New Varieties of Kentucky Bluegrass for Minnesota

By Nancy Jo Ehlke

Turfgrasses are the major erosion control and landscape surface in Minnesota. There are over 200,000 acres of home lawns, 55,0000 acres of cemeteries, 20,000 acres in school grounds and over 40,000 acres in golf courses. Kentucky bluegrass *(Poa pratensis* L.*)* is the most prevalent grass species found in these landscape surfaces in Minnesota. Turfgrasses are an important industry in Minnesota where there are over 30,000 acres of grass seed production and 15,000 acres of commercial sod production. Minnesota now ranks third in the production of Kentucky bluegrass seed behind Oregon and Washington. However, because of residue management concerns and the high cost of production, acreage of Kentucky bluegrass for seed production is expanding outside of its traditional area of adaptation in the Pacific Northwest. Kentucky bluegrass seed produced in Minnesota has several advantages over seed produced in Washington and Oregon. The seed is consistently of high quality and the seed is free of annual bluegrass seed, a noxious weed in the turf and sod industry.

In 1957, 'Park' Kentucky bluegrass was released by the University of Minnesota to the Northern Minnesota Bluegrass Growers Association. To date, this is the major veriety in seed production in northern Minnesota occupying over 95% of the Kentucky bluegrass acreage. Park is characterized as having good seedling vigor, but has dramatically lost market share due to poor disease resistance and the development of higher quality turf types of Kentucky bluegrass by the turf industry. Most of these high quality Kentucky bluegrass varieties are proprietary and are not available for seed production in northern Minnesota. Therefore, the overall goal of my Kentucky bluegrass variety development program is to develop high turf quality varieties of Kentucky bluegrass that produce consistently high seed yields in northern Minnesota for use in the turf industry in Minnesota and throughout the United States.

The development of Kentucky bluegrass varieties with high seed yield and excellent turf performance that are significantly different from existing varieties is difficult because the species is apomictic. Apomixis is a form of reproduction where the genotype of the maternal parent is identically reproduced in the progeny. Prior to 1970, selection among natural ecotype populations was the only breeding method that had produced successful cultivars. In other words, most of the older varieties were "collected" or "found" in turf areas such as parks, cemeteries and school yards. Hybridization and breeding efforts are also complicated by apomixis. Controlled crossing or hybridization between Kentucky bluegrass clones has been used to generate genetic variability; however, successful hybridization rates are low and range from 0 to 17% of the progeny produced being distinctly different from the maternal parent.

Because of the limitations of traditional plant breeding approached with Kentucky bluegrass, my research at the University of Minnesota in cooperation with Dr. David A. Somers and Dr. Donald L. Wyse has developed the technology needed for a tissue culture system in Kentucky bluegrass that is successful with a wide range of varieties. Briefly, tissue culture is a technique where a small portion from a plant is aseptically placed on nutrient media for growth. The plant tissue proliferates into an undifferentiated mass of cells that derive their nutrients from the media. In our Kentucky bluegrass system, we use immature flowers as our source of plant material to initiate tissue culture. After these cells have proliferated into callus, which is an undifferentiated mass of cells, the content of the nutrient media can be manipulated with hormones that will induce the callus cultures to produce roots and leaves. These plants can be removed from the nutrient media and potted in soil for further evaluation. Because tissue culture is an extreme disruption in plant growth and development, genetic and cytogenetic changes are frequently observed in plants regenerated from tissue culture and these changes are termed somaclonal variation. Cell and tissue culture technology have induced useful somaclonal variation in other species such as corn and oats. In Kentucky bluegrass, because of the limited success obtained with hybridization and the lack of new germplasm being readily available on plant collections in the USA and other countries, somaclonal variation induced by tissue culture is an alternative source of genetic variation.

In my research program, Kentucky bluegrass plants have been regenerated from tissue culture and established in the field at St. Paul in 1991. In 1992, the plants were evaluated for turf and seed production characteristics. Parental plants were selected based on turf quality, new traits and/or seed production potential. Seed was harvested off of the selected clones and the progeny from the selected plants were transplanted to the field in May, 1993 at St. Paul and Rosemount. Data was collected on individual plants a for rhizome development, least rust resistance, color and growth habit. Preliminary analysis of the field data indicates that somaclonal variation is an important source of genetic variation in apomictic Kentucky bluegrass.

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Kentucky Bluegrass —

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Plants show variation for turf traits and disease incidence, and often show better turf characteristics than the original varieties used in our tissue culture system. In September, 1994, I selected individual plants for further evaluation in small turf plots. I am excited about the possibility of developing new varieties of Kentucky bluegrass using tissue culture. Based on our initial field evaluations, tissue culture induced somaclonal variation will be useful in generating genetic variability in Kentucky bluegrass. However, it will be at least three more years before we know if we have been successful in developing high quality turf varieties of Kentucky bluegrass for Minnesota.

The Smell of Spring

March, normally our snowiest month, is the "transition zone" between our cold season and warm season in the Midwest. During this transition the greening of the landscape is a welcomed sight! This greening is what our jobs depend on, indeed what every living thing depends on. Photosynthesis is the most important chemical process known to man. It is not only an essential function of green plants themselves but is of the utmost significance to animals and man. It constitutes the sole ultimate source of food in the world.

March is the time of year to breathe in the smells of spring (those rejuvenating, promising smells this time of year.) If we could only keep those smells in our head and bring it back during the long winter months, like we bring back a favorite melody from our subconscious.

Spring officially comes March 20th or 21st on the vernal equinoz where an exact second separates winter and spring. We unofficially define it when we once again can smell the earth, see the first crocus or daffodil and get asked by a golfer when we think the course will open. We define spring by sounds. It's announced by the birds defending territories and attracting mates. You can't help but be impressed how the Red-Winged Blackbirds know when to return to the cattail swamps, or when Canada geese know when to fly northward.

One of the ways I know spring is coming is how the sunlight shines through my windows. Each morning the sun moves a little farther to the left until its light comes through the entryway window and hits the braided rug. That's when I can proclaim it's spring.

All those signs of spring are something we don't get from radio, television or the newspapers. The smells, sounds and sights of spring, which sometimes seem to materialize overnight, make our golf courses come alive once again.

—Tom Johnson

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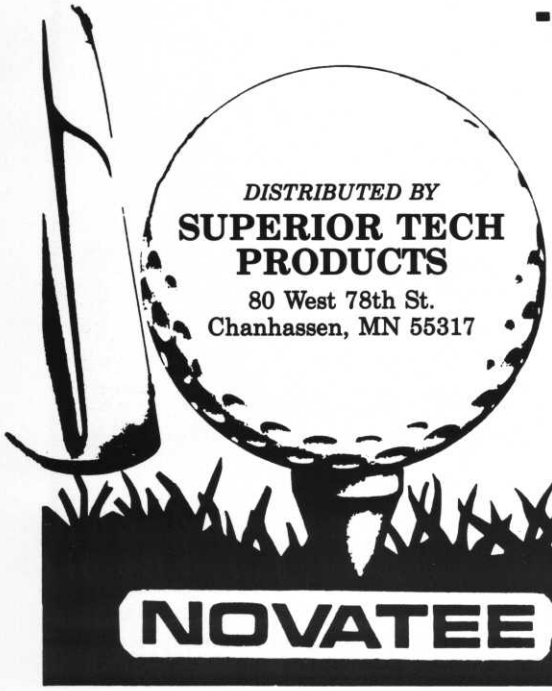

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U of M Update

By
Bradley Pedersen
University of Minnesota

An increasing number of phone calls I receive are directed at the "landscape" side of golf course grounds management. It is obvious to me that a maturing golf course in the 90s requires a great deal of time and money in the development of the aesthetic value of the golf course in addition to the functions normally associated with playing the game. Many Minnesota courses have a part-or full-time position that deals specifically with the design, implementation and maintenance of ornamental trees and shrubs, perennial and annual flowers, vines, groundcovers and hardscaping features.

The University of Minnesota Department of Horticultural Science, and the Minnesota Landscape Arboretum will be offering specific classes to aid those industry professionals who wish to beef-up their landscaping skills. The classes are directed at those who *do not* have formal training in the landscape area but have responsibilities in that area, or those who wish to be updated or learn more. In 1995, two classes will be offered:

Title: Commercial Landscape Design: The Planning Process

Instructor: Brad Peterson, Turfgrass and Landscape Specialist

Description: Creating long-term landscapes with minimal problems isn't as simple as "have bobcat - will landscape!". It requires intelligent design that takes into account not only the site, but also the needs and growth of chosen plants. Horticulture and design come together in this intensive class for golf course, park, cemetery and other grounds professionals; Master Gardeners and students of landscape design and construction. Participants will analyze current landscape situations in class and in the field while developing and evaluating plans for further installations.

Specifics: 4 sessions, 8:30 to 11:30 a.m., Minnesota Landscape Arboretum, June 15, 22, 29 and July 6. Class limit of 25 students.

* * * *

Title: Woody Plants of the North

Instructor: Michael Zins, Environmental Horticulture Specialist

Description: Which lilac is loveliest and least disease-prone? Which maple has the most marvelous color? Which honeysuckle is most likely to look horrible after five years? For an up close, in-depth look at woody plant cultivars appropriate for northern landscapes, join this intensive class for professionals, Master Gardeners and horticulture students. Lectures and field work combine in a hands-on approach.

Specifics: 4 sessions, 12:30 to 3:30 p.m., Minnesota Landscape Arboretum, June 15, 22, 29 and July 6. Class limit of 25 students.

* * * *

Doug Fender, executive director of TPT (Turfgrass Producer International) was the Keynote Speaker at the Environmental Care Association's annual convention this past December in Twin Falls, Idaho. I thought you would enjoy a few excerpts from his talk to the lawncare operators and pest-control specialists that make up the association.

According to Fender, "Both lawns and rain forests are made up of the thousands or millions of plants. . .the average 10,000 square foot lawn has over 8.5 million individu-

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al grass plants with more than 8 million miles of roots. The micro and macro, flora and fauna populations living in that forest of grass are immense, serving very useful purposes."

He noted that lawns, like the rain forests, moderate temperatures, hold soil in place and enrich it through decomposition of plant tissue and biodegrade many pollutants that would otherwise stay in the air or go into the water supplies.

During this hour-long presentation, Fender encouraged his audience to increase their personal awareness and education about environmental issues. He also invited them to become more pro-active by sharing scientifically based facts about the benefits of turfgrass with the public to counter the pseudo-scientific attacks by people he termed "eco-terrorists."

In one example, he reported that because grass clippings going into landfills are calculated on a wet-clipping basis, they are said to represent 20 to 50 percent of the total flow of the waste stream. However, knowing that clippings are 90 percent water and they degrade quickly, the actual dry bulk amount clippings contribute to landfills is more like 2 percent. He added that while clippings are not actually large contributors to the waste stream, homeowners should be educated about the benefits of leaving the clippings on the lawn as it is mowed to return the nutrients they naturally contain.

Other environment-related points brought out during the talk by Fender included tree-turf water use comparison fallacies, the comparative low risk actually resulting from proper pesticide use and the massive size of the Environmental Protection Agency's annual budget.

In closing his presentation, Fender urged attendees to begin examining their entire public relations and education efforts, as well as how they can more effectively market the benefits of their products and services to a population that is continuing to undergo major changes. A copy of the 16-page manuscript used for this presentation is available from the Turf Resource Center by calling 800/405-TURF (8873) The Turf Resource Center is sponsored by the American Sod Producers Association, Rolling Meadows, Illinois.

It's Time for Golfers To Pay Their Fair Share

Over the years, the entire golf industry has borne the cost of turfgrass research.

The United States Golf Association, private industry, the Golf Course Superintendents Association of America and state and regional chapters have all gone to great lengths to raise money, then given it away to scientists investigating everything from pesticide fate to low-input turfgrasses.

Now it's time for the end-user—the golfer—to pitch in. Golfers are, after all, the beneficiaries of the lifetime of hard work that superintendents and their crews devote to creating perfect playing conditions.

The Arizona green industry took a severe blow last spring when two legislators killed legislation that would have assessed 10 cents per round of golf, with the funds bankrolling research. The entire golf industry reeled, stunned by that debacle. Similar legislation is in effect in various states supporting research in citrus, agriculture and other industries. Superintendents and scientists around the country expected to push for this type of law. That may still happen.

But in the meantime, others are undeterred in their own innovative efforts to raise funds.

Dick Stunz of Alvamar Country Club in Lawrence, Kan., may have pioneered another way to skin this cat—using mailings to GHIN Handicap users to ask for donations for research. Stunz and his green industry colleagues in Kansas should be lauded. They and others must have unique ideas to pass on. We welcome the chance to be the clearing house for these ideas, tried or untried. Multiply a $2 donation by the number of golfers applying for handicaps in America and the potential is truly enormous for the Kansas-type fund-raising alone.

The industry could take the lead from organizers of the Herman Sani Fund in Iowa, which provides scholarships to graduating high school seniors. For 30 years they have raised funds at the state tournaments. Sometimes it's voluntary. Other times, a donation is simply added to tournament charges.

There must be myriad solutions to the money problem. One thing is certain: "A worker is worthy of his wages." And scientists from the University of Massachusetts to the University of Arizona continue to solve problems affecting golf courses.

They should get the support they need. And golfers should be among the supporters.

—Source: Golf Course News

Member-Generated Articles

Articles written by members are the key to the success of a publication such as *Hole Notes*. We listen to each other's ideas and trust each other's common sense and advice, so why not share it?

An experience of a superintendent at one golf course may be of use to a fellow superintendent at another course. *Hole Notes* needs you to put down those thoughts on paper and welcomes your suggestions for articles.

Please contact Tom Johnson, Editor, *Hole Notes*. Phone 715-246-4850 or FAX 715-246-7059.

SOIL CORE ANALYSIS A DIAGNOSTIC TOOL

By Joe Farina, Golf Course Turf Specialist
Read Sand & Gravel, Inc., Rockland, MA

(Reprinted with permission)

The turfgrass plant, much like a human being, requires a proper balance of air, water, food and a healthy environment to sustain life and survive in its flora world. The basic teachings of turf physiology have sharpened the expertise of many a superintendent to help combat against the elements that seek to upset this balance and to weaken, stress or kill our grasses. When an adverse condition is noticed—whether a pathogen, insect or climatic influence—the turf manager becomes a physician of sorts who analyzes, defines and resolves the problem using diagnostic methods of on site visual or off site laboratory tests. Most of the time this occurs after the damage has been done to some degree. We know that a weakened turfgrass plant is more susceptible to disease, stress and parasitic invasion. Identification of what causes a weakened plant in the first place could be the key to prevention and could increase the survivability of the turfgrass. A soil core analysis should be part of your check list.

True, many factors from close mowing to foot traffic or phytotoxicity can put a turfgrass plant in a weakened state, but the subsurface environment of the root zone area can set the stage for "do or die" of the turfgrass plant. Infiltration, porosity, organic content and particle distribution are the dynamics of a soil structure engineered for turf. Harmony and balance must exist among these root zone characteristics below the surface in order to support your cultural program atop the surface. When a soil imbalance exists, the turf cannot respond fully to the applications you apply to enhance its quality and vigor. Thus the turf plant becomes weak due to the soil environment in which it is anchored. Unfortunately, by the time the weakening effects are felt the mercury hits 90 plus, humidity is oppressive, there is a shotgun member guest at 12 o'clock, and you cancel lunch while you grab that bottle of antacid. Sound like the summer of '94? It's "no holds barred" with Mother Nature and the last thing on your mind is a soil test.

Spring and Fall are more opportune times to conduct a soil test analysis as a diagnostic tool prior to aeration and topdressing, and to make proper decisions on what material you should or shouldn't be amending the root zone with. Conventional soil testing methods are good for choosing a new root zone or topdressing material for greens and tees. However, for an existing soil profile in either a new high sand or an old push up green, a more surgical approach is required to locate, pinpoint and isolate a soil malfunction within a specific area from 0 to 12″ so that you can implement the proper corrective action (a "smart bomb" analogy, if you will). Such a method has been developed by International Sports Turf Research Center of Olathe, Kansas, to test intact, undisturbed soil cores inch by inch and evaluate the physical well-being of the soil medium as it relates to the root system and health of the turf plant. This is especially effective on golf greens where intense culture and abuse struggle to find an equilibrium. Now soil testing technology has devised a way to bring your golf green to the laboratory. Okay, sure, core samples have been done for years by using a cup cutter or pounding in random lengths of PVC, but never with this high degree of accuracy.

This New ISTRC SYSTEM cores with a plugger device and extracts a 2″ diameter by 3″ deep intact core into a copper sleeve that is then capped and sent off the the lab. Two types of cores are extracted which represent specific levels of the root zone for analysis. First, the most crucial upper tier — 0″ to 3″ — that is subject to general aeration practices, topdressing, soil amending, surface contamination and direct compaction. Second, the lower 3″ to 6″ tier that can harbor hard pan, fines build up, and is affected during vertidrain, deep tining and hydrojet practices. Additional lower tier cores may be extracted from 6″ to 9″ and 9″ to 12″, especially when considering deep tining or rebuilding. Identification of the make up of the soil profile with inch by inch accuracy is the intended purpose when subject to the following series of tests: USGA physical evaluation guidelines including infiltration rates; Walkley/Black organic; Particle distribution and textural analysis; Bouyoucous test; Porosity in capillary and non-capillary; Particle sphericity/angularity; and Root mass and feeder roots analysis.

Where and what are the most common soil problems found through core testing? Definitely in the upper tier 0″ to 3″. Buildup of organic and fine layers that seal off the root zone and impede proper infiltration, choking of the soil porosity creating an imbalance of air and water, the restriction of feeder roots from penetrating the depths of the root zone, and confining the root mass to the upper portion of the root zone. What could cause all the mayhem? The cause could be as simple as using improper topdressing material. Not that your topdressing material may be bad, but it just might be too much of a good thing such as high organics or particles too abundant in coarse or fines. Can you imagine what would happen to our cholesterol levels if we ate steak and eggs every day? Just as a blood test is a good diagnostic tool for human health, soil core analysis is a good diagnostic tool for the health of your turf.

San Francisco Hosts National Turf Conference & Trade Show

Many familiar faces and some new ones from the MGCSA visited the Bay City and took part in the 66th GCSAA International Convention. The educational opportunities plus the huge trade show make this an extremely worthwhile event for people in the golf industry.

Some of the best people in this industry were there to provide us with current information in turfgrass management. Over 60 one and two-day seminars plus concurrent educational sessions were offered during the week, capped off with a look at all the latest in turf equipment and accessories.

The opening session featured former Pittsburgh Steeler's running back, Rocky Bleier, and the GCSAA's involvement with ESPN films promoting the golf course superintendent. The "Old Tom Morris" Award was given to Dr. James Watson for all he has contributed to the turf industry.

"Changing Perspectives," was the theme of the Environmental General Session this year. John Stossel of ABC TV's news magazine "20/20", was back for a second time going head to head with the EPA. He felt perhaps enough was enough when it comes to some regulatory issues. Another speaker in that session was Dr. Kimberly Erusha, director of education for the USGA Green Section. Her message was to be persistent with the information about the positive effects that golf courses can have on the environment, but that information should be in small doses.

Bill Johnson of Edina Country Club won the GCSAA Senior Division Golf Tournament by shooting an 82-75—157. Former Minnesotan Paul Mayes (now in Japan), finished runner-up in the second flight.

This year's MGCSA get-together, featured a boat ride in San Francisco Bay. About 200 MGCSA members and families enjoyed a cruise under the Golden Gate Bridge with the beautiful lights of San Francisco in the background. We had a delicious dinner followed by dancing, at least for those who didn't have "sea legs." A thank you to Monty Montague and all the associate members for this year's "Great MGCSA Get Together!"

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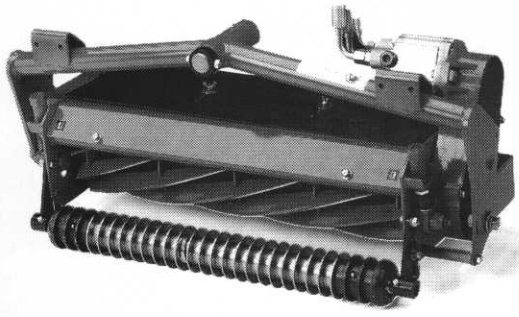

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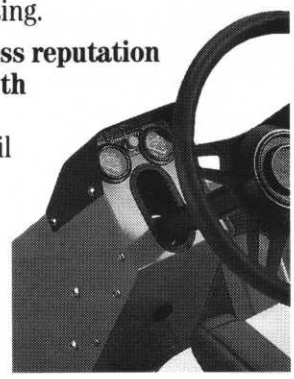

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