the personnel to go with it. And you certainly have the energy, motivation, drive and enthusiasm with Drs. Kussow, Rossi, Koval and Meyer. It's so wonderful to see that."

He added that one advantage to the Noer Facility is that it is seven miles from campus while his research center is 180 miles from campus. "But we're very uniquely located in Dallas," he continues. "The horticulture growing maps show that we can be too hot, too cold, too wet and too dry. That exposes plant materials to the worst conditions that they can have."

"As a native of Wisconsin, what do you like/dislike about Texas? What do you miss about Wisconsin?" I wonder.

"I always make it a point not to be in Dallas in the summer," he quickly answers. "And I always make it a point not to be in Wisconsin in the winter. I do a lot of my research in Oregon where most of the bentgrass seed production is done. And so when the summer temperatures get pretty high, I find my way out to Oregon.

"But I miss the season changes," he continues. "The rolling hills and the trees. I love Wisconsin. It's a great state. I love coming back for visits." With his mother in Platteville and his 21-year-old daughter at college in LaCrosse, he usually gets back to Wisconsin every other year.

Milt was born and raised in Grant County, Wis.—Platteville and Belmont. "I essentially grew up as a city boy. But, since I was about 11 years old, I spent my summers on the farms with my grandparents and my uncles," he remembers.

Upon graduating from high school, he attended the UW-Platteville where he received a B.S. in agriculture in 1968. One professor there, Dr. Roger Higgs, greatly influenced his future plans. "I did not want to go out into the sales world in agribusiness," Milt explains. "Because of Dr. Higgs' teaching and the way he handled things, I felt that I really wanted to be involved in teaching and research. That was my primary driving force for going on to graduate school."

Graduate school was put on hold for two years while Milt served Uncle Sam at Fort Bliss, Texas. Then he entered the UW- Madison where he received his M.S. in agronomy in 1972 and his Ph.D. in plant breeding and plant genetics in 1974 under Dr. Richard R. Smith. He did some post-doctorate work at Oregon State University. Then he was hired by the USDA Agricultural Research Station in Temple, Tex.

"In 1979 the call came to go to work for North American Plant Breeders," Milt recalls. It was his first work with turf and his first work with a private company. "I reinstated a turf/forage grass breeding program that had been dormant for about 10 years.

"I stayed in that position until July of 1980 when the BIG call came," he continues. "That was to come back to Texas and join the Texas A&M faculty as an associate professor located at the Dallas Research and Extension Center."

"Research and work aside, what other interests do you have?" I inquire.

"I love world travel," he answers. "I've been in China, through most of the Pacific Rim countries a number of times, and in Europe. Most of these trips have been related to my work. As a plant geneticist, I travel around the world collecting new plant materials as well as visiting golf courses and sports facilities.

"I have become interested in photography again, especially macro photography," he adds. "It's work related, but it's fun. I'm working on a book on identifying plant materials using vegetative keys, and I will do a lot of photography for that.

"And I love the outdoors," he adds. "Recently my wife and I purchased a new home and we will be creating some ornamental gardens, working with ornamental grasses as well as flowers—a perennial landscaping system is what we want.

"I hesitate to call it golf, but I do swing at that little white thing," he jokes. "I'm not a very good golfer because I don't concentrate on the game. I spend more time enjoying the environment, enjoying nature."

"How are you handling a two-state marriage?" I ask, knowing that his new wife works in Oregon.

"Our argument is, she works for a company that is home officed in New Jersey. Her research center is in Oregon. So it makes sense that her home ought to be in Texas," Milt explains. "Our primary residence will be in Texas and we'll have a secondary residence in Oregon."

"Anything else you'd like to say to the superintendents in Wisconsin?" I inquire.

"Go Big Red!"

"Did you see the Rose Bowl game?" I proudly ask.

"I was involved with the renovation of the Cotton Bowl here in Texas, to go from artificial turf back to natural turf," he explains. "Notre Dame and Texas A&M were playing in the Cotton Bowl that same day. And their tee-off time—catch that, their kick-off time—was about 10 minutes after the kickoff time for the Rose Bowl.

"I was in Wisconsin with my family, my brothers and sisters and everybody else, and knew that these games were at the same time," he continues. "So I gained control of the remote control. I kept switching back and forth because I wanted to see both games. We missed only one play of both games.

"So I did get to see the Rose Bowl while I was back in Wisconsin. It was great to be home," he concludes.

ANSWERS TO *THE WISCONSIN GOLF COURSE QUIZ* ON PAGE 26)

1. No, of course not.
2. You are, obviously. The architect needs to reread the specs for USGA greens.
3. No, you are merely "responsible". If the sand doesn't meet the USGA size specs, you won't have USGA greens. The driver needs to understand his frustration properly should be vented with the sand supplier, not you, if the load doesn't meet specs.
4. Wrong. The lab answered your question, but your question should have been, "do either of these samples meet USGA Green Section specs for putting green construction?" If the "better" of the two samples doesn't meet specs, you **DON'T** have USGA greens. Period.
5. No. Go back to square one, find new samples and resubmit them to the lab.
6. Of course. Greens built to USGA specs are built of root zone material mixed OFF-SITE.
7. No way, not if you want a USGA green for that hole. The specs say "there must be an absolute minimum of 12" of uncompacted top mix spread over the green." The contractor owes you at least two more inches of rootzone blend.
8. Of course he can; it's his property and his golf course. But he won't have USGA greens.
9. There aren't any.
10. No.

A revolutionary leap in the evolution of mowing.
To see where rotary mowing is headed, take a good look at the sleek new Jacobsen HR-5111.™ It delivers an 11′-plus, high-production cut and exceptional trimability in a rugged four-wheel-drive package.

Built for long life in rough country.
Hydrostatic 4WD, a heavy-duty axle with differential lock, and a reliable, fuel-efficient, 51-hp diesel let the HR-5111 confidently tackle tough hills that stall the competition.

Our new box-channel steel, straight-line frame takes the pounding of tough conditions like no other mower in its class. Plus, the full-fiberglass body keeps its good looks for years, even in the harshest environments. And it's all backed by a 2-year, 1,500-hour warranty.*

No belts. No pulleys. No kidding.
Our revolutionary, fully hydraulic cutting system eliminates the maintenance and adjustments of belt-driven units. It incorporates individual, lifetime lubricated spindle motors which deliver more power to knock down tall, heavy grass, for a clean 1″ to 5½″ cut. The decks have a unique, counter-rotating spindle configuration producing the smoothest rear discharge going.

Smooth operator.
From the easy-to-read, full instrumentation, to the ergonomic controls, the HR-5111 redefines operator convenience. What's more, power steering, tilt wheel, cruise control and the adjustable high-back suspension seat keep the operator comfortable, for a more productive day.

For high productivity, 4WD mobility, heavy-duty durability and operator comfort, there's nothing like the HR-5111 on turf. So be sure to ask your Jacobsen distributor for a demonstration today.

*See your Jacobsen distributor for full warranty details.

JACOBSEN
TEXTRON
Jacobsen Division of Textron, Inc.

THE SHARPEST THINKING ON TURF.

THERE'S NOTHING LIKE IT ON TURF.

HORST DISTRIBUTING, INC.
P.O. Box 110, 444 N. Madison St. • Chilton, WI 53014-0110
Phone 414-849-2341
Turf Maintenance Equipment & Supplies
Serving N.E. Wisconsin & Upper Michigan

A Look at 1994 Research

By Scott A. Mackintosh

Next on the tee, the O.J. Noer Turfgrass Research and Education Facility. Yes it's time to tee up the research ball and whack it down the research fairway. Spring is springing and the season is underway. What an exciting time of year. As soil temperatures rise and the turfgrass begins to stretch its arms and legs after a long winter snooze, it's time once again to get outdoors.

While this past winter was certainly the coldest I have ever experienced, the turfgrass at the Facility came through the winter very well. Unfortunately, (from a research standpoint) there was no ice formation on the turfgrass. Therefore, there was no opportunity to observe the effects of ice removal from calcium magnesium acetate (CMA) applications. Nevertheless, I still intend to apply liberal to excessive applications of CMA on bentgrass and Kentucky bluegrass throughout the growing season.

As Dr. Kussow mentioned during EXPO-94, there is a substantial thatch layer forming on the lawn surrounding the O.J. Noer Building that will require immediate attention this spring. Interestingly, the Kentucky bluegrass sod was established on muck soil and is now growing on top of a clay loam soil and it appears the roots have not significantly migrated out of the muck soil.

We all know that thatch is a partially decomposed layer of organic matter lying above the soil surface. Surprisingly, thatch is made up of a significant portion of the turf plant other than the leaves. Thatch usually forms on well maintained turf, i.e., excessively irrigated, optimum to excessive nitrogen, and pesticide applications. Eradicating the thatch problem, however, is not as easy as defining it.

Dr. Kussow has used thatch reducing agents with limited success. To reduce the thatch problem at the Facility we will use traditional control measures to enhance the environment for thatch decomposition. We will aerate to increase soil oxygen levels and expose more soil microorganisms to the thatch layer, apply moderate nitrogen, avoid excessive irrigation but maintain moist conditions and a soil pH from 6.0 to 7.0.

Dr. Koval will be installing an ornamental grass demonstration plot this year. Ornamental grasses have become a very popular choice of many superintendents across the country. Ornamental grasses are relatively low maintenance, offer unique aesthetic qualities to clubhouse grounds, waste bunkers and golf tees. Certainly, they would look fantastic around anyone's home or business. Compared to traditional ornamentals such as Arborvitae, Hemlock and Taxus, most ornamental grasses need little upkeep other than a little fertilizer and water during the dry months. As an added benefit, once the ornamentals grow and increase in basal diameter they can be separated and transplanted to other locations.

Everyone who has visited the Facility knows how much, how new and how fortunate we are to be able to operate loaned turf equipment from our local industry. A special thanks to Hanley's, John Deere, Reinders and Wisconsin Turf Equipment. If it were not for them we would not be able to maintain the turf at our present level.

Thanks to the Wisconsin Turfgrass Association and the Wisconsin Golf Course Superintendents Association, research will begin on a native soil push-up green and a USGA spec sand green. Seeding should begin in mid-to-late April depending on the weather.

Don't forget the O.J. Noer Turfgrass Research and Education Facility is a information resource for anyone in the turfgrass industry. Call anytime at 608-845-6536.

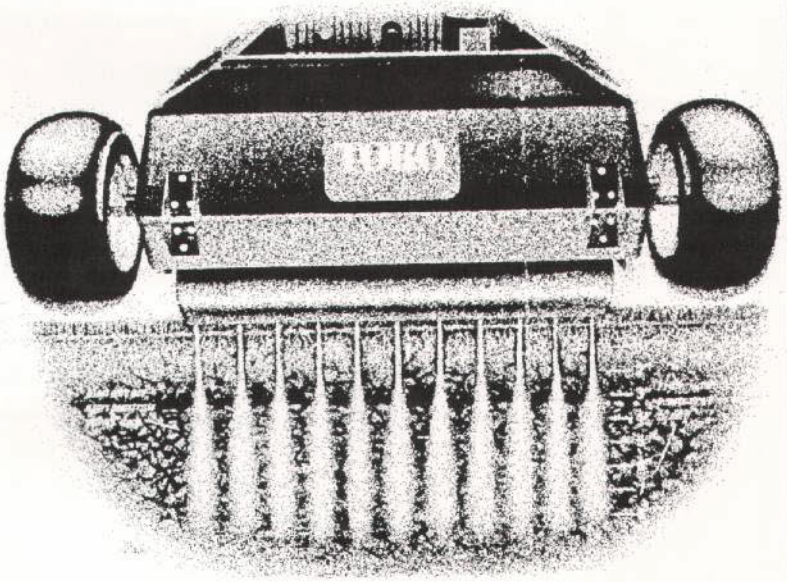
Reinders TURF EQUIPMENT

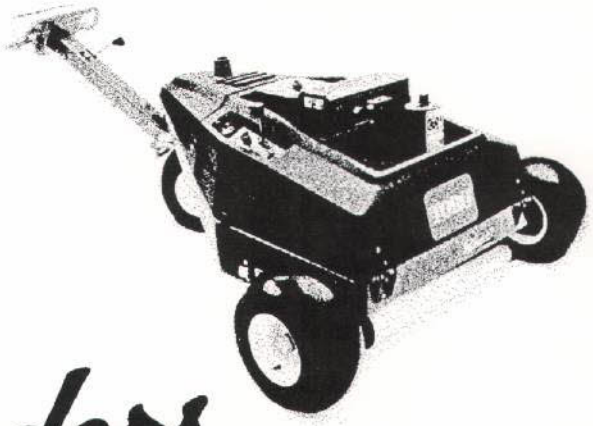
Aerate Without Disturbing Your Greens!

HydroJect 3000

Meet Toro's revolutionary Hydroject™ 3000. The only aerator that injects water at high velocity to penetrate compacted soils.

- The hydroject 3000 will penetrate 4 to 6 inches and beyond up to 20 inches if needed.
- No more soil cores
- Works on tees, fairways and anywhere you need aeration relief.
- No disturbed turf. No disrupted play.
- And the Hydroject is backed by Toro's Direct Today 48 Hour Part Delivery program.





TORO.

The Professionals That Keep You Cutting.

Reinders TURF EQUIPMENT

13400 WATERTOWN PLANK ROAD, ELM GROVE WI 53122-0825

PHONES: LOCAL (414) 786-3301 800-782-3300

Management Systems for Creeping Bentgrass Putting Greens: THE WISCONSIN STUDY

By Dr. Frank S. Rossi
Department of Horticulture
University of Wisconsin-Madison

Background

I have been fortunate in my life to find a career that I thoroughly enjoy. I am able to give of myself in ways that many who dread their work cannot. Since my arrival, almost 2 years ago, I have cherished the emphasis my colleagues (Kussow, Koval, Meyer, & Mackintosh) and I have placed on teamwork. We refer to ourselves as the UW-Turfgrass Group, each of us bringing unique perspectives and experience that creates a special environment for research and education. The following research project is our first group effort with the entire team in place and with the support of the WGCSA.

Perspective

The most common criticism of turfgrass research is; *studies that isolate one, maybe two, management factors and maintain other inputs at constant levels don't relate to real world situations*. The single factor approach enables the researcher to identify the specific influence of individual components of the management system. For example, if I wanted to know the effect of different mowing heights on bentgrass rooting, I would select 3 to 5 different heights of cut and set fertility, irrigation, cultivation, topdressing and pesticide use at constant levels. I would replicate my experiment so as to account for variability in plot location and any effect of a chance occurrence, collect and analyze the data, then report the findings.

The advantage of this approach is that it provides precise information regarding the contribution of one factor to the entire management system. Still, what if you irrigate and fertilize differently than the levels used in the study? I could vary several factors at a time, but then, logistically it is difficult to conduct the work and determine absolute effects. Therefore, one must recognize that all research has limitations and needs careful interpretation to determine actual effects in a specific management system.

Thinking of all the components of a management system, we begin to realize how many decisions are made to attain specific aesthetic and functional quality goals (see flow chart on cover). Also, from a research perspective, determining the impact of several management components simultaneously on measurable biological factors poses a unique challenge. With this in mind, the UW-Turfgrass Group is initiating a long-term study, on the WGCSA-funded experimental USGA sand-based and native soil (push-up) greens, to evaluate several putting green management systems.

Project Overview

Putting green management systems research involves setting functional & quality goals then designing management programs to achieve the goals. Our systems approach is based on classical long-term systems research techniques, group experience and from information gathered in the Putting Green Management Survey (Bob Erdahl; *THE GRASS ROOTS*, 1989).

The significant benefits of a systems approach is the inherent long-term nature of the study and the flexibility it allows when implementing various management tools—just as you would do on your putting greens. The study is divided into phases that address grow in (year 1), maturation (years 2 to 4), species transition (years 5 to 7) and species conversion and management (years 8 to 10). Each phase has functional goals designed to simulate several management intensities practiced at high budget, medium budget, and low budget facilities on sand-based and push-up soil greens. Throughout the project the turf group will observe the progress and "tweak" the systems to maintain specified levels of functional and aesthetic quality. Additionally, as we evaluate the biological and ecological response of the green to the systems we might initiate separate single factor experiments to isolate individual effects. An important facet of the project is economics. To address the topic in general terms, time and cost estimates for each management system will be recorded regularly. These estimates could be used to determine relative efficiency based on the measured parameters.

The Grow-in Phase

Many superintendents will be involved in new construction or renovation that will require growing in a new putting surface on sand-based and push-up greens. We selected 3 bentgrass varieties that represent industry use, growth habits and performance in trials at the O.J. Noer Turfgrass Facility. Plots on each green will be seeded at 1 lb. (pure live seed) per 1000 ft^2 with Penncross as the *old-timer* with substantial lateral growth, Providence as the more widely planted of the new varieties, with moderate upright growth that scored high in our variety trial and Crenshaw as the *new kid on the block* with substantial upright growth, also scoring high in trials.

The major focus of the grow-in phase will be to evaluate the influence of 3 nitrogen (N) fertility strategies on establishment and any leaching of N through the profile. The latest *fad* in grow in philosophy is weekly or bi-weekly applications 0.5 to 1.0 pound of soluble N per 1000 ft^2 on sand-based greens and will serve as the basis for the high intensity manage-

(Continued on page 37)

You Just Can't Beat THE SYSTEM.

Two solid designs- one solid story

CUTTING UNIT ADVANTAGES:

- *Two cutting unit options allow you to match the right cutting unit to your turf. The standard 5-inch, 7-blade cutting unit is designed for delicate grasses—while the heavy-duty 7-inch, 8-blade ESP unit is perfect for tougher conditions.*
- *Moving the cutting-unit mounting point behind center puts balanced force over both rollers improving quality of cut by keeping their cutting units more level during operation.*
- *Hydraulic down pressure helps keep the cutting units tight to the turf without weights or springs. A big advantage for mowing grasses in the warm and transitional zones.*

A mechanic's & operator's dream

SERVICING & OPERATING ADVANTAGES:

- *Patent-pending RFS (Rotate For Service) cutting units give unequalled service access. Cutting units rotate and present themselves for service — merely flip an unlocking spring and pull a pin.*
- *Onboard backlapping is standard on both the 3215 and 3235. Simply pull out a knob to reverse oil flow and "dial-in" the desired reel speed. The same system allows you to set reel speeds for actual mowing conditions as well.*

3215 TURF SYSTEM I — 3235 TURF SYSTEM II

The days of "one-size-fits-all" lightweight fairway mowing just ended. Now, you can get the ground-hugging benefits of 22-inch cutting units regardless of what turf surface you work on.

The 3125 Turf System I and 3235 Turf System II Mowers let you choose from two horsepowers and two 22-inch cutting unit sizes. Combined, they deliver three solid options to match your fairways.

The 3215 with standard cutting units is a 25.5-hp machine designed to perform well on any turf type, but especially on the more delicate cool-season grasses. Cutting units are 5 inches in diameter and feature 7-bladed reels.

The 32-hp 3235 can be equipped with standard or heavy-duty ESP cutting units. The ESP units are 7 inches in diameter, have 3-inch rollers, and feature 8-bladed reels.

Their wider mouth, extra weight, and higher-capacity hydraulic motors allow them to work well where lightweights never have before— long grass, wet conditions, tough warm-season grasses, and scalping for overseeding operations.

THE JOHN DEERE GOLF & TURF PROMISE

If for any reason you are not completely satisfied with your purchase, simply return it to your distributor within 30 days or the first 100 hours (whichever comes first) for a full refund.

The only test left for us to pass is yours

No one can accuse John Deere of rushing products to the marketplace. Thorough functional and field testing has always been part of a product's development.

Three years and 8,000 hours of field testing have proven and improved the system. It's mowed over 30 different golf courses in different areas of the turf world. It's worked in the cool-season, warm-season, and transitional zones—on bent, rye, bermuda, zoysia, and more.

JOHN DEERE

J.W. TURF INC.
Hampshire, Il
708/683-4653

New Location:
21600 W. Capitol Dr.
Pewaukee, WI 53072
414/783-7947

(Continued from page 35)

ment system. Two other systems are designed to fertilize with soluble and/or slow-release N applications based on demand for color or strictly slow-release N applied on a calendar schedule. Additional management factors will include the sandwich method of regular light topdressing while lowering the cutting height, as well as other medium and reduced intensity systems designed around the fertilization strategies.

To address the substantial pressure superintendents are under to open the greens for play, a traffic simulator has been constructed with over 400 golf spikes on two rollers. This apparatus will be used to impose wear at various stages throughout the grow-in phase. We anticipate providing support for holding the golfer off as long as possible, especially as we view the long-term effects of opening to early for play.

The Maturation Phase

Following the initial grow in season we will superimpose 3 levels of management over the 3 levels of establishment. For example, a high intensity management system that results in stimpmeter readings at or above 10 feet will be imposed over the weekly soluble fertility program (rapid grow-in—fast greens). This system will include mowing at or below 0.125", quad-tine cultivation, bi-weekly topdressing, preventative fungicide applications, plant growth regulators, etc.

The medium intensity system will be designed to provide stimpmeter readings between 8 to 9 feet and emphasizing wear tolerance.

The reduced intensity system is concerned with aesthetic quality and consistent roll with no speed requirements. Keep in mind that each system will be practiced on sand-based and push-up soil greens.

Status and Logistics

As a group we anticipate an open dialogue with the WGCSA regarding the status of the study with regard to specific management tools you may have found to be helpful. Please take some time and review the proposal you received at the spring business meeting and give us your input on the systems we designed. After all they are trying to simulate what you would be doing and can only be as useful as you help us make them.

As of this writing we are ready to install resin bags to collect any nutrient leaching below each plot and begin seeding. We are excited about the opportunities this study will provide for research and for training graduate students. We expect to garner more financial support from other associations throughout the region and begin to realize the potential of the Noer Facility. It is the center of turfgrass research and education and home of your UW-Turfgrass Group.

SEED PRIMING

We all want two things from turfgrass—we want it to be beautiful, and we want it now. Selecting the right varieties helps to ensure beautiful turf, and seed priming can deliver germinated seed sooner than traditional methods.

By Judy Brede, Research Associate and
A. Douglas Brede, Research Director, Jacklin Seed Company

Editor's Note: With the golf season well upon us, articles like this one from HOLE NOTES *take on more significance. It appeared in the official publication of the Minnesota Golf Course Superintendents Association for July 1993 (Vol. 23, No. 5), pp. 20 - 21. We are reprinting it with permission from Scott Turtinen, Executive Director of the MGCSA.*

Unfortunately, our most desirable turf species are among the slowest to germinate. For example, Kentucky bluegrass is very slow to germinate, taking several months to fully establish. This gives weeds plenty of time to overtake the sluggish bluegrass seedlings. Likewise in turfgrass mixtures, more aggressive turf species can overcome the slower bluegrass. For example, in a mixture of Kentucky bluegrass and perennial ryegrass, the ryegrass often dominates the slow-to-establish bluegrass. To compensate for this, turf managers may plant 90 percent or more bluegrass in the seed mixture to obtain a 50:50 mix of plants. This can lead to clumping or segregating of the two species.

Turf scientists have tried for years to speed up turf seedlings. There are three methods used to enhance the germination of seeds:

- Presoaking seed in water,
- Presoaking seed in water and giberillic acid (GA), or
- Seed priming.

Presoaking means partially germinating seed before planting. Usually, the procedure involves placing the seed in a 55-gallon drum containing water, using an aquarium pump and an air stone to aerate the seed for 48 hours or more, and then planting the seed wet.

The most vigorous seed will usually germinate in the water—here, we define germination as the root and shoot breaking the seed coat. This presents a problem—seed must be planted wet, and wet seedlings are susceptible to physical damage. Furthermore, you must plant presoaked seed into a damp seedbed immediately after treatment or the seed is wasted. Planting into a dry seedbed results in severe desiccation to your most vigorous seed—those that have already germinated or are germinating. Adequate moisture has to be maintained after planting until the stand is established.

Presoaking in water and GA will result in more rapid and uniform germination. This works best with annual ryegrass and tall fescue. This method of presoaking is done by dissolving a very small quantity of giberillic acid in 75 gallons of water. The seed should be presoaked in this solution for 2 days at 77°F, while being aerated with an air stone and an aquarium pump. Again, the seed must be planted wet, so you'll encounter the same problems you had with presoaking in water alone. The advantage of this method is that seed will germinate 3 days sooner than those soaked in just water.

SEED-PRIMING

Scientists in the vegetable industry have developed a method called seed priming to deal with slow-to-germinate crops and weak seedlings. Seed priming or osmoconditioning is a seed pretreatment where moisture is controlled, allowing the seed to be brought through the germination process, just before root and shoot emergence. Nothings breaks the seed coat.

The difference between presoaking and priming is important to understand. In priming, the root and shoot do not break through the seed coat. You can plant the seed dry using traditional methods without any physical damage to the seed. Conversely, in presoaking, roots and shoots have emerged from the seed coat in the more vigorous seed, and you must plant the seed wet using a hydraulic seeder.

In priming, the seed is soaked in a solution concentration that makes only a certain amount of water available to the seed. We use solutions containing polyethylene glycol (PEG 8000) or various salts (NaCl or table salt). PEG is a non-toxic thickener found in shampoos

and soft drinks. The large molecular size of PEG prevents it from penetrating the seed coat. But, it is very expensive, so we also prime with various salts, such as table salt. Salts present some hazard because they penetrate the seed coat and may be toxic to the seed, as in the case of potassium nitrate.

TESTING PROCEDURE

Our testing procedure to evaluate potential priming treatments uses petri dishes containing blotter paper, soaked with the experimental solutions. We place 50 seeds in the dishes where they prime in a germinator set at a constant temperature, usually around 60°F, for a set period. When priming is complete, we rinse the seed in running tap water and then dry them at 60°F until they are surface dry. We then place them in petri dishes with blotters soaked in water where we germinate them and test them against untreated seed.

We do daily seed counts to monitor their progress. We also run germination tests in the field using 1-inch diameter mini-plots, which we monitor daily. The field tests give the advantage of seeing how primed seed performs under natural conditions.

If we plan to store primed seed for any period, we store it in a refrigerator. Priming effects subside over time at room temperature. However, even old primed seed never performs worse than untreated seed. It may eventually equal untreated seed, but it never drops below it.

PRIMING LARGE QUANTITIES

Various problems arise when we need to prime large amounts of seed using this petri dish concept. This is because grass seed has several requirements that have to be met if the seed is to germinate to its full potential:

1. Grass seed has a light requirement. Grass seed is photosensitive. That is, it does not germinate as well in total darkness as it does with even a small amount of light. That is one of the reasons why you plant many seeds shallowly. Seeds have the same requirements during the priming process that they have during germination in the field.

2. Grass seed has a high oxygen requirement. Water does not contain enough free oxygen to meet the needs of germinating grass seed. The seed realizes this and will go dormant in standing water. That's why we aerate the water, preferably with an oxygen supplement.

3. Grass seed excretes toxins that inhibit germination. When seed imbibes water, it excretes chemical toxins. In large quantities, these chemicals are harmful to the seed and can inhibit seed germination.

4. The germination rates of grass seed differ among species, varieties and seed lots. We designed the experimental seed priming apparatus to meet the needs of the grass seed and deal with the problems of priming large quantities of seed. The aquarium holds 18 clear testing columns, each containing priming solution and seed. A pump supplies a combination of air and pure oxygen through the bottom of the columns to aerate the solution. We fill the aquarium itself two-thirds full with water to create a waterbath, which we heat or cool to maintain a constant temperature. The seed get adequate light, oxygen, the right temperature and the right water concentration. We change the priming solution every 24 hours to remove all excreted toxins.

Because germination rates differ among species of grass, among varieties within a species, and among seedlots within a variety, it is hard to know how long to prime a given batch of seed. If the seedlot has a long drawn out germination, priming needs to run longer than if the seed germinates fairly rapidly. It is possible to end up with seed that hasn't primed sufficiently or seed that has primed too long and deteriorated.

OTHER RESEARCH

Priming is very successful with other species of grass, such as bermudagrass. Bermudagrass seed has a very impervious seedcoat causing it to have a long, drawn-out germination rate. But, priming has a dramatic effect on bermudagrass. To quantify the germination rate, we used a germination index; the larger the number, the faster the seed germinates, and the more uniform the germination. Our testing showed that priming with an experimental salt was more successful than PEG.

The high germination index numbers we found also demonstrate another advantage of priming. Weaker seeds take so long to germinate that they become targets for fungus and bacteria; however, when we prime, these weak seeds develop much faster and our final germination count is higher.

Priming can also aid a slow-to-establish species in competing with a more aggressive species when you plant a mixture. This is the case with perennial ryegrass and Kentucky bluegrass. We compared Prelude perennial ryegrass with primed and untreated Baron Kentucky bluegrass to test this concept. The primed Kentucky bluegrass started to germinate on the same day as the perennial ryegrass, whereas the untreated bluegrass lagged behind.

To show what this edge can do for Kentucky bluegrass, we set up another experiment using Prelude in a mixture with untreated Baron Kentucky bluegrass. After 3 months when the stand was fully established, there was twice as much Kentucky bluegrass in primed lots than in the untreated Kentucky bluegrass plots.

Chapter Delegate Report

By Mark Kienert

This is a summary report to the membership of the Wisconsin Golf Course Superintendents Association of the voting results of the GCSAA annual meeting in Dallas, Texas during the 65th International Turfgrass Conference and Show on February 7, 1994.

When analyzing the fifteen separate bylaws votes cast in this year's balloting, the end results can be directly linked to the chapter delegates meeting held in September of 1993 in Lawrence, Kansas. It was there that simple debate created the overwhelming support for the adoption of eight of the fifteen proposed bylaws changes. As it has been reported in many of our trade publications, the proposed changes were a rehash of many of the measures that were soundly defeated by the chapter voting delegates in Anaheim in January of 1993.

In what can now be termed an understated "backlash", a large voting block of highly motivated delegates voted against the progressive desires of the "old guard." The most controversial of issues (e.g. individual voting, field staff members) were left off the ballot. The others were separated and reviewed as individual items. The board of directors of the GCSAA felt that this was an effort to guard against "throwing the baby out with the bath water" as many of those issues were of considerable merit and warranted a second look. Those issues were debated, revised and sent to the bylaws committee for their review and subsequent authorization to place those issues on the ballot for membership vote.

There were close to 5,500 ballots cast in this year's referendum, second highest vote totals when compared to last years record turnout. The bylaws proposals that succeeded with an excess of 5,000 votes were as follows:

Ballot 1 (Eliminated the word Green Keeper from the articles of incorporation.) Ballot 2 (Changed the bylaws to reflect the change in Ballot 1.)

Ballot 9 (Suspension of membership privileges for perjury.)

Ballot 11 (Made secretary/treasurers position an elected one.)

Ballot 12 (2/3rds vote of board required to indebt future Boards.)

Ballot 13 (Makes secretary/treasurers position an officer position.)

Ballot 14 (Changes the title of executive director to CEO.)

Ballot 15 (Established the trustees of the benevolence fund.)

The only two issues that failed to achieve the required two-thirds majority vote for passage were the issues that dealt with the creation of numerous "Class D" memberships (Ballot 5), and the establishment of classifications for "Club Officials" (ballot 6). However, those measures would have passed in an election governed by a simple majority of votes!

Other measures that were passed to amend the association's bylaws were:

Ballot 3 (Gives the board the right to develop standing rules for new membership classifications.)

Ballot 4 (Established a "Class C" classification for assistant golf course superintendents.)

Ballot 7 (Established membership classifications for educators and extension personnel.)

Ballot 8 (Allowed for the establishment of membership dues by delegate voting.)

Ballot 10 (Would publish how chapter delegates voted on issues in *"Newsline."*)

The election of officers for 1994-95 saw Joseph Baidy from the Acacia Country Club in Lyndhurst, Ohio elected to the position of president. Gary Grigg from the Naples Golf Club in Naples, Florida was elected to serve as vice president. For one remaining year, Bruce Williams of the Bob O'Link Golf Club in Highland Park, Illinois was appointed to serve as secretary/treasurer for this year. Changes in the bylaws will now make this an elected position in 1995.

Those nominated to serve the various lengths of terms for the position of director of the association were Bruce Williams (4460 votes); Paul McGinnis from the Union Hills Country Club in Sun City, Arizona (3750 votes and); R. Scott Woodhead from the Valley View Golf Club in Bozeman, Montana (3399 votes); Appointed to fill the one year term left vacant by the appointment of Bruce Williams to the position of secretary/treasurer was Tommy Witt from the Bent Tree Country Club in Dallas, Texas (2905 votes).

A major disappointment and an indication that "The Big Machine Politics" of the association is still alive and well was the defeat of Charlie Passios of the Hyannisport Club in Hyannisport, Massachusetts. All indications are that he wasn't able to carry one large chapter voting block in his quest to return to the GCSAA board after having been a victim of last year's fallout. In my mind, it is too bad that so few control so many of the votes.

It is for this reason that I would propose and would like to see the development of the midwestern chapters into a strong voting block to maintain a balance of power. I would call it a "Conference of State Chapters". It is very doubtful, under the present system, that this effort would ever work. But as it stands now, there are no checks or balances in place to provide any measures to guard against special interest projects being force upon us by any large voting block that is capable of supporting such a special interest measure.

As long as you've read this far and I still have your attention, here's to the hope that the GCSAA never again takes our association conference to the "Detroit of the South,"—Dallas, Texas. And I was one of the fortunate to have stayed in the Stouffers Hotel. Very nice, if it wouldn't have cost me a month's wages for cab fare to attend the various functions and to find a spot for dinner since there were no restaurants within a safe walking distance. Should have rented a car.

The convention center was nice, but the transportation to the conference center and the hotels left a lot to be desired. In my mind, they should have had one bus route that serviced the enormous number of guests that stayed at the Loews Anatole. This hotel saw many of our group walk to register for a room after the deplorable conditions of their original hotel choice was too much to handle after a couple of nights. I can still hear the groan of those of us on the bus when the bus driver would ask for a show of hands from those needing to be dropped off at the Travel-lodge. Yuk!

"San Francisco, here we come!"