



Annual Conference and Exhibition Changes Approved

After an extensive analysis of the comments of the attendees and exhibitors at the last two NTA conferences and exhibitions, the NTA Board of Directors has concluded that the majority of the members are interested in conference sites with the traditional resort amenities rather than those offered by major city hotels. Accordingly, future conference sites will lean more toward destination resorts e.g. Coeur d'Alene Resort, Rippling River, etc. than hotels in major urban centers e.g. Seattle, Spokane, etc.

One drawback to this decision is the fact that the exhibition, which has grown extensively over the past years, will have to be tailored to more limited spaces than those we've enjoyed recently such as the Spokane Convention Center. The NTA Board recognizes it is important for members to have the opportunity to meet with suppliers and see their products and equipment, rather than reducing that opportunity by reducing the annual exhibition space, the exhibition will be divided into two parts. The first part will be a "products supplier exhibition" to be held in conjunction with the annual conference in the Fall. The second part will be an "equipment supplier hands-on demonstration" to be held in conjunction with the Summer Golf Tournament for Research and the WSU Field Day.

In addition, the NTA Board approved the following "Conference Prospectus" or statement spelling out the goals that the annual conference is intended to attain:

- to assist the conferees develop and refine turfgrass management skills necessary for the effective performance of their responsibilities;
- to broaden the conferee's perspective and knowledge regarding turfgrass industry research and development activities;
- to provide the conferees with the opportunity to share policies, programs and practices concerning their responsibilities;
- to provide conferees and industry leaders and experts with a forum (open discussion) opportunity pertaining to contemporary Pacific Northwest turfgrass industry management issues;
- to provide conferees with a display and, where practical, demonstration of state-of-the-art cultural and technological turfgrass industry developments.

1989 Northwest Turfgrass Conference and Exhibition

This year's Northwest Turfgrass Association (NTA) **43rd Northwest Turfgrass Conference and Exhibition** will be held September 18-21, 1989 with the Tacoma Sheraton Hotel serving as the conference headquarters.

The adjoining Bicentennial Pavilion will house the products supplier show. Inquiries are already being received in the NTA office about exhibit space in the seventeen thousand (17,000) square foot Pavilion exhibit hall. Exhibitors should get this exhibition on their schedule immediately!

Plans for the conference golf tournaments (men's and women's) are already taking shape. In addition to the golf tournaments, many other activities are on tap for the spouses. Plan now to join your colleagues at the conference and exposition. You can't afford to miss it.

Research and Scholarship Fund Raising Campaign

Randy Shults, chairperson of the NTA Research and Scholarship Fund Committee, has announced the kick off of the 1988/89 Research and Scholarship fund raising campaign.

Intimately involved with turfgrass management, we realize more than most, that today's turfgrass quality is the result of knowledge and technological gains resulting from research and education accompanied by hard work and effort. We owe our thanks to those who gave their time and money to make the research and education possible, for without them we would have to rely on our own slow trial and error methods.

Few of us are independently capable of nor prepared to conduct the research or develop the education program necessary to keep the industry on the leading edge. Recognizing this, the Northwest Turfgrass Association created a research and scholarship fund to help make it possible for each of us to participate significantly in the advancement of present and future knowledge. Through this fund, each of us can financially contribute to industry research and education advancements.

Donation forms will be mailed to members and industry supporters within the next month or so. Contributions are tax deductible and those contributing to the research and scholarship fund each year are recognized in the NTA Annual Directory.

Buy a share today in better turfgrass for tomorrow.

President's Corner

Another year has gone by and, as we prepare to put it in the books, it seems to be a good time to reflect on the accomplishments of 1988 and look at plans for 1989. The following individuals will all play essential roles this year making my job as president easier.

The educational sessions at the 1988 NTA Conference in Spokane were among the best ever. Vice President Dr. William Johnston will again chair the educational program with help from newly elected board member William Griffith and past president Jim Chapman. Expect another outstanding program at the 1989 NTA Conference in Tacoma.

Bo Hepler will serve as treasurer this year having served the association in many capacities including vice president in 1986, president in 1987 and treasurer in 1988. Bo did such a great job last year, we've elected him for a repeat performance.

Our past president, Jim Chapman will chair the nomination committee this year after an outstanding job of leading the association in 1988. Jim left some big shoes to fill, but his years of experience and knowledge will still be with us.

The research and scholarship committee is being chaired by Randy Shults, who also served in that capacity in 1988. Randy has done an outstanding job in reorganizing the time frames for applications, as well as, the grant allocations process. Randy will be assisted by William Griffith. They will do a great job in 1989!

Another repeat performance will come from Norm Whitworth who will chair our membership committee. Norm is also organizing the Second NTA Golf Tournament for Research. Plan on attending the golf tournament on Monday the 19th and the WSU Field Day and NTA Equipment Demonstration on the 20th.

Heading our conference hospitality and spouse program this year will be Becky Michels. Her knowledge of the Tacoma area, combined with input from Bo Hepler, will make the program one of the best ever. Becky is a great addition to the board.

This year's conference golf tournament chairman will be Rick McCoy. Rick knows his way around the golf course, having always been among the winners in the past conference golf tournaments.

The chair of our trade show will be Pat Nibler. Pat's viewpoint as a supplier, along with great facilities, will insure an outstanding show.

Rounding out a great board of directors for this year is Roy Goss. Roy's name is synonymous with the Northwest Turfgrass Association. After nearly 30 years of dedication, he still serves the NTA as Director Emeritus and his input is priceless.

Blair Patrick, and his staff at Organization Management, will handle the bulk of the administrative work during the year. They don't let anything slip between the cracks.

The Sheraton in Tacoma is an outstanding site for our



1989 NTA Conference and Exhibition and we will make it one you won't want to miss. Hope to see you all there.

Have a great year in 1989.

Second NTA Golf Tournament for Research

The Northwest Turfgrass Association will host the **Second NTA Golf Tournament for Research** Monday, June 19, 1989. The tournament is being organized by Norm Whitworth and Ric McCoy. The cost will be \$50/person with most of that fee going to the NTA Research and Scholarship Fund. Norm and Ric promise more information and details in the near future.

Membership Drive for 1989

The annual membership drive is well underway. Annual membership dues statements for 1989 were mailed in December to all 1988 members. Reminder notices are being mailed currently to those members who have not yet paid their dues for the year and, in addition, invitations are being mailed to a number of new member prospects, according to Norm Whitworth, NTA Membership Chairperson.

Benefits of NTA membership include a quarterly newsletter; an annual membership directory; an annual conference proceedings; reduced registration for the annual conference and exhibition; information on current research and other industry developments; and golf tournaments with proceeds going to benefit turfgrass research and student scholarships. The fact that the NTA is responsible for a major portion of the turfgrass research funding in the Northwest today is an accomplishment all NTA members are proud of.

Oregon Requires Pesticide Applicator's License Renewal

Those with Oregon Pesticide Applicators licenses will have to renew them every five years, according to new state rules. The one-time test to obtain a license is gone.

There are two ways to be re-certified. One is to take a test at the end of each five-year period.

Or, one can get additional training and education relating to handling pesticides and document that work for credit. The new rules require a person to obtain 16 "credits" over the five years. "Credits" will be given for attending various educational sessions offered by horticultural organizations, manufacturers and supply companies, Oregon State University Extension Service, community colleges, etc. The sponsoring group will apply to the Oregon Department of Agriculture (ODA) for the credit-units they can offer those attending. The available credits will be included in all session announcements.

To receive credit, one must register his or her license number with the sponsor at the session.

And, there are some additional rules. First, no more than 12 hours can be accredited in any one year. Secondly, four hours must be taken from both Core "A" topics as current federal and state laws concerning labeling, application, safety, and handling of pesticides. Core "B" topics include toxicity, protection and preventing contamination of the environment, and protecting endan-

(Continued on page 3)

Applicator's License *(Continued from page 2)*

gered and threatened species from pesticide exposure.

Each licensee will be notified annually by the ODA on the years remaining on their license, their present credit total toward renewal, and the units still needed for renewal.

The Oregon Golf Course Superintendent Association offers a two-day Oregon Pesticide Applicator Seminar annually.

For information, contact Dick Malpass, OGCSA, 10804 NW 11th Ave., Vancouver, WA 98685, or call (206) 573-6969.

Goss Establishes Turfgrass Research Fund

Roy L. Goss, retired turfgrass specialist from Washington State University, has challenged the turfgrass industry to donate money for education and research and offered to match contributions out of his own pocket. The challenge was announced last week at the 42nd Northwest Turfgrass Conference and Exhibition. Goss retired in February after nearly 30 years as WSU's turfgrass extension specialist.

Goss will match each \$15 donated to the **Roy L. Goss Turfgrass Endowment Fund** at Washington State University with \$1 of his own, with a ceiling of \$10,000 on his own contribution. The offer is good for one year.

Rick Swantz, development officer for the WSU College of Agriculture and Home Economics, said the fund will be used to support turfgrass research education and scholarships.

Goss said he issued the challenge because there is a need for more money for scholarships and research programs in turfgrass management, and because turfgrass affects everyone's life.

It not only makes the home environment attractive, but is an essential element in many recreational pursuits, such as golf, ball games, and city parks.

Grass seed production also is a major Pacific Northwest industry. Washington farmers produce about \$13 million worth of Kentucky Bluegrass seed each year.

Contributions may be made to the **Roy L. Goss Turfgrass Endowment Fund**, 223 Hulbert Hall, WSU, Pullman, WA 99164.

Turf Research You Can Use

by Thomas Cook

Turfgrass research in the West has long been in a state of flux and the past year was no exception. Three of our finest extension and research people retired leaving large gaps to fill. Dr. Roy Goss of WSU will long be remembered for his fine work with turfgrass nutrition and athletic field construction. Dr. Jack Butler of CSU leaves a legacy of outstanding graduate students and his many years of work with turfgrass water use and iron fertilization. Mr. Bill Davis from UC-Davis leaves his extensive work with sand construction for athletic fields and his work with irrigation efficiency. In spite of these losses the turfgrass research picture is beginning to look stronger than it has for some time. Expanded and redirected programs are developing rapidly throughout the West led by young and energetic researchers. The research efforts reported here are a small glimpse of what the future holds for our region.

Brauen, Nus, and Goss, WSU, reported on nitrogen use efficiency studies conducted at Puyallup, WA. On Penn-cross bentgrass putting turf maximum growth and turf quality were achieved with ammonium sulfate and the lowest with ureaformaldehyde. Nitrogen content of turf clippings was highest with ammonium sulfate and SCU and lowest with ureaformaldehyde. In all measurements urea, ammonium nitrate, IBDU, Oximide, and urea +MgCl₂ were intermediate. Nitrogen contained in clippings and in the sand profile accounted for 75% of applied ammonium sulfate but only 52% of applied IBDU. Ammonium sulfate produced the lowest level of nitrate in leachate when compared to other sources.

Johnston, Golob, Gullickson, Crook, and Brower, WSU, reported on their long term fertility studies in Pullman, Wash. Nitrogen sources in this test included mehtylene urea, IBDu, SCU, Ammonium sulfate, Ammonium nitrate, and two mixed fertilizers. Best turf performance was observed with ammonium sulfate, sulfur coated urea, and a complete fertilizer 21-3-5 using urea and SCU as nitrogen sources. Light frequent fertilizations regardless of source gave the best turf quality. Late fall applications with ammonium sulfate produced excellent turf quality in spring. Other nitrogen sources were less effective. This test emphasized the value of fall fertilization and the need for sulfur fertilization in eastern Washington.

Harivandi reviewed the role of iron in turf culture. Iron deficiency is intensified by frequent close mowing and may be intensified by nitrogen fertilization. Deficiency symptoms are typically most severe in late summer to mid-fall. Causes include iron deficiency in soil, antagonism by other nutrients, high soil pH, high bicarbonate in water, and susceptible turf varieties. Correcting this problem will solve the problem in many cases. Rapid improvement in turf quality can be achieved with both soluble and chelated iron sources. Rapid improvement in turf quality can be achieved with both soluble and chelated iron sources.

Irrigation continues to be an important area of research throughout the West. Fry, CSU, reported on turfgrass water research at Fort Collins, CO. Water use by "Penn-cross" and "Emerald" bentgrass were similar to *Poa annua* in 1985 but higher in 1986. All grasses used more water when mowed at .5 inches than at .25 inches. He suggested fairway and green collars may require more water than putting turf during summer months. During turf establishment "Rebel" tall fescue used more water than

(Continued on page 4)

**QUALITY
AT ITS**



J. R. SIMPLOT COMPANY



FERTILIZER

(206) 485-2378

Turf Research *(Continued from page 3)*

"Merion" Kentucky bluegrass in 1985 but not in 1986. When irrigated at 100%, 75% and 50% potential ET "Reliant" hard fescue had significantly lower quality at 50% of ET than at 75% or 100%. "Rebel" fall fescue generally produced acceptable turf even when irrigated at 50% of potential ET. In this test Rebel exhibited exceptional drought tolerance.

Minner, MO, summarized his work with irrigation scheduling done at Fort Collins, CO. When irrigating at 2, 4, 7, or 14 day intervals less water was required to achieve acceptable turf quality when water was applied frequently. Turf irrigated at 2 day intervals required 73% of the predicted maximum water requirement, while 4 day intervals required 85% and 7 day interval 106% of the predicted amount. Minner noted many variables that might affect water requirements. In situations where water use may be entirely restricted in late summer, thorough infrequent irrigation is the preferred approach. Where water is consistently available, top quality turf can be maintained with less total water if applications are made at 2-4 day intervals than at 7 day or longer intervals.

Pest Management

According to Brauen and Goss, WSU, a wide variety of insecticides are effective in controlling larval stages of European crane fly. Isofenphos, bendiocarb, trichlorfon, chlorpyrifos, methoxychlor, diazinon and carbaryl have all proven effective in insecticide trials over the past five years. Currently these researchers are evaluating the potential effectiveness of endophytic fungi for biological control of this insect.

Necrotic Ringspot has become a serious patch disease in Washington and parts of Oregon. Chastagner and Hammer, WSU have developed methods for stimulating fruiting bodies and sporulation of the causal fungus. They have also initiated field trials to screen for varietal resistance to this disease. Current information indicates that greenhouse screening techniques are not entirely reliable under field conditions. Fungicide control of this disease is possible with Rubigan, Banner, Spotless, and Fungo. When applied in early spring these chemicals effectively control disease development during late summer and fall. Successful control of this disease requires yearly fungicide applications.

Chastagner and Staley, WSU, have also evaluated fungicides for control of Take-All Patch on soil-base bentgrass turf. Single applications of Banner, Rubigan, or Baleton (1-2 oz. ai/100 sq. ft.) during December provide effective disease control. Less control was achieved with spring applications.

Meyer, OR, reported that stem rust (*Puccinia graminis*) has been observed on tall fescue in Willamette Valley of Oregon. This has long been a serious disease on perennial ryegrass grown for seed production and can seriously reduce seed yields.

Harivandi, Elmore and Henry, CA, evaluated numerous herbicides on "Futurf" and "Adalyd" seashore paspalum. Temporary turf injury resulted from application of 2,4-D amine, dicamba, and mixtures of these two herbicides. Injury to both cultivars also occurred after application of MSMA and Quadmec. Super trimec caused slight injury only to "Futurf". Injury from triclopyr and trimec were observed one month after herbicide application. No phytotoxicity was observed from annual February applica-

tions of benefin, DCPA, bensulide, or oxadiazon.

Johnston and Golob, WSU, tested Acclaim for post-emergency crabgrass control. In these experiments Acclaim provided excellent post-emergency control of crabgrass. Kentucky bluegrass was slightly injured and bentgrass was severely injured by the herbicide. Nitrogen and iron tank mixed with Acclaim reduced herbicide injury on Kentucky bluegrass. Tank mixing Acclaim with broadleaf herbicides reduced crabgrass control.

Grasses

Development of turfgrasses with low fertilizer and irrigation requirements, and with good salt tolerance has become a high priority in the West. A great deal of attention is currently focused on tall fescue. Gibeault and Autio, CA, have evaluated turf type tall fescues in southern California. All varieties performed better at a 1½" mowing ht. than at ¾" mowing ht. Turf types had better color, better resistance to crabgrass invasion, and better rust resistance than forage types. Top varieties in this test included Jaguar, Rebel, Adventure, Arid, Olympic, Apache, Falcon and Hounddog. The authors consider the turf type tall fescues to be a major plant material breakthrough in cool season turfgrasses for California.

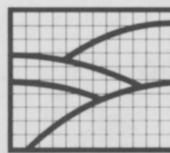
Working with the same test area Leonard, Autio, Gibeault, and Cockerham, CA, determined thatch production characteristics of pasture and turf type tall fescues. Thatch depth varied from 0.64 in. for KY-31 to 1.14 in. for Trailblazer. Low thatch formers among turf types included Jaguar, Mustang, Bonanza, Willamette, Finelawn, Falcon, and Pacer.

Meyer, OR evaluated tall fescues for shade tolerance from 1983-1987. Trailblazer, Apache, Jaguar, Olympic, and Bonanza were among the top performers in this trial. Meyer also reported on vertical growth of fine fescues under low maintenance conditions. Sheeps fescues were the shortest followed by hard fescues. Chewings and Creeping fescues were generally taller than other grasses in this trial.

Under low fertility conditions Cook, OR, rated fine fescues for Red thread disease. Hard fescues were highly resistant, chewing fescues were intermediate, and creeping fescues were generally highly susceptible.

Gibeault and Leonard, CA, evaluated mixtures of clover and bermudagrass for low maintenance turf in southern California. Strawberry clover seeded at 1-2 lbs/1000 sq. ft. during fall into an established common bermudagrass sward that had been vertical mowed and/or close mowed resulted in a uniform mix of the two species. Uniformity and color were generally good under low nitrogen fertility and cutting heights above 1.25 in. Clover

(Continued on page 5)



INTEGRATED TURF
MANAGEMENT PROGRAM

LILLY/MILLER.

COMMERCIAL
TURF PRODUCTS

Fertilizers • Seed • Chemicals

The Chas. H. LILLY Co.

PORTLAND

(503) 256-4600

1-800-433-3015 (In Oregon)

1-800-523-3668 (Outside Oregon)

SEATTLE

(206) 762-0818

1-800-562-7013 (In Washington)

1-800-562-7823 (Outside Washington)

Turf Research *(Continued from page 4)*

flowers were considered unsightly and attracted bees during periods of heavy use. Succulent clover growth made mowing difficult.

Kopec, Mancino, and Namde, AZ, studied performance of endophyte containing perennial ryegrass under desert conditions. Turf with endophyte did not differ significantly from endophyte free turfs for ET rates, total water use, canopy temperature, or visual wilting. Turf without endophyte tended to wilt earlier at higher volumetric water content but not significantly. Heat tolerance was equal for turf with and without endophyte.

Wu, Till, and Torres, CA, studied germination of annual bluegrass seed from greens, fairways, and roughs under high temperature (25 degrees C) conditions. Seed from roughs had poor germination indices while seed from greens had high germination indices. Seed from fairways varied dramatically in germination percentage.

Source: Parks/Ground Management

Winterizing Irrigation Systems

by O. J. Warner

These instructions are based on observations and time-proven practices in the field. Extreme caution must be taken when injecting compressed air into an irrigation system.

Some manufacturers of pipe and other components do not warrant their products when subjected to compressed air and do not prescribe to this method of vacating the water.

Hunter Industries and the publisher assume no liability and do not guarantee success by following these guidelines.

In areas where the potential frost level extends below pipe installation depth, the designer and installer must provide irrigation systems with drainage capabilities. This can be accomplished with either manual or automatic drain valves.

Some end users feel that automatic drain valves are too easily clogged, causing water to remain in the pipes which could result in freeze damage. It is also possible for water hammer damage to cause system damage, if the pipes are drained after each irrigation cycle.

Either type of drain should be installed and utilized according to manufacturers instructions. Systems utilizing check valves to prevent low head drainage cannot be winterized using manual or automatic drain valves.

The use of a portable air compressor to provide insurance against pipe breakage is most common. The method to blow water out of an irrigation system may differ from the following depending on the type of equipment involved.

Drainage of the Irrigation System

There is a controversy whether winterizing is necessary in systems using poly pipe. Some contractors feel that systems installed with poly will survive for a short time without vacating the water, but that after a period of years the stress put on the pipe by expansion of the water will cause fractures.

All manufacturers of poly I have talked with agree that it is not necessary to vacate the water from poly. They do caution that the pipe must be **buried**. Otherwise, it may be possible for the pipe to be broken if struck or flexed while full of frozen water.

(Continued on page 6)



A Natural On The Gridiron

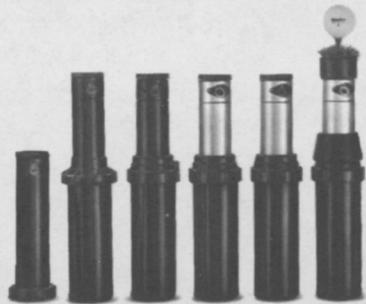
The Institutional Series

For high performance and versatility, Hunter Institutional Series sprinklers score big on sports fields.

Interchangeable nozzles make it easy for turf managers to water exactly the way they want. They can match other sprinklers in a system, or use modern low-precipitation rates for water and energy savings.

The Institutional Series also comes out on top in player safety and vandal resistance. All sprinklers have safety-cushioned rubber covers and small exposed surface areas. They feature break-resistant arc stops, clutch-protected drive systems and locking caps.

The Hunter Institutional Series — backed with a five-year, over-the-counter exchange warranty (not prorated).



The Hunter Line-up (left to right)
I-10, I-20, I-25, I-40, I-42, I-44 Sod Cup



Hunter Industries □ **The Irrigation Innovators**
1940 Diamond St. □ San Marcos, CA 92069 □ 619/744-5240

Member 
The Irrigation Association

Telex: 9103335694 Ans. HUNTER IND SM □ FAX: 619/744-7461

Irrigation Systems *(Continued from page 5)*

Systems with 3" diameter pipe or less can be blow out with a 125 CFM compressor. Larger systems (4" diameter pipe and larger) may require 250 CFM or more.

After hooking up the compressor, insure one zone is on prior to opening the valve on the compressor. Gradual adjustment of pressure upward to 50 PSI will reduce the chance of water ram damaging components. If the heads do not pop up and seal, adjust the pressure upward until they do. **NOTE: Do No Exceed 80 PSI!**

Activate the zone furthest from the source first. After the main is cleared of water, sequence through the other zones. Run through two short cycles rather than one long one. This allows for the removal of water that has drained from another zone. Cycling through the system twice also helps to avoid longer dry times which could cause damage due to heat build up.

Also, be sure to blow out the zones at highest elevation first and work downward. Don't forget that water will run down hill into the main if you start at the bottom and work upward.

At lower temperatures there is a potential for ice to build up in the nozzle. If the nozzle opening freezes shut, it is possible that the water will not be vacated from that area of the pipe and freeze damage may occur.

Check the pipe closest to the compressor from time to time to ensure that it does not get hot to the touch. This is an indication that air velocity through the pipe is too great and should be reduced. Excess heat buildup can cause damage to the pipe and other components in the system.

The time required to vacate a zone will be anywhere from five minutes up. When the water coming from the sprinkler nozzle is reduced to a fine mist, an adequate amount of water has been blown from the system. When you are satisfied that you are through, leave one zone on and shut down the compressor.

When winterizing a hydraulic control system, close and disconnect the potable water supply line to the signal control tubing and let the tubing drain. Most reference materials say that it is not necessary to drain poly control tubing, but if PVC control tubing has been used it must also be blown out.

Don't's

1. Don't exceed 80 PSI of air pressure to blow out systems that are designed to operate at less than 80 PSI water pressure.
2. Don't stand over component parts while system is under air pressure.
3. Don't leave air compressor unattended.
4. Don't blow out an entire system through a pump. First blow out the system; then winterize the pump.
5. Don't leave manual drain valves open. It could cause water to enter the system during winter thaws.
6. Don't disassemble component parts while the system is under pressure.
7. Don't forget that it is easier to do the job right the first time than it is to replace components in the spring.

Source: *Industry News (IRA)*



THE BEST IN TURF MAINTENANCE FROM ONE RELIABLE SOURCE.

Your satisfaction is important to us. That's why we worked so hard to represent nothing but the best brands in turf maintenance equipment. So far, we think we've done a pretty good job. But we're not going to stop there. We are constantly testing and looking for new equipment that will help you do your job better and more easily.

Have you used or seen something you think we should stock? Give us a call. With your help, we're going to become your "one-stop" source for all your turf maintenance needs.

ONE CALL DOES IT ALL!

Western

Equipment Distributors Inc.

20224 80th Ave. S.
Kent, WA 98032
(206) 872-8858

E. 2824 Garland
Spokane, WA 99207
(509) 483-8665

Underground Storage Tank Regulations

Thousands of golf courses nationwide will soon have to comply with the first set of comprehensive federal guidelines aimed at preventing groundwater contamination from underground storage tanks (UST's).

In mid-September, the Environmental Protection Agency issued a 370-page set of regulations requiring the owners of UST's to take steps to prevent contamination. The rules begin applying to new tank installation as soon as December of 1988, but some owners have until 1998 to bring most newer existing UST's in line with the new corrosion protection standards.

The EPA's Office of Underground Storage Tanks has given GCSAA permission to reprint copies of "Musts for UST's: A User's Guide to Regulations for Underground Storage Tank Systems." The 40-page brochure thoroughly details all aspects of the new UST regulations and offers useful technical information on the installation, maintenance and closure of underground tanks. For a free copy, contact GCSAA's Government Relations Office at 800-472-7878.

Plastic Grass Must Go

The Capital Press has taken up the cudgel against artificial turf, also known as plastic grass.

This is heartening because not only plastic grass a scourge on athletics, it is unworthy competition for Oregon's grass seed industry. Published in Salem, the Capital Press is the Northwest's leading agricultural newspaper.

In a recent column, newspaper publisher Dewey Rand Jr. raised the question that gnaws at any Oregonian who knows the sad plastic grass story.

Writes Rand: "It's ludicrous and an affront to the seed industry that an artificial playing field be laid at a land grant institution, with a college of agriculture centered in a prolific grass seed growing area, to say nothing of the recognized hazards such playing fields provoke."

It is shameful enough that two plastic grass playing fields lie within the fertile Willamette Valley. It is ignominious that one of these playing fields lies close by the ryegrass capital of the world and that the playing field is owned by an agricultural school, Oregon State University.

Are the good young men and women who go to OSU to learn agriculture now also required to appreciate the aesthetics of chemical grass? Is there a new course at OSU in artificial turf management?

Rand has nailed the abject failure of our system. Here we have a school dedicated to the virtues of tilling the soil and it has paid good money for a plastic rug to cover the soil!

Where was Oregon's grass seed industry when this crime was perpetrated? There is a proven hybrid grass seed that is designed specifically for playing fields in inclement climates. Robert F. Kennedy Stadium in Washington, D.C. is covered with this turf.

Oregon's grass seed industry not only lost business when the University of Oregon and Oregon State University went to plastic grass. The industry lost face.

But the game is not ended. Armed with the wisdom of The Capital Press, perhaps we can talk some sense into those who have allowed this intrusion of plastic grass into Oregon's agricultural heartland.

Source: The Daily Astorian

TURF-SEED PRODUCTS ARE DISTRIBUTED IN THE NORTHWEST BY "THE CHIEF" Norm Whitworth



KENTUCKY BLUEGRASSES

- Columbia • Midnight
- Challenger
- Galaxy Blend

FINE FESCUES

- Shadow • Flyer
- Fortress

HARD FESCUES

- Aurora • Waldina

SHEEPS FESCUE

- Bighorn

CREEPING BENTGRASSES

- Penncross • Penneagle
- PennLinks
- Pennway blend

PERENNIAL RYEGRASSES

- Citation II • Birdie II
- Omega II • Manhattan II
- CBS II Blend

TALL FESCUES

- Olympic • Apache
- Monarch
- Triathalawn Blend

Wildflower mixture

- Bloomers

Norm Whitworth

Turf Products Division

P.O. Box 68314 • Oak Grove, OR 97268

503/659-3114

New Office for NWGCSA

Congratulations to the Northwest Golf Course Superintendents Association (NWGCSA) for their recent move to the new offices at Elk Run Golf Course. The new NWGCSA address and telephone number are:

NWGCSA
27515-228th Ave. S.E.
Maple Valley, WA 98038
(206) 432-2667

New Turfgrass Variety Cost

by Arden Jacklin

Most people, including myself at times, have no conception of what it costs to develop, test and introduce a new variety of turfgrass. My figures here are mostly based on Kentucky bluegrass, as this is the kind with which I am most familiar.

Let's start with a new selection or a new hybrid which has passed the first screening and is ready for more extensive testing. That first screening costs about \$500 for each entry. Of all entries, about 10% pass the first screening. So, we start with a \$5,000 cost on each entry which does not include the cost for getting it.

Two-Thirds Fail

Preliminary testing for turf quality and seed producing ability in our plots runs about \$4,000 per accession. A fair appraisal shows about two-thirds of the accessions fail in this test. So the investment in this test is \$12,000.

The next step is advanced turf and disease resistance in both western and eastern U.S. Eastern testing is

necessary because in the West we don't have all the diseases that affect turf in the largest (eastern) consumption area. These tests will cost about \$5,000 per entry. Assuming an average of two-thirds will fail to show promise, we come up with \$15,000 per successful accession.

National Testing Important

So far, it's only our word that it's a good or superior variety. Therefore, it's necessary to give it wider and more open public testing in the National Variety Testing trials which involve some 30 testing sites. The charge is \$1,800 for a 3-year test. In our experience about one-third will fail, generating a cost of \$2,700 per accession. At this point, still an experimental number yet to be registered as a named variety, we have a total investment of \$34,700 in it.

It is now time to produce breeder seed from which foundation will be produced. Breeder seed fields or plots are small, requiring much work at high cost. An arbitrary cost well above what the seed can be resold for or charged out is about \$4,000.

Plant Variety Protection

Next it is advisable, if not entirely necessary, to "insure" ownership by protecting rights to and registering of the variety. This is done through the PVP (Plant Variety Protection) process which for bluegrass costs \$2,000 per entry. Gathering information for submission on a PVP application costs an estimated \$3,000. The same data for PVP can be used to register the variety with the American Society of Agronomy and provide data to the various state certifying agencies for their certification standards.

The variety must be advertised and promoted to get potential customers and promote themselves in their markets. We have good cost figures here. We average \$30,000 per variety for first-year promotion, which includes magazines, in-house publications, convention displays, advertising brochures and favors.

A Whopping Total

The grand total is **\$73,700**. That's a lot of money! To back up or justify that kind of investment requires an ongoing, aggressive marketing setup to reclaim it. Not too many companies will take the gamble, and it practically rules out public agency releases. Conversely, when an accession succeeds and is properly marketed, it becomes a valuable asset.

The foregoing does not include the "ability to do the job" in terms of technical know-how, knowledgeable personnel at each level of development and suitable land sites. Also required are small lot seed processing equipment and plot machinery. Obviously a development program for more than one, or even a few varieties, must operate on a continuing basis for reclaiming costs.

The time frame to go through the foregoing process averages about ten years.

Source: Grass Clippings (Jacklin Seed Company)

New GCSAA Program Designed To Protect Golf's Environment

Coping with regulatory obligations and managing environmental and safety risks are increasingly being recognized as important professional priorities for today's golf course superintendent.

(Continued on page 9)

VALLEY TOPSOIL, INC.

"You can dig our dirt"

QUALITY TOPSOIL MIXES

TOPDRESSING SAND

DIVOT MIX

GREENS MIX

COMPOSTED HARDWOOD BARK

"vita-mulch"

USING YOUR ON-SITE MATERIALS

35019 West Valley Highway • Algona, WA 98001
Office Phones (206) 839-5384 939-0886

Golf's Environment *(Continued from page 8)*

To help superintendents continue to meet these responsibilities, the Golf Course Superintendents Association of America (GCSAA) has contracted with Hall-Kimbrell Environmental Services, Inc., one of the nation's leading environmental consulting firms, to develop the first comprehensive environmental management program for the golf course industry.

"We want to help superintendents make their golf courses as environmentally pleasant and safe as possible," said John M. Schilling, executive director for GCSAA.

In recent years, federal, state and local environmental regulations that apply to golf courses have increased dramatically. The rules are complex — sometimes even contradictory — and compliance is often frustrating and time-consuming. The new regulatory compliance audit package allows superintendents to objectively and comprehensively evaluate their own facilities.

"As the superintendent of several municipal courses, I can say that this new program gives me a better opportunity to meet regulatory requirements in a timely fashion and to manage for risks that might have meant liability or fines," said Dennis D. Lyon, CGCS, Golf Division superintendent for the city of Aurora, Colo.

The audit package deals with such issues as pesticide usage, storage, handling and disposal of containers and rinsates; worker safety, hazard communication standards, proper equipment use; water supplies, use, purity and restrictions applying to irrigation; underground storage tanks, and many more.

The package consists of:

- The Compliance Auditor Booklet — a notebook-style set of checklists containing more than 500 questions that the superintendent answers and then submits to Hall-Kimbrell for evaluation. Results are returned to the superintendent as a "Response Report" detailing specific compliance on the federal and, in some cases, state level. The report also provides additional expert guidance to allow superintendents to find out more on their own.
- An instructional videotape, which gives users an overview of the regulatory framework affecting golf courses.
- Additional printed material, giving superintendents more information on the regulations that affect them.

In addition, Hall-Kimbrell will develop on-site follow-up services to help superintendents develop in-house programs to meet or exceed the compliance standards set out in the response report.

"The up-front cost of developing these materials is several hundred thousand dollars, which Hall-Kimbrell has decided to invest," noted Schilling. "The result will be a very valuable new management tool with a comparatively low per-audit cost to individual superintendents."

The cost of a privately solicited environmental audit can approach \$10,000. Under this jointly sponsored program, GCSAA member superintendents will pay only \$725. Non-members will be charged \$900.

Equipment Storage Facilities

by Michael R. Bruns

As the cost of owning and maintenance lawn servicing equipment increases, so does the value of adequate maintenance and storage facilities.

A pre-engineered (integrated design, factory fabricated) building system offers several advantages over conventional wood and brick construction. A "system building" can offer time savings and cost savings, because interim financing needs may be reduced due to shorter construction time. Pre-engineered systems have flexible designs and a variety of wall and roof systems to meet aesthetic and performance requirements.

Evaluating storage facilities

The following are features to look for in a storage or maintenance facility.

• **Design flexibility.** The building system should meet the needs of your operation with regard to size, function and design. With today's computer-aided design and advanced manufacturing technology, the building system manufacturer should be able to provide you with virtually any building to meet your needs.

• **Maintenance.** The building system should be constructed of high-quality materials that meet the appropriate building codes. The manufacturer should provide a guarantee on paint finishes for chalk and fade ratings. A standard paint coating should contain at least 50 percent

(Continued on page 10)

Scotts® introduces fine-particle trace element product

To give your soil the micronutrients it needs, use ProTurf® STEP™ (Scott's Trace Element Package). It supplies your turf with amounts of iron, zinc, magnesium, copper, molybdenum, calcium and sulfur to correct and/or prevent deficiencies in turf.

Ask your ProTurf® Tech Rep for details.



Ask your ProTurf® Tech Rep for details.

Don Clemans
(206) 254-8748

Mark Jones
(509) 255-6033



Storage Facilities *(Continued from page 9)*

silicone polyester for durability. For improved weather tolerance at a slightly higher price, consider purchasing a finish that has a premium coating of at least 70 percent Kynar 500 fluoropolymer resin.

The structural systems and paneling systems should be factory-punched (drilled), thereby assuring proper panel alignment and weathertightness. If the roof structurals are not factory-punched, the alignment of the roof panels is depended on the skill of the local erection crew and a chalk line. A misaligned, leaky roof can significantly increase your building maintenance costs.

• **Energy efficiency.** The wall and roof systems should be energy efficient with tested in-place thermal values rather than theoretical thermal values. With tested thermal values, your heating, ventilation and air conditioning (HVAC) contractor can design the most efficient system for your building.

• **Roof system integrity.** The standing seam roof system should provide for movement of up to 2½ inches for thermal expansion and contraction. The roof also should carry a 20-yr. weathertightness warranty. If you opt for a standard metal roof system instead of a standing seam roof, make sure the roof panels are sturdy enough (1½-in. corrugation depth) to handle roof traffic.

• **Appearance.** The selection of wall systems should include a variety of exposed and concealed fastener panels. Also, check to see if the building system is adaptable to concrete or masonry wall systems.

• **Interior space.** A high-quality, pre-engineered building system should be able to meet almost any requirement, such as clearspan interior (free from center columns), the proper clear height to meet your needs, and the ability to accommodate a rack system if necessary. It is best to consider all the options and needs of your business early in the planning stages.

Where to begin

First, evaluate the needs of your business. Do you plan to use the building to store equipment, or will it be occupied by maintenance crews? If you plan to use the building primarily for storage, you do not need to give as much consideration to human comfort in your building designs. Highly energy-efficient insulation systems HVAC equipment and interior aesthetics are less important for simple storage buildings.

In addition, consider your budget and the time frame of the project and it will affect your business plans. A pre-engineered building system can save up to one-third of the construction time necessary for traditional building methods. A design/build builder can design and construct the project which can save time and money compared to the conventional architect/bid process.

Building size is another important consideration. Be sure the pre-engineered system you are considering is fully adaptable to the size of building you need and flexible enough to accommodate the site you have selected. If you expect your business to grow, be sure your new building is expandable. This is a simple process with a pre-engineered system that has an expandable endwall designed into it.

Examine your needs for entryways and exits. Locate the overhead door in the most efficient areas to help the interior flow of your facility.

Site selection can be an expensive unknown. Before you commit to a piece of land, consider the site carefully. Test the soil before you purchase any land. You may discover that you need a more expensive foundation because of certain soil conditions. You also need to be aware of local zoning laws, land use restrictions and the time it takes to obtain a building permit.

Source: Lawn Servicing (PLCAA)

Turfgrass Information File (TGIF)

To students at many colleges and universities, TGIF means getting away from books and getting an early start to the weekend.

In one department at Michigan State University, however, it means nothing of the sort. In this case, TGIF stands for Turfgrass Information File, a cooperative effort by the United States Golf Association and Michigan State to provide information on turfgrass management and research.

Begun in 1984, TGIF is a bibliographic computer database designed and developed by the MSU Library. The system, the first of its kind, provides access to all published materials reporting the results of research that affects turfgrass and its maintenance.

"Nothing like this have ever been done before," explained Peter Cookingham, project manager of the Michigan State Libraries. "There are thousands of bibliographical databases out there, but never before has there been one on turf. Some of the material has been out there, but prior to this only searching professionals would know where to go to find it."

The collection is a compilation of materials both old and new. With more than 2,000 new records being added each year, the database has grown to total some 14,000 records. Included in the collection are early works on turf culture, such as "Golf Greens and Green-keeping," published in 1906, and "The ABCs of Turf Culture" (1928).

The TGIF project was located at Michigan State because of the previous existence there of the O. J. Noer Memorial Turfgrass Collection. Including books, journals, research reports and conference proceedings, the Noer collection is recognized as one of the best in the country. Noer was the 1963 recipient of the USGA Green Section Award.

A private foundation, the Turfgrass Information Center has been created through the joint efforts of the USGA and Michigan State. Its goals are threefold: to develop and maintain the collection; to provide computer access to the bibliographic data of turfgrass research; and to deliver documents from the collection to researchers, practitioners and other appropriate users.

Much of the use currently being derived of the project is of the problem-solving nature by golf course superintendents. The first block of subscribers has drawn nearly equal proportions of academic institutions and the private sector, such as landscape firms and architects.

Although the librarian at TGIF acquires much of the materials needed for the collection, a network of researchers and practitioners in the field is being developed to assist in its growth.

Access to the collection is provided by the USGA TGIF, an on-line computer-based bibliographic database, to which anyone can subscribe for an annual fee.

(Continued on page 11)

For a basic subject search, more than 13,000 possible keywords are available to the user. The computer will then find records in which the term entered appears, either as part of the title or as an assigned subject. The computer also enables the user to locate specifics, such as the retrieval of records by certain authors, from specific journals, or proceedings within a particular year or range of years.

The information is not restricted to those in the agronomy field, or even to those with access to the Michigan State facilities.

Anyone interested in a subject can either call the center or submit a request by mail. If done by mail, it is helpful to be as specific as possible about the subject matter.

It even is possible to search the database on one's own computer. Although the TGIC needs to be contacted to receive the necessary technical details and forms, dial-up access can be supported by most IBM PC or PC-compatible systems with the necessary software. The computer is available daily 18 hours per day.

"With a computer, the intermediary is removed," explained Cookingham. "With a PC and link you can self-research. The procedure really is quite easy."

Although TGIC can provide limited photocopies or facsimile transmissions, the goal is to soon expect full text retrieval. Response to most requests currently is 48 hours.

Phone requests for information can be made at 517/353-7209, or by writing: Turfgrass Information Center, W-212 Library, Michigan State University, East Lansing, MI 48824. Additional information also is available by calling the USGA Green Section at 201/234-2300, or by writing: United States Golf Association, P.O. Box 708, Far Hills, NJ 07931.

Motor Vehicle Safety Tips

The following checklist will help you get your vehicles and your driving habits on the road toward safe vehicle operation.

Before operating the vehicle:

- Be sure that all vehicle operators have a valid driver's license applicable to the vehicle being operated.
- Do not allow unauthorized people to operate or ride in company vehicles.
- Instruct operators to inspect the vehicle for safe operating conditions before use. Have them report defects in the vehicle maintenance record and promptly call it to the attention of the appropriate supervisor.
- In addition to exterior cleanliness, keep the cab and interior clean.
- Securely fasten or store equipment or supplies carried on the vehicle beds or within the vehicle to prevent accidental dislodgement from the vehicle or driver's compartment.
- Do not operate any gasoline or diesel engine in a warehouse, garage or other enclosed area unless there is adequate ventilation to remove carbon monoxide.
- Be sure the tire pressure is correct.

- Be sure that each truck has chock blocks, which must be placed under the rear wheels each time the truck is parked with the engine idling and the transmission in neutral. Also, use chock blocks under the rear wheels any time the truck is parked to ensure that the drive inspects the area behind the vehicle for clearance if backing is necessary.
- Do not overload vehicles, and replace weak or leaking shock absorbers.
- For heavy loads, place the center of gravity directly over or slight forward of the truck's rear axle, and center the load side-to-side.
- Be sure that all vehicle and equipment lights are working properly. Check them monthly.
- Tie down or cover loose loads to avoid scattering debris.
- Service the vehicle at regular intervals, paying special attention to clutches and brakes.
- Keep vehicle windows clean and replace any damaged glass.
- Use safety chains when towing equipment.
- Do not bypass or disconnect any safety devices, including neutral-start or similar safety devices.

Driving safely:

- Do not use excessive speed.
- Avoid following too closely.
- Keep your eyes on the road.
- Look to the left, then the right and again to the left before crossing intersections.
- Establish eye contact with other drivers or pedestrians.
- Anticipate stops. Watch out for traffic lights that have been green for some time. Remember to pump your brakes to stop, even for emergency stops and on slick roads.
- Use flashing lights on tractors and other slow-moving equipment (where permitted by law) for both day and night driving. For vehicles or equipment moving slower than 25 mph, also use a slow-moving vehicle emblem.
- Downshift manual or automatic transmissions before starting down long, steep hills, and do not coast downhill with the transmission in neutral.
- Do not haul people in the back of open trucks or lift them in a forklift or front-end loader.
- Reduce speed before entering curves to avoid a shift in the center of gravity.
- Watch the road at least 12 seconds ahead, and use a following distance of 4 seconds (6 seconds if the road is slippery).
- Brake slowly if your right wheels hit a soft shoulder, and then pull onto the road again. Do not brake suddenly, jerk the wheel back or move completely onto the shoulder.
- Do not permit anyone to drive or operate equipment when his reactions or judgement are impaired by alcohol or drugs.
- Do not back tankers. If this is unavoidable, adjust the mirrors to improve your visibility to the rear; circle the tanker from the rear before entering the cab to back; and get assistance from someone who can keep an eye on the rear and guide you while you are backing.
- Set the parking brake when parking.

(Continued on page 12)

Safety Tips *(Continued from page 11)*

Tractor safety tips:

- Use seat belts in any vehicle with a roll-over protective structure (ROPS). Do not use tractor seat belts with ROPS.
- Use the shoulder of the road for wide loads; do not let the load extend into other traffic lanes.
- Use wide wheel tread to prevent overturns on slopes.
- Do not turn uphill going across steep slopes, and avoid holes on the downhill side and bumps on the uphill side. Always back up steep grades and drive forward going down. This will prevent tipping to the rear.
- Do not allow passengers on tractors or other power equipment.
- When pulling equipment with a tractor, pull only from the drawbar or 3-point hitch.

Source: *Lawn Services (PLCAA)*

The Other Elements of Plant Nutrition

by David Lawson

Sports ground managers, groundsmen and greenkeepers are familiar with the NPK fertilizers routinely applied to turf. Nitrogen (N) is the mineral nutrient required in greatest quantity by turfgrasses, it being important for general growth, aesthetic appearance, disease tolerance and the ability of turf to recover from wear and tear. Phosphorous (P) is needed for good root growth, especially on newly sown or turfed areas. Potassium (K) has a positive effect on the disease, low temperature and drought tolerances of grasses.

However, these three nutrients are by no means the only mineral elements that turfgrasses need to take up from the soil. So far ten other elements have been found to be vital to the nutrition of grasses, like most other plants. Normally the concentration of these mineral nutrients in soils is more than adequate to supply the needs of turfgrass. Nevertheless, the increased utilization of extremely sandy rootzone constructions for sports grounds and golf greens may lead to turf becoming deficient in one or more of these nutrients.

Two broad classes of mineral nutrient can be defined: macronutrients and micronutrients. Nitrogen, phosphorous and potassium belong to the former class and are defined as such because of the relatively high amounts required by plants. Three other elements, **calcium**, **magnesium** and **sulphur**, fall into this class. The micronutrients are required in only minute quantities, measured in terms of parts per million (ppm) of plant material. For this reason they are also known as **trace elements**.

Grasses contain one to three percent **calcium** (calcium symbol: Ca) in dry leaf matter. This is in fact a greater concentration than for phosphorous, but because most soils contain very high amounts of calcium there is no need to supplement it by fertilizing.

Stabilization

In plants, calcium is necessary for the stabilization of cell walls and so is of extreme importance for the plant's solid structure. The growing points of roots need calcium for proper development and, if present at low concentration, then growth stops and the roots become prone to fungal infection. Only soils of very sandy texture with an acid reaction (low pH) are likely to provide conditions in

which calcium deficiency could be encountered in turfgrasses. Indeed it is well known that perennial ryegrass and annual meadowgrass grow relatively poorly on acid soils. Part of the reason for this is the low concentration of calcium on such soils; a condition to which turfgrass species such as browntop bent are adapted.

Where ground limestone or chalk is applied to turf in order to raise the pH of acid soils, a large amount of calcium is provided to the soil in the form of calcium carbonate.

Like calcium, **magnesium** (chemical symbol: Mg) is a plant macronutrient, concentrations ranging from 0.2 to 1 percent of dry leaf tissue. Its best known role within plants is as part of the chlorophyll molecule which allows leaves to absorb light energy and also causes their green coloration. However, most of the magnesium is required for the synthesis of plant protein.

Deficiency of the element is only likely to be encountered on acid, sandy soils. Chemical analysis of soils can usefully indicate their magnesium status although soils found to have very low levels of magnesium can maintain a turf without any visual symptoms of deficiency. Where magnesium is to be applied as a precaution against deficiency the most common sources are Kieserite, Epsom salts or a proprietary compound fertilizer containing the element. If lime is being applied to an acid soil which is low in magnesium dolomitic limestone should be used, as this contains 10 to 11 percent magnesium.

Plant leaf dry matter normally contains 0.1 to 1 percent **sulphur** (chemical symbol: S), mostly within proteins. There have been some reports of turf in the USA showing symptoms of sulphur deficiency, but as yet no such observations have been made in the British Isles. This is due partly to deposition of sulphur from the atmosphere as sulphur dioxide gas or dilute sulphuric acid in rainwater.

In Great Britain the total input of sulphur to the soil from these sources is around 30kg/ha. As well as being a major constituent of ammonium sulphate fertilizer, sulphur is present as an impurity in most fertilizer products.

Flowers of sulphur can be added to the soil in order to reduce the pH of alkaline soils, but the practice should not be carried out on established turf without expert supervision or severe scorching of the grass may result.

Micronutrients

The following seven micronutrients are essential for plant growth, but only in minute quantities ranging from 0.1 to 200 parts per million of dry leaf tissue. Most soils contain adequate quantities of these nutrients for turfgrass nutrition and moreover there are regular inputs from atmospheric deposition and from impurities in fertilizers and top-dressing materials.

Iron (Chemical symbol: Fe) acts as an activator for several plant enzymes and is intimately involved with the synthesis of chlorophyll. In soils it is present in relatively large concentration, principally as iron oxide. This gives soils their characteristic red or brown color.

Normally enough iron is released from the oxide for plant needs, but in alkaline soils the iron oxide becomes highly insoluble and iron deficiency may be encountered in susceptible plants such as pear and apple trees, heathers and other lime-hating species. The condition is known as lime induced chlorosis. Although actual symp-

(Continued on page 15)

THE WATER MANAGEMENT TEAM...



A Winning Line-up from Rain Bird

For more information contact your local Authorized Rain Bird Turf Distributor:

Evergreen Pacific Supply, Inc.
Washington

Bellevue 206/828-4554
Everett 206/353-3600
Spokane 509/467-6601
Tacoma 206/581-4018

United Pipe & Supply Co., Inc.
Oregon

Bend 503/382-9311
Eugene 503/688-6511
Medford 503/779-6721
Portland 503/288-6271
Salem 503/588-1250
Tigard 503/639-7473

RAIN BIRD®



Quality Equipment For Quality Turfgrass . . .

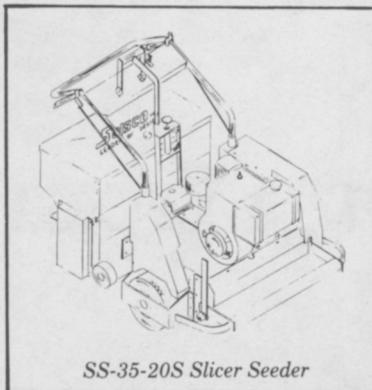


FTA-60-24 Total Golf Course Aerator

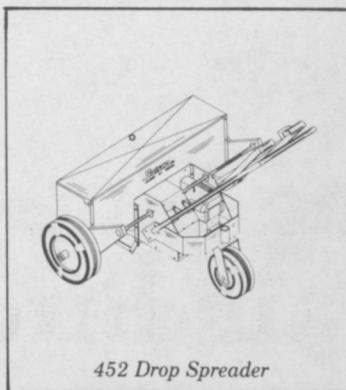


30-12 Greens Aerator

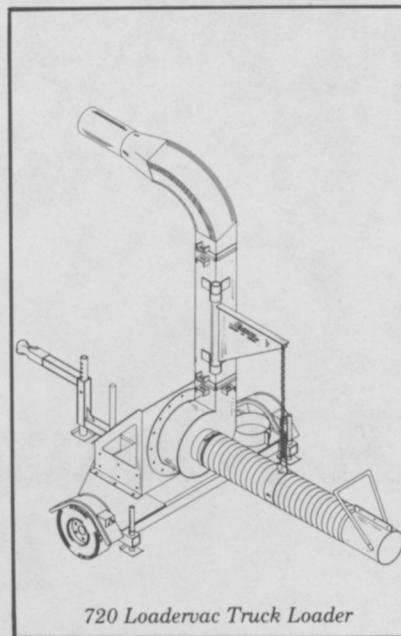
SALSCO products are known for Quality *and* Performance. No aerators on the market can outperform the FTA-60-24 . . . 128 holes per square foot, 60,000 square feet per hour . . . or the 30-12 . . . 36 holes per square foot, 13,900 square feet per hour. From self-propelled drop spreaders to powerful truck loaders, every one of SALSCO's twenty products is a rugged, state-of-the-art piece of equipment.



SS-35-20S Slicer Seeder



452 Drop Spreader



720 Loadervac Truck Loader

To schedule a product demonstration, or obtain complete information on our fine line of equipment, please contact either:

**BARNETT
IMPLEMENT CO., INC.**

5211 BICKFORD AVENUE • SNOHOMISH • WA 98290
(206) 334-4048

SALSCO, INC.
LEADER BY DESIGN

105 SCHOOL HOUSE ROAD • CHESHIRE • CT 06410
1-800-8-SALSCO • FAX (203) 271-2596 • (203) 271-1682

Plant Nutrition *(Continued from page 12)*

toms of iron deficiency have not been observed in turf-grasses, the fact that species such as browntop bent do not thrive on alkaline soils is probably due to the low availability of iron.

Iron has traditionally played a useful part in the culture of close-mown fine turf. The application of calcined sulphate of iron (ferrous sulphate) to fine turf causes a cosmetic greening-up of the leaf blades which lasts for two to three weeks after each dressing. It also helps to reduce disease infestation by *Fusarium* patch, discourages broad leaved weeds and kills moss. Many proprietary fertilizer products for turf now contain iron. It is important that over-application of iron is avoided as it can permanently scorch the turf.

Manganese (Chemical Symbol: Mn), like most of the micronutrients, acts as an activator for some of the plant enzymes, although in many instances magnesium can take its place. It is thought that manganese also has a role to play in the photosynthesis pathway, through which the plant manufacturers carbohydrates from carbon dioxide and water, using the energy from light.

Plant-available manganese is released from manganese oxides in the soil; the greater the soil acidity the greater the amounts released. Indeed manganese may be toxic to some plant species growing on very acid soils and this is probably a factor in the poor tolerance of some grass species, such as perennial ryegrass, to soil acidity. In alkaline soils, particularly those of a sandy and organic nature, manganese may be deficient for plant growth. Deficiency of manganese has been reported for turf growing on a sand rootzone construction in the British Isles.

Analysis

Soil analysis can be of value in predicting potential manganese deficiency in turf and actual deficiency can be confirmed by chemical analysis of grass clippings. Supplementary manganese can be applied as manganese sulphate, chelated manganese or from trace element-containing fertilizers. Chelated manganese is in a form which is highly available to the grass, both through root and foliage uptake.

Boron (Chemical symbol: B) is involved in the synthesis of plant cell walls and in the metabolism of carbohydrate. In soils it is derived from the weathering of minerals, particularly minerals from rocks laid down under the sea. The demand for boron by grasses is so small that deficiency is unlikely to be a problem in turf. However, toxicity from boron may arise if it is present at high concentration in irrigation waters. In temperate climatic regions the applied boron would be quickly leached from the soil, but in arid regions it builds up in the topsoil and affects plant growth. Species tolerant both to high salinity and boron must be used for turf in such situations.

Problems of boron toxicity have been reported when pulverised fuel ash from coal fired power stations has been used as a growth medium for grass.

Soil analysis is particularly useful in predicting the likelihood of boron toxicity to turfgrass from contaminated soils.

Copper and Zinc (Chemical symbols: Cu and Zn). Both of these micronutrient metals are required by a number of plant enzymes as activating agents. Their

primary source in soils is the breakdown and dissolution of mineral matter.

In turf the major problem concerning zinc and copper is likely to be one of toxicity rather than deficiency. Toxicity may occur where grass is established on copper mine waste heaps or where application of municipal sewage sludge has caused a build-up of metals.

The problem is normally overcome by applications of lime to the contamination area. This raises soil pH, immobilizing the copper and zinc, along with other toxic metals such as nickel, thus reducing the amounts taken up by the grass roots. Some cultivars of browntop bent have been found to be tolerant of high soil copper levels and are used in reclamation of mine spoil heaps.

Soil analysis is extremely useful in the discrimination between toxic and non-toxic levels of metal contamination.

The element **molybdenum** (Chemical symbol: Mo) is required by plants for the enzymatic conversion of nitrate-nitrogen to ammonium-nitrogen before its incorporation into proteins. Leguminous plants, such as clovers, need the presence of molybdenum in order to fix gaseous nitrogen from the atmosphere through their root nodules. In the soil it occurs within molybdate compounds and is absorbed onto iron oxide material.

Molybdenum differs from the micronutrients mentioned previously in that it is more available to plants as soil alkalinity increases. Such minute quantities of molybdenum are required by turfgrasses that it is unlikely that deficiency would occur, even on very sandy rootzones.

It is unlikely that any plant growing outdoors would become deficient in **chlorine** (chemical symbol: Cl), but laboratory studies under controlled conditions have shown that it is required for photosynthesis. However, wilting damage may occur in turfgrasses where excess chloride is applied to soil in sea spray, saline irrigation water or drift from rock salt used in the defrosting of road surfaces.

Seedlings are particularly susceptible to chloride damage and so large applications of potassium chloride fertilizer should be avoided just prior to sowing. If applied well before sowing, then the potentially harmful chloride will be leached from the soil.

Source: Parks and Sports Grounds

FRESH, STURDY, MATURE **GRASS** FROM OUR PLOT TO YOUR LOT

Your turf is professionally grown and especially adapted for Northwest conditions. We insure a quality product at reasonable prices. Also, we supply large caliper shade trees.

**OREGON
TURF
FARMS**

CALL OR WRITE FOR
FREE BROCHURE
PORTLAND
223-8871
WOODBURN
981-8873
18381 Boones Ferry Rd. N.E.
Hubbard, OR 97032

Supplier Services Survey

Most *Grounds Maintenance Magazine* readers expressed satisfaction with the time suppliers spend with them and the level of service suppliers offer, but even the most satisfied readers thought of things suppliers – and the companies they represent – could do to improve their service. Here are the most frequently mentioned suggestions:

- Provide information on the compatibility of chemicals – within a single manufacturer's line and among different manufacturers' lines.
- Improve the ability to answer this question frankly: What problems are there with your products?
- Give better time estimates on parts, equipment or supply deliveries.
- Take better care of established customers rather than always working to recruit new ones.
- Keep customers posted on coming events like conferences, trade shows, etc.
- Assist customers with cost estimation, estimating how long it will take to do a job with a certain piece of equipment, etc.
- Expand repair parts inventories.
- Give faster price quotes.
- Improve the quality of technical literature, manuals and catalogs, especially to include regularly updated price lists.
- Learn to make appointments rather than just drop in.
- Provide test data from independent testing sources.
- Know the assets and limitations of their products better.
- Improve on-time deliveries and service after the sale.

Readers were just as eager to point out new services their suppliers could offer:

- Provide more local training classes, classroom updates and equipment demonstrations on the customer's site, especially during the off-season.
- Set up test plots on the customer's site or provide samples that he can test in advance of making a purchase.
- Have a hotline for problems and rush orders.
- Have an 800 number.
- Develop more short-term rent/lease programs.
- Provide more cost and efficiency comparisons with competitive products.
- Have computer access lines for direct purchases from the grounds manager's office to the manufacturer or supplier's office.
- Provide financing.
- Do soil testing and oil testing.
- Have flexible hours to coincide with the site manager's schedule.
- Give regular safe-use seminars.

That is not to say that respondents didn't think their reps were already doing a good job or that some companies are not already offering prompt delivery, free seminars, suggestions for cutting costs, thorough technical assistance and high-quality products.

Respondents have a median of four suppliers calling on them each month, with golf superintendents having the highest number (6) and landscape contractors the lowest (3).

Two-thirds of the respondents are satisfied with the amount of time they spend with suppliers each month. Golf superintendents spend the most (4.6 hours) and landscape contractors the least (2.4).

Respondents gave these reasons for buying from a specific supplier:

- Service (73%)
- Price (64%)
- Technical assistance (52%)
- Adequate inventory (44%)
- Immediate delivery (40%)

Source: *Grounds Maintenance Magazine*, August 1986

What is pH?

When reading about growing plants, reference is often made to something called pH. There are now pH meters available at garden stores that you can use to determine soil pH. With such emphasis, it all must be important, but what is pH?

Soil is made up of particles (sand, silt, clay) which vary tremendously in size. The surface of these particles hold and release electrically charged portions of chemical compounds. For instance, water is composed of hydrogen ions, which are positively charged, and hydroxyl ions, which are negatively charged. When there are more hydrogen ions in the soil, it is acid; when there are more hydroxyl ions in the soil, it is alkaline; and when there are equal numbers of hydrogen and hydroxyl ions, the soil is neutral. pH is the expression of this relationship. In an acid soil, the pH is less than 7; in an alkaline soil the pH is more than 7; and in a neutral soil, the pH is at 7. With time, soils tend to become acid, but there are some alkaline and some neutral soils.

(Continued on page 18)

From Tees to Fairways to Greens-



We've Got Your Cover!

Pickseed West offers a complete line of Oregon's highest quality turfgrass products. From tees to fairways to greens Pickseed's perennial ryegrasses, Kentucky bluegrasses, turf-type tall fescues, fine fescues and bentgrasses can be found on the finest playing surfaces in the Northwest.

Improved seasonal performance, disease resistance, color, and playability are just a few of the reasons superintendents like yourself are choosing Pickseed products.

For all your turfgrass needs – we've got your cover!



ED DRAPER
Northwest Turf Seed Sales

WORK (503) 926-8886
HOME (503) 926-6640

PICKSEED®
PICKSEED WEST Inc.
P.O. Box 888 • Tangent, Oregon 97389

JACOBSEN. UP FRONT IN LIGHTWEIGHT FAIRWAY MOWING.

Introducing the all-new Jacobsen LF-100, the 5-gang designed to increase your lightweight mowing productivity.

The wing mowers are up front for better visibility. So the operator can hold a closer line—even at mowing speeds over 5 mph—to take full advantage of the 100' cutting width. This unique, up-front configuration also gives better access to all mowing units to quickly empty catchers and make mower adjustments easy.

Heavy-duty reels deliver a greens-like cut. New heavy-duty reel construction provides extra strength for long life in demanding fairway conditions. The fully floating, 22-inch steerable 7-blade reels are heavier, to follow ground contours closely, for that smooth, consistent Jacobsen cut that's the envy of the industry.

True lightweight mowing. Newly designed low-profile turf tires produce the lightest ground pressure, and the rear wheels roll on a different track than the front,

so your tender turf thrives with less compaction. And the wide 4-wheel stance offers excellent traction, increased stability and a tight turning radius.

Built to last. The LF-100 has a proven, rugged chassis, a durable and simple hydraulic system and liquid-cooled diesel engine for a longer, trouble-free life on your fairways.

What's more, the entire machine is backed by your Jacobsen distributor, so you're never far from dependable parts and service support.

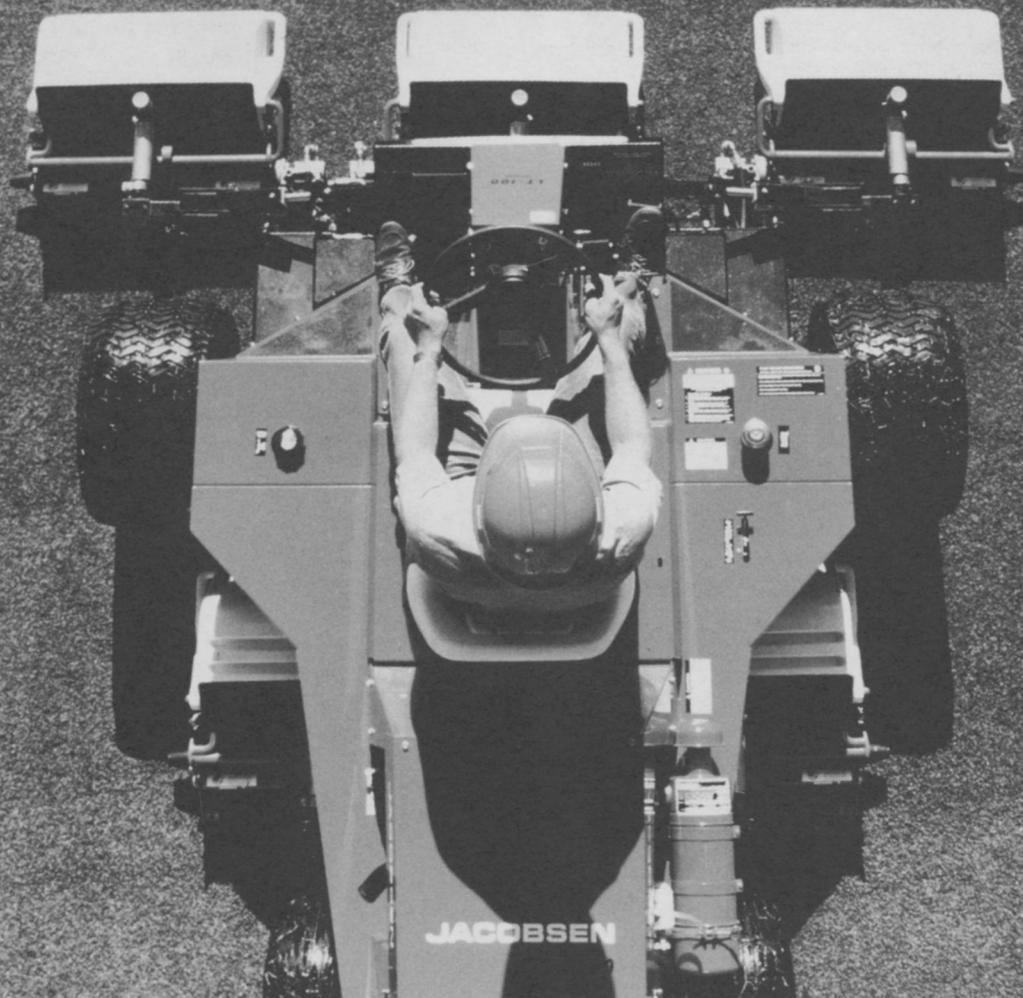
See all the LF-100 differences. Ask your Jacobsen distributor for a free demonstration. Attractive lease and finance plans available.

Or contact:
Jacobsen,
1721 Packard
Ave., Racine,
WI 53403.

**JACOBSEN
TEXTRON**

Jacobsen Division of Textron Inc.

© Jacobsen Division of Textron Inc. 1988



FARWEST TURF EQUIPMENT

2305 N.W. 30 AVE., PORTLAND, OR 97210
(503) 224-6100
TOLL FREE 1-800-727-TURF

NORTHWEST MOWERS

926 N. 165 ST., SEATTLE, WA 98133
(206) 542-7484
N. 7718 MARKET, SPOKANE, WA 99207
(509) 467-6604

FALLIS EQUIPMENT LTD.

11951 FORGE PLACE
RICHMOND, B.C. CANADA V7A4V9
(604) 277-1314

What is pH? *(Continued from page 16)*

Soils that are close to neutral (6.5 - 7.0) are best for growing lawngrasses. A soil that is acid or alkaline tends to have both physical and chemical characteristics that make it more difficult for grasses to grow vigorously.

In order to find the pH of your lawn soil, it is best to send a soil sample to a soil testing laboratory (most state universities have one). They not only can determine soil pH but also the physical and chemical properties, and will provide recommendations on what needs to be added for a better lawn.

Ground limestone makes soil less acid. Use of lime can be overdone so not more than 50 pounds/1000 square feet should be added at one time. This is slowly available and thus changes the pH slowly. Winter is a good time to apply ground limestone.

When a soil is too alkaline, flowers of sulfur or powdered sulfur can be added either in granular form (mixed with sand or sawdust) or mixed as a suspension with water. This will make the soil more acid. Rely on soil test recommendations for the proper amount to apply.

Fertilizer is available in various forms. Some fertilizers are acid reacting and some are alkaline. The continued use of one type of lawn fertilizer can change the soil pH in time.

The pH of the soil not only affects the availability of nutrients to the grass plants, but also affects the physical properties of the soil itself. Soils that are at either end of the scale (very acid or very alkaline) tend to compact making water, air and nutrient penetration difficult.

The Lawn Institute recommends that a soil sample be tested for pH at least every three years and that recommendations for use of lime or sulfur to the soil be followed. This will help create the best possible environment for lawngrass plants.

Source: The Lawn Institute

Social Swinger Or Golfaholic? Take This Quiz To Find Out

Convinced that someone you love has fallen prey to "acute ball-beating dependency" (golfaholism)? Then take this test (if you dare), and expose the true depths of your loved one's obsession.

1) Does your spouse often engage in unconscious, repetitious acts like wiggling his feet, wagging his rear and hitching up his pants?

YES NO

2) Does he practice his grip, stance, or swing naked in the bathroom, outside church, on airplanes, or in other public places?

YES NO

3) Have you ever gone shopping and turned around to find him standing in front of a full-length mirror taking a full swing at a ball that isn't there with a club that isn't there?

YES NO

4) Is there a divot in the carpet in front of the television or family room?

YES NO

5) Does he treat his clubs like a lover, embracing them with both hands, no matter how many times they betray him?

YES NO

6) Has the love of your life turned into a golfing mailman? In other words, neither rain nor snow, nor dark of night keep him from his appointed rounds?

YES NO

7) Does his nose twitch when he gets within 1,760 yards of a golf course? (To any normal person that's one mile. To a golfaholic, it's 1,760 yards to the first tee!)

YES NO

8) Does his passionate pursuit of the game know no bounds... like a lot of his shots?

YES NO

9) Has your golf lover ever gone on "bogey binges" for days, weeks, or months at a time? Does he want to talk about it afterwards?

YES NO

10) Has this person succumbed to the "Rocky Reaction"? No matter how the game beats him down, is he always ready to come back for one more round?

YES NO

From the book "How To Live With A Golfaholic," published by Golfaholics Anonymous. Reprinted with permission of the publisher.

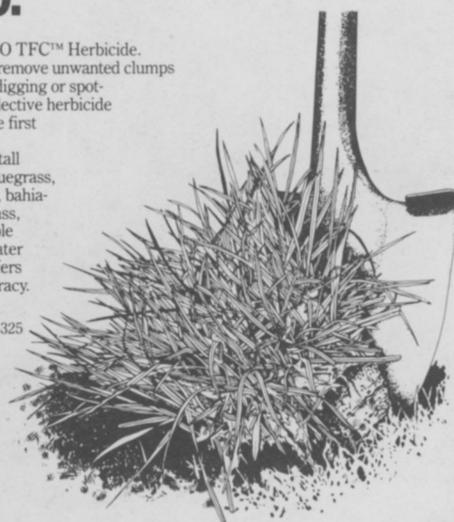
We dug into the tall fescue control problem. So now you don't have to.

Introducing LESCO TFC™ Herbicide. The new, easy way to remove unwanted clumps of tall fescue without digging or spot-treating with a non-selective herbicide

LESCO TFC is the first product to provide selective spot control of tall fescue in Kentucky bluegrass, bentgrass, fine fescue, bahiagrass and bermudagrass, while allowing desirable grass to fill in. This water dispersible granule offers convenience and accuracy.

Order today!

Nationwide • (800) 321-5325
In Ohio • (800) 686-7413



LESCO

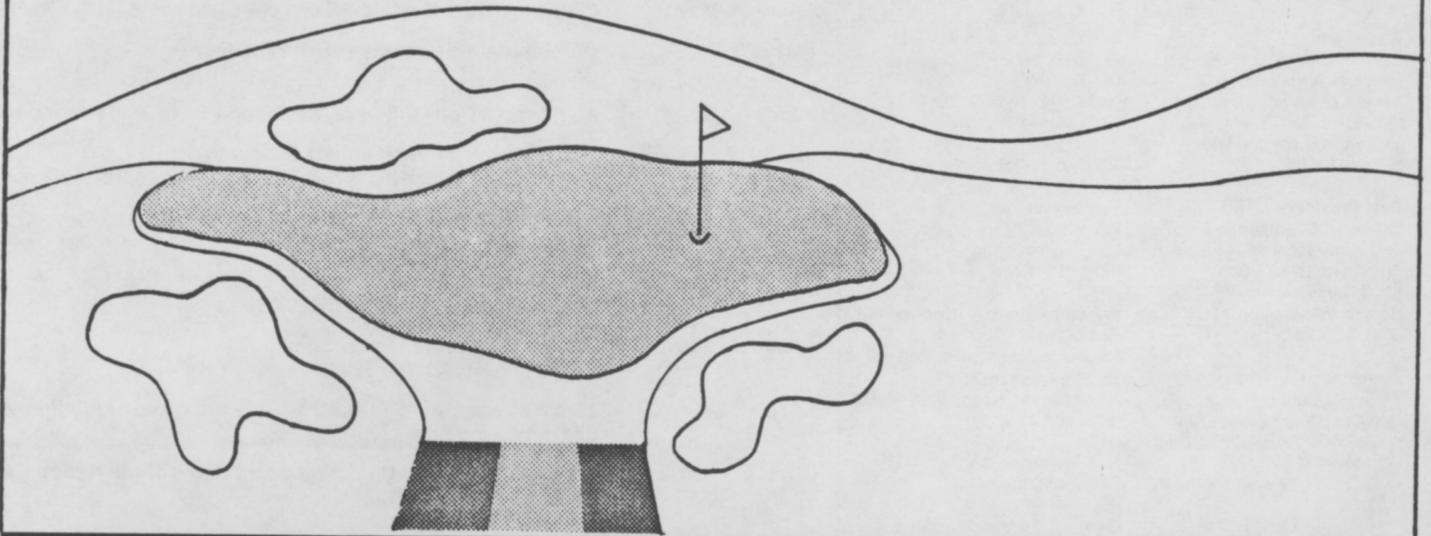
LESCO, Inc. 20005 Lake Road, Rocky River, Ohio 44116
(216) 333-9250

Always read and follow label instructions before using any chemical product.



RANSOMES
BOB-CAT®

EZGO



TURF EQUIPMENT NORTHWEST, INC.

Quality Products & Quality Service For All Your Needs

- Fertilizers • Fungicides • Herbicides • Grass Seed
- Grass Machinery • Insecticides • Aerators

Washington
17824 N.E. 65th
Redmond, WA 98052
(206) 883-6694

Two Stocking And Full Service Locations

Oregon
19435 S.W. 90th Court
Tualatin, OR 97062
(503) 692-5268

1988-89

NTA Board of Directors Roster

President

Mike L. Kingsley
Golf Course Superintendent
Spokane County Park Dept.
MeadowWood Golf Course
N. 111 Wright
Liberty Lake, Washington 99010
(509) 255-6602

Vice President

William J. Johnston
Agronomist Turfgrass Science
Department of Agronomy & Soils
Washington State University
Pullman, Washington 99164
(509) 335-3620

Treasurer

Bo C. Hepler
Turfgrass Agronomist
Senske Lawn and Tree Care
P.O. Box 9248
Yakima, Washington 98909
(509) 452-0486

Past President

James R. Chapman
Technical Services Manager
The Chas. H. Lilly Co.
5200 Denver Avenue S.
Seattle, Washington 98108
(206) 762-0818

Directors

William B. Griffith
Golf Course Superintendent
Walla Walla Parks & Rec. Dept.
P.O. Box 478
Walla Walla, Washington 99362
(509) 527-4336

Richard E. McCoy
Golf Course Superintendent
Glendale Golf & Country Club
13440 Main Street
Bellevue, Washington 98005
(206) 746-7947

Directors (continued)

Rebecca R. Michels
President
Messmer's Landscaping
Service, Inc.
24664-156th S.E.
Kent, Washington 98042
(206) 228-5779

Patrick J. Nibler
Operations Manager
PRO GRASS
8600 S.W. Salish Lane
Wilsonville, Oregon 97070
(503) 682-6076

Randy D. Shults
Golf Course Superintendent
Tualatin Country Club
P.O. Box 277
Tualatin, Oregon 97062
(503) 692-4499

Norman J. Whitworth
Owner
Norman Whitworth, Ltd.
P.O. Box 68314
Oak Grove, Oregon 97268
(503) 659-3114

Director Emeritus (Non-voting)

Roy L. Goss
Extension Agronomist (Retired)
13716 Camus Road
Anderson Is., Washington 98303
(206) 884-4978

NTA Executive and Editorial Office

P.O. Box 1367
Olympia, Washington 98507
(206) 754-0825

EXECUTIVE DIRECTOR

Blair Patrick

SECRETARY

Linda G. Tunison

ADVERTISING/EDITORIAL
DEADLINE
15th OF MONTH
PRECEDING PUBLICATION

Calendar of Events

- February 6-13** GCSAA 60th International Golf Course Conference and Show – Contact GCSAA (800) 472-7878
- February 13-15** Inland Northwest Turf and Landscape Show – Contact Jones & Associates (509) 327-5904
- February 24** Joint OGCSA & NWGCSA Meeting (tentative) – Contact Ron Coleman (206) 825-3942/Dick Malpass (206) 573-6969
- March 12-15** 40th Canadian Turfgrass Conference & Show – Contact CGSA (416) 249-7304
- April 17** NTA Board of Directors Meeting – Contact Blair Patrick (206) 754-0825
- April 30-May 1** OGCSA Annual Meeting – Contact Dick Malpass (206) 573-6969
- May 23** Oregon State University (OSU) Field Day – Contact Tom Cook (503) 754-3695
- June 9-11** 21st Annual Convention of the Oregon Seed Trade Association
- June 19** 2nd NTA Golf Tournament for Research – Contact Blair Patrick (206) 754-0825/Norm Whitworth (509) 659-3114
- June 20** Washington State University (WSU) Field Day – Contact Stan Brauen (206) 593-8540
- August 14** NTA Board of Directors Meeting – Contact Blair Patrick (206) 754-0825
- August 26-27** 4th Annual Seattle Flower Show – Contact Phil Traff (206) 863-0542
- September 18-21** 43rd NTA Northwest Turfgrass Conference and Exhibition – Contact Blair Patrick (206) 754-0825
- October 29-Nov. 1** Annual Educational Conference and Show of the National Institute on Park and Grounds Management – Contact National Institute (414) 733-2301

NORTHWEST TURFGRASS ASSOCIATION

Published at least quarterly by the Northwest Turfgrass Association, Blair Patrick, Managing Editor. Articles for future issues may be sent to the NTA office. Membership dues include the cost of subscription. Separate subscription price \$15.00 per year. All comments herein are not necessarily endorsed by the association. Advertising should be addressed to the NTA office.

ADDRESS CORRECTION REQUESTED

NONPROFIT ORG.
U.S. POSTAGE PAID
PERMIT NO. 385
OLYMPIA, WA

S1 7

Thomas W. Cook
Assoc. Prof. Hort.
Oregon State University
OSU-HORTICULTURE DEPT.
CORVALLIS OR 97331

P.O. Box 1367
Olympia, Washington 98507
(206) 754-0825

Address Corrections: If address is wrong in any respect, please correct the above label and return it to the NTA office.