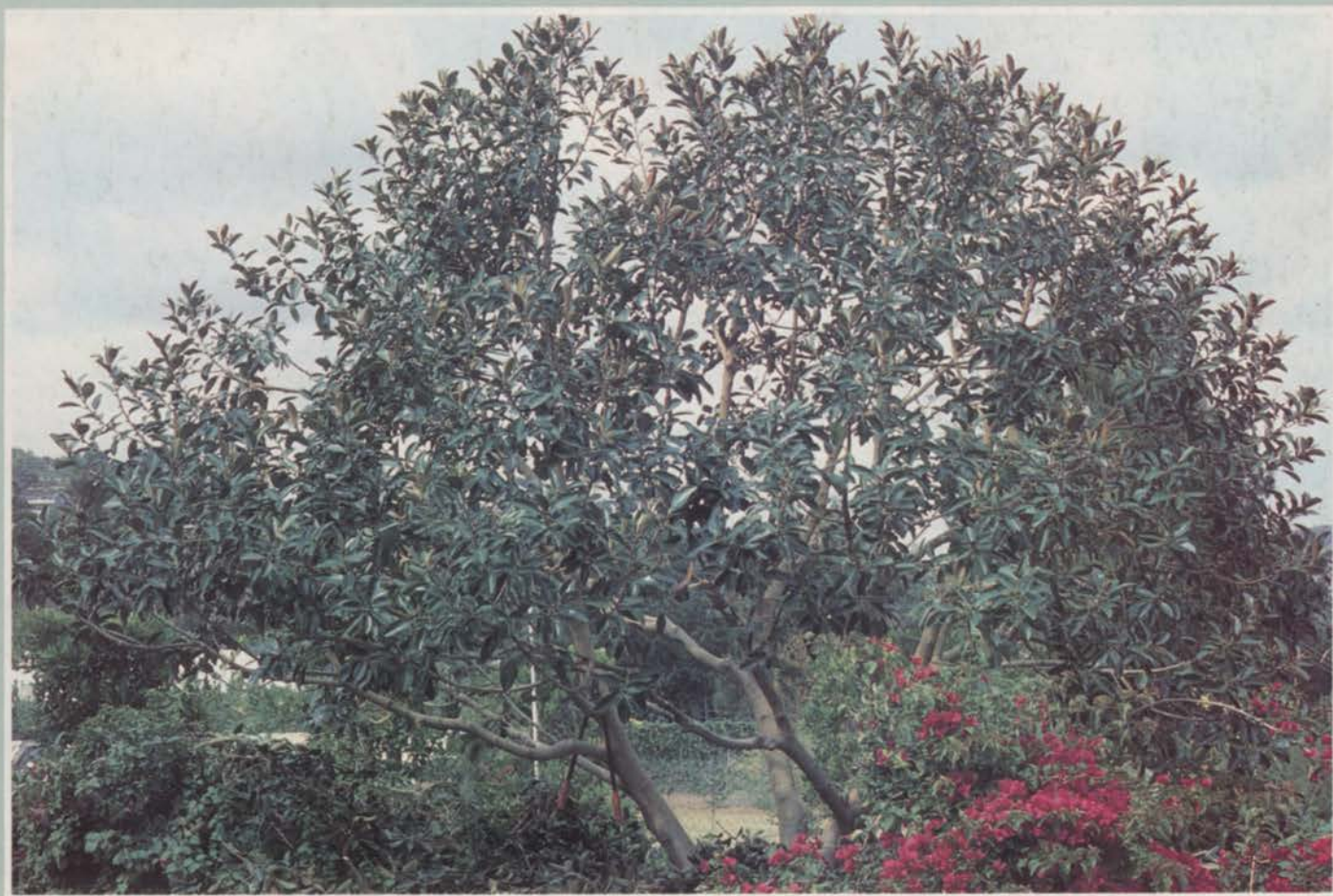


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SEPTEMBER 1988
VOLUME 9, NUMBER 9

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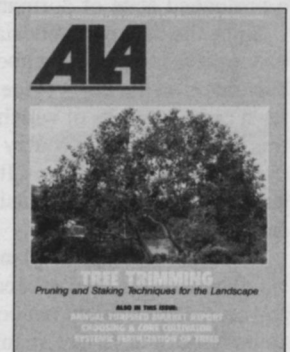
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COVER

This month's cover story gives the landscape contractor some helpful hints on the pruning and staking of trees. On the cover is an 8-12 year old *Ficus rubiginosa* (rusty leaf fig). (Photo courtesy of Alden Kelley, a California consulting arborist.)

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INSIDE STORY

It's ironic. The Pacific Northwest and the Willamette Valley had one of the best growing and harvesting seasons in recent years, yet there probably won't be enough seed to meet the urgent demand coming from the Midwest and Northeast.

The weather — or more simply put, "The Drought" — played havoc with most of the country at one time or another this summer, resulting in botched mowing, fertilization and weed control schedules, and confusion over turf's ability to rebound from a prolonged state of dormancy.

Since the heat was unbeatable, maintenance professionals went about educating customers on the importance of continued lawn care — results of which will be seen this fall as companies scurry to aerate and overseed customers' lawns. It is hoped that such practices will erase unsightly memories of the drought.

Although it's a good plan, there's one small hitch — the seed needed to complete the overseeding might not be available for quite some time. In fact, many seed companies are predicting shortages until the 1989 harvest.



The demand has been particularly strong for the new improved turf-type tall fescues. Although the turf-types have been around for several years, production of the high quality seed has not increased quickly enough to meet growing demand. The new turf-types have, however, been a shot in the arm for the seed industry — opening up

the Southern overseeding market and creating a competitive frenzy among growers.

That demand, compounded with the drought-induced loss of the Kentucky 31 crop in Missouri, has left many scrambling for alternatives not only to the tall fescues, but high prices. As was expected, seed demand led to increases in seed prices — for the tall fescues, and others.

"The drought turned the seed business upside down," said Barry Green of Jonathan Green Inc., Farmingdale, N.J. "Seed's in very short supply and very high price."

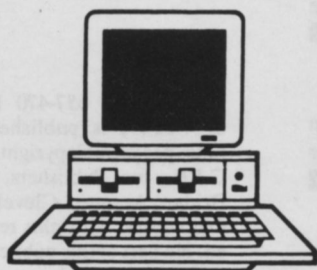
One supplier said turf-type tall fescue was selling for \$1.25 to \$1.50 a pound, when it normally doesn't sell for much over \$1 a pound.

For more information on the availability of specific seed varieties, turn to the "Turfseed Market Report" beginning on page 16.

A handwritten signature in cursive script that reads "Cindy Code".

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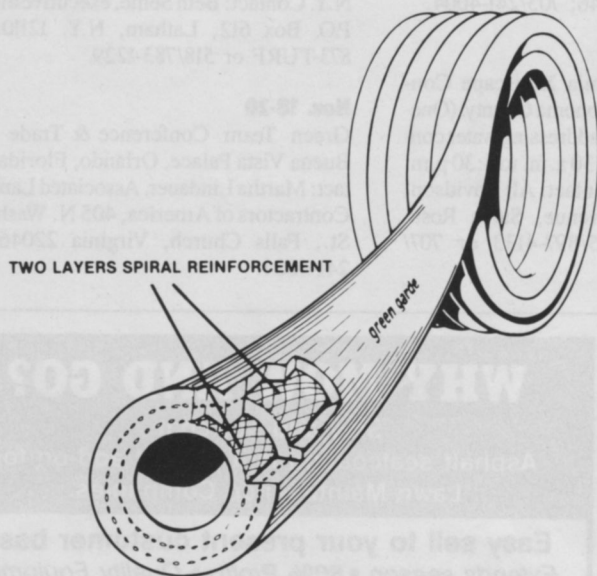
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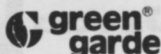
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CALENDAR

Sept. 28-30

The International Pesticide Applicators Association Annual Convention and Trade Show, Red Lion Inn, 300 112th Ave. S.E., Bellevue, Wash. Contact: Bill Harlan, P.O. Box 681, Kirkland, Wash. 98083; 206/823-2600.

Oct. 2-3

Construction Injury and Tree Evaluation Clinic, Ramada Inn, Syracuse, N.Y. Contact: Beth Seme, Executive Secretary, New York State Arborists, ISA Chapter, P.O. Box 58, Latham, N.Y. 12110; 518/783-1229.

Oct. 4

24th Annual Golf Course Superintendent Association of New Jersey Turfgrass Equipment, Irrigation and Supplies Field Day, Rutgers Stadium and Golf Course, River Road, Piscataway, N.J. Contact: Dr. Henry W. Indyk, 201/932-9453.

Oct. 5-6

Annual meeting of the New England Agricultural Chemical Association, Hotel Ashworth by the Sea, Hampton Beach, N.H. Contact: Kathy Pappalardo, 508/374-1594.

Oct. 9-12

Florida Turfgrass Annual Conference and

Show, Curtis Hixon Convention Center and the Hyatt Regency Hotel, Tampa, Fla. Contact: FTGA, 302 S. Graham Ave., Orlando, Fla. 32803; 407/898-6721.

Oct. 22-24

Third Annual Landscape Exposition, Nashville Convention Center, Nashville, Tenn. Contact: Becky Lerew, show manager or Mary Sue Christoffers, sales manager at 203/853-0400; or write to Landscape Exposition, 50 Washington St., Norwalk, Conn. 06854.

Oct. 23-26

1988 Interior Plantscape Division Conference & Trade Show, Los Angeles Airport Hilton and Towers, Los Angeles, Calif. Contact: Martha Lindauer, Associated Landscape Contractors of America, 405 N. Washington St., Falls Church, Va. 22046; 703/241-4004.

Nov. 3

1988 Northern California Xeriscape Conference, Rohnert Park, Sonoma County. (One-day regional conference addressing water conserving landscaping - 8:30 a.m. to 4:30 p.m. at the Red Lion Inn.) Contact: Ali Davidson, 2150 West College Avenue, Santa Rosa, California 95401; 415/897-4133 or 707/526-5370.

Nov. 6-9

1988 International Irrigation Exposition & Technical Conference, Las Vegas, Nev. Contact: Mark Williams, Irrigation Association, 1911 N. Fort Myer Dr., Ste. 1009, Arlington, Va. 22209; 703/524-1200.

Nov. 7-10

9th Annual Professional Lawn Care Association of America Conference & Trade Show, Superdome, New Orleans, La. Contact: Doug Moody, PLCAA, 1225 Johnson Ferry Rd., N.E., Ste. B-220, Marietta, Ga. 30068; 404/977-5222.

Nov. 8-11

New York State Turfgrass Association 42nd Annual Turf and Grounds Exposition, Rochester Riverside Convention Center, Rochester, N.Y. Contact: Beth Seme, executive director, P.O. Box 612, Latham, N.Y. 12110; 800/873-TURF or 518/783-1229.

Nov. 18-20

Green Team Conference & Trade Show, Buena Vista Palace, Orlando, Florida. Contact: Martha Lindauer, Associated Landscape Contractors of America, 405 N. Washington St., Falls Church, Virginia 22046; 703/241-4004. ■

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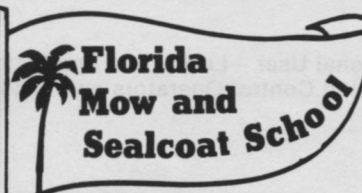
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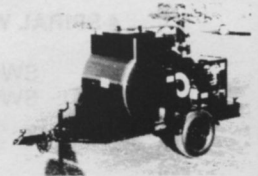
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ALCA UPDATE

Katy Moss-Warner, chief horticulturist for Walt Disney World, will be the keynote speaker at the third annual Green Team Conference and Trade Show at the Buena Vista Palace, Walt Disney World Village, Orlando, Fla. The show runs from Nov. 18-20.

The show is sponsored by The Associated Landscape Contractors of America and the Professional Grounds Management Society. Both the Landscape Management Division and Exterior Landscape Contractors Division of ALCA will be represented.

"Commitment to Professional Image" will serve as the general theme of the show, centering on issues such as maintaining a quality landscape 365 days a year, to staff development and industry involvement.

Warner, who holds a degree in landscape architecture, will focus on Disney's commitment to professional horticulture. Show attendees can also hear about Disney's management style, giving the contractor and grounds manager the opportunity to see and hear how Disney creates and reinforces commitment and pride among the 22,000 members of the Walt Disney cast, as well as how they maintain their 28,000-acre

property in Orlando.

Educational seminars will be available in three tracks: professional grounds management, landscape management and exterior landscape contracting. All conference attendees may attend either the PGMS or ALCA educational sessions.

Subjects ranging from landscape design and building, to low-cost maintenance techniques will be given in-depth treatment.

Among the conference speakers are Kurt Bluemel, owner of Kurt Bluemel Inc. Landscaping of Baltimore, Md., who will speak on "Landscaping with Ornamental Grasses;" Dr. Jeff Norcini, a specialist in plant growth regulators and herbicides for woody ornamentals, who will discuss "Growth Retardants for Woody Plant Materials;" and Dr. Bert McCarty, a turfgrass extension specialist at the University of Florida, who will speak on "Turf Renovation and Soil Improvement."

Martha Lindauer, ALCA's director of communications, said she hoped to have about 100 exhibitors at the show — consistent with previous years' shows.

There's still time to register for this year's show, she added.

For more information contact ALCA, 405 N. Washington St., Suite 104, Falls Church, Va. 22046; 703/241-4004 or PGMS, 12 Galloway Ave., Suite 1-E, Cockeysville, Md. 21030; 301/667-1833.

In other news, ALCA recently released the seventh in a series of in-depth reports about the industry titled, "Leadership in the Landscape Industry: The Changing, Challenging Role of the Chief Executive Officer."

The report examines the role of the CEO, explores his position in an evolving business and details his relationship with middle management.

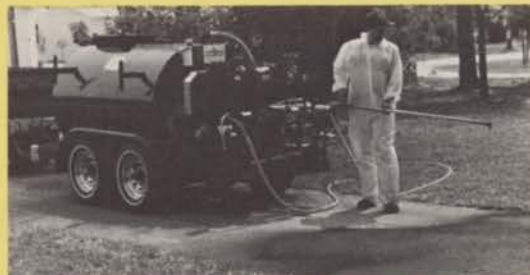
The comprehensive report was written by ALCA's Crystal Ball Committee, a study and research group of the association which was established in 1975. The report fulfills the committee's responsibility to investigate the landscape industry, to identify current and future opportunities and problems which should be addressed. The committee also recommended courses of action for members to become more responsible in planning future business activities.

The report is available to members for \$3 and to nonmembers for \$5. ■

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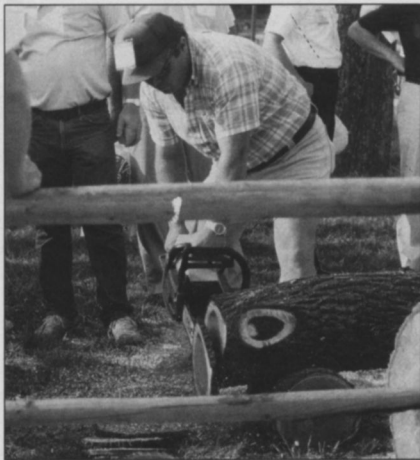
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• (203) 271-1682

NEWS IN BRIEF

EXPO 88 SETS ATTENDANCE, EXHIBITOR RECORDS

The fifth annual EXPO 88 broke all sorts of attendance records and in the process, showed signs of attracting the commercial end of the industry to the traditionally dealer/retailer show.

More than 22,300 registered for the 1988



Outdoor equipment demonstration.

International Lawn, Garden & Power Equipment Expo, topping all previous registration marks. The number of exhibiting companies reached 555, a slight increase over 1987's Louisville, Ky., show.

Before the show's doors even opened, about 18,000 had pre-registered — nearly 4,000 more than the previous year's pre-registrants. Warner Frazier, show committee chairman, attributed the increase to the initiation of a \$5 on-site registration fee. By signing up before the show opened, visitors were admitted free to all seminars and the extensive indoor and outdoor exhibit areas.

Nearly 1,000 international visitors from 50 countries attended the show.

Indoor exhibit space, totaling 270,000 net square feet — an increase of 4 percent to 5 percent over 1987 — was sold out. The 450,000-square-foot outdoor demonstration area was filled to capacity as attendees tested a variety of equipment.

While 40 percent of those attending the show were retailers/dealers, 49 percent of them carried both commercial and consumer equipment lines. Only 5 percent of the retailers/dealers carried strictly com-



Inside the Coliseum at EXPO.

mercial lines.

The information was collected from registration forms, on which retailers were asked to indicate whether they carry commercial or consumer products, or both.

Increased interest from the commercial side of the industry will be the subject of discussion in fall committee meetings designed to prepare for the 1989 show.

The remaining attendee breakdown included 23 percent distributors, 18 percent manufacturers' representatives, 11 percent trade visitors, 4 percent merchandisers/buyers, 2 percent media and 2 percent commercial mowing contractors and golf course superintendents.



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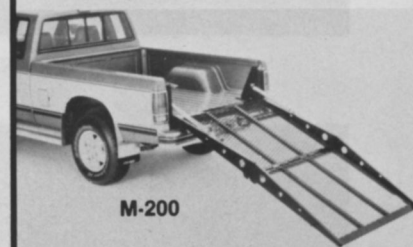
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Almost 41 percent of the 1988 exhibitors featured non-power products related to the industry, including landscape fabric and fertilizers.

New features of EXPO 88 included video coverage of the show through closed-circuit televisions located in many of the hotels and at the EXPO itself, a "model store" where retailers picked up tips on merchandising and a new safety exhibit sponsored by the Outdoor Power Equipment Institute, which also sponsors EXPO.

EXPO 89 will be held in Louisville, July 31 to Aug. 2 at the Kentucky Fair & Exposition Center.

CHIPCO ALIETTE RECEIVES EXPANDED LABEL IN CALIFORNIA

Chipco® Aliette® brand fungicide from Rhone-Poulenc Ag Company has now been registered in California for prevention of *Pythium blight* in turfgrasses.

The product was featured in the August issue of *ALA* magazine, but had not yet been approved for expanded use in California.

Chipco Aliette translocates from the leaves to the roots and from the roots to the leaves. Its complex mode of action attacks the fungus and stimulates the natural ability of turfgrasses to resist disease infection. As a result, resistance to Chipco Aliette is not likely to develop, according to company officials.

Chipco Aliette fungicide will control *Pythium* from 14 to 21 days depending on the rate of application.

For more information, write Rhone-Poulenc Ag Company, P.O. Box 12014, Research Triangle Park, N.C. 27709.

EIGHT DOW BUSINESS SEMINARS SCHEDULED

Eight business seminars for LCOs have been announced by The Dow Chemical Co.

The one-day programs provide extensive information on marketing, forecasting and pricing principles, market segmentation and differentiation, and profit and loss implications. They feature respected industry consultants Ed Wandtke and Rudd McGary, senior partners for All-Green Management Associates, a Columbus, Ohio-based consulting firm.

Seminars are set for Nov. 21 in Bloomington, Minn., Holiday Inn-International Airport; Nov. 28 in Cincinnati, Ohio, Ramada Inn-North; Nov. 29 in Indianapolis, Ind., Holiday Inn-East; Nov. 30 in Detroit, Mich., Holiday Inn-Livonia; Dec. 1 in Cleveland, Ohio, Holiday Inn-Strongsville; Dec. 2 in St. Louis, Mo., Embassy Suites (North First Street); Dec. 15 in Chicago,

Ill., Embassy Suites-Schaumburg; and Dec. 16 in Omaha, Neb., Howard Johnson Motel (I-80 at 77nd. St.).

More information about the seminars can be obtained by contacting Karen Smith at Dow, 1-800-248-6700.

CONTROL DATA ACQUIRES DATASPHERE COMPUTER SYSTEMS

Control Data's position as a leading supplier of software and information services was enhanced by the recent acquisition of

Datasphere Computer Systems, Inc.

Datasphere, originator of the Terra System, is a leading supplier of software for landscape contractors, nurseries and greenhouses. It will become part of Control Data's Doane Information Services business unit.

Datasphere will retain its base in Portland, and its operation will continue to be managed by Richard Buffo, general manager and Judith Buffo, manager of product development.

Control Data, with \$3.4 billion in 1987 revenues, provides computer products and services for businesses worldwide.

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ON-THE-ROAD TRAINING WITH HONDA POWER EQUIPMENT

The power equipment division of American Honda Motor Co. Inc., recently launched a mobile service training program, believed to be the first of its kind in the industry.

The company has custom-fitted 13 vans with complete audio-visual equipment, technical training materials, training products and product models. The traveling vans allow Honda Power Equipment district service managers to conduct portable generator and lawn and garden service training sessions at individual dealerships across the country.

The permanent program will cover Honda's entire line of lawn and garden products, and is part of Honda's ongoing effort to improve service and training opportunities, according to Linda Carlson, a representative for Honda.

"The mobile service vans allow us the flexibility to target specific service training needs in specific geographic areas," said Chuck Lebo, national manager for field service operations.

Honda power equipment dealers will be able to use the new program to help train new service technicians and provide refresher sessions to veterans.



Honda's custom-fitted training van.

GRAZER COMMERCIAL MOWING LINE SOLD TO M & W GEAR CO.

M & W Gear Company of Gibson City, Ill., recently acquired the assets of the Willsey-D Corporation, which includes the Grazer lawn and commercial grounds mowing equipment line, for an undisclosed price.

The acquisition is the first step into the lawn maintenance market by M & W Gear, a manufacturer of farm equipment since 1949, according to Chuck Rathbun, vice president of product services.

The Grazer line includes commercial mowing equipment, with decks ranging in size from 42 to 72 inches. The mowers come

with 18- to 22-horsepower motors.

Rathbun said M & W Gear had been a distributor for Grazer for several years before the acquisition. "We had been in the farm business for quite some time and we were looking to expand our sales potential."

All Grazer products will continue to be manufactured at the Maple Hill, Kansas, plant by the former Willsey-D personnel.

M & W Gear has no present plans to expand the Grazer line, Rathbun said.

PLANTING AND STAKING VIDEO AVAILABLE TO CONTRACTORS

The California Landscape Contractors Association has released a new planting and staking video intended for classroom instruction and employee training.

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TURFSEED MARKET REPORT

The harvest has ended, the seed is cleaned and it's only a matter of time before the seed will be shipped. Find out how well your favorite seed performed in the 1988 harvest.

Other than the devastating loss of the Kentucky 31 tall fescue crop in Missouri, the majority of the seed companies survived the 1988 harvest with average to above average yields.

However, what appeared to be good-sized yields in many cases, quickly turned to shortages as turf-type tall fescues, followed by perennial ryegrasses, were called to fill in the gap left by the meager Kentucky 31 crop. The crop is only expected to produce about 25 percent of its 1987 yield.

Although the seed harvest in the Northwest was not directly affected by drought conditions, indirect effects reverberated throughout the industry.

The demand has been particularly strong for the new improved turf-type tall fescues. Although the turf-types have been around for several years, production of the high quality seed has not increased quickly enough to meet growing demand. The new turf-types have, however, been a shot in the arm for the seed industry — opening up the Southern overseeding market and creating a competitive frenzy among growers.

Weather was good throughout the growing season and into the harvest, but production of the new turf-type tall fescues has never caught up with the demand.

High demand and short supply has translated into high prices for industry buyers. Kentucky 31 prices are expected to remain high until the next new crop, leading to price increases in all tall fescues. Annual ryegrass prices are higher because there's fewer acres being produced. Perennial ryegrass and Kentucky bluegrass prices vary depending on the variety purchased. Creeping red fes-



The harvesting of Glade Kentucky bluegrass at Jacklin Seed company's major production area.



Combines at work in Rathdrum, Prairie, Idaho.

cue prices out of Canada are showing slightly higher than normal prices. Turf-type varieties of tall fescue, bluegrass and perennial ryegrass are as high or higher than previous years, not only because of high buyer demand, but because suppliers are paying growers more to grow the improved varieties.

In addition to high prices, shortages may catch up with companies which haven't placed their seed orders.

In this article, individual seed companies report on their varieties, yields and expected supplies for the coming year.

E.F. BURLINGHAM & SONS. Yields were up for this Forest Grove, Ore.-based company, but everything is "still pretty much sold out," said Greg McCarthy, product manager.

He attributes the good yields to a fair amount of rain in May and June and excellent harvest weather.

"It was like two different growing seasons, the Northwest was OK, but the Midwest didn't do so well," he said.

Yields from Falcon and Winchester, fine-leaved tall fescues, are already committed for this year. Perennial ryegrasses are also in a similar situation.

"Right now we're cleaning seed and it looks good," McCarthy said. "We've been short on production the last couple of years, but this year we're able to meet our goals."

Like others, the seed company is experimenting with new turf-type varieties and expects to plant some this fall.

(continued on page 20)

POP QUIZ

1. WHAT DO YOU CALL A TALL FESCUE THAT LOOKS LIKE BLUEGRASS?

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BLUEGRASS

TALLTUCKY
GRASS

BLUE FESCUE

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 RHÔNE-POULENC AG COMPANY

TURFSEED MARKET REPORT

(continued from page 16)

GARFIELD WILLIAMSON. High yields and strong demand met Garfield Williamson's new crop this year, leading to sellouts before harvesting even began, according to John Zajac, president. Garfield Williamson is located in Farmingdale, N.J.

Omega II perennial ryegrass had above average yields and will have good availability. However, Saturn, a new ryegrass from Garfield Williamson, was sold out long before the new crop was even in.

Saturn, which rated number one in national seed trials, had good yields and strong demand — almost too strong a demand. "Because it was number one in the national trials, I wish we had more of it," Zajac said.

Tall fescue yields are sporadic, with some doing well and others reaching only average yields. However, overall supply should be better than last year.

Emperor, a new turf-type dwarf tall fescue is in limited supply. Jaguar is in good supply, but Jaguar II, in its first year of availability, is in limited supply.

Liberty and Eclipse Kentucky bluegrasses are holding stable in price, but Liberty has good yields compared to average for Eclipse.

"In general, I'm quick to say we have an

OK supply, but remember there was no carryover, and the demand is strong," Zajac said.

The same sparseness will remain true for 1989. Zajac predicted there would be no carryover in 10 out of 10 cases for tall fescues, 9 out of 10 cases for perennial ryegrasses and 8 out of 10 cases for Kentucky bluegrasses.

"That being the case, there will be a scramble for seed next fall," he said.

INTERNATIONAL SEEDS INC. Despite early concern over poor crop quality, this Tangent, Ore.-based company, came out of this year's harvest in good shape.

Craig Edminster, director of research, said he had originally been worried about the extremely dry summer of 1987, but good winter growing conditions enabled grasses to grow through the winter, all the way to June.

"We had excellent production across the board," he said, "but demand was way above production. We're sold out."

Edminster said there will be little seed available in any of the company's varieties and predicted high demand would carryover until the next new crop.

"Quality will be a big issue next year," he said. "Any carryover will probably be in poor quality."

Cindy creeping red fescue and Cobra creeping bentgrass, two new turfgrasses, did well in production this year.

JACKLIN SEED CO. Based on early estimates, it appears that Jacklin Seed will have an average proprietary Kentucky bluegrass crop this year, according to Gayle Jacklin-Ward, of the Post Falls, Idaho company.

"With no carryover and increased demand for proprietary Kentucky bluegrass, we are once again looking at another year of seed shortages on all varieties," she said.

The common Kentucky bluegrass is down about 30 percent — somewhat better than original estimates. However, with increased acres over last year, the prices have remained stable, she added.

Jacklin Seed will have a limited amount of Putter, a new creeping bentgrass variety. It will be available for testing purposes only.

J & L ADIKES INC. Adelphi Kentucky bluegrass will be available in limited supply, but All-Star perennial ryegrass should be in good supply for this Jamaica, N.Y.-based company.

Adelphi ran into problems with insufficient acres planted and low yields, according to Gayle Jacklin-Ward of Jacklin Seed Co. Jacklin harvests and cleans the varieties for Adikes.

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Jacklin-Ward said those which historically had low yields, such as Adelphi, yielded lower than in previous years. Likewise, those which were in highest demand, suffered low yields.

JONATHAN GREEN INC. "It's been some fall so far and we're just getting started," said Barry Green, vice president of sales for Jonathan Green. The company is headquartered in Farmingdale, N.J.

"Our harvest was good, but not good enough. The drought screwed up a good year," he said. "Last season we felt the prices would have come down, but the drought turned the seed business upside down. It's in very short supply and very high price."

As a result, seed is available only to those under contract in most cases.

Richmond and Mesa, the company's turf-type tall fescues, received the boost many new turf-types did from the loss of the Kentucky 31 crop. In addition, the company's fine-textured perennial ryegrasses, Allaire and Sherwood, are being targeted as alternatives to Kentucky 31. As a result the perennial ryegrasses are seeing price increases as well.

And not to be outdone by the others, the price of proprietary bluegrasses are showing no signs of coming down. Green said the price of proprietary bluegrasses usually drops after the new crop, but the demand has been so strong, particularly in the East, that they can't get enough of it.

Despite the first good harvest for both Mesa and Richmond, Green said, Jonathan Green would probably run out of both of them. Sherwood, with its 96 percent endophyte content, and Destiny Kentucky bluegrass will also be in short supply.

While the industry's running short on seed this year, Green predicts things may turn around in one year. With interest rates rising and building costs going up, the bluegrasses and the ryegrasses may reach a level of surplus next year.

LESCO INC. Art Wick, vice president of research and development for the Rocky River, Ohio-based company, said this year's harvest will come in slightly above last year's, but because of the drought will result in market shortages next spring.

He said prices will remain strong for the tall fescues, averaging about 25 percent higher than last year.

NORMARK INC. Adequate yields from fine-leaved perennial ryegrasses and turf-type tall fescues gave the company enough seed to get by, but with not much room to spare, according to Don Herb, sales manager for Normark, Tangent, Ore.

Like many companies, Normark sells its seed on a contract basis, leaving little to no seed for the companies which haven't put in seed orders.

"It'll take a couple of years to catch up with demand. We have to continue to find more yields for the prices to back off," he said.

Herb said the industry will be short about 100 million pounds of seed this year — a large majority of which results from the loss of the Kentucky 31 crop.

Pinnacle, a new fine-leaved perennial ryegrass from Normark, will be available this year through local distributors. Pinnacle is a semi-dwarf variety with a high endophyte content. Another new dwarf turf-type tall fescue is still being tested, and will be available to the industry in one year.

NORTHROP KING. The seed situation continues to improve for this Minneapolis, Minn.-based company, which reports both good yields and supplies.

Product Manager Joe Churchill predicted good supplies of Aspen, Trenton, Rugby and Parade Kentucky bluegrasses into next spring and better than expected yields of Delray, Pennfine and Caddie perennial ryegrasses.

Caddie, a new variety from Northrup King, improves rust resistance in turf, is dark in color and has excellent tillering capabilities. The seed is expected to do well in winter overseeding blends in the South.

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"We had a fairly decent crop compared to the last three years," he said. "I'm looking forward to next year."

All turf-type tall fescues, including Galway, had good yields leaving the company with adequate supplies to date. But because of the increased demand for the tall fescues, Churchill said, he's not sure if the supplies of bluegrass and ryegrass will hold up.

The company also has high hopes for its new alkalide grass, named Fults. The product does well in high pH soil, and so far is doing well in production.

O.M. SCOTT & SONS. The varieties produced by this Marysville, Ohio, company are coming in better than anticipated, according to Bill Junk, purchasing manager.

Junk said he didn't see any significant problems with the overall seed availability, just with certain varieties. For instance Chesapeake turf-type tall fescue is completely sold-out.

"The turf-type tall fescues haven't caught up with the market. Everything that's being produced is being consumed," he said. "Every year there's more and more people trying to buy them."

This is the fourth year of production for Chesapeake, whose acreage has been increased each year.

O.M. Scott is researching new varieties including a new perennial ryegrass named Accolade. To date, Accolade has been tested only under experimental conditions.

PICKSEED WEST. All in all it was a good growing season for Pickseed West, headquartered in Tangent, Ore. Gerry Pepin, director of research reported that good harvest conditions brought in above average yields for tall fescue and perennial ryegrasses. However, most of those yields have been spoken for.

"We could definitely use more seed. Even as big as our crops are, there's no carryover from last year," Pepin said.

To try and avoid a similar problem next year, the company will plant more acres in 1989.

Fiesta II, Mustang tall fescue and Touch-down Kentucky bluegrass all brought in nice yields for Pickseed.

TURF MERCHANTS. All varieties for this Tangent Loop, Ore.-based company did extremely well, according to Steve Tubbs, general manager.

Higher yields from an increased number of acres put the company in a good position for this high-demand seed season — or so they thought.

"All of it is pretty much spoken for," Tubbs said.

Aquarius perennial ryegrass did well for its first year and Bonzai dwarf tall fescue has limited availability until the 1989 crop. Tubbs added that Gnome bluegrass also did

well this harvest.

TURF SEED INC. Yields are up on Citation II and Manhattan II, two fine-bladed perennial ryegrasses from this Hubbard, Ore.-based company.

The company's turf-type tall fescues, Apache, Olympic and Monarch, came in average as expected; as did its bluegrasses, Midnight, Columbia and Challenger, according to Tom Stanley, marketing manager.

In general, Stanley sees prices increasing about 20 percent for tall fescues, 10 percent to 15 percent for perennial ryegrasses and 5 percent to 10 percent for Kentucky bluegrasses.

Because of ideal harvest conditions, Turf Seed saw 15 percent to 20 percent higher ryegrass yields than had been expected. The perennial ryegrasses are among those being called on to fill in the gap left by the Kentucky 31 crop.

Next spring, the company will continue to make deliveries on current distributor contracts, he said, but this fall, Turf Seed is more or less sold-out.

Turf Seed will increase the acreage of Silverado and Eldorado, two dwarf tall fescues, in anticipation of high demand in the fall of 1989.

VAUGHAN'S SEED CO. Although it may have been slow in coming, increased demand for proprietary grasses is here to stay, according to Tom Breier, manager/grass seed at the Downer's Grove, Ill.-based company.

"I see it continuing to have an affect in the market year after year," he said. "The trend has been developing slowly, but is more obvious with the extreme weather conditions."

Breier said he couldn't be sure of actual seed poundage until clean-out was complete, but predicted common Kentucky bluegrass would yield the same as last year, proprietary Kentucky bluegrass would be up in poundage and the perennial ryegrasses would be up somewhat.

Freedom Kentucky bluegrass, a fast germinating, drought-tolerant seed from Vaughan's, was in limited supply its first year, but should be more readily available this year. Freedom was showing signs of a strong season even before the drought hit. Vaughan's also continues to market Arid turf-type Tall Fescue from Jacklin Seed.

Breier attributes some of the increased interest in the new turf-type varieties to the fact that the end-user is becoming more knowledgeable about the different varieties. This in turn is leading the seed companies not only to produce larger quantities of currently available seed, but also to come up with newer, even better varieties. — *Cindy Code*

The author is Editor of ALA magazine.

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TREE PRUNING & STAKING

Proper pruning and staking techniques can make the difference in growing a healthy and aesthetically pleasing plant.

The pruning of landscape trees is a rejuvenating process, done primarily to preserve the health and aesthetics of trees.

The effects of pruning in the landscape can be seen everyday — sometimes with good results, but often with signs of a hastily done job.

Just as important to good tree health is the staking of trees in the landscape. Staking can play a vital role in the development of a young tree and, like pruning, there's a right and a wrong way of doing it.

Knowing the plant material, growth zone and climate are important considerations before a tree pruning job is

attempted, according to Michael Zohns, a horticulturist at California Polytechnic State University. This sort of knowledge will affect the contractor's attitude and ability to properly prune a plant.

Because of the variety of reasons for pruning, no one pruning method or style can be used on each and every tree. Without knowing the history of the plant, a serious pruning mistake can be made — one which can take years to correct, he said.

The way in which a tree is pruned also depends on the type of look desired. For example,



PRUNING TERMS AND DEFINITIONS

Topping — cutting the trunk a few inches above bud

Rootstock — base of the plant, below the union

Bud — a small swelling or projection on a plant, where a shoot, cluster of leaves or flower develops

Sucker — a shoot which grows from the rootstock

Heading back — cutting back branches to buds or side branches

Evergreen — plants that have leaves on them throughout the year

Deciduous — plants which shed their leaves yearly

Terminal buds — growing point of the stem

Lateral buds — side branches

Bud union — point at which rootstock and top of plant unite

Stub — improperly pruned branch which leaves a protruding hook; entry of insects and disease

Watersprout — long, vertical shoots arising from branches

Primary scaffold branch — first main branch from trunk

Secondary scaffold branch — limb branching from primary scaffold

Spur — short lateral that bears the fruit in many species

Leader — the central stem of a plant

Lateral — those branches growing from primaries and secondaries

Thinning — complete removal of branches to the trunk or to the ground

Node — part of the joint of stem from which leaf starts to grow

Internode — distance on stem between leaves or buds

Pinching — most basic pruning technique, using thumb and forefinger to remove the stem tips of new growth

Shearing — method of clipping the surface of densely foliated plants, using hand or electric shears

Espallering — the practice of training a tree or shrub to grow flat either on a trellis or against a wall

Loppers — a pruning tool used for cutting limbs up to one inch

Pruning saw — a pruning tool used for cutting limbs larger than one inch

Pole pruner — a pruning tool used to prune high branches

Hand shears — a pruning tool used to cut twigs, small branches and vines

Brushing out — the removal of dead wood

and brush-like growth from trees and shrubs

Canopy — refers to the top, shade producing structure made up of branches and foliage of a tree or shrub

Crotch — the angle formed between the trunk and scaffold branch or between a pair of trunks

Double leader — when two trunks or main stems compete for the dominant, leading position

Pollard — shearing off the top of a tree so that it puts out a dense head or slender shoots

Standard — a plant, not naturally growing as a tree, that is trained into a small tree-like form with a single, upright trunk and rounded crown

Topiary — the technique of shearing trees and shrubs to geometric or animal-like shapes

Conifer — cone bearing trees and shrubs, primarily evergreen with needle or scale-like foliage

Framework — the basic branch structure of a tree which gives it its shape

Shoulder ring — ridges around the base of a branch where the branch is attached to the trunk or another limb

it would be a mistake to remove all of the lower limbs on a weeping willow. In a globe-headed style tree, the central leader should be taken out.

Most pruning is done in the dormant season — November through March — but the tree won't suffer any detrimental effects if pruning is done in the summer months, according to Elton Smith, a horticulturist at The Ohio State University.

Pruning can be just as beneficial to human health as it is to tree health. In addition to keeping the plant growing well, a properly pruned tree can also help avoid injury to passersby, Smith said.

If no pruning is done, the plant may enter a stage of stress leading to an increase in winter injury as well as insect and disease problems. "Pruning is just one aspect of total plant health," he said.

Common reasons for pruning trees include clearing, removal of dead or crossing branches and the removal of sharp-angled branches.

In clearing, branches should be removed as needed and redirected to establish new growth. Clearing may be needed to take care of pedestrian and vehicular traffic areas, buildings, outdoor lights, walls and other objects, as well as trees and shrubs.

Removal of dead, broken, diseased or crossing branches and those which will become crossing branches, such as suckers, water sprouts and branches growing vigorously into the interior of the crown is also necessary, according to Alden Kelley, a consulting arborist.

Kelley added that most branches arising at angles of less than 30 degrees should be removed. Some exceptions, however, are Eucalyptus and other species which fuse at branch bases. If a narrow-angled branch needs to be retained for the sake of form, it should be lightened and restricted in growth to reduce danger of wind breakage.

If two branches within a foot or so of each other run parallel for several feet along their main stems, the less desirable branch should be removed.

Other reasons for pruning are for balance and form, to reduce wind resistance and for size reduction.

As a rule, not more than one-fourth of the total foliage mass should not be removed at one pruning, according to Kelley. Exceptions are extreme thinning of heavy crowns of brittle trees, and severe thinning of crowns to prevent blow-down when root pruning is done.

When pruning, branches should not be cut so that stubs



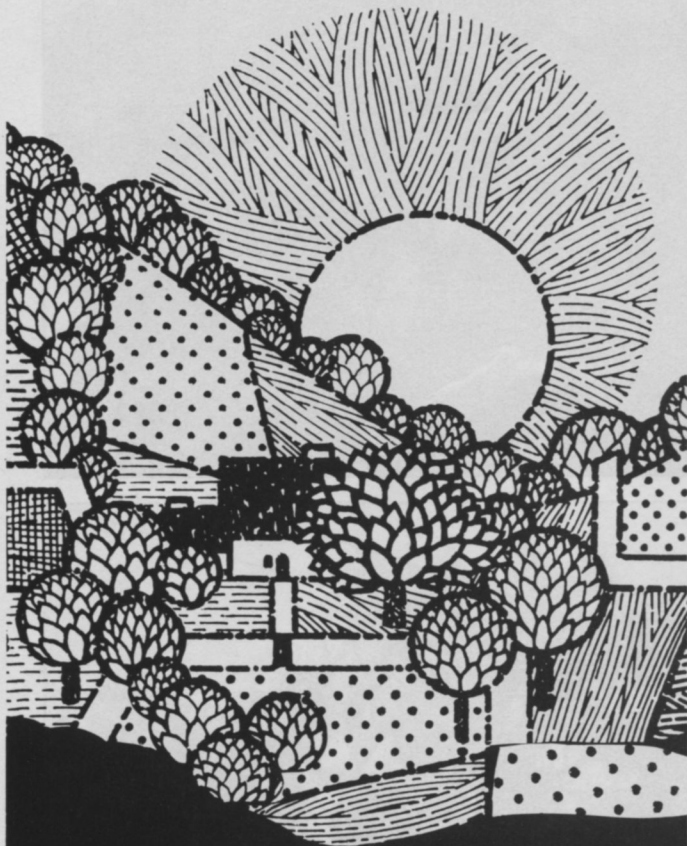
Olive tree; ornamental specimen, 25-35 years old. Before and after pruning. Photos courtesy of Alden Kelley.

are left behind. Terminals should not be cut back to very small laterals.

TOPPING. One common, but incorrectly used method of pruning, is topping. Topping, also referred to as heading, hat-racking, or pollarding, consists of cutting the major branch system back to stubs and/or to very small laterals.

Many nonprofessionals, but fewer professionals, view topping as an OK pruning practice if done conservatively. Nevertheless, the results of topping are usually negative.

"I can't think of any situation in which topping is good," Smith said. "It's rather harsh (method), but it's often done under power lines. I think from that aspect, the general public thinks it's acceptable."



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After topping, branch stubs or entire trees can die from the shock, according to Kelley. New branches in the regrowth after stubbing are characterized by being too close, being weakly attached and having a narrow crotch angle.

Unless corrective pruning is done, the wind breakage hazard can soon become greater than it was before topping. The tree is also considered to be more susceptible to disease, its life expectancy is reduced and the tree's natural form is destroyed.

The real estate value of the tree can be reduced by about 20 percent to 100 percent after topping, according to Kelley. It takes most trees years to come back to their pre-topping value.

Kelley recommends the following general pruning practices.

When pruning, the final cut in removing a lateral branch should be just beyond the branch bark ridges, preserving the branch collar.

For any branch too large to be held while being cut, undercut the branch four to 10 inches beyond the base, and then cut off the branch beyond the undercut. Remove the remaining stub via a shoulder cut.

For the thinning effect, thin out terminal portions of branches by cutting terminals back to laterals. It's better to remove a number of small terminals and laterals, rather than taking out a few large ones.

To take out portions of the crown for reducing height, remove terminals back to laterals. Each lateral should be adequately situated to serve as the new terminal — establishing the crown at a lower level. The basal diameter of a lateral should be at least one-third the basal diameter of the terminal being removed.

A properly trimmed tree seldom looks pruned to the untrained eye. If it is obvious that the tree has just been pruned, it has probably been pruned incorrectly.

STAKING. The staking of recently planted trees in the landscape is vital to the tree's growth, but should only remain for about one year. Trees which need staking after a one- to two-year period were probably staked improperly.

Not all trees need staking. If a tree has a proper stem taper, it probably doesn't need staking unless it's bothered by harsh winds, Kelley said. But most trees over two inches tall will need staking for the proper support during its development.

Staking can be done to support, anchor and protect a tree. Some things to consider before choosing a method of staking is whether the tree is slow- or fast-tapering, the direction of the prevailing winds and materials to be used.

"The wind ideally should be blowing left to right. Don't let the tree bat against the stake," Zohns said. "You're only compounding the problem if you stake too close to the tree."

In addition to banging against the stake, a tightly staked tree can develop curvature problems.

Most young trees should be protected by staking. Zohns suggests supporting slow-tapering trunk trees with a single, double or triple pole method, and anchoring fast-tapering trunk trees with three low stakes or guy wires.

Whether one or three stakes are used, the stakes should be connected to the tree with a flexible, nonconstricting tie. The tree trunk should be able to sway a little to develop the strength and taper it needs to stand without support.

In the single and double pole methods, Zohns suggests using six to eight feet tree stakes (depending on size and type of tree) and placing them through the backfill into undisturbed ground. With a three-stake method, three stakes, about 24 inches high should be attached to the tree trunk with an appropriate tree tie.

The stakes should be high enough off the ground so the top of the tree remains upright. A tree tie in a figure eight pattern will ensure that space is left for the tree to move.

Staking always helps to protect a tree — whether its main purpose is to anchor or support. It gives trees a chance to grow and develop so they're able to survive howling winds and harsh winters. — *Cindy Code*

The author is Editor of ALA magazine.

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SELECTING CORE CULTIVATION EQUIPMENT

The growing number of aerators available in the commercial market gives maintenance professionals a lot to consider before selecting the right piece of equipment for the job. Soil exposure and tine diameter, depth and spacing are just a few of the areas to be explored.

Many home lawns on which we are trying to grow quality turfgrasses have been established on poor soil. Valuable topsoil has either been graded away to produce a level building site or has been covered by excavated subsoil brought to the surface while digging a basement. Most of these subsoils are high in clay content, and can be easily compacted by grading or by preparing the building site while the soil is wet.

Many other home lawns have become thatch laden because of poor prior management practices. Finally, recent developments in the trend toward intensive late fall fertility have caused many lawns to develop thatch layers that prevent the development of quality turf.

An ideal soil is made up of 50 percent pore space and 50 percent solids. Of the 50 percent pore space, half should be small and filled with water for proper soil moisture content while the other half should be large and contain gases.

Many soils that are compacted and high in clay content have less than 50 percent pore space. This effectively restricts the amount of water and oxygen available to the grass plant, and thus inhibits the proper growth and development of the turf.

Thatch is a tightly intermingled layer of living and dead stems, roots, rhizomes, stolons and crowns that develops between the green vegetation and the soil surface. Thatch has a high content of organic material, but also has abundant amounts of large pore spaces. When a heavy thatch condition develops, crowns and other parts of the plant grow in this porous, organic layer. The thatch, because of its

physical nature, does not provide a satisfactory growth medium.

Thatch accumulates when organic matter production increases faster than microorganisms present in the soil are able to decompose the accumulated organic matter. Without proper aeration, it is difficult for the microbes involved in decomposition to keep pace. At this point, the rate of thatch accumulation exceeds the rate of thatch decomposition. Therefore, the development of a thatch problem depends on how wide this differential remains, and over how long a period it is allowed to exist.

As compaction and thatch become more of a problem, desirable conditions for proper turf growth decrease and the turf becomes much more susceptible to stresses such as drought, heat, insects and disease. These stresses will increase the intensity of management needed to produce a quality turf area. Therefore, additional management practices will be needed to reduce compaction and diminish the negative influence of thatch. It is important to remember that these practices will require a number of years for improvement to become evident.

There are several management options available to the turf manager when dealing with compaction and thatch.

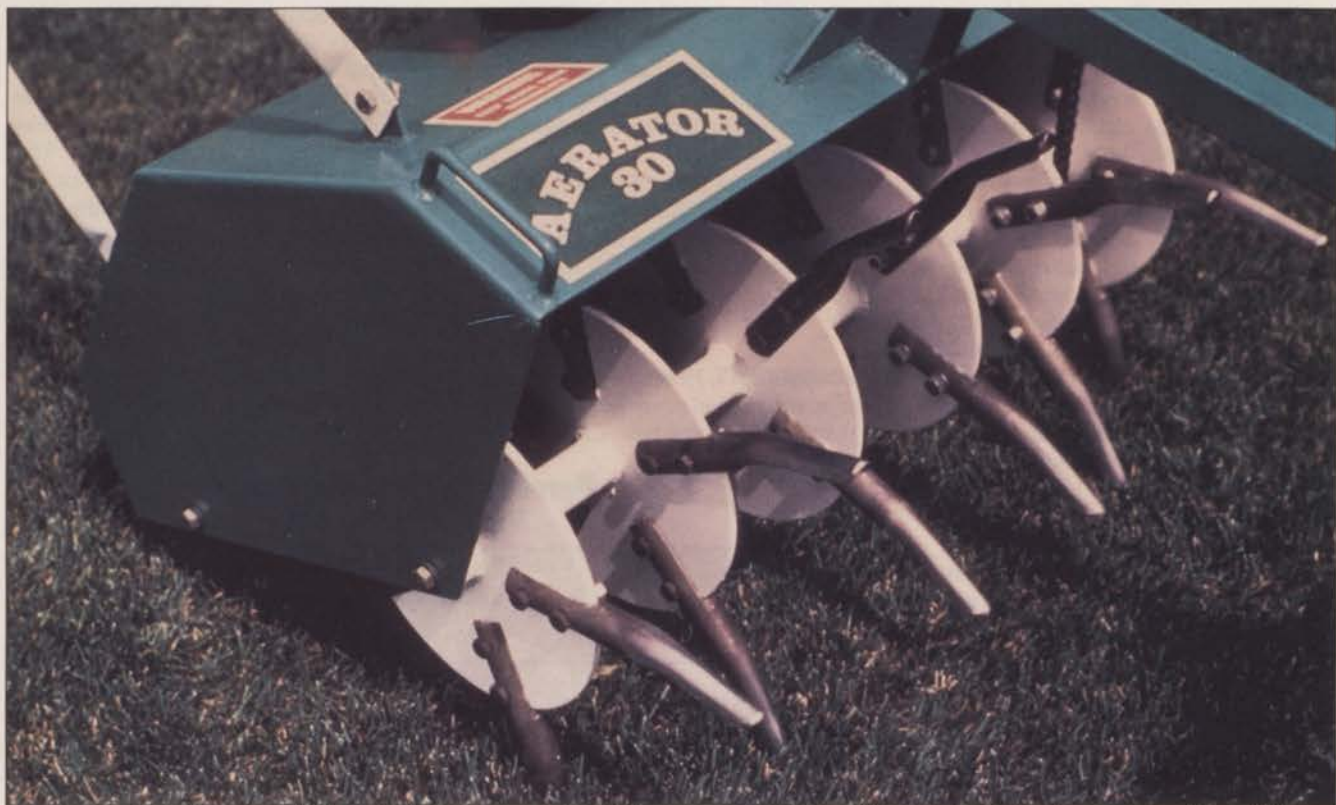
DETHATCHING. Dethatching physically removes thatch from the soil surface by using a series of vertical knives or tines. It is a very destructive process that removes many live plants and living tissue, as well as dead tissue. Dethatchers will bring a great deal of debris to the surface, but if there is a severe thatch layer, the knives will not penetrate completely down into the soil. This process is best done at a time when the turf has an ample growth period to completely recover.

Even though it appears large amounts of thatch are removed by the dethatching process, the actual reduction in the thickness of the thatch layer is minimal unless the dethatching procedure is repeated many times.

This process involves many hours of labor for both machine operation and cleanup time. And, if soil compaction is a contributing factor to the accumulation of thatch, then dethatching does nothing to change the soil environment that may have contributed to the development of the thatch. The net result is that very little is done to remove thatch, and nothing is done to alleviate a contributing factor.

$$\begin{aligned} \text{Tine Area} \\ \% \text{ Soil Exposed} &= \frac{\text{Tine Area}}{\text{Tine Spacing}} \\ \text{Tine Area} &= \left(\frac{\text{Tine Dia.}}{2} \right)^2 \times 3.14 \\ \text{Example: } & \frac{3/4" \text{ Tine Dia.}}{4" \times 4" \text{ Tine Spacing}} \\ \left(\frac{.75}{2} \right)^2 \times 3.14 &= \frac{.44 \text{ sq. in.}}{16 \text{ sq. in.}} = \frac{.028}{2.8\%} \end{aligned}$$

Determine the amount of soil brought to the surface during core cultivation with this equation. Tine diameter and spacing can impact the amount of soil brought to the surface.



Two types of coring devices are available for the drum type aerator pictured above: open spoon tines and closed, hollow tines. Photos courtesy of Doug Halterman.

REESTABLISHMENT. At times, a thatch layer becomes too thick (greater than two inches) and dethatching or core cultivation will make little immediate impact on the turf. At this time, reestablishment becomes a viable alternative. If reestablishment is necessary, steps must be taken to cultivate the soil so as to relieve any soil compaction that may have contributed to the thatch buildup.

CORE CULTIVATION. Core cultivation (also called aerification) removes cores of soil from the turf on two to six inch centers, usually to a depth of two to three inches. It increases the air in the soil by replacing solids from the soil with air from the atmosphere. Coring also breaks up the thatch layer, allows water to penetrate into the root system and gases to flow freely in and out of the root zone. Finally, this process supplies turfgrass plants with oxygen for root growth and metabolic activities.

Since well aerated soils are essential for soil microbial activity, coring may further enhance decomposition of the remaining thatch because more air and moisture can enter the thatch and soil. Restoration of adequate soil/oxygen levels should provide a microclimate that is beneficial for root growth, thereby restoring water uptake and decreasing the potential for high temperature stress.

Another benefit of core cultivation is the intermingling of the soil with the thatch, which favors decomposition and alters the physical structure of this organic layer. This process can be referred to as thatch modification. The large pore spaces from the thatch layer are intermingled with



This represents the number of soil cores you should see after an ideal aeration.

the smaller pores from soil the cores brought to the surface. This intermingling of thatch and soil creates a better growth medium for the turf by combining a soil medium low in pore space with a thatch medium high in pore space.

With soil core removal, water can now penetrate the surface easily, fertilizer can more readily move to the root system and gas and heat exchange can take place. The entire core cultivation process creates an environment more suitable for the growth of quality turf.

Core cultivation equipment has been used to aerify golf course greens and tees for years. Of late the same equipment has been used to effectively aerify fairways. In recent years, the need for aeration of home lawns has been recognized by the lawn care industry. However, the same equip-

ment used for golf courses has not proven to be useful in the home lawn environment, and manufacturers of equipment for home lawn use haven't been able to completely meet the maneuverability and durability requirements needed by the lawn care industry.

Basically, there are two types of machines available: drum type and cam type core cultivators. These two types can be further classified as either walk-behind models or units that the operator rides while aerating.

Two types of coring devices are available for the drum type aerators: open spoon tines that do not take a uniformly circular core, but are easier to keep clean, and closed, hollow tines that take a cleaner, circular core, but wear faster, require more frequent tine replacement and are more difficult to keep clean. Weight added to drum aerators can improve tine penetration in soils either too dry or compacted for adequate cultivation.

Generally, cam type aerators only come with closed, hollow tines. They are not dependent on weight for penetration and usually offer the most uniform coring. Cam type aerators do, however, require much more maintenance than drum type.

There are several factors to consider when purchasing coring equipment: tine diameter, tine spacing, tine durability, non-productive time and machine maintenance.

TINE DIAMETER. Given the same tine spacing and tine penetration depth, (2½ to 3 inches for these purposes), a 3/4-inch tine diameter (inside diameter) will remove more than twice the soil as a 1/2-inch tine, and more than nine times the soil as a 1/4-inch tine (see percent surface exposed chart). Basically, the more soil brought to the surface and deposited on the thatch, the greater the effect on the thatch layer.

TINE SPACING. As with tine diameter, the effects of tine spacing are expressed geometrically when compared to other spacing intervals. At any tine diameter, a spacing of 2" by 2" will remove two times more soil than a 2" by 4" spacing, four times more than a 4" by 4" spacing and six times more than a 4" by 6" spacing.

Generally, the closer the tine spacing the more difficult it is for proper tine penetration due to the increased surface area of tines trying to penetrate the soil at any one time. However, the more holes and the deeper the holes left in a compacted soil, the greater the improvement in rooting and other benefits.

The combined effects of tine diameter and tine spacing on any given core cultivator can make a tremendous impact on the amount of soil brought to the surface, the number of core holes produced and the resulting benefits from the process. Some currently available equipment produces very little benefit from a single pass across

the turf area, and in order to have any significant impact on the turf, it may be necessary to make two or more passes.

When comparing the percent surface exposed with a variety of tine spacings and tine diameters, the exponential effects of different combinations can be graphically represented. For example, to expose 4 percent of the surface, it takes three passes of the 1/2-inch tine at 4" by 4" spacing to remove the same amount of soil as two passes of a 3/4-inch tine at 4" by 6" spacing. Also, you can see that it takes six passes of a 1/4-inch tine at 2" by 4" spacing to do the same. (See percent surface exposed chart).

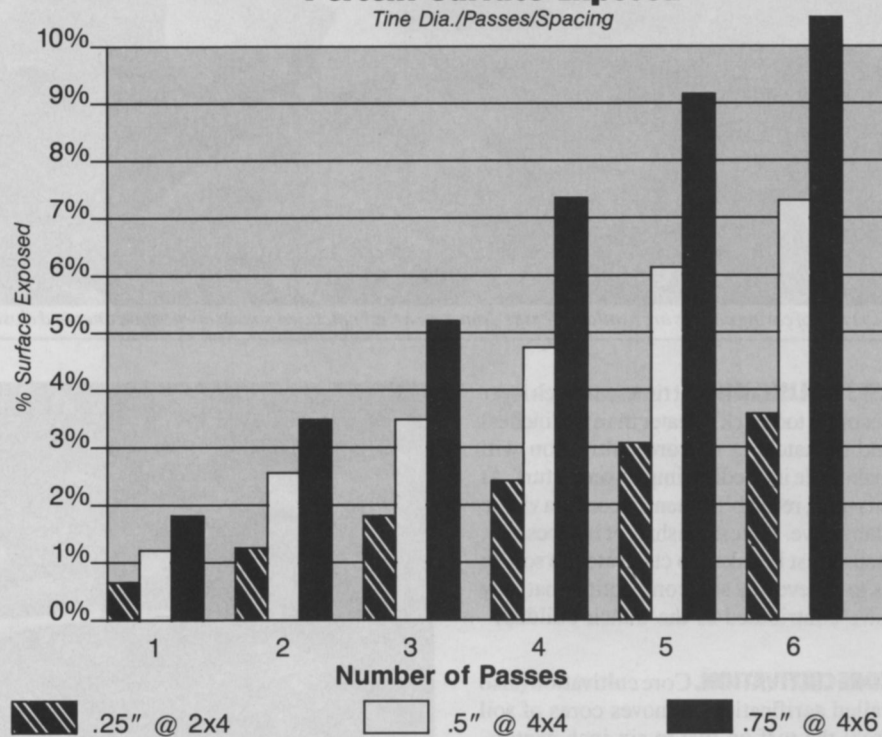
TINE DURABILITY. How many hours a tine remains effective in properly penetrating the thatch and soil can have an impact on

tion equipment can be considered non-productive time, because it is time taken away from the revenue-producing activity of the equipment. A machine needs to be easily transported to the job site, quickly and safely unloaded and on the lawn with minimal wasted time.

Also, time spent raising and lowering the equipment to move across curbs, sidewalks and driveways is nonproductive. The maneuverability of the equipment on the lawn is important because much time can be wasted in backing and turning around. With some core cultivators, backing is almost impossible, leaving some turf areas inaccessible.

MACHINE MAINTENANCE. Many pieces of core cultivation equipment have been produced that require heavy maintenance. Of

Percent Surface Exposed



how often tines are replaced, and how good a core the cultivation equipment pulls. Case-hardened tines tend to last longer, but may be more prone to breaking rather than bending. Open spoon tines last longer than closed, hollow tines. And tines used on drum type aerators tend to last longer than those used on cam type aerators.

Generally, the larger the tine diameter, the more durable the tine. The thickness of the tine wall also has an influence on how well the tines withstand heavy use. Heat-treated alloy steel tines with a wall thickness of .08 inches seem to withstand heavy use. Look for any type of hardening process that will prevent tines from bending.

NONPRODUCTIVE TIME. Time spent loading and unloading your core cultiva-

tion course the more moving parts you must contend with, the more maintenance will be required. Therefore, the cam-operated aerators require more maintenance than the drum type. Within the ranks of the cam type aerators there are many differences in the intensity of maintenance required.

When considering which core cultivator to purchase that will perform an adequate aeration of a lawn, we need some type of standard by which to compare the existing machines. If we would consider the type of aeration currently being used on some golf course fairways as an ideal situation, then a machine that exposes the type of soil a Ryan Greensaire exposes, would be a standard by which we could draw comparisons. The Greensaire has 1/2-inch tines on a 2" by 2" spacing. This effectively exposes 5

(continued on page 45)

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SYSTEMIC FERTILIZATION OF TREES

Restoration of nutrient imbalances and normal leaf color can be accomplished and maintained for several years by topsoil and subsoil treatments.

Many species of trees have historically exhibited habitual chlorosis, particularly when planted along streets and around homes where the original topsoil had been removed or mixed with the subsoil. Urban soils have relatively poor physical, chemical and biological characteristics. Root development and penetration are reduced in heavy clay subsoils that lack adequate aeration and water drainage. In addition, the amount of available nutrients and organic matter is often critically low (3).

Arborists have been coping with these problems for many years and were treating trees in a variety of ways, but primarily through soil treatment of fertilizers and acidifying agents. Foliar treatments with minor elements, such as iron, have been common practice.

Typically, arborists and landscape maintenance personnel were treating with fertilizers with acidic residues such as ammonium sulfate. Acidifying agents in the form of sulfur or aluminum sulfate were used to lower, and limestone to increase, the soil pH. When available, minor elements were added to the fertilizer with iron sulfate, and later iron chelates commonly used with pin oak, white oak, dogwood and shrubs such as rhododendrons and other broadleaved evergreens. Shurtleff and Jacobsen (10) claim that more than 250 species of plants are susceptible to iron deficiency alone.

LITERATURE REVIEW. During the decade of the 1970s, a flurry of research was conducted as new products became available to the industry in the form of tree trunk implants and injections containing various minor elements. These compounds were effective in reducing or eliminating chlorosis of certain trees. However, controversy arose over the potential injury to the trees over the short- and long-term as a result of drilling holes in the trees for the implants and injections.

This concern led to further research activity in learning more about wound closure following injury, injections or implants of an assortment of chemicals (8). Research was also conducted on internal injuries of trees and the following recommendations for injection treatments were offered (9):

- Make wounds as small as possible.
- Make wounds as shallow as possible.
- Make wounds on the root flare but not in the valleys.
- Do not align wounds in a vertical pattern.
- Do not wound trees annually.

- Do not wound trees when leaves are expanding in spring.
- Do not inject trees with large columns of decay.
- Do everything possible to increase growth of injected trees including watering, fertilizing and pruning.

The compounds receiving the most attention during the 1970s included ferric citrate and ferric ammonium citrate for control of iron chlorosis, manganese sulfate for manganese deficiency and zinc sulfate for yellowing of specific trees in the southern United States.

Ferric ammonium citrate implants effectively controlled habitual iron chlorosis in willow oak (6), pin oak, scarlet oak, northern red oak, willow oak and white oak, as well as white pine, Japanese black pine, sweet gum, star and sweetbay magnolia and oriental photinia (11).

Manganese sulfate implants have been found effective in reducing manganese deficiency found in flowering cherry (5), sugar maple, Norway maple (4), silver and red maple (11).

In 1980, continued research with "Maple Decline" was conducted by Funk and Peterson (1) in Michigan. They observed that soil fertilization with high nitrogen fertilizer, and trunk or foliar treatments with manganese, were often effective in improving the color and growth of sugar maples symptomatic of maple decline. The nutrient level was lower in chlorotic leaves than in healthy leaves for all elements except sodium and aluminum, supporting the thought that salt (sodium chloride) is involved in sugar maple decline along highways.

Pressure trunk injection of zinc sulfate increased leaf zinc levels of zinc deficient pecan trees in Georgia (13).

Few tree species require high levels of zinc for adequate growth, however, pecan trees are the exception and a range of 50-100 ppm zinc in the foliage is desirable. Without adequate zinc, pecan trees develop rosette, which begins with small crinkled terminal leaflets with interveinal chlorosis followed by limb dieback. Soil applications of zinc may take years to correct, especially in alkaline soils. Working with zinc sulfate implants and high pressure injection of zinc sulfate, Worley et al in 1980 (14) found pressure trunk injection the preferable treatment for pecan trees.

Some investigators have researched methods of acidifying the soil to correct chlorosis induced by unavailable iron and manganese in soils above pH 6.2.

According to Messenger (7), restoration of nutrient imbalances and normal leaf color can be accomplished and maintained for several years by topsoil and subsoil treatment with sulfuric acid. The author used 3N sulfuric acid



Iron deficiency of Sweet Gum grown in soil with a pH of 7.0

diluted in 5 gallons of water/100 square feet in two-inch diameter holes (PVC pipe), two feet apart, in two circles beneath the crown. Topsoil pH's beneath treated pin oaks were approximately neutral three years after sulfuric acid application. Subsoils treated similarly were still considerably acidic after four years.

Whitcomb (12) applied granular sulfur (96 percent) at rates of 10 and 20 lbs./100 sq. ft. of surface area of Bermudagrass sod. After 7 months, soil pH had dropped from 8.2 to 7.8 with 10 lbs. of sulfur, and to 6.6 with 20 lbs./100 sq. ft. Soluble iron and manganese increased with the added sulfur. Soil samples after 10 years showed that the availability of iron, manganese and zinc all remained higher in the soil as a result of the application of granular sulfur.

It is important to note that Messenger (7) observed injury to Kentucky bluegrass from granular sulfur at rates of 12 to 18 lbs./100 sq. ft., and unreported research in Ohio has shown injury to Kentucky bluegrass at both 10 and 20 lbs./100 sq. ft.

CURRENT COMMERCIAL PRACTICES. Current practices (1987) of two of the largest tree care firms in the U.S. for iron and manganese chlorosis are as follows:

IRON DEFICIENCY

Soil treatments — chelated iron and iron sulfate

Tree treatments —

1. Implants — ferric ammonium citrate
2. Injection
 - a) Chelated iron (gravity)
 - b) Ferric ammonium citrate (20 lbs. pressure)



Eastern White Pine (left) untreated control. (Right) Treated in March with trunk implants of Ferric Ammonium Citrate.



Manganese deficiency of Silver Maple (left) treated in March with trunk implants of manganese sulfate. (Right) Untreated control. Photos courtesy of Elton Smith.

MANGANESE DEFICIENCY

Soil treatments — manganese sulfate

Tree treatments —

1. Implants — manganese sulfate
2. Injection
 - a) Manganese sulfate (20 lbs. pressure)
 - b) Manganese sulfate (gravity)

All treatments, but especially those in the soil, should be made only when the soil is moist or results will be less than expected. Trees should be properly fertilized and otherwise healthy in order to achieve maximum results with minor element treatments.

SOIL AND FOLIAR TESTING. Minor element applications, along with all other mineral elements, should be based on the results of foliar and soil analysis. Soil analysis, of course, is necessary to determine the pH of the soil as well as phosphorus, potassium, calcium and magnesium levels. Foliar or leaf analysis is a more accurate means of determining mineral elements and especially important for minor elements such as iron, manganese and zinc.

Leaf analysis is used in arboriculture to diagnose suspected deficiencies or toxicities and to monitor the fertilizer program.

RESEARCH NEEDED. All the answers for successful prevention and correction of chlorosis problems of trees have not been found. Treating the cause instead of the symptoms is a high priority and continued research is needed to find better techniques to lower the soil pH for extended time periods without injuring the trees, turf or other plants.

More work is definitely needed in the correction of manganese deficiency of trees (2). The injection and implant treatments are only partially effective in work with maples. More effective compounds and/or application methods must be developed.

Most tree research with iron chlorosis has been conducted with pin oak, and cur-

rent commercial treatments have been quite successful. However, other species should be studied and more precise recommendations developed for sweetgum, river birch, red oak, white pine and other species.

Work remains to be done with foliar analysis to more fully define the requirements of various species of trees and the optimum range of iron and manganese. Deficiency levels have been determined, but sufficient or optimum ranges need to be more thoroughly defined. — *Elton M. Smith* ■

The author is a professor of horticulture at The Ohio State University, Columbus, Ohio.

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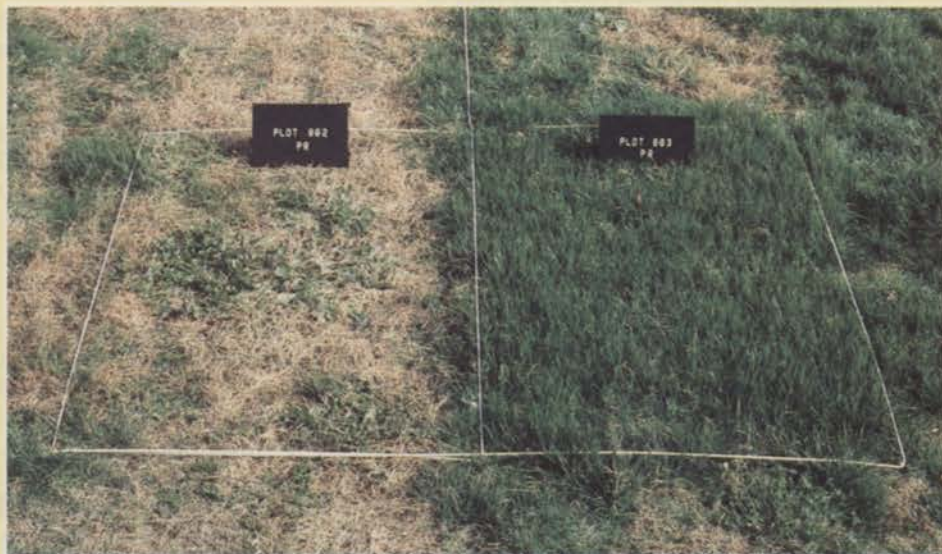
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Left, insect damage in perennial ryegrass. Right, endophytic ryegrass resists insect pests.

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Circle 4 on reader service card

PLCAA UPDATE

Why do people enjoy their lawns? There are many and various reasons why pleasure is derived from a healthy lawn. The Lawn Institute, in conjunction with the Professional Lawn Care Association of America, suggests that there are at least 26 good benefits of a healthy lawn — as simple as A, B, C. Following are excerpts from the soon to be released brochure on the ABC's of lawn and turf benefits:

A. Aesthetic values of turfed areas have been recognized since emperors in China (157-87 BC) maintained extensively mowed grass for beauty and enjoyment. Today most segments of the population of the United States enjoy lawns around their homes and in parks open to the public.

B. Business and manufacturing complexes that have well-maintained grass areas extend a favorable impression to the general public, as well as to employees and customers. The lawn increases the value of the property by up to 6 percent.

C. Climate is controlled at ground level by turfgrasses as they cool tempera-

tures appreciably, thus working as exterior "air conditioners."

E. Erosion of soil by water is highly controlled by grasses as they intercept raindrops before they disturb the soil, and slow flowing water so that it drops larger soil particles collected.

H. Health of humans is enhanced by turfgrasses as they function in cushioning, cleaning air, generating oxygen and creating a serene landscape.

I. Injuries in sports and games can be buffered by a soft, resilient turfgrass surface.

L. Lawns are estimated to occupy an area somewhere between 25,000,000 to 30,000,000 acres in the United States (the size of the five New England states). As the population increases so too will the amount of turfgrass acreage.

O. Oxygen generation by turf has a major impact in making our environment habitable. A 50-foot square lawn produces enough oxygen for a family of four.

P. Pollutants, such as carbon dioxide and sulfur dioxide, are absorbed by turfgrasses thereby rendering the air fit to breathe. Turfgrass thatch acts as a barrier deterring chemicals from entering the soil profile.

S. Sports playing surfaces are made safer when grassed with sure footing and cushioning sod that adds to the quality of play.

T. Traffic, both vehicular and pedestrian, is directed by lawn barriers in areas of heavy movement of people and on roadsides and medians.

Copies of the ABC's of lawn and turf benefits will be made available by the PLCAA in the coming months. The brochure is a good distribution piece for LCOs when educating their customers on the need for lawn care services.

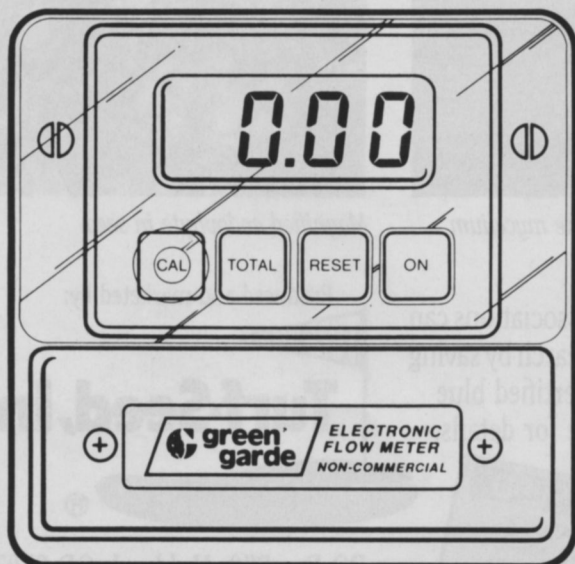
For more information on when the brochure will be available and its price, contact: Doug Moody, PLCAA, 1225 Johnson Ferry Rd., N.E., Suite B-220, Marietta, Ga. 30068; 404/977-5222. ■

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12 Galloway Avenue, Suite 1-E
Cockeysville, MD 21030
(301) 667-1833



CLIPPINGS

Ancient irrigation? It shouldn't be surprising that the father of the modern assembly line owned what is believed to be the largest surviving estate automatic sprinkler irrigation system in the world.

But Henry Ford was nearly as much an irrigation pioneer as an automotive tycoon. And today, the gargantuan matrix of three-inch underground pipe and antique pop-up sprinkler heads that cover much of his 1,210-acre estate is being put in working order for the first time in nearly 40 years, thanks to the efforts of several irrigation firms.

The system, one of the earliest of its type ever built, can be seen at his plush estate, Fair Lane, in Dearborn, Mich.

The unusual, early master satellite-type system features consecutive switching, carbonyl steel alloy pipe, and original 1915-patented John A. Brooks Inc. pop-up brass sprinkler heads. The zoned system consecutively sprinkles some 25 zones at 150 gallons per minute, about 10 times that of today's residential installations.

Michigan-based companies Century Rain Aid, Brooks and Waterways Irrigation Co. are working to revive the ancient



The search continues for 1,300 sprinkler heads on the Henry Ford Estate in Dearborn, Mich.

system by replacing broken and outdated sprinkler heads, and restoring the system's underground viability.

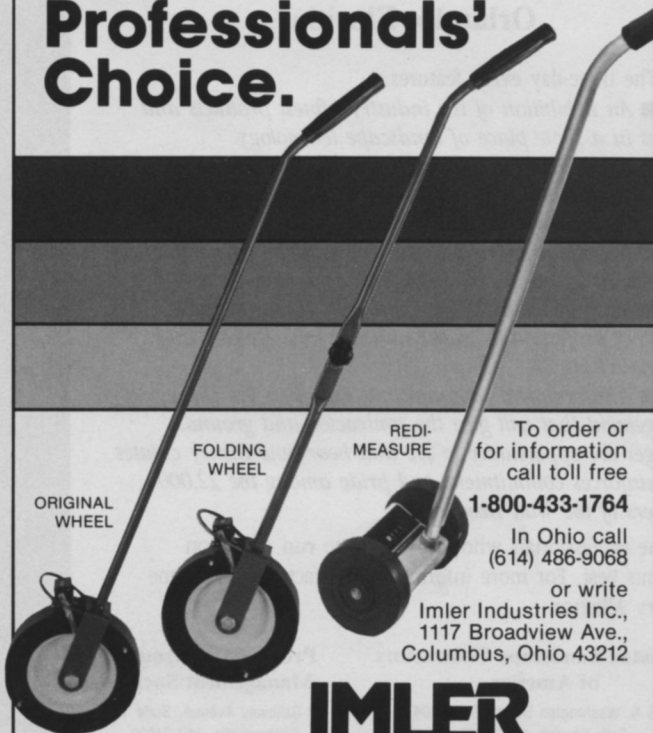
Century is donating the materials and Brooks, the original contractor on the Fair Lane installation, is providing consultation and labor as subcontractor on the restoration. Waterways Irrigation is the general

irrigation contractor and will install a new irrigation system in areas where there had been none before.

At best, the team can determine the system was completed around 1926. Though the system's cost is unknown, the Fords were known for never skimping on landscape architecture or groundskeeping. ■

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PEOPLE

Patti Curry Dunfield has joined the research department at Jacklin Seed Company, headquartered in Post Falls, Idaho.

Dunfield will coordinate plant variety protection and certification applications for the company. She will also be research liaison for The Lawn Institute and head up the Jacklin perennial ryegrass breeding and development program.

Her background includes teaching vocational agriculture and research in grass germplasm collection, morphological and cytological investigation.

Dennis Miller has been promoted to director and controller of Kubota Tractor Corporation, Compton, Calif. In his new position, Miller will be responsible for all corporate accounting and financial functions.

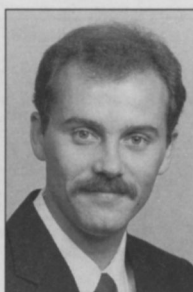
Miller joined Kubota in 1987 as controller.

Rain Bird Sales Inc., Glendora, Calif., has appointed **Tom Barrett** as district manager for its turf division.

Barrett will be responsible for providing sales support to Rain Bird distributors and contractors and serving as a liaison bet-



Dunfield



Snoddy

ween Rain Bird management and landscape architects, irrigation consultants and city and county officials. His territory includes the Great Lakes region.

R. Lawson Oldenburg has joined the sales staff at LESCO Inc., Rocky River, Ohio, as an equipment sales representative for North and South Carolina.

Before joining LESCO, Oldenburg worked as an assistant to the superintendent at Duck Woods Golf Club in Kitty Hawk.

Precision Laboratories Inc., has appointed **Alan M. Farha** to manager of its sorbent products division.

Former national sales manager for Renishaw Inc., Farha has also served in international and domestic sales and marketing management capacities with Bendix Corp. and Hesston Corp.

He will direct all phases of sales, marketing and technical support for Precision's CHEMSORB group of universal sorbents for hazardous and liquid spill control. The company headquarters are in Northbrook, Ill.

Steven P. Hansen has been named director of information services for the Toro Company.

Hansen previously was director of management systems for the Pillsbury Company with responsibility for planning and developing information applications for Pillsbury's food divisions.

Michael Snoddy was recently appointed manager of product engineering for Weather-matic.

Snoddy brings to his new position more than 10 years experience with Weather-matic. Most recently he was regional sales manager for Weather-matic's Rocky Mountain and Pacific Northwest sales regions.

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PRODUCTS

The Mixer, from **Power Spray Technology**, is a state of the art concept in chemical application that eliminates the pre-mixing and transporting of bulk chemicals, and the associated problems of waste and disposal.

Easily adaptable to an existing lawn rig, the mixer can be calibrated to draw any chemical concentrate directly from the manufacturer's original container. Once calibrated, dial the setting for the finished spray desired and the mixer's patented micro-injection system™ automatically meters the correct amount of concentrate, and mixes it with water drawn from the lawn rig. No chemical passes through the pump, so chemical concentrates can be switched at any time.

Power Spray Technology's mixer is adaptable to any rig with a pump supplying a minimum of 2.3 gpm and minimum 1/2-inch ID hose.

The mixer comes with two brass 3/4-inch by 1/2-inch reducer bushings, one 3/4-inch by 3/8-inch galvanized 90 degree ELL, a calibration kit and instruction booklet.

Circle 101 on reader service card



A new one-pass Goossen Rake 'n' Vac from **Goossen Industries** is a three-season machine. It removes thatch in the spring, picks up and mulches leaves in the fall and mows through the summer. In addition, the Rake 'n' Vac hauls all the debris away.

The Rake 'n' Vac is two machines in one — a P.T.O.-driven flail unit and a powerful vacuum mounted on a 101-bushel trailer. The flail unit power rakes, mulches leaves

as it picks them up and mows (with available accessory blades for the flail unit). The Goossen VAC drops the material into the large trailer, which is equipped with an automatic endgate and tilts for easy unloading. Driven by its own 8-horsepower gasoline engine, the Goossen Vac can be operated independently of the flail unit.

An available hand-held flexible vacuum hose allows pick up of leaves and debris

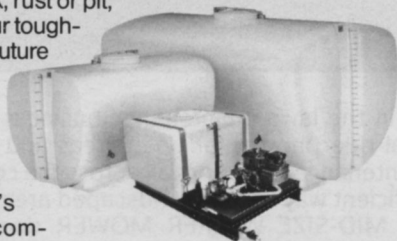
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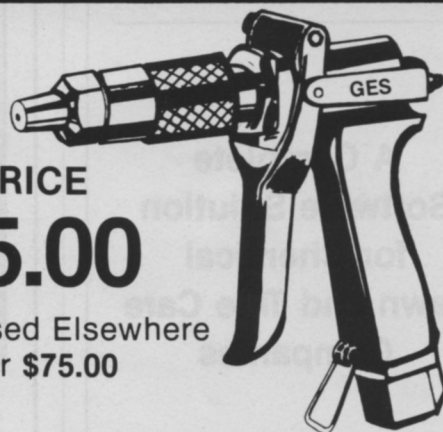
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from ditches and other areas where the flails cannot be operated.

Circle 102 on reader service card

Becker Underwood recently introduced a new, special purpose spray pattern indicator called Bas-Oil Red.

Bas-Oil Red is a soluble, bright red spray marker designed for systems which use petroleum-based chemicals and diluents. It is specially designed to enhance the spray accuracy for streamline and convention basal treatments, dormant stem and cut stump herbicide treatments.

Initially developed and formulated last year, Bas-Oil Red has had limited distribution through selected dealers. After months of field trials, Bas-Oil Red is now available for widespread distribution.

Mixed properly, Bas-Oil Red takes the guesswork out of applying herbicides. It helps prevent skips and double applications and assists in minimizing drift.

Bas-Oil Red comes packaged in convenient pint and gallon containers. Normal rates call for as little as 2 to 4 ounces for each 5 to 10 gallons of chemicals.

Circle 103 on reader service card

Stallion Turf-Type Perennial Ryegrass from **Fine Lawn Research Inc.** was recently released.

Stallion was developed using fine-textured clonal material collected in Germany, Austria and Hungary, plus three selected clones from a spaceplant nursery in Oregon.

PRODUCT SPOTLIGHT

Jacobsen's new commercial-quality portable chipper/shredder has 3-inch chipping capacity.

The chipper/spreader loads easily onto an equipment trailer for transport between jobs. This frees up the landscaper's hitch to haul a whole trailer load of grounds maintenance equipment — not just a chipper. Large wheels and a swivel tow bar make the unit easy to move.

The chipper/shredder has separate drive shafts for the shredding rotor and chipping flywheel. The flail-like rotor operates at 950 rpm for efficient, high-torque shredding. The 3/4-inch thick, 20-pound flywheel runs at 3,500 rpm for fast, high-energy chipping. Individual clutches allow the shredder to operate without running the chipper, reducing wear and tear.

Jacobsen's chipper/shredder is available with either a Briggs & Stratton or Kohler Magnum 8-horsepower air-cooled engine.

Circle 104 on reader service card

Stallion is a 27-clone synthetic cultivar of moderately green color with good turf characteristics. It produces dense turf due to its heavy tillering ability and has excellent mowing qualities. Stallion has good resistance to leaf spot and crown rust.

Stallion establishes quickly and is compatible with other ryegrass varieties in overseeding blends. It performs best with moderately high soil fertility, but has good per-

sistence under low fertility levels. Stallion is well-suited to northern climates and is well-suited for annual overseedings of Bermudagrass.

Stallion will be marketed throughout the United States and Canada, and will be available in limited quantities this crop year.

Circle 105 on reader service card

LESCO Inc.'s new Turf Renovator is designed to function as a dethatcher, slicer or slicer/seeder. The renovator is a self-propelled unit with a variable ground speed

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from zero to 4 mph and a dethatching, slicing and seeding width of 20 inches.

The compact, low profile design provides hillside stability and ease of transportation and storage. Equipped with an 8-horsepower Briggs & Stratton I/C® engine, or an optional Honda engine, the renovator also features flotation tires for improved traction and reduced compaction. Down-pressure on the handle raises the front wheels, the seed hopper and slicing reel for easy turning.

As a slicer, the turf renovator dethatches lawns and general turf areas, and can overseed at the same time. It has a manual depth control variable from zero to 1½ inches. Hardened, high-carbon steel blades, spaced 2 inches apart, provide more effective overseeding than machines with 3-inch spacing. The blades are reversible and replaceable.

As a seeder, the renovator has a fully-agitated seedbox. A 1½ cubic-foot hopper holds approximately 35 pounds of seed. For optimum incorporation, seed is metered before slicing.

Circle 106 on reader service card

The Dow Chemical Company recently introduced childproof containers of Dursban™ 50W insecticide in water soluble packets.



The new 13-inch tall fiber cans contain eight individual packets of the product and are clamped shut with a metal lid called a "friction fit plug." The lid is similar to the lid on a paint can.

The new packaging has advantages because it offers continued ease of disposal by crushing or burning, and provides better moisture resistance, according to company representatives. It has a larger capacity than the original paper laminated pouch, and it's easy to reclose.

The childproof concept is not new to Dow, as the company already offers Turflon™ herbicide, Dursban 4E and Dursban LO in childproof containers.

New packaging for Dursban was prompted by Environmental Protection Agency regulations which require all pesticide products carrying a "danger" or "warning" classification, and used in and around private residences, to be packaged in child-resistant containers.

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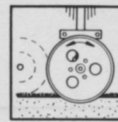
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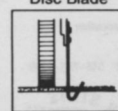
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TURFCO

An 11-horsepower truck loader is now being offered by **Billy Goat Industries**.

The TR-1100 IC is ideal for heavy-duty cleanup of wet and damp debris, such as freshly cut grass and wet leaves. The 11-horsepower model joins the other truck loaders in Billy Goat's TR-series lineup: the 8-horsepower TR-800 and the 5-horsepower TR-500.

Under heavy, wet loads, the bigger Briggs & Stratton IC engine gives the TR-1100 IC an increased rpm so that tough jobs can be performed without slowdown or interruption.

Like the other Billy Goat truck loaders, the TR-1100 IC sucks material through an 8-inch by 12 1/2-foot intake hose. The debris is pulverized by a four-blade steel impeller before being discharged into the back of the truck. This reduces the bulk of the load and maximizes hauling capacity.

The TR-1100 IC is designed for industrial and commercial use. Its heavy-duty housing and discharge chute resists abrasion and gives a smooth flow of debris into the truck. The exhaust elbow rotates for loading and unloading, and the adjustable deflector at the end is designed to decrease the velocity of debris at dispersion.

Circle 108 on reader service card

CORE CULTIVATORS (continued from page 30)

percent of the soil in one pass.

When looking at the present soil exposed by the currently available machines — anywhere from 1 percent to 4.4 percent in one pass — we see that many are exposing far less surface in a single pass than is necessary for what would be considered a high quality core cultivation. If we lower our standards to 3 percent as an adequate performance standard, few currently available machines meet this standard.

The combined effects of tine diameter and tine spacing on any given core cultivator can make a tremendous impact on the amount of soil brought to the surface.

In order to perform an adequate core cultivation with most of the machines available to the lawn care industry, several passes are necessary. With this in mind, it is possi-

ble to weigh some of the other considerations more heavily before deciding which machine comes closest to meeting the industry needs.

Some lawn care operators may want to trade the heavy maintenance requirements of some core cultivators, particularly cam types, for fewer passes across the lawn. Others may be content to pass over the turf area several times with some of the lower maintenance machines, especially drum types. Still others may not be doing an adequate job of core cultivation.

As you can see there are a lot of choices to be made just when you consider surface exposed per pass. The minimum amount of soil exposure on home lawns should be somewhere around 3 percent to 3 1/2 percent.

Put all of this information together with the durability, maneuverability and number of passes required to do the kind of job you would like to accomplish, and you have all of the factors needed to make a purchase decision. — *Doug Halterman* ■

The author is senior vice president of Leisure Lawn Inc., Dayton, Ohio, and is an agronomist specializing in turfgrass management. He is a frequent speaker at many Midwestern conferences including the Ohio Turfgrass Foundation Conference and Show.

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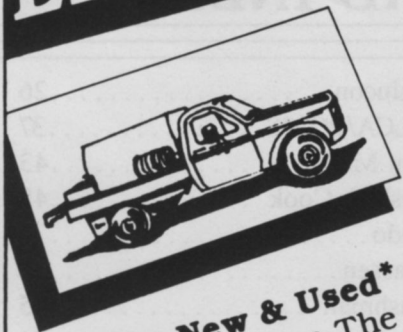


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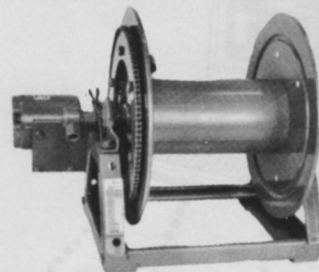
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Lawn care companies of all sizes anywhere in U.S. wanted to purchase by national corporation. If interested please respond to: ALA magazine, Box 329, 4012 Bridge Ave., Cleveland, OH 44113. Strict confidentiality maintained.

Wanted to Buy

Ever-green Lawns, a Division of ADT Limited, an international service company doing in excess of a billion dollars in sales annually, wants to acquire lawn care companies of all sizes. All inquiries strictly confidential. Please contact: Steve Hirshmuyl, Director of Finance and Acquisitions, Ever-green Lawns Corporation, 1390 Charles-

town Industrial Drive, St. Charles, Mo. 63303; 314/946-9700.

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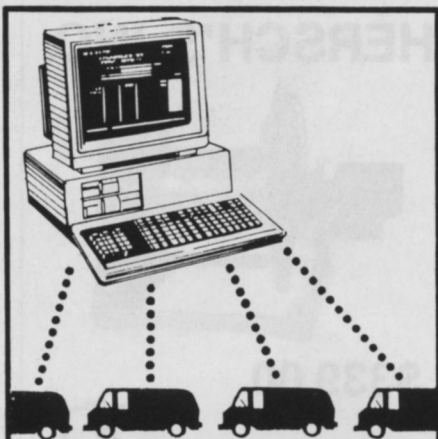
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