will be needed during periods of drought, as this grass does not tolerate drought stress. If maintained at a high level of cultural intensity, Centipede grass thatches excessively. Propagation is by sprigs, plugs or sod. Seeding is possible, however, the establishment rate is slow.

Use: Centipede grass may be used in home lawns with minimal traffic and low maintenance conditions. It is not used in athletic fields or playgrounds due to its poor wear tolerance and slow establishment.

Pests: Centipede grass is relatively pest free. Occasional problems with spittlebugs or ground pearls can be encountered. Diseases (brown patch and dollar spot) can cause serious damage, as well as root feeding activity by nematodes.

Cultivars: Common and Oaklawn. **LM**

A.D. Ali, Ph.D., is a technical advisor with the Davey Resource Group, a division of the Davey Tree Expert Company, in Kent, Ohio. He is based in Ft. Meyers, Florida.



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Centipedes
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Fleas (Adult, Larvae)
Imported Fire Ants (Adult, Mounds)
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Events

JUNE

17: Scotts Company Field Day, Gervais, Ore. (614) 846-7777.

17: Seed Research of Oregon Field Day, Corvallis, Ore. (800) 253-5766.

18: Turf-Seed, Inc./Pure Seed Testing Field Day 16, Hubbard, Ore. (800) 247-6910.

18-19: Turf Merchants, Inc., Field Day and dinner. (800) 421-1735.

19: Advanta Seeds Pacific, Inc., Field Day, Albany, Ore. (800) 288-7333.

18-20: Super Floral Show, Columbus Convention Center, Columbus, Ohio. Jim Johnson, 602/998-3992; (602) 998-7838.

25: Urban Tree Conference, Univ. of Calif. Extension, Riverside. Call Jan Crump (909) 787-5804.

25-27: Southeast Greenhouse Growers Conference, Palmetto Center, Greenville, S.C.; Charles Hall, (800)453-3070; (706) 883-8215.

JULY

5-8: Soil & Water Conservation Society Annual Conference, Hyatt Re-

gency, San Diego; Charlie Persinger, (515) 289-2331.

6-10: Groundskeepers Management Academy, Millington, TN. Contact Floyd Perry (407) 363-5965.

6-11: Perennial Plant Assn. Symposium, Westin Hotel Copley Place, Boston. Contact Dr. Steven Still, (614) 771-8431; (614) 876-5238.

15: Maryland Turfgrass Council, turfgrass field day, at the University of Maryland Turfgrass Research and Education Facility on Cherry Hill and Gracefield Rd., Beltsville, Md. (410) 335-3700.

16-18: Turfgrass Producers International Summer

Convention & Field Days, Sheraton of Tyson's Corner, Virginia; Tom Ford, (847) 705-9898; (847) 705-8347.

25-27: International Lawn, Garden & Power Equipment Expo, Kentucky Exposition Center, Louisville, Ky. Call (800) 558-8767.

28: Midwest Regional Turf Field Day, West Lafayette, IN. Call Zac Reicher (765) 494-8039.

28-30: Penn Allied Nursery Trade Show, Fort Washington Expo Center, Fort Washington, Pa.; Sandy Seltzer, (717) 238-1673; (717) 238-1675. **LM**

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SUPPLIERS CORNER

Steve Busash joined Americalist's Lawn Care Marketing division. **Americalist** is a full-service direct marketing company specializing in several industries, including lawn care. The company compiles mailing lists and has full printing, mailing and telemarketing services in-house. Corporate offices are in North Canton, Ohio.

Fairmont Minerals, parent company of **Best Sand Corporation**, signed an agreement to form a limited liability corporation with the D.M. Boyd Co., New Wilmington, PA. D. M. Boyd is a producer of high quality topdressing and construction mixes for golf courses and athletic fields. Fairmont Minerals is headquartered in Chardon, Ohio.

FLOWTRONEX PSI has named John Swindle product manager for the FLOBOY product line, which features the "plug it in and pump it out" pumping sys-

tem technology. Swindle has experience working the irrigation markets of Florida, Georgia, Alabama and the Caribbean.

Foley United, River Falls, WI, presented **Golf Ventures**, Lakeland, FL, with its Outstanding Achievement Award because of its largest percentage increase in the sales of grinding equipment and accessories for 1997. Ron Blodgett and Greg Turner of Foley United made the presentation to Don DeLaney, vp of sales, Golf Ventures, at the GCSAA Show in Anaheim.

Gil Herr, president of U.S. distributor **HAMM Compactors**, Irving, TX, announced **E.F. Craven**, Greensboro, NC, as the latest dealer to carry the line of Schaeff loaders/excavators. The line includes SKS wheel loaders, SKL swing loaders and the new mini excavators. The products are manufactured in Germany.

Horizon, Tempe, AZ, promoted Lee Diller to regional sales manager of the metropolitan Phoenix area. He was most recently manager of Horizon's Scottsdale location. Horizon, known formerly as Mesa Sprinkler, is a supplier of turf-care and irrigation products.

King Machine Company, Scottsburg, Ind., has formed a Pro Series Products Division to handle sales of its Pro-Chopper and Pro-Crimper mulching and seeding units, which it has made since 1986. Rick King, founder and president, is vice president of the new division.

Kohler's overhead camshaft 18 hp engine won the 1998 "New Product Award" in a national competition sponsored by the National Society of Professional Engineers (NSPE).

Andrew Semple is the new midwest sales manager for fer-

tilizer sales for **Nature Safe Natural & Organic Fertilizers**, Cold Spring, KY. Previous to that he was a sales manager for Pursell Technologies.

Rena OEM Sales has been formed in Charlotte, NC, as a division of Philadelphia-based **Aquarium Pharmaceuticals**. The new division's focus on the supply of water pumps, air pumps and water quality products to a variety of commercial and industrial users.

Simplicity Manufacturing, Inc., named **Claymore Grass Machinery** as its UK distributor late in 1997. Claymore will provide dealers throughout the UK with the complete line of Simplicity ride-on products and service parts. As a result the company will discontinue its Simplicity Manufacturing (UK) operations, headquartered at the Garden Mechanisation facilities in High Wycombe. Simplicity has provided product to the UK market for more than 35 years.

Turf and Garden, a division of Todd Farm Equipment, has expanded into the sod growing business with Southern Belle Turf Farms, a 269-acre farm along the Blackwater River, Southampton, VA. Steve McCulloch, 12 years with the company and a former golf course superintendent, is the farm manager. Turf and Garden is headquartered in Chesapeake, VA. **LM**

Info center

VIDEOS AND LITERATURE FOR THE GREEN INDUSTRY

SALT-AFFECTED TURFGRASS SITES: ASSESSMENT AND MANAGEMENT... 250-page hard-cover book written by Robert Carrow and Ronald Duncan helps turfgrass managers identify and pinpoint salinity problems and gives them the tools to implement effective management strategies. Price \$54.95. Contact: Ann Arbor Press, Inc., 121 South Main St., P.O. Box 310, Chelsea, MI 48118. Phone: 313/475-8787. Fax: 313/475-8852.

VIDEOS MAKE WATER FEATURES PROFITABLE... "Growing Your Water Feature Business" video training set. Tape 1: Advanced Construction Techniques. Tape 2: Landscaping Your Waterscape. Tape 3: Designing, Selling & Estimating Water Features. Separately \$19.95. Complete set \$49.95. Contact: Aquascape Designs, 1130 C. Carolina Drive, West Chicago, IL 60185. Phone: 800/306-6227.

THE POWER OF HYDRAULICS... Free, full-color product guide. Contact Stanley Hydraulic Tools, 3810 S.E. Naef Road, Milwaukie, OR 97267-5698. Phone: 503/659-5660. Fax: 503/652-1780. For English the version ask for part #31838. For Spanish version ask for part #31839.

Do they really care about kids?



Ron Hall

RON HALL
Managing Editor

The doublespeak emanating from the nation's capital concerning health risks to America's youth seems to be increasing. Consider the widely disparate actions of our legislators to reduce the health risks to youngsters from two sources—tobacco and pesticides.

This past spring Congress debated tobacco (again), and argued the wisdom of taxing cigarettes out of the economic reach of youngsters. This is logical and appropriate considering the tiny financial cost of addiction compared to the hugely expensive health problems that addiction creates.

So what does Congress do? It poses and postures, and does virtually nothing to keep youngsters from tobacco. It apparently feels that even talking about making America safer and healthier for kids is a sure thing with voters.

So, what's this got to do with the green industry? Plenty.

In August, 1996, President Clinton signed into law the Food Quality Protection Act (FQPA). The Act amends FIFRA and the Federal Drug and Cosmetic Act (FDCA) and went through Congress like a speeding bullet.

The FQPA—one of whose cornerstones is protecting children and infants from pesticides—is a huge piece of legislation. It does no less than replace the pesticide laws we had been working under. It defines how the U.S. EPA will deal with pesticides and, consequently, with many of us. While most of the details are yet to be worked out, there are indications that the Act might be used to eliminate or reduce the use of some of our chemical products.

Contrast the rapid-fire passage of the FQPA, a complicated and problematic measure, with our legislators' contentious wrangling over youth and tobacco where the evidence of risk to youngsters is overwhelming, if not damning. **LM**

[LANDSCAPE/GROUNDS]

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Expo '98 celebrates 15 years

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What's next for LandCARE?

PAGE 16 L ▶

Get your field back to grass

PAGE 18 L ▶

Quick guide to pre-emergents

PAGE 22 L ▶

Proper pruning techniques

PAGE 24 L ▶

The benefits of organic recycling

Agree? Disagree? Comments? Questions? Let Ron Hall know at 440/891-2636. Fax: 440/891-2683. E-Mail: rhall@advanstar.com.



[PEOPLE & PROJECTS]

Stano nabs 'healthy' project

Stano Landscaping, Inc., Milwaukee, WI, earned the landscape contract at Waukesha Health Care, Inc.'s, Southside Clinic. The contract calls for Stano's crew to install foundation plantings around the new health clinic. More than 22 trees, 11 evergreens, 100 shrubs, plus ground cover and perennial plants will be planted at the site.

Scott Byron employee talks trucks

Thomas O'Donnell, fleet & safety manager for Scott Byron & Co., Lake Bluff, IL, addressed a national audience of truck manufacturers and suppliers at the recent Mid-America Trucking Show in Louisville, KY. O'Donnell, 35, spoke about buying and selling equipment, as well as maintenance and repair.

EXPO '98

celebrates 15 years

The 15th annual International Lawn, Garden & Power Equipment Expo will be Saturday through Monday, July 25-27, 1998, at the Kentucky Exposition Center in Louisville.

Surveys show that the No. 1 reason visitors attend the Outdoor Power Equipment EXPO is to see new products.

In response to those needs, EXPO '98 will give additional emphasis to new products and how they can contribute to profitability for dealers, retailers and lawn and landscape professionals.



Veteran attendees consider EXPO an open house of new products because it is their one opportunity during the year to see nearly 600 suppliers' latest innovations, all under one roof.

"EXPO 98 is a can't-miss event for every business person in our industry interested in making a profit," said Dennis C. Dix, president and CEO of the Outdoor Power Equipment Institute Inc. (OPEI), sponsor of EXPO.

"It's the only place everyone in the industry can learn smart business practices, whether it's running a profitable dealership, merchandising products or marketing services."

EXPO officials also report that a new technical and O.E.M.-supplier pavilion has sold out of its exhibit space.

Displays are expected to cover 262,000 sq. ft. in the exhibit halls. Products on display will include power equipment and lawn and garden products for consumer,

The International Lawn, Garden & Power Equipment Expo is an open house of new products.

EXPO '98 the international marketplace for new products

For distributors, agents and buyers from around the world, the International Lawn, Garden & Power Equipment Expo is an open house of new products. Set for Saturday through Monday, July 25-27, 1998, at the Kentucky Exposition Center in Louisville, this is the industry's one opportunity during the year to see the latest innovations from U.S. suppliers, all in one place. About 600 exhibiting companies worldwide are expected to participate.

The trade fair is sponsored by the Outdoor Power Equipment Institute (OPEI). Its members are among the companies that will exhibit and demonstrate their new products and equipment. As of March 20, companies from 8 countries have reserved exhibit space. The countries represented include Australia, Canada, England, Ireland, Italy, Sweden, Switzerland and the United States. Visitors are expected to travel from 60 countries worldwide.



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¹Excludes other GM vehicles. ²When properly equipped; includes weight of cargo and passengers.

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EXPO '98 daily schedule

FRIDAY, JULY 24

Exhibitor Reception
7-11 p.m.

Tour: "Star of Louisville" dinner cruise; \$45/person (includes dinner; transportation to dock not provided)

7 p.m. Dealer Night - Redbirds Baseball

SATURDAY, JULY 25

Outside Exhibits: 8 am-5 pm/Inside Exhibits: 9 am-5 pm

8-10 a.m. Technician Testing & Certification; sponsored by the Engine Service Association

8-10 a.m. Technician Testing & Certification; sponsored by Kohler Co.

8-10:30 a.m. Technician Testing & Certification; sponsored by Tecumseh Products Company

8 a.m.-12:30 p.m. Technician Testing & Certification; sponsored by Briggs & Stratton

9-11 a.m. Free Seminar: What Impact Will The Industry EDI Guidelines Have On Your Business? sponsored by the Outdoor Power Equipment Institute, Inc.

10 a.m.-12:30 p.m. Technician Testing & Certification; sponsored by the Engine Service Association

10 a.m. Free Hands-On Dealer Workshop: Make Money In Service

10-11:30 a.m. LGDA meeting

10-11:30 a.m. TSDA's open forum for dealers on setting goals

11 a.m.-3:30 p.m. Tour: A day in the Bluegrass. Lunch at Old Stone Inn with a stop at Labrot & Graham Distillery; \$32/person

1-3 p.m. Technician Testing & Certification; sponsored by Kohler Co.

1-3:30 p.m. Technician Testing & Certification; sponsored by Tecumseh Products Company

1-4:30 p.m. Tour: Louisville Slugger Museum & Joe Ley Antiques; \$32/person

1-5:30 p.m. Technician Testing & Certification; sponsored by Briggs & Stratton

1:30 p.m. Free Hands-On Dealer Workshop: Make Money In Service

3-5 p.m. Make Your OPE Dealership Into A Star!, free seminar for dealers

3-5 p.m. Selling Millions Every Year, for lawn care industry & landscape management professionals.

6:30-10:30 p.m. Tour: A night of racing at Louisville Motor Speedway; \$15/person (includes picnic, but not transportation)

7 p.m. Dealer Night - Redbirds Baseball

SUNDAY, JULY 26

Outside Exhibits: 8 am-5 pm/Inside Exhibits: 9 am-5 pm

10-11:30 a.m. Tour: Fashion seminar and makeovers. Coffee and

Associations plan education tracks

Landscape professionals at the International Lawn, Garden & Power Equipment Expo (EXPO 98) will find more valuable opportunities than ever during the annual trade show, July 25-27, in Louisville. And with the show's successful Saturday start-date, landscape contractors will spend less time away from their businesses.

The Professional Lawn Care Association of America (PLCAA) and the Associated Landscape Contractors of America (ALCA) will sponsor a free seminar program for lawn & landscape pros. The seminars will be 3-5 p.m. Saturday and Sunday, and 9-11 a.m. on Monday.

Landscape professionals will learn how to improve profits and operate more productively with topics including customer service, management, marketing and employee motivation techniques.

The Outdoor Power Equipment Distributors Association (OPEDA) will sponsor a series of seminars for dealers.

soft drinks provided; \$12/person

10 a.m. Free Hands-On Dealer Workshop: Make Money In Service

Noon-4:30 p.m. Tour: Derby Dinner Playhouse matinee: "Sound of Music." \$40/person (includes lunch)

1:30 p.m. Free Hands-On Dealer Workshop: Make Money In Service

2:45 p.m. Organic Gardening magazine presents the 10th annual Ultimate Garden Tool Giveaway.

3-5 p.m. Managing Your Business for Profit, free seminar for dealers

3-5 p.m. Beyond Customer Service, seminar for lawn care & landscape management professionals.

4-4:45 p.m. Free International Seminar: Future Perspective of Worldwide OPE Business; sponsored by the Outdoor Power Equipment Institute, Inc.

5-6:30 p.m. International Reception for international visitors and exporters; free; by invitation only.

6-10 p.m. EXPO Dinner/Concert starring The Four Tops and The

Temptations; \$35 per person; 6 p.m. cash bar / 6:30 p.m. buffet dinner / 8 p.m. concert

MONDAY, JULY 27

Outside Exhibits: 8 am-noon/Inside Exhibits: 9 am-3 pm

8:30 a.m.-12:30 p.m. Tour: Backside and front side tour of Churchill Downs; \$31.50/person (includes breakfast)

9-11 a.m. Getting Your Message Through, free seminar for dealers and lawn care, landscape management professionals

11:15 a.m.-2:30 p.m. Tour: Star of Louisville luncheon cruise; \$36.50/person (includes lunch)

Free seminars for dealers sponsored by OPEDA; co-sponsored by OPEAA & NAEDA.

Free seminars for lawn care & landscape management professionals sponsored by ALCA & PLCAA.

Free workshops for dealers sponsored by NAEDA.

The Temps, The Tops, racing & Redbirds

The Temptations and The Four Tops will sing at a Sunday evening dinner concert, July 26, 6-10 p.m.

Also on the schedule of entertainment is a night of racing at Louisville Motor Speedway, Saturday, July 25, 6:30-10:30 p.m.

Friday and Saturday nights will be EXPO Night at the Louisville Redbirds Baseball Game. Free tickets to the games will be available to EXPO visitors. First pitch each night will be at 7 p.m. at Cardinal Stadium which is located at the Kentucky Exposition Center.

Participating associations include:

American Nursery & Landscape Association (ANLA)

American Society of Agricultural Engineers (ASAE)

Associated Landscape Contractors of America (ALCA)

Engine Service Association (ESA)

Lawn & Garden Dealers Association (LGDA)

North American Equipment Dealers Association (NAEDA)

Outdoor Power Equipment Aftermarket Association (OPEAA)

Outdoor Power Equipment Distributors Association (OPEDA)

Professional Lawn Care Association of America (PLCAA)

The Service Dealers Association (TSDA) □



commercial and rental use. In addition, a special emphasis on products that provide opportunities for diversification, such as outdoor living products and Christmas decorations will be evident at this year's show.

The popular outdoor demonstration area will have new products ready for "test drives" or other workouts throughout each of the three days. In the 641,875 net sq. ft.

natural turf area, visitors will drive equipment, kick tires, ask questions about repair and maintenance, and check out the innovations that will benefit their businesses. EXPO is their once-a-year opportunity to check out and compare the innovations that will benefit their businesses in "try-before-you-buy" setting.

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The outdoor demonstration area gives prospective buyers a chance to try out new equipment.

mercial end-users, rental equipment dealers, distributors, manufacturers' reps and exhibitors will visit from throughout the US and 60 countries worldwide to compare and assess the newest products on the market; test equipment; and attend dealer meetings, exhibitor-sponsored events and seminars.

It's all free for those who pre-register before July 20. Registration at the show will be \$25 per person. The show is sponsored by the Outdoor Power Equipment Institute. Its members are among the companies that will exhibit and demonstrate their new lines indoors and out at EXPO.

For a preregistration brochure, call Sellers Expositions, toll-free, 800-558-8767, or call 502-562-1962. Web address is: <http://EXPO.mow.org> □



Landscapers can learn how to improve profits and operate more productively with topics including customer service, management, marketing and employee motivation ideas.

What's next for **LandCARE?**

LandCARE USA, INC., goes 'public' in its quest to acquire more landscape/tree service companies and become a national player

By RON HALL/ Managing Editor

What's next for LandCARE USA, Inc.? Owners of landscape and tree service companies across the United States are wondering this as LandCARE in May took the final steps to become a public company.

As *LANDSCAPE MANAGEMENT* magazine went to press, LandCARE, headquartered in Houston, TX, prepared to offer for sale 5 million shares of Common Stock. A successful offering means that LandCARE stock (proposed symbol GRW) will be traded on the New York Stock Exchange. It would also complete the merger of the seven founding companies into LandCARE (see sidebar), and provide the framework around which the company hopes to construct a national landscape/tree care empire.

LandCARE says that it intends to expand from its seven regional operations into a national company.

Its operating strategy is to:

- ▶ focus on commercial and institutional markets,
- ▶ operate on a decentralized basis.

Local management will retain responsibility for the day-to-day operations, profitability and internal growth of the business, achieve operating efficiencies by

adopting "best practices" operating programs for its management information systems, recruiting and training, safety and risk management, sales training and human resource management.

"The company intends to implement an aggressive acquisition program focusing on entering new markets through significant acquisition as well as expanding within existing markets through acquisitions of smaller companies," says the document it filed with Securities and Exchange Commission (SEC). The strategy focuses on "the acquisition of numerous, relatively small companies."

"We're in the process of auditing the best management practices of existing

companies," who may be prospective LandCARE partners, says Roger Braswell, president of Site Work Systems and Southern Tree and Landscape Company, Charlotte, NC.

"Chief Operating Officer Hal Cranston is working through that, to be certain that we're applying the best information across the board," Braswell adds.

"We're a little limited by the SEC [regulations] prior to the initial public offering," says Braswell, "but we've been pleased and excited with responses from the industry, from other entrepreneurs and potential partners."

LandCARE, because of its size, could conceivably have several advantages over

The seven founders of LandCARE

The seven founding members of LandCARE USA generated revenues of about \$116.2 million in 1997 and \$26.6 million the first three months of 1998, says the prospectus that LandCARE USA filed with the Securities Exchange Commission.

About 75 percent of the company's revenues came from maintenance services, installations for about 25 percent.

The founding members, and their 1997 revenues:

Trees Inc., Houston, TX, \$50.1 million (line clearing services in 13 states accounting for 96 percent of the revenues);

Four Seasons Landscape and Maintenance, Inc., Foster City, CA, \$16.1 million;

Southern Tree & Landscape Co., Inc., Charlotte, NC, \$14.2 million;

D.R. Church Landscape Co., Inc., Lombard, IL, \$13.3 million;

Ground Control Landscaping, Inc., Orlando, FL, \$9 million;

Arteka Corporation, Eden Prairie, MN, \$7.4 million;

Desert Care Landscaping, Inc., Phoenix, AZ, \$6.5 million.

For merging their companies into LandCARE the seven founding companies will receive a total of \$27.2 million in cash and 5,162,645 shares of Common Stock, making the owners and officers of these "wholly-owned subsidiaries" the holders of at least 55.5 percent of shares of LandCARE's stock, according to the document filed with the SEC on May 6.

They will be paid out of the proceeds of the IPO of 5 million shares expected to sell for between \$10-\$12 per share. The company estimated the offering to raise about \$55 million. □

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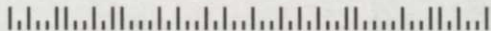
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Don't fear consolidation, says Ross

Industry financial consultant Frank Ross thinks the consolidation in the landscape industry is "fantastic." He refers to the formation of LandCARE USA by its seven founding members.

"In the next three to five years, we're going to see billions of dollars coming into our industry. Most of it's real estate driven, coming from the public sector. That's great. We need capital," says Ross.

"[The landscape industry] has been a notoriously under-capitalized industry from day 1," explains Ross.

"When I talk to landscape contractors all across the country, it's not an issue of selling more or producing more. It's about cash flow, pricing, tracking, and making a profit."

In effect, says Ross, "business sense" has always been an industry weakness.

"And because the financial side is not on an equal plane with the production side, we tend to be an under-capitalized industry."

LandCARE USA's marketing strategy is to go after national corporate accounts.

"When they do that, don't you think by training those corporate accounts to higher expectations, those accounts are going to demand a higher level of professionalism? And what does that do to all of us? To compete, we have to match it."

All of this money flowing into the industry will bring the larger companies' costs down, according to Ross, who believes industry consolidation will help the industry save money in three areas: interest, insurance, and commodity buying.

"Let's take interest expense. How much is interest expense in relationship to revenue in your company; one percent, two percent? These roll-ups don't have debt, therefore interest goes away. So where does that interest fall? On the bottom line.

"How much does insurance in your organization cost? Eight percentage points of revenue? Do you think national buying of in-

smaller competitors. It would have more negotiating leverage in seeking volume discounts from vendors—everything from trucks to insurance. Its size and growing visibility would also be a plus in attracting new supervisory talent and, perhaps, in hiring and keeping laborers, particularly if it

insurance is going to be able to economize on that? That's probably a savings, as far as revenue is concerned, of one-two percent. Where's that going to fall? On the bottom line.

"What about commodity buying on a national level? Do you think these organizations are just going to go after national accounts generate revenue? They're also going to go after equipment dealers and commodity dealers of material."

That national buying power will give those landscape companies another one to two percentage points on revenue.

"By coming into the roll-up in a profitable manner, and then being able to appreciate savings in three areas of cost will have 6-10 percentage points on sales to their bottom line should they choose to keep it. That's a lot. In many of our organizations, that's as much as we make in profit.

"You don't have anything to fear about anyone coming into your marketplace if you operate as well as they do, or better."

Don't look for predatory pricing from these giants, assures Ross. It isn't part of their mission.

"When I think of predatory pricing, I think of pricing at a loss or a break even, to gain access to a market," says Ross.

"These guys aren't going to be pricing at a loss. They're still going to be pricing at a profit; not only did they have profit to begin with, but now, they've added to it."

Though very few companies will ever become part of a roll-up, Ross says the challenge is clear. Make it work, or make your way out. We've got to be a little bit better.

"We've got to become better business people."

Terry McIver

can improve on the skimpy benefits packages most laborers receive in the industry. The biggest advantage, however, might be the ties a national landscape/tree service company can build with regional and national commercial and institutional property owners or managers.

But, most of this is still ahead of the company. LandCARE, in spite of the hard-earned experience of its founding members, is still far from being a national powerhouse with just seven regional operations scattered across the country.

There are strong independent competitors in every marketplace. But the biggest threat to LandCARE's expansion plans could come from companies like TruGreen/ChemLawn which is now branching into maintenance services and the several other large landscape or tree services that have operations across entire regions of the country.

Even so, Braswell says, there is an "incredible excitement" among the employees of LandCARE. "They've had a positive response to the entire concept, and to the potential to participate" in purchase of LandCARE stock. □

Terry McIver contributed to this story.

LandCARE could gain a competitive advantage if it improves on the benefits packages most laborers receive in the industry.

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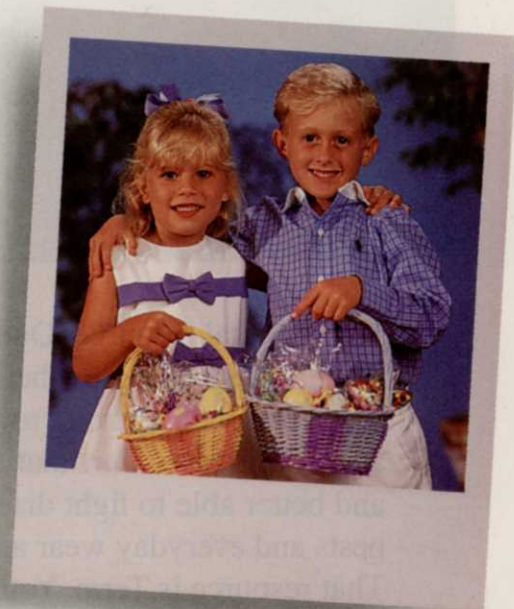
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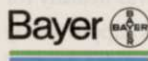
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Get your field 'back to grass'

Back to grass is the wave of the present, and the future for athletic fields.

By MIKE ANDRESEN

Jack Trice Field, the playing surface at Cyclone Stadium, and the home of the Iowa State University Cyclones, was converted from artificial turf to a sand-based natural grass surface prior to the 1996 football season. The new field earned the Sports Turf Managers Association's College Football Field of the Year Award for 1996-1997.

The ideal time to make the conversion decision is when the existing artificial turf surface is reaching the end of its effective life. For ISU, that point arrived in 1995,



Rootzone development is crucial to the durability of a turfgrass playing surface.



When Dan McCarney joined Iowa State University as head football coach, he knew he had to land more top prospects, a decision that weighed heavily in favor of natural turf.

the year Dan McCarney joined the University as Head Football Coach. In his meetings with Athletic Director Gene Smith and Associate Athletic Director Elve Everage, McCarney defined the priorities of his program. In order to strengthen the football program within the highly competitive Big 12 Conference, McCarney needed to recruit aggressively. Part of that package was assuring potential recruits that they would be playing on a high quality natural turf surface that was healthy for the body. This decision was supported by the ISU athletic trainers and the medical staff. ISU tied the field conversion into a total package with the construction of the Jacobsen Athletic Building, a facility which would bring the entire intercollegiate athletic program staff, including the coaches, into one building. The internal consensus definitely helped gain acceptance and support for the total project. Additional support was spurred by the presence of Heisman candidate, Troy Davis.

Maintenance higher but worth it

Commitment to excellence extends beyond the construction process. The conversion to natural turf is senseless without the commitment of resources to adequately maintain it. Obviously, maintenance costs are higher for "real" grass fields, since turf needs attention during, before and after the active growth period. Mowing and weekly painting alone would push maintenance costs higher. With artificial turf fields, surface cleaning is the major maintenance requirement.

It's vital that the proper equipment be available to achieve the quality control necessary for the natural turf grow-in and maintenance programs. The field conversion project budget allowed about \$100,000 for additional equipment.

Enduring first year stress

In 1996, we had four home games during the field's first six weeks. This put the field under stress entering the dormant season. Scrutiny over turf condition was in-

tense. The season-long question was, "Would the natural turf hinder Troy Davis' ability to achieve a thousand yards rushing?" It didn't.

Then there was the week of rain and the ISU-Nebraska game in yet more rain.

With Nebraska's then Head Football Coach Tom Osborne as one of artificial turf's strongest supporters, media across the nation were watching closely in anticipation of mud pit conditions. The field held up extremely well. Osborne had no complaints.

The winter of 1996 hit early and hard. We aerated, overseeded, topdressed with a half-inch of root zone mix, and covered the field, pounding stakes through a frozen layer of the sand.

Second year lessons

Spring of 1997 brought winter kill on the perennial ryegrass we'd used for late-season cover and on the sides of the field not covered with the tarp. We reestablished turf cover in those areas. This was a learning year. We fine-tuned everything, including our fertilization process, extending the first year's 10 day intervals to 14 to 21 days to match the needs of the more mature grass.

Early season home games were spaced out better, allowing for turf recovery, so we entered the dormant period with a good stand of grass.

In 1997, we core aerated the last week of November, scalped the grass before overseeding, topdressed with 1/2 inch of root zone mix and put on the field covers.

Dormant seeding in year 3

Following a mild 1997-1998 winter, an excellent field emerged in the spring, with the mid-field filled with immature grass. Dormant seeding has proved effective both years we've used it. We use a gold-tag seed blend of four bluegrass varieties that is high maintenance and high performance, can withstand low mowing and shows excellent ability to repair itself. Early soil

The process

1) Once the old artificial covering and underlying base were removed, a sub-surface drainage system was installed. This consisted of 4-inch perforated drain pipes placed in gravel-filled slits cut into the field's clay base on 15-foot centers in a heringbone pattern.

2) This was topped by 4-inch layer of gravel. The irrigation system was then installed at a 12-inch depth. Dr. Dave Minner and the project's consulting team developed precise specifications for the selection of

materials and monitored them closely throughout the construction process. The rootzone consists of a 12-inch layer of 93 percent sand and 7 percent peat.



3) Bluegrass sod with the same rootzone base was not available. The most workable match was sod grown on an 84 percent sand-base. This was cut thinly enough to avoid capping off the drainage capabilities of the underlying sand, yet thick enough to provide stability.

MA

samples showed roots at 7 and 8 inches. During 1998, we're doing tissue analysis every couple weeks and spoon feeding micronutrients accordingly.

We're aerifying and topdressing very lightly after each game to keep the bluegrasses thriving. We have always collected the cores to work out the soil layer that came in with the sod. As the field gets older, potential for black layer becomes more of a factor. We used deep tine aeration once in the spring of 1997. We'll use

it two or three times prior to the 1998 football season and once afterwards, basically to increase the gas exchange within the soil profile. □

Mike Andresen is Athletic Turf Manager for Iowa State University, Ames, Iowa. He joined the University in that position during the field conversion, just after the old surface had been removed. He's a past-president of the Iowa Chapter of STMA and serves as Chapter Relations Chair at the national level.

Quick guide to pre-emergents

Avoid costly mistakes in buying and using preemergent herbicides by following a common sense program for their selection and use.

By THOMAS L. WATSCHKE, Ph. D.

The small profit margin realized from preemergent herbicide applications means lawn care operators can't afford to make mistakes when using these products. This, combined with the fact that the cost for the product is incurred at the beginning of the year when checkbooks may be slim, means the decision on which preemergent compound to use definitely affects the operator's bottom line.

But deciding which 'pre' product to apply isn't always easy since weed spectrums, customer expectations, and turf and environmental conditions change from site to site. Lawn care operators should first determine their overall needs in terms of application methods, efficacy and cost-effectiveness when making their herbicide selection. Consider other factors such as re-seeding intervals, formulation choice and water solubility and volatility issues as well.

The product has to complement the operator's particular application set-up,



whether it is liquid or granular, or both. It also needs to cover the weed spectrums they generally encounter, and satisfy their customers' control expectations and personal feelings towards the type of product being used.

Liquid or granular?

Liquid and granular formulations offer different advantages to lawn care operators. Generally, liquids tend to be more economical and promote more precision application. On the other hand, granular products can help turf professionals address homeowner perceptions about environmental issues since much of the public has a more positive view of materials being applied with a spreader than a spray gun.

But lawn care operators need to be careful when applying granular products, or a preemergence herbicide impregnated in fertilizer, with a spinner-type spreader near ornamentals. They should select a product that can be used in both places and can be safely used over a wide variety of ornamentals. This not only eliminates the potential for ornamental injury; it helps make customers happy since the ornamental bed gets the benefit of the application too. Some products, such as pendimethalin, can be used on well over 300 ornamentals with no injury.

Weed spectrum

Although most lawn care operators use preemergent compounds primarily to control crabgrass, products that offer broad-

spectrum effectiveness of other summer annual grasses and broadleaf weeds provide icing on the cake. They also reduce the potential for profit-stealing callbacks. It's very important for operators to compare product labels for the list of weeds controlled to help determine herbicides' weed control spectrums.

However, just because a herbicide has the broadest spectrum doesn't mean it is the right choice. Lawn care operators need to balance spectrum and price to determine the most cost-effective program for the situation. Products that offer seasonal control of some of the most troublesome weeds return additional value since

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they reduce the expense and time spent on post emergent applications.

Water solubility and volatility

Two important, but sometimes over-hyped selection criteria for preemergents are water solubility and volatility. Solubility, the measure of the amount of herbicide that can be dissolved in a given volume of water, indicates the product's resistance to leaching out of the weed germination zone. Generally, the lower a herbicide's solubility, the less potential there is for leaching due to rainfall or irrigation.

Volatility refers to a herbicide's tendency to evaporate or be lost to the atmosphere as a gas. Low volatility means a herbicide is less likely to escape as a vapor and more product remains in the soil to control weeds. It also means lower possibility of harm to nearby ornamentals.

Most commercially available preemergent herbicides have very acceptable water solubility and volatility characteristics. In fact, one product being slightly less soluble than another doesn't mean that much, and there is no great difference in volatility between the leading brands. But, since there are differences, lawn care operators should refer to the label and MSDS for the product they are using to determine if there could be a potential problem. Taking precautionary steps to ensure the product not only works but stays in place goes a long way in making sure customers remain satisfied.

Application timing

Application flexibility is another criteria to consider when selecting preemergent programs. Since improper application timing causes the majority of preemergent weed failures, operators need a product with a wide enough application window to accommodate spring weather conditions. This is especially necessary in northern regions where snow needs to melt before preemergent programs can be applied. Most operators who track call-backs will find preemergent failures clustered around the end of the first application round.

There are only so many days suitable for herbicide application in the spring and

lawn care operators can get caught in a real time crunch trying to get to all of their accounts. Selecting products that have broad spectrum activity and that stretch application timing further into the season reduces call-backs, increases customer satisfaction, and makes life a little easier for the lawn care operator.

Reseeding intervals also affect preemergent decisions. Late fall seedings should not

Most commercially available preemergent herbicides have very acceptable water solubility and volatility characteristics.

be sprayed with a spring preemergent program other than a product like Tupersan (by the DuPont Company) until the operator is sure that germination is complete. A general rule of thumb to reduce the potential for injury is to mow a newly seeded or overseeded area at least four times before making a preemergent application.

Managing customer expectations

Customer expectations also affect efficacy considerations. Overall, the accepted minimal commercial standard is 85 percent control of targeted weeds. Some customers who have had problems controlling weeds on their own may be thrilled with that degree of effectiveness. Others, especially those who are used to cleaner turf, may not. Since it is not always easy to determine what the customer wants, operators should function on the premise of 'out of sight, out of mind', and treat with a broad spectrum product for new clients.

Training employees in how to manage their clients expectations enhances customer relations and reduces call backs. Employees need to be up front about the level of control a customer should expect from the application and answer questions re-

garding herbicide activity in a manner that is understandable to their clients. Explaining what kind of results to expect and how long it takes to see activity helps cut down unnecessary call backs since customers can see for themselves that the program is working.

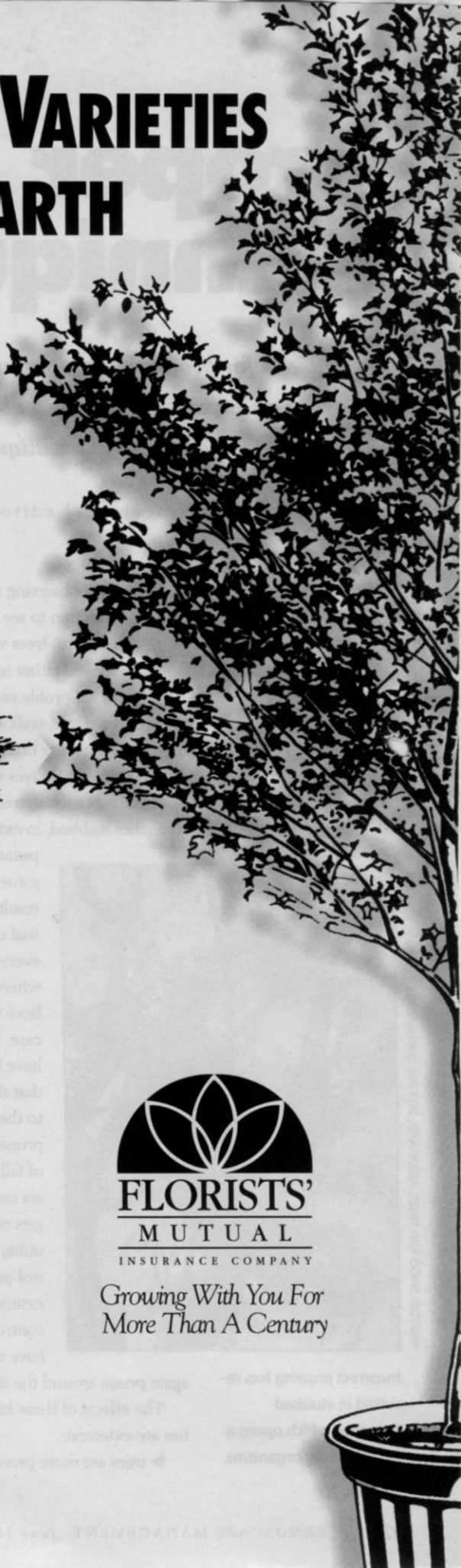
But determining which is the best product for a lawn care operator's total business can be confusion. Conflicting advertising claims can reduce credibility. And, although independent research results provide more objective comparisons, it often seems there are studies to support every claim made by every manufacturer if you look hard enough. To gain the appropriate perspective, lawn care operators should attend university field days and see for themselves how products stack up in side-by-side comparisons. For example, studies at Penn State show that products including Barricade (by Novartis), Dimension (by Rohm and Haas Company), Team (by Dow AgroSciences) and pendimethalin all provide good preemergent activity. By attending local field days, where weather, soil and turf conditions are comparable to those that lawn care companies encounter when servicing their accounts, lawn care operators can make final decisions based on how a particular product fits their specific conditions and needs.

In general, preemergent herbicide selection involves the art of matching circumstances to solutions. Lawn care operators must take into consideration several selection criteria when making their program choices.

The bottom line: select the most cost-effective program for your operation and communicate with customers to set appropriate expectations for the desired result. And, as with any pesticide, always read and follow label directions. □

Watschke is Professor of Turfgrass Science, Penn State University

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Proper pruning techniques

The reasons for promoting proper pruning techniques are based on research, study and observation of tree response to branch removal techniques.

by NANCY STAIRS, technical editor

When observing tree pruning, it is not uncommon to see some severe examples of the craft: trees with the tips of the branches removed either to make an artificially rounded profile or to reduce encroachment over a street, walkway or building; trees which have had the inner branches of the crown removed, leaving a shell of leaves which appear only at the end of the branches; trees which have had the branches stubbed, in extreme cases leaving an amputated skeleton of a tree. In

some cases, these situations are a result of ignorance. There are actual communities where virtually every tree has been topped—and where the residents appear to believe that this is appropriate tree care. In other cases, people may have been told by a company that their tree presents a danger to their home and must be pruned to reduce the possibility of falling limbs. Older homeowners can be particularly easy targets of such tactics. Finally, some utility companies, trying to control outages, severely prune to extend the pruning cycle and control costs, so that they do not have to return soon thereafter to

again prune around the utility lines.

The effects of these kinds of detrimental activities are extensive.

► trees are more prone to decay at these incor-

rect pruning cuts, which are not placed at points where the natural defense boundaries of the tree exist;

► open crowns are exposed to increased light and heat on branches, thus increasing the occurrence of cambium dieback and decay;

► increased sprouting of branches occurs at the pruning points, often defeating the actual reason for the pruning in the first place by vigorous regrowth;

► new sprouts are weakly attached and increase



Decay resulting from improper pruning not only affects the health of the tree but also the structural strength of the branch.



Incorrect pruning has resulted in stubbed branches which opens a tree to decay organisms.



Removing the inside branches of the crown increases light and heat which can wound the tree and open it to decay.



Sprouting at the end of a stubbed branch results in weakly attached branches and increased weight at the end of the branch.

potential for breakage and damage;

- ▶ natural tree structure, which extends the weight of branches and leaves throughout the entire tree and along the entire branches, is affected;

- ▶ increased sprouting at the ends of branches places all of the weight of the leaves and new branches at a single point, increasing the potential for breakage and damage.

- ▶ removal of large portions of the tree crown reduces the leaf area available for photosynthesis, and hampers the production of carbohydrates, which weakens the tree; more stressed trees are less able to withstand poor site conditions or additional attacks from insects and disease.

Efforts have been made by the International Society of Arboriculture, the American Society of Consulting Arborists, the National Arborists Association and many state extension offices to make information available to the public regarding the appropriate methods of pruning that will bring about the desired results and limit damage to pruned trees. This information is available in many forms: press releases, reports, standards, research, web pages, pamphlets and photographs. This information does not exist because too many people have too much

time on their hands; the effects of poor pruning on trees are exhaustively documented, as are the benefits of proper pruning.

It can be stated, in a nutshell, that all pruning cuts should be made at the branch bark ridge of the branch to be removed. This technique answers virtually every reason for pruning and every concern of pruning:

- ▶ this point is where the tree is best able to compartmentalize decay and keep it from spreading throughout the tree;

- ▶ reduced sprouting should result at the pruning points so that growth can be directed away from potential conflicts;

- ▶ remaining branches are still well attached;

- ▶ the natural wood structure which extends branch and leaf weight throughout the entire tree and along the entire branch is maintained by reducing sprouting at the ends of branches and minimizing the potential for breakage and damage.

- ▶ by removing no more than 25 percent of the tree crown at any one pruning, the tree retains a significant portion of the crown and is better able to withstand additional stresses from site conditions, insect pests or diseases.

Proper pruning techniques can be used to:

- ▶ lighten the crown of a tree;
- ▶ reduce the resistance to wind and decrease breakage;
- ▶ re-direct growth away from roads, sidewalks, wires, etc. without increased sprouting and repeated pruning treatments at a point of conflict;
- ▶ reduce tree height or raise the crown of the tree while retaining a natural form and growing pattern;
- ▶ remove branches which have increased potential for breakage due to decay, disease or poor branch attachment.

The key is 'proper pruning technique'. □



The loss of this large limb would not only cause damage to any property or person below at the time of failure but would also affect the tree form and the future of the tree on-site.



Organic recycling a full-circle benefit

Collecting and recycling green waste is a business opportunity for a small but growing number of service companies.

By MARY BETH JANNAKOS

While recycling efforts have become a regular practice for many Americans, it's still common to see bags of leaves, grass clippings, brush and tree branches being carted off to landfills.

Many states still do not have legislation for recycling organic materials. Even in those which have passed laws, collected green waste is often transported to designated areas in landfills where it is not put to any good use. Where legislation fails, however, some businesses and private organizations are picking up the slack.

These groups have found that recycling often saves them money in collection costs while requiring minimal extra effort. Com-

panies are also realizing the benefits of preserving natural resources and projecting an environmentally friendly image.

Landfill? What's a landfill?

Grounds Keepers, a design/build construction and maintenance company located in Parker, CO, recycles its green waste despite the absence of a state law.

"We have always recycled. We don't take anything to the landfills," said Manager Jeff Roth. Grounds Keeper produces "a significant amount" of green waste each year, said Roth. As a result, the company employs the services of Organic Recycling Services, LLC (ORS) to pick up these items on a regular basis. ORS is a new company in the Denver Metro area which collects green waste for recycling. It operates like a waste disposal company by placing roll-off containers on its clients' sites.

"It costs our clients less money to use our services than having their organic material hauled off by traditional waste disposal companies," ORS Manager Joe Tingley said. This is how ORS maintains its

In the best recycling operations, piles of shredded organic waste are converted into compost or other useful products. Here, a CCL Organics tub grinder shreds large tree branches and stumps into material that can be recycled.

competitive advantage and attracts clients which may normally opt to mix organic material with their regular trash.

Beyond landscape companies

In addition to landscape maintenance companies that produce a large percentage of green waste, ORS is catering to an increasing number of private groups such as homeowner associations. (A report issued to the Colorado General Assembly in 1994 states that yard waste from residential and commercial properties represents the largest single component of the waste stream subject to waste diversion.)

If the national average is applied, then each person in Colorado produces about one ton of green waste per year. About three million tons of green waste are being

produced annually in the state. The U.S. EPA also reports that yard waste and food residue make up almost 25 percent of the 180 million tons of municipal solid waste which is generated each year nationwide.

ORS either provides a one-time collection service for residential organizations, or adds them to its regular schedule depending on the amount of their green waste. In addition, ORS also serves stables, lumber companies and other businesses which produce a large percentage of organic waste.

The company takes the collected material to a recycling facility near Golden, CO, which is operated by AL Organics, Inc., Colorado's largest, fully permitted, commercial organic recycling company. Here the items are turned into fertilizer and compost. ORS also provides the service of returning the recycled material to those clients which have a use for it.

Roth says it takes little or no effort on the part of Grounds Keepers to recycle its green

Look for more businesses, private organizations, and government agencies to team up with compost companies.

waste. "As Colorado's population continues to grow, it will become increasingly necessary for businesses to implement environmentally friendly practices," Tingley said.

Colorado isn't the only state in which businesses and private organizations are taking action. In California 50 percent of the waste stream must be diverted from landfills by the year 2000. Many are already employing the services of roll-off companies which transport the material to recycling facilities.

CCL Organics, which is in the East San Francisco Bay area, operates on the same

lines as that of ORS in Colorado.

"By choosing our services over another roll-off company, our clients are ensuring that their organic waste is being put to good use now. They are making a strong statement that the environment counts even in the realm of business," CCL Organics Manager Butch Benson said. In addition, CCL Organics helps its clients communicate this message to the public by providing them with mailing inserts and other public relations materials that help promote the company's environmentally friendly practices.

CCL differs slightly from ORS in Colorado since it handles the recycling process itself. The company's green waste collection site in Benicia, CA, converts the material into usable compost over a six-month period. CCL Organics then sells the compost to companies such as nurseries and landscape maintenance businesses. □

The author writes about Green Industry issues from her home in the Southwest.

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Circle 120

OPEDA elects officers

Tony Troisi, vp of KPM Distributors, Inc., Kenil, NJ, is the 1998-1999 president of the Outdoor Power Equipment Distributors Association. Other newly elected OPEDA officers include: Vice President, Stan Crader, president of Stand Crader, Crader Distributing Co.; Secretary/Treasurer, Ken Taylor, vp Consumer Products, Kenney Machinery Corp.

Newly elected directors include: Lynn Matson, president, Turf Equipment & Supply, Inc.; Mike Medart, president, Medart; Chris Saxon, president, PACE; and Mark DeShetler, president, Florida Outdoor Equipment.

Bill Parsley, president of Carswell Distributing Co., and John Smith, president of Exmark Manufacturing Co., won election for one-year terms. □

Underwood earns award

Bob Underwood, owner of AAA Landscape, earned the Lifetime Achievement Award from the Arizona Landscape Contractors' Association. Bob and his brother Richard Underwood started AAA Landscape 23 years ago. It is now one of the leading landscape companies in the state. Bob is a past president of the Arizona Landscape Contractors' Association and currently serves as treasurer of the Arizona Certified Landscape Professionals.

The Arizona Landscape Contractors' Association named Mitch Cluff as its 1997 Landscape Contractor of the Year. Mitch graduated from Arizona State University with a degree in Architectural Landscape Horticulture Design, and established Quintana, a landscape design and installation company, in 1987. □

IA show is 'international'

The Irrigation Association has renamed its International Exposition and Technical Conference to The International Irrigation Show.

The event happens November 1-3 in 1998 in San Diego.

"We are attracting more international exhibitors and attendees to the show each year," says Denise Stone, IA meetings and exposition director.

"We wanted to demonstrate that in the the [show] title."

Stone reports that 58 countries were represented at the 1997 IA conference.

The International Irrigation Show is produced for irrigation buyers, specifiers and contractors, and is reported to be the largest irrigation-specific trade show in the world.

For registration information, contact IA at (703) 575-3551. □

SC show a hit

The South Carolina Contractors Turfgrass Management & Grounds Maintenance Conference was a "rewarding experience for everyone who attended," reports the association. The state's leading research authorities shared information on the latest management technology and updated attendees on a variety of issues.

In a special luncheon presentation by Clemson University's Dean of Agriculture, Forestry and Live Sciences, Dr. W.H. Wehrenberg, members were brought up to date on the changes in the department. Dr. Wehrenberg thanked the department for its dedication.

Scholarships were awarded to John Eppelsheimer, Horry-Georgetown Technical College and Matt Swartzmiller, a student at Spartanburg Technical College.

Clemson University Turf Trials are held Sept. 15, 9 am - 12 noon at Walker Golf Course, Clemson University, Cherry Rd., Clemson SC. An afternoon golf tournament benefits the SC Turfgrass Foundation. □

Gallup survey good news

According to a recent Gallup survey, more than 22 million U.S. households spent \$14.6 billion on professional landscape/lawn care/tree care services in 1997. This represents an increase by one million households from 1996 and a \$600 million increase in spending. The numbers are expected to continue to rise with estimates of 24.2 million households planning to purchase these services in 1998.

Older homeowners (ages 50 and above) represent the largest client group and account for nearly half of the money spent on horticulture services. The study also shows that that homeowners spent an average of \$647 in 1997.

The tree care category showed the largest increases in spending (50%), average amount spent (38%) and household participation (21%). Meanwhile, lawn and landscape maintenance accounted for the largest dollar volume of spending (\$7.6 billion) and the greatest household participation (14.3 million). □

Fularczyk leads GMAW

The Grounds Management Association of Wisconsin (GMAW) elected officers for 1998 during the Wisconsin Landscape Federation annual convention.

The new officers are: President, Tom Fularczyk, River City Landscape, Onolaska, WI; President Elect, John Crossmock, Tru-Green-ChemLawn, Park Ridge, IL; Secretary, Bill Vogel, Spring Valley Turf Products, Jackson, WI; Treasurer, Kathy Kurth, Lawn Care of Wisconsin, Inc., Madison, WI; Immediate Past President, Lou Wierichs, Jr., Pro-X Systems, Appleton, WI. □

Today's super must know about \$\$ as well as turf

Turf schools are graduating increasing numbers of potential golf course superintendents. The GCSAA web site discussion forum is "hot" regarding the topic of job security. One of the more popular seminars is entitled "Enhancing Your Value as a Golf Course Superintendent". The bottom line is that there is a growing sense of uncertainty in an industry that was once known for long-term employment.

Getting that first superintendent's job is going to be increasingly difficult. Keeping the job will take more than knowledge of agronomy and years of experience. Golf course owners and club committees want "golf course managers" who can deal with turf conditions, employees, customer relations, equipment maintenance, and financial situations.

The golf business is very unique. Each golf course is different in physical layout and composition. The financial resources needed to operate each course vary accordingly. Comparing operating expenses and budgets among golf courses is meaningless except on a general level. Recognizing this "uniqueness", owners and committees would rather consult with their employees than with outside "experts".

- Consult on what? Well, how about:
- ▶ leasing versus purchasing of equipment,
 - ▶ comparing the costs of different leases,
 - ▶ identifying areas in need of "cost controls",
 - ▶ expense versus depreciation "gray areas",
 - ▶ the tax ramifications of new construction and capital improvements,
 - ▶ contract labor versus employee classification,
 - ▶ employee fringe benefits,
 - ▶ inventory management.

These are just some of the financial issues that have serious importance in the golf business. A



CLEVE CLEVELAND,
CGCS
Superintendent/owner,
Newark Valley Golf Club

GOLF

PAGE 4 G ▶

Sahalee is PGA primed

PAGE 10 G ▶

New driving range a winner

PAGE 13 G ▶

Cultural cures for wet greens

PAGE 16 G ▶

Sub-surface technology shines

PAGE 20 G ▶

Vargas touts 7-day spray program

PAGE 22 G ▶

Work on bio controls still active

superintendent who can demonstrate knowledge in these areas will be a VIP at his or her golf course. He or she will also be attractive to golf operations that value such knowledge.

The superintendent's profession is changing rapidly. Without the acquisition of new skills and knowledge, today's "Old Tom Morris" could be posting a job search tomorrow. **LM**

[SUPERS ON COURSE]

NGF fetes Watson, and Dye family

Tom Watson earns the 1998 Graffis Award from The National Golf Foundation (NGF). "While Tom is undeniably one of the great players of our time, he's also quietly become one of the game's most giving people," said NGF Chairman Bob Maxon. The award presentation will take place June 17 during the U.S. Open.

The NGF also named the family of Pete and Alice Dye, including sons Perry and P.B., its Golf Family of the Year for 1998. Between them, the Dye family members have designed more than 150 golf courses in the U.S. and overseas.

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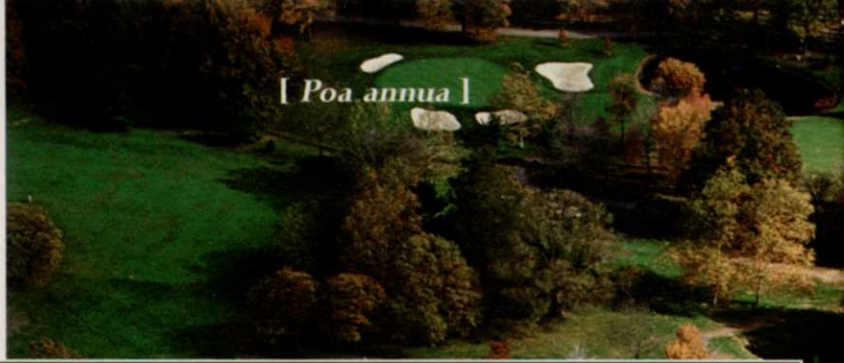
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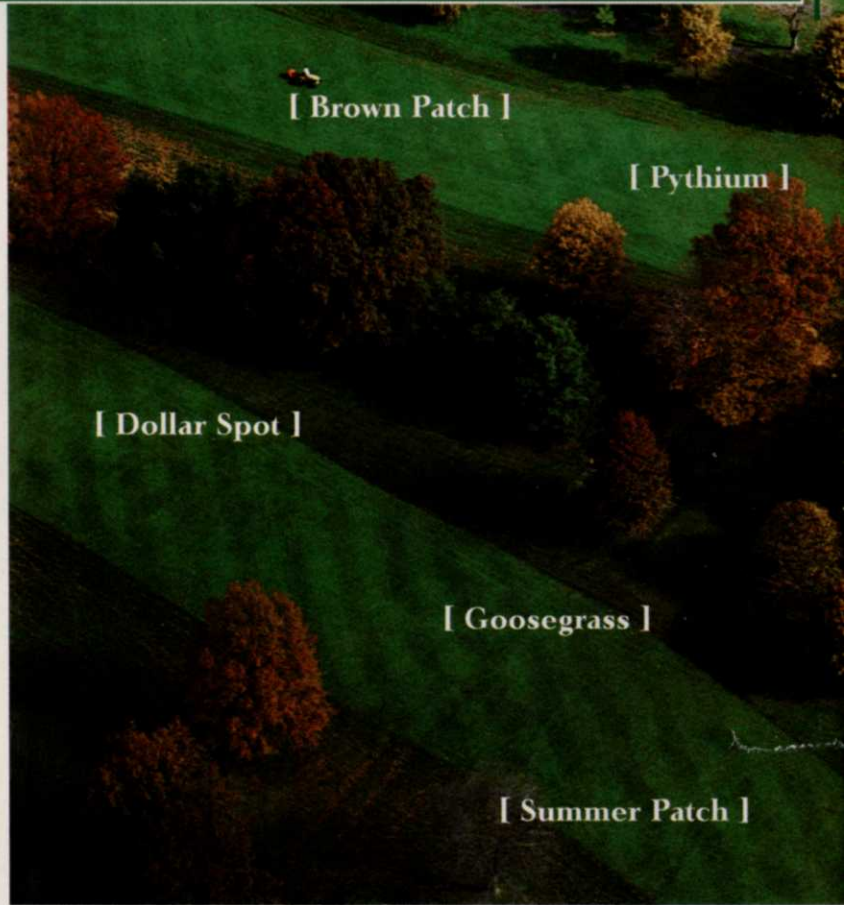
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[*Poa annua*]



[Brown Patch]

[Pythium]

[Dollar Spot]

[Goosegrass]

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Crabgrass
Poa annua
Goosegrass



Dollar Spot
Summer Patch
Anthracnose



Pythium
Yellow Tuft

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[Crabgrass]

[Weak Turfgrass Root System]

[Oak Wilt]

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Sahalee

IS PGA PRIMED



Learn how this club in the Pacific Northwest used topdressing and upgraded its irrigation and bunkers to land the 1998 PGA Championship.

By LESLEE JAQUETTE

Microsoft put Redmond, WA, on the map. This August Sahalee Country Club, the site of the 1998 PGA Championship, will further enhance Redmond's reputation as a trend-setting Seattle suburb.

A private, 27-hole, "golfers" club, Sahalee not only defines quality golf in the Pacific Northwest but the club's landscape falls under constant scrutiny and modification. By committing to "nothing but the best" since the club's opening in 1969, membership has in actuality been preparing for this event for three decades.

While continuing a normal, rigorous maintenance schedule, Sahalee Superintendent Tom Wolff and Assistant Superintendent Rich Taylor have stepped up a number of programs to enhance the course beyond PGA specifications. Over the past seven years they have managed a number

of special programs that include: fairway topdressing, irrigation system replacement, bunker renovations and tree trimming as well as tee leveling and over-seeding roughs.

Still, says Taylor, "we feel the course is in good condition and we didn't have to do anything out of the normal. The tournament isn't a far stretch because we make continuous improvements. The PGA hasn't demanded very much and, in fact, it has been a totally cooperative effort in terms of maintenance."

In 1990 a local agronomist, Dr. Roy Goss, helped members visualize what an aggressive fairway top-dressing program could accomplish. Goss suggested that Sahalee, designed by Ted Robinson and located on the Sammamish Plateau about 20 miles from Seattle, could develop beyond a soggy, shoe-eating course to a beach model. While water would still exist, the sand would eventually build up, allowing

winter players to walk the course without wearing hipwaders.

After a successful trial of topdressing wet areas in fairways and roughs, membership budgeted two years with topdressing as the club's top maintenance focus. Tackling priority areas that made up about 30 percent of the fairways, the staff top-dressed a quarter of an inch of sand every 7 to 10 days during the summer growing season of May through September. Using 5,000 tons of sand a year those first two years (30,000 tons to date), the course was raised one inch by the end of 1992.

Despite the program's success, the membership wearied of the weekly sanding. Wolff notes, "each divot became a political nightmare," to the point that the topdressing program was modified to once in the spring and once in the fall over the entire course. Despite the slowdown, Taylor reports that these days the program



Fulltime members of Superintendent Tom Wolff's staff average seven years experience at Sahalee Country Club near Seattle.

Sahalee's only fear a wet June

Sahalee Country Club Golf Course Superintendent Tom Wolff and Assistant Superintendent Rich Taylor have one fear about hosting the 1998 PGA tournament in Redmond, Wash. "A wet June!"

If the Northwest enjoys an all-to-typical rainy June, it will make it just that much harder for the course to sustain "TV perfection" in the face of move-in and construction. With an economic impact of \$60 million to the region, the supers' fears are well founded.

While the weather is beyond their control, their management style is comfortable and successful by the looks of the course and the lack of employee turnover. Of the 21 full-time, year-around staff, one employee has been working at the course for 17 years; the average runs around seven years.

Capitalizing on complimentary styles, the two superintendents see their employees as

clients and the goal is to continue to engender loyalty, responsibility and career development. By rejecting the "boss" mentality and nurturing education and cross-training, everyone simply does their job. "With our solid, experienced crew we can run on autopilot," says Taylor, who admits Sahalee does not pay the highest wages in the area. "It also helps when it comes to training new people."

For the most part Wolff, who has been superintendent for nine years, operates on a "laid-back" philosophy. He is soft-spoken, a natural empowerer who teaches by example. "I believe in letting people do their job, give them the tools and let's all take responsibility," says Wolff.

Taylor manages the crew and admits to being a bit of a perfectionist. Both superintendents also admit they have a hard time playing golf for focusing on maintenance issues. However, the crew consists of excellent golfers who are invited to use the course three days a week.

In addition to this perk, staff takes great pride in the continual development inherent in the club. As professionals they enjoy challenges, new projects and an open invitation at the club's cost to participate in further education through seminars and community college programs. "Education isn't an extra, it's a continuing endeavor and our employees embrace the opportunity," says Taylor.

—LJ

still works with priority areas measuring four inch accumulation and others up two inches. Another huge benefit of the program has been an increase in the root zone such that the course hosts stronger plants and sees improved growing conditions.

Wolff recalls years ago during the PGA's first visit to Sahalee, a representa-

tative asked what was contained in the green boxes scattered about the course. Wolff gulped. The boxes held the original irrigation system's sprinkler valves, an obvious eyesore as well as a nuisance to playability. In an effort to demonstrate the old system's weaknesses, irrigation supervisor Scott Larson filmed a video to show the membership examples of how the heads were off-spaced. Conversely, the video showed how a more modern system works in terms of coverage and control. In response to the PGA query and the video, the members initiated a year-long, irrigation replacement program in 1990, installing

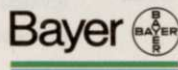


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A third project stimulated by the upcoming PGA Tournament was a bunker renovation on the north and south nines. The last nine will be finished after the August event. Wolff recalls that upon evaluation, the PGA only required that Sahalee change the contaminated sand out of the

The goal was to bring the bunkers closer to the greens to enhance play.

bunkers. Still, in keeping with the standards of the course, members decided a complete renovation was in order.

Redesigned by Rees Jones and installed



Members were apprehensive when workers began trimming and removing some trees, but they're happy with the results.

in 1996, the bunkers were moved much closer and grass was rolled down more on the green side. The bunkers were kept as deep as possible. Continuing an "aesthetics first" priority, Wolff admits the new bunkers are just as high maintenance as the old ones. Staff still hand rakes and hand trims the new bunkers, which are all now filled with tan bunker sand from Ravensdale, WA.

The bunker redesign entailed tree trimming and further landscaping. For the redesign to be successful and decrease tree litter from the courses' forests of 50-year-old cedars, firs and hemlocks, many trees demanded trimming, root removal or complete removal. At first members were skeptical about limbing up, but the results have received good reviews. Now the trees show increased contrast with more bark showing, the fairways receive more sun and spectator viewing is improved.

Over the past few years in keeping with Sahalee's Northwest woodland style, the maintenance staff of 21 fulltime (40 in the summer) is adding 84 large landscaped areas. Using no bulbs, annuals or wildflowers but rhododendrons, azaleas and heather, these gardens demand tremendous attention in terms of weeding and raking.

In addition, in preparation for the PGA Championship the staff has been occupied with an in-house, tee-leveling project. Undersized to begin with, the tees will all be leveled and expanded by summer. The process involves lifting off the sod, expand-



The Sahalee preparation has been a totally cooperative effort.

ing and leveling the tees, checking drainage and relaying the sod.

During the past two years the staff has overseeded the roughs to meet PGA requirements. In both September of 1996 and 1997, the crew spread 300 pounds per acre of a three-way blend of rye grasses. Next spring another 300 pounds will be spread in an attempt to increase the consistency and density of the roughs to a 3.5 to 4-inch cut. Despite this seed blitz, Wolff and Taylor are still concerned balls will get lost in the roughs. □

Writer/photographer Leslee Jaquette writes for LM out of Edmonds, WA

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New range plays as good as a round

Commonwealth National Golf Club in Cranberry, NJ, has reworked its driving range into a practice area with variety.

By JOHN CALSIN, JR.

Superintendent Larry Schlippert, CGCS, says he's wanted to do something like this for years, and finally got the money to make it happen. His range is ready! The new driving range at Common-

wealth National Golf Club, Cranberry, NJ, is a model practice area for visitors to this 400-acre course. Schlippert hopes Commonwealth's new range will give other superintendents an idea of what they can accomplish with a small piece of land.

"We've done a lot here, and we didn't get involved with a whole ton of reconstruction. Existing features were made to stand out and work for us."

Golfers love to visit the secluded, quiet range to relax and practice with no interruptions.

Economical use of space

"With the amount of space we had to work with, it is a well-designed plan that

accomplished many different things in the practice area," says Terry Tumolo, Commonwealth general manger.

"For clubs that don't have 50 acres to work with for their ranges, it is a great model to come and see."

Amelia Rorer, teaching pro in her first year at Commonwealth says the driving range was a deciding factor in her decision

to join the team.

"To be able to teach the whole game, you need to hit every shot," says Rorer. "Most [driving ranges] do not have a short game practice area. It was a wonderful design."

From 'blah' to a blast

The original range was a four-acre parcel in the middle of the golf course. It consisted of a 7500 square-foot, two-tiered practice tee. The remaining turf was a maintained area of about 3½ acres of ¼-inch bentgrass, with mounded turf targets.

The range is about 100 yards wide, and is no longer a dull and lifeless piece of ground.

"The range was kind of blah" says Schlippert. "It was like a driving range. The golfers wanted more of a target, something they could hit shots to."

Members originally wanted to move the facility to a different area, says Schlippert, who persuaded them to adapt to a short game practice area.

Most finish work was done in house.

That 'range of dreams' would also have to be versatile enough for golfers to use a variety of clubs. Ideally, says Schlippert, golfers could practice shot placement as well as distance.

Jim Blaukovitch was chosen to be range architect. He came up with a plan to enhance the four-acre area, one that would allow golfers to use every club in the bag. The target areas range from 35 to 240 yards. Bunker shots are now possible, to the fairway and greens.

Golfers also have a choice of matted or grassy tee areas.

Use existing turfgrass

The total project cost about \$75,000, including labor and in-house materials. Schlippert and his crew moved all the sod and did all the final grading. An earth moving company did the earth work, and installed the irrigation and drainage. All the soil and bentgrass came from the site or other locations around the course.



Looking down the range from the tee area, the bunkers and flags are clear targets.

It's time for action.



We've been talking about IPM and experimenting with ways to be more environmentally responsible. Now that a product like BIO-TREK 22G has come along, there's no excuse for fighting common turf diseases the old way. We waited until we saw the disease, then slammed it with chemicals. Now, with BIO-TREK 22G, we can prevent infection long before we'd ever see it.

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Superintendent Larry Schlippert, CGCS surveys the range. Grass tees are at right; chip-ping bunker and putting green are behind.

The only imported materials were the fescue sod and the seed bed mix for the tees.

Fescue sod covers an area of 42,000 square feet. It was installed around the target greens and around the traps.

All bentgrass was recycled from other areas around the course. Schlippert wanted to save as much bentgrass as possible from the fairways, to use on tees. Traps were marked off; sod was stripped from areas where bunkers were to be placed and saved so the traps could be built over winter.

The sod was put in the woods next to the range, on top of four-mill plastic, so it wouldn't take root. Schlippert covered the sod with a geotextile material so it would not desiccate through dehydration. The sod sat in the woods from December of 1997 to March 18, 1998, and survived without irrigation.

"The ironic thing was, we started this project in late November of 1997 in anticipation of heavy earth work and trap construction during freezing weather, which we never got."

Thanks to an unseasonably warm winter, rain was the chief weather annoyance, and resulted in piece-meal work.

On Commonwealth's first range, the



Concrete under each mat keeps the mats from getting that spongy, sinking feeling. Drain pipe runs under each slab.

tee was behind the trap. Now, it is located in front. "You never want to put mats in front of a tee, because while the golfers are using the grass tee, they are blowing the dirt and debris up on the mats, which contaminates them."

The mat area is totally drained underneath. "My previous experience with mat-

ting is you've got to have drainage underneath, otherwise it will never stay level."

The entire length of the matted area has a trench cut through the middle, one foot wide and up to two feet deep, with perforated pipe laid in the trench for the main drain. This is covered with stone.

The stone area serves as a drain field during heavy rain. The grassy tee area slopes back toward the stones, which channels rainwater to the drains.

The tee boxes are surrounded by six inches of crushed stone. Wood frames outline each matted tee area. The mats are set on four inch concrete slabs to keep them solid and level.

Granite yardage markers will be placed at different distances from target areas. Schlippert will laser the distance from each marker to the nine different colored flags on the range. Marker #1 therefore, will have nine different yardages; marker number two will have nine more, etc.

A score card will give the distance from each marker to each flag. The tee is 250 feet wide. With the specific yardage from each stone, a golfer will be able to sharpen his or her accuracy. This should help a golfers short range game.

Each day, certain areas of the tee will be roped off for maintenance and to give the turf a rest.

Commonwealth is owned by Matrix Development, specialists in golf course management and hospitality. □

John B. Calsin, Jr. writes for LM out of West Chester, PA

Cultural cures for wet golf greens

Consider irrigation management, tree effects, traffic and drainage.

by JAMES T. SNOW, USGA Green Section

There are many factors that can contribute to a green being considered poorly-drained, and there are many things that can be done to shift a green from the "poor" to "satisfactory" category.

Irrigation management

Many greens diagnosed as having poor drainage are actually over-watered.

A new superintendent at a course is often able to eliminate poor drainage symptoms from certain greens by instituting a different irrigation program or by redesigning or remodeling the irrigation system.

Over-watering can be due to improper irrigation practices, poor irrigation system design or both.

Trees may block air

Poorly-drained greens are often located in a pocket of trees. Trees block air circulation through the area and may cast shadows on the turf, preventing the soil in the greens from drying as quickly as other greens on the course.

Possible solutions:

- ▶ remove or thin out a few of the nearby trees
- ▶ adjust the irrigation program
- ▶ traditional methods of drainage or reconstruction may have to be used.

Traffic leads to compaction

Many greens that exhibit adequate drainage characteristics under light to moderate use can develop poor drainage symptoms when subject to heavy traffic. The

cause of the problem in this situation is compaction in the upper part of the root zone.

Possible solutions include:

- ▶ Core cultivation, followed by core removal and topdressing with a sandy, compaction-resistant material
- ▶ Deep-tine cultivation may be needed on soils affected at a greater depth.
- ▶ Green design sometimes impacts the effects of traffic. For example, heavily-trafficked greens that lack adequate cupping area can show severe symptoms of surface compaction and poor drainage in the most common hole locations.

▶ When traffic problems occur on walk-on and walk-off areas, redesigning the green or the nearby sand bunkers can sometimes relieve the symptoms.

Clues to poor drainage

- ▶ Thin turf
- ▶ Shallow roots
- ▶ Compacted surfaces
- ▶ Greater disease
- ▶ Increased traffic injury
- ▶ Mower scalping
- ▶ Algae encroachment
- ▶ Foot printing
- ▶ A predominance of *Poa annua*.

▶ Walk-behind mowers for part or all of the time can reduce traffic effects.

Poor drainage solutions

If drainage symptoms persist, it could be:

- ▶ poor surface drainage
- ▶ poorly-drained soils
- ▶ layering problems.

Poor surface drainage is often recognizable by the surface puddling that occurs after light to moderate rainfall or irrigation.



Deep-tine aerification can be incorporated into a core cultivation program for faster results.

▶ Low spots can be eliminated by selectively topdressing the area on a light, frequent basis.

▶ Where a broader area is involved, sod may have to be removed, the subsurface regraded and the sod replaced. The entire surface may have to be stripped, regraded and resodded, or be rebuilt completely.

Layering problems caused by poor construction, topdressing inconsistencies or some other factor can sometimes be overcome by regular core cultivation or deep-tine cultivation, depending on the location of the layer. If the coring holes are filled with sand, real progress can be made in overcoming the effects of the layer. In a more severe case, it may be necessary to add drainage tile.

Greens that do not respond to these techniques should be rebuilt to USGA specifications. □

Adapted from an article by James T. Snow, national director of the USGA Green Section. An expanded version originally appeared in the January/February 1991 edition of the USGA's Green Section Record.

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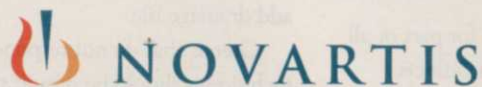
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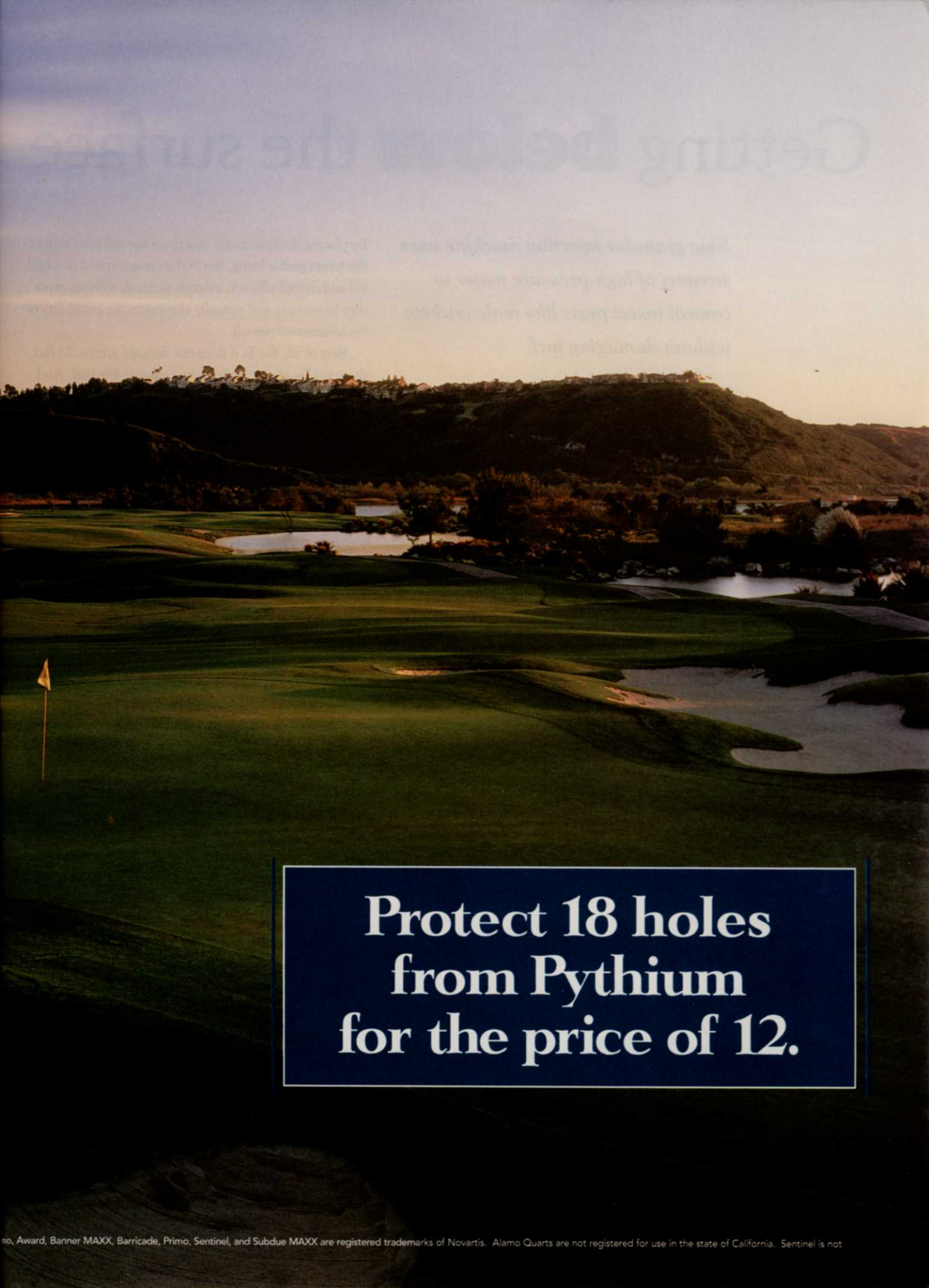


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Getting **below** the surface

New granular injection machine uses streams of high-pressure water to control insect pests like mole crickets without damaging turf.

By ROGER STANLEY

The steady "dunk-dunk-dunk" beat is music to the ears of Chuck Barclay, golf course superintendent for the Twisted Oaks and Pine Ridge Country Clubs in Beverly Hills, FL. Sounding like a muffled air hammer operating at a slow speed, a new SGI (Subsurface Granular Injector) sweeps back and forth over one of Barclay's greens as it injects granular insecticide below the turf surface.

Last year several greens on both of Barclay's courses were treated with an SGI, a self-propelled applicator specially designed to use high-pressure water to inject granular insecticides into the soil. It is manufactured by LIS, Inc., in Crystal River, FL.

In March 1997, the SGI was field tested with Talstar GC Granular Insecticide on Barclay's two courses. A single subsurface granular application resulted in zero mole crickets on the treated greens for the entire season.

The Subsurface Granular Injector (SGI™) uses high-pressure water injection to apply Talstar GC granular insecticide at Twisted Oaks CC in Florida.

By placing the insecticide exactly in the soil zone where the target pest is living, the SGI increases speed of initial kill and overall efficacy, extends residual, reduces exposure to humans and virtually eliminates the possibility of environmental run-off.

Best of all, the SGI does not damage greens. In fact, the jets of water actually serve to aerate the turf. And golfers can play greens immediately after, especially if a greens mower follows behind the SGI. A typical golf green can be treated in three to four minutes.

Don Taylor and his son Tom invented the patented SGI. The Taylors' company, LIS, Inc., specializes in industrial use of high-pressure water. The company has developed technologies using high-pressure water to cut metal or concrete, for industrial cleaning, and to inject salt-inhibiting chemicals into soil. When an avid golfer suggested that their technology might be useful in turf pest management, the Taylors began to experiment. They developed and patented a liquid sub-soil injection unit in 1994. They began working on the Subsurface Granular Injector in 1996.

While some industrial applications require up to 35,000 pounds per square inch (PSI) of water pressure, the SGI requires a mere 4,000 psi. Still, that relatively low water pressure is powerful enough to inject a granular product six to 12 inches into the soil, depending on the soil type and moisture level.

By regulating the travel speed of the SGI and selecting one of three pressure accumulators (a 6-, 20- or 60-cubic inch unit), the SGI injects granular materials to precise depths ranging from one-half inch down to the maximum of six to 12 inches. In their initial field tests, the Taylors targeted mole crickets for control and injected the insecticide to a depth of $\frac{3}{4}$ -inch. At that injection depth the SGI's application ground speed is about 5 mph.

Licensed to control turf pests, they tested their prototype SGI unit in 1996 in a nearby park heavily infested with mole crickets. They selected a pyrethroid insecticide formulated on sand. They treated one-half acre at a depth of $\frac{3}{4}$ -inch.

"Within days we found dead mole crick-



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

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

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ets all over the place," says Don Taylor. "We came back for more than a month and saw no signs of mole cricket activity on the treated area. We also learned from the treatment that Talstar granular did not damage our equipment."

They sent a video of the treatment and results to Geri Cashion, a Florida-based technical representative with FMC Corporation, the insecticide manufacturer. Cashion met with the Taylors in early 1997 to arrange field tests on Twisted Oaks, Pine Ridge and several other sites with complementary product. For the Twisted Oaks and Pine Ridge SGI applications, the product was applied at the 140 lbs./acre rate on several of the greens. All other greens on the two courses were either left untreated as controls or treated with a standard insecticide used for mole crickets.

By May 1997, two months after the field tests began, Barclay had to treat the



Don Taylor, president of LIS, Inc., Crystal River, FL, developed the SGI after years of working with high-pressure water for industrial uses. He says SGI can be used to apply granular or liquid.

untreated greens because they were being chewed up by mole crickets. But his treated greens were free of the pests.

"I did not have a single mole cricket on one of my treated greens for the season," says Barclay. "There were a few fly-ins late in the fall, but I slept real good throughout the entire season."

FMC's Cashion says this study and oth-

The cost savings possible in reduced insecticide use and other cultural benefits could offset the SGI's \$32,000 price tag.

ers done since with the insecticide on turfgrass, commercial turf and athletic turf show that the SGI application increases both efficacy and residual.

Cashion says subsurface application of the granular product has extended residual control of mole crickets in our field tests. Cashion says. "In others, where we would have only expected suppression due to the application rate or conditions, we have seen control."

With 45 holes on two courses to care for, Barclay says that the cost savings possible in reduced insecticide use and the many other cultural benefits could quickly offset the \$32,000 price tag for an SGI.

"An SGI can be purchased as a multi-purpose turf tool. We have used it to apply granular products, to aerate greens and to treat localized dry spots in turf. It can be used to make granular applications without concern about rainfall or during the day while golfers are using the course. It even elimi-

nates the need to water-in some products. We could use an SGI throughout the year."

Taylor says LIS began commercial production and sales of the SGI this year. Sales are already outstripping production, so LIS is moving production to a larger factory in Florida this summer.

Additional field tests with this granular

product and other granular and liquid products are also being done. Most tests are being done on golf courses along the eastern seaboard but SGIs are also being used on sports and commercial turf, parks and rights of ways.

Cashion says more research is needed to quantify the enhanced efficacy and residual gained with Talstar through an SGI application. One interesting application to explore is the use of an SGI to apply the product in flowable and granular form at the same time.

The benefit: a flowable might provide and enhanced initial kill of mole crickets, while the granular provides longer residual control.

Don Taylor says success with the SGI is proving that granular injection will be important in commercial turf management. Now the company is working on a smaller version of the SGI for use in residential lawn care.

"Subsurface granular injection in residential treatments could mean lower environmental impact and reduced exposure to people and pets," he says. "It could also require fewer applications since the residual control can be extended. Those are important benefits and we are working with several companies to test the concept.

"We feel very good about our results with the SGI. The feedback we are getting from commercial applications shows that subsurface injection is effective and meets environmental requirements." □

Roger Stanley is a writer living in Milwaukee, WI.



Superintendent Chuck Barclay liked results of treatment.

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Disease control research finds more is...less

A seven-day disease control spray program reduces product use and keeps pathogens from getting a hold of golf course turf.

New research by Dr. Joe Vargas at Michigan State University shows that spraying greens, fairways and tees with a fungicide—in this case, Daconil Ultrex—as often as every seven days promotes healthier turf and saves money on product.

Tests at MSU show that a seven-day program can help solve thinning out problems on golf course turf.

Dr. Vargas, a turfgrass pathologist with the Department of Botany and Plant Pathology at the University's East Lansing campus, says his studies have indicated that turf disease control is excellent at low

rates, however, the spray program has to be carried out every seven days rather than on the usual 14-21 day schedule.

"What we found," reports Vargas, "was that using Daconil Ultrex with Super Weather Stik at a rate as low as .88 oz. per 1000 square feet on greens and .44 oz. on fairway-length



Vargas: golf course superintendents will welcome the low-rate, seven-day cycle as a means of promoting good plant health, once they try it.



Dense green turf on a research plot (left) at Michigan State University shows the beneficial effects of Dr. Joe Vargas' low-rate fungicide program. The control plot at right was not treated, and shows substantial thinning due to summer heat stress.

turf, applied at seven day intervals, gave us every bit as good disease control as applying 3.8 oz. of Daconil per 1000 square feet on a spraying cycle that has 14-day intervals between sprays."

It's all about simple math, says Vargas.

"Using less of a substance over a measured time period will cost less. The great thing about the low rate/higher frequency spray cycle is that it's not only more economical, but you also get the same disease control that you would at higher application rates that are separated by 14 days or more. In fact, the disease control achieved with a low-rate cycle may even be superior."

Keep the pathogens at bay

Vargas says the seven-day system may be superior to longer sprays because it just doesn't give the disease pathogens a foothold.

"Soil and thatch are just beneath the

turf canopy and contain many pathogenic fungi," says the well-known pathologist.

"If the temperature is ideal for their development, they attack the turf, and cause diseases such as leaf spot, dollar spot, brown patch and Pythium blight.

"And when the temperature is not ideal, minor infections are constantly taking place in the turf canopy, which can lead to an undesirable thinning of the turf throughout the season."

Vargas says the low-rate, seven-day program is particularly useful in treating bentgrass turf so it remains dense enough to fight off *Poa annua* invasions.

New growth picks up on disease

A key to understanding why the seven-day cycle works lies in the act of mowing grass.

Vargas observes that when greens and fairways are mowed, leaves that carry resid-

ual amounts of fungicide are replaced by new growth leaves which are not protected by the fungicide. This cuts the effectiveness of the treatment right along with the turf.

"So if you make frequent applications, you can put the e fungicide on the newer grass that is coming up as the older blades are mowed off."

Spray equipment might bring added stress to the turf, adds Vargas. "But with today's lightweight mowing equipment, the turf's stress should be minimal; and, you're assuring yourself of more seamless protection against the diseases that can badly thin and damage turf. That's what really counts."

Dr. Vargas warns that the program is most effective as part of a solid cultural and spray program, starting in spring.

"I think some superintendents think that when they spray on a seven-day schedule, they're over-spraying, and perhaps damaging the environment.

"In fact, when you examine most curative programs, you will find that by the time disease has become apparent, you're going to have to apply just as much fungicide, or even more than you would have used if you had been on a low-rate, seven-day program.

"I think this is just as environmentally sound as waiting to see the disease develop and then dumping a whole lot of product on the turf all at once."

"When the temperature is not ideal, minor infections are constantly taking place in the turf canopy, which can lead to an undesirable thinning of the turf throughout the season."

It's part of good health

Vargas counters those who say fungicides do not promote good plant health.

"The implication that fungicides do not promote plant health is just dead wrong. The key to the sound health of any organ-

DOLLAR SPOT/LOW RATE FUNGICIDE COMPARISON, GREEN-HEIGHT TURF

Treatment	Rate/1000 sq. ft.	Interval	% area infected	*Tukeys
Daconil Weather Stik	4.00 fl. oz.	14 days	0.00	a
Daconil Ultrex	1.76 oz.	7 days	0.13	a
Daconil Ultrex	3.80 oz.	14 days	1.00	a
Daconil Ultrex	.88 oz.	7 days	1.10	a
Daconil Weather Stik	2.20 fl. oz	14 days	8.30	b
Daconil Ultrex	.44 oz.	7 days	15.30	c
Untreated control	—	—	36.30	d

* Treatments followed by the same letter not significantly different from each other.

DOLLAR SPOT: LOW-RATE FUNGICIDE COMPARISON, FAIRWAY-HEIGHT TURF

Treatment	Rate/1000 sq.ft.	Interval	% area infected	*Tukeys
Daconil Ultrex	3.80 oz.	14 days	0.00	a
Daconil Ultrex	.44 oz.	7 days	2.50	a
Untreated control	—	—31.30	b	

* Treatments followed by the same letter not significantly different from each other.

ism is to prevent it from being attacked by disease, and that is what fungicides do for plants in much the same way that preventive medicines play an important role in maintaining human health.

"I think fungicides are critically important in the highly artificial conditions under

which plants exist on a golf course, especially for the turf on golf greens," says Vargas.

"Frequent mowing [at such low heights] is extremely stressful for plants, so they need all the help they can get to stay healthy and resist disease. Plant health

depends on a variety of good horticultural practices that include frequent spraying to avoid fungal attack, aeration, sand top-dressing and proper vertical mowing."

Lower exposure for golfers

Vargas notes a further advantage to the

program: low rate spraying means golfers are exposed to proportionately less fungicide.

"When you use lower rates," says Vargas, "even if the fungicide is applied on a more frequent basis, there is less exposure for golfers than when you use high rates, and they go out on the course right after application."

But Vargas cautions superintendents to start the cycle early.

"When superintendents call me in July and August in a panic because the turf on their courses is thinning, it's too late to go out and start applying fungicides. A sound preventive program has to start in the spring and continue throughout the season. You cannot wait until you see the disease developing. That's why the prevention of minor infections that you get from the low-rate, higher-frequency application cycle is so beneficial; but only if you start soon enough." □

Are biological controls in your future?

Research has improved our ability to use biological controls to manage pests. Landscape managers and golf superintendents have more options than ever for pest control, and the next decade will undoubtedly bring new ones.

By: R. L. BRANDENBURG, PH.D., North Carolina State University



Biological control agents are often quite sensitive to environmental conditions and like their conventional counterparts may be less effective in providing acceptable control of soil insect pests.

With so much talk these days about the next millennium and predictions or changes we can expect, one can't help but wonder what awaits the Green Industry. Numerous changes will occur in the next few years and hopefully many of them will be technological advances that help us do our job better, more economically, and more efficiently. Most likely, however, many of these changes will be spawned by new or modified regulations that affect our industry.

Regulations on the turfgrass industry encompass many areas including labor and worker protection standards and, in some areas, noise regulations. Some of the most prevalent regulations, on both state and federal levels, involve pesticide use. These regulations have a dramatic impact on which pesticides we have available for us and how we use them. As a general rule, the regulation of a pesticide benefits us all, although sometimes many question how regulations are conceived.

In light of these regulations and consumer demand for pest management strategies other than conventional pesticides, biological control has gained popularity. During the past few years, research has improved our ability to use biological control to manage all types of pests. Some companies have sought to take advantage of new effective products and a growing market.

Bio-control of turfgrass insect pests

Since my expertise focuses on the management of insect pests of turfgrass, I will stick with that topic in this article. However, keep in mind that the concepts behind biological control are similar for other pests in other settings and the progress in

developing similar products for other pest types has been successful and shows promise for the future.

Biological control in turfgrass is not a new concept. One of the earliest uses was the application of milky spore. These bacteria, *Bacillus popilliae*, were first used many years ago for control of Japanese beetle grubs. This was a naturally-occurring bacterial disease of the Japanese beetle white grub that could be grown in grubs in the laboratory and the spores harvested. These spores could then be packaged and sold as a biological control of this species of white grub.

While milky spore has been used for many years and many testimonials have been given as to its long-term suppression of grubs, its availability

today is still quite limited. The product is also limited in that its greatest effectiveness, at least as shown by laboratory studies, is against the Japanese beetle grub, although some other species appear to have some susceptibility to this disease. While its use has declined, this is an example of an early biological control product successfully commercialized and used in the landscape industry.

More recently, the use of another bacteria, *Bacillus thuringiensis* (B.t.) has become more common in both agriculture and turfgrass management. There are various strains of B.t. and each strain varies in their effectiveness against different insects. In turfgrass, most strains are directed against

Milky spore availability is limited, but has become more common.

many of the various caterpillars that feed on turf. B.t. was first discovered in Japan in 1901 and has been researched extensively. The bacteria actually produce a protein crystal that is toxic. These bacteria must be ingested by the insect and the toxin attacks the gut lining. New technology has permitted the actual production and encapsulation of the toxic crystal to further improve the effectiveness of many products.

These products usually don't kill the insect immediately, and have short residual activity, a trait common to many biological control products, but feeding and damage usually decrease soon after treatment. This slower activity is frustrating to some landscape managers, but again it is important to understand that the key element, plant damage, does slow soon after application.

Endophytes reduce feeding

A somewhat different concept of "biological" control is the use of endophytes. Endophytes are fungi that reside within the turfgrass plant and can significantly reduce insect feeding. These endophytes are found in some commercial cool-season turfgrass varieties of perennial ryegrass, tall fescue, and fine fescue and will be indicated on the seed label. Endophytic cultivars reduce above-ground pests such as chinch bugs, green bugs, sod webworm and cutworms, but little effect is observed on below-ground soil pests.

Nematodes, pathogens

Two types of biological control that have received a lot of commercial attention in recent years include entomogenous nematodes and fungal pathogens such as *Beauveria bassiana*. Fungal pathogens are quite common in nature and their commercial use has been limited our ability to produce large quantities of a high quality product for a reasonable price. Now, however, at least two companies are producing a *B. bassiana* product and one company, Troy Bioscience, has a product labelled for turf use. Many above and below ground pests are listed on the label and a lot of independent testing is underway on this product. Like many biological materials that are very sensitive to the environment, the ultimate

level of control obtained will likely depend upon environmental conditions which favor its performance.

The production of various entomogenous nematode products has been limited in the past two years. Problems with production, shelf life, formulations, and the consistency of results seem to plague this approach to pest management. The concept of using such nematodes is still a good one. The nematodes themselves don't actually kill the insects, but rather death is caused by a bacteria the nematodes introduce when they invade the insects' body. Several companies are aggressively pursuing the development of new strains and formulations of nematodes that may serve us quite well in the near future.

Oils, spinosads

Natural products, while not true biological controls, have also received attention of late. One of the original products, azadirachtin, the oil from the neem tree, acts as a growth regulator that disrupts normal insect development. It has been marketed under a number of trade names including Azactin® and Turplex®. A more recent addition of a natural type of product is the insecticide Dow Agrosience called Conserve SC®. This is the first insecticide in the spinosad family which is derived from a naturally-occurring soil organism. This product has a novel mode of action and works by ingestion or contact against caterpillars. Conserve must be applied against small worms and is being used commercially with good success.



Conventional pesticides pose little threat to our environment, when used properly in the landscape; however, in combination with soil erosion can cause negative environmental consequences.

Technological advances are enabling scientists to synthetically produce the active ingredient in many of these natural controls found in nature. In addition, bio-technology is allowing genetic engineering to be used as a tool to genetically incorporate some toxins directly into the turf plant. The future of pest management in turfgrass never looked brighter or more exciting. **LM**

Brandenburg is a turfgrass entomologist at North Carolina State University.

EETC's first year sees start of certification program

Schools across the United States are excited about the prospect of gaining certification from the Equipment and Engine Training Council (EETC). At the council's meeting in Milwaukee, WI, in May more than 120 participants received copies of the new "Outdoor Power Equipment Technology Program Certification" publication.

For a school to become certified it must meet the industry's standards for providing professional training facilities and tools; ensuring instructor competency; and teaching industry-specified and desired subjects.

Each of the three levels of certification will require compliance with specific standards for the facility, instructor qualifications, and curriculum competencies.

Level 1 covers two and four-stroke engine competencies.

Level 2 covers electrical, driveline, hydraulics, and hydrostatic competencies.

Level 3 covers compact diesel & generator competencies.

Bruce Radcliff, incoming president of the EETC, said that "one of the primary goals of the EETC for the coming year is to provide accreditation to six to 10 schools in North America. The first school accreditation should be complete by early June."

A second goal outlined by Radcliff was for the EETC "to see a measurable increase in the participation of OPE dealers." He said the involvement and experiences of OPE dealers are needed for the success of EETC.

EETC wants to develop strategies to provide servicing equipment dealers with a continuing flow of qualified service technicians, and improving training and educational opportunities.

Nine speakers addressed the audience

Georgia supers meet with club managers

Members of the Georgia Golf Course Superintendents Association and the Georgia Club Managers Associated met April 13 at a Superintendent/Club Manager Seminar and Golf Tournament. More than 100 superintendents, managers, golf pros and members of the golf course industry were welcomed by hosts Jimmy Geter, CGCS, and Joe Carter, GM of the Marietta Country Club where the event took place.

The morning's seminar featured a panel discussion concerning golf course maintenance budgets. Panel participants included Mark Esoda, CGCS, Atlanta Country Club; Dick Schulz, owner, The Oaks Course; and Bill Stewart, GM, Atlanta National Golf Club.

While the seminar focused on duties and responsibilities held by superintendents and managers, the GGCSA opened the seminar and tournament to all association members.

For more information on the GGCSA, contact Karen White at 706/769-4076. □

of about 120 at the EETC meeting at Briggs & Stratton. Andy Kuczmar, outgoing EETC President and Director of National Service/Training for Echo, Inc., set the positive tone for the meeting. Other speakers included: Curt Larson, VP of Distribution Sales & Service for Briggs & Stratton; John Rainone, VP of Service for MTD Products; Tony Saiia, VP Quality & Customer Support, Textron Turf Care; Dave Haeck, Training Manager, Commercial Products, John Deere; Jerry Bernhardt, Director of Career & Technology Education, Texas Dept. of Criminal Justice; Clifford Korkowski, President, Anoka-Hennepin Technical College; Judy Fuller Wood, Fuller's Power Equipment, an OPE dealer located in Lansing, MI; and Jim Starmer, President, Dixie Sales Company, a distributor located in Greensboro, NC.

The 1999 EETC annual meeting will be at the headquarters of Husqvarna Forest and Garden in Charlotte, NC, on May 2 and 3. For more information about the EETC, contact Virgil Russell, Executive Director, at 512/442-1788 or E-Mail at opecert@io.com. The EETC's web site is www.opecert.com. □

Seminar topic: pesky mole crickets

More than 70 golf course superintendents and industry members from Georgia and north Florida learned first hand about how to deal with turf-damaging mole crickets. They attended a seminar at The Island Club on St. Simons Island sponsored by the Georgia and North Florida Golf Course Superintendents Association.

Dr. Will Hudson, USGA Extension Entomologist; Ken Hopkins, Chipco; Geri Cashion, FMC; and Dr. Leon Stacy, Coastal Consulting, all spoke at the seminar. Completing the event was an on-site demonstration of a subsoil injection machine. Afterwards, participants golfed at the Island Club, hosted by Norm Pilote, director of golf maintenance, and Scott Lomis, superintendent.

This event is held annually through the cooperative efforts of the Georgia and Florida GCSA's. For further information, contact Karen White, executive director, GGCSA, at 706/769-4076, or Bill Plante, CGCS, Orange Park CC at 904/276-7660. □

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June 1998

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- 01 250 GOLF COURSES (Also fill in questions #3 & #4)
- 02 255 Landscape Contractors (installation and maintenance)
- 03 260 Lawn Care Service Companies
- 04 265 Custom Chemical Applicators (ground and air)
- 05 270 Tree Service Companies/Arborists
- 06 275 Landscape Architects
- 07 280 Land Reclamation and Erosion Control
- 08 285 Irrigation Contractors
- Other (please specify) _____

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

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

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

- 26 10 Executive/Administrator- President, Owner, Partner, Director, General Manager, Chairman of the Board, Purchasing Agent, Director of Physical Plant
- 27 20 Manager/Superintendent- Arborist, Architect, Landscape/Grounds Manager, Superintendent, Foreman, Supervisor
- 28 30 Government Official- Government Commissioner, Agent, Other Government Official
- 29 40 Specialist- Forester, Consultant, Agronomist, Pilot, Instructor, Researcher, Horticulturist, Certified Specialist
- 30 50 Other Titled and Non-Titled Personnel (please specify) _____

3. Is your golf course:

- 31 A Public 32 B Semi Private 33 C Private 34 D Hotel/Resort 35 E Municipal

4. If you work for a golf course, how many holes are on your grounds?

- 36 1 9 37 2 18 38 3 27 39 4 36+

5. How many acres are maintained at your facility? _____

6. SERVICES PERFORMED (fill in ALL that apply)

- 40 A Mowing 45 F Turf Fertilization 50 K Paving, Deck & Patio Installation
- 41 B Turf Insect Control 46 G Turf Disease Control 51 L Pond/Lake Care
- 42 C Tree Care 47 H Ornamental Care 52 M Landscape Installation
- 43 D Turf Aeration 48 I Landscape/Golf Design 53 N Snow Removal
- 44 E Irrigation Services 49 J Turf Weed Control 54 O Other (please specify) _____

7a. Do you specify, purchase or influence the selection of landscape products?

- Yes No

7b. If yes, check which products you buy or specify: (fill in ALL that apply)

- 55 1 Aerators 62 8 Herbicides 69 15 Sweepers
- 56 2 Blowers 63 9 Insecticides 70 16 Tractors
- 57 3 Chain Saws 64 10 Line Trimmers 71 17 Truck Trailers/Attachments
- 58 4 Chipper-Shredders 65 11 Mowers (reel/rotary) 72 18 Trucks
- 59 5 De-icers 66 12 Snow Removal Equipment 73 19 Turfseed
- 60 6 Fertilizers 67 13 Sprayers 74 20 Utility Vehicles
- 61 7 Fungicides 68 14 Spreaders

8. Do you have a modem? Yes No

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111	123	135	147	159	171	183	195	207	219	231	243	255	267	279	291	303	315
112	124	136	148	160	172	184	196	208	220	232	244	256	268	280	292	304	316