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A.

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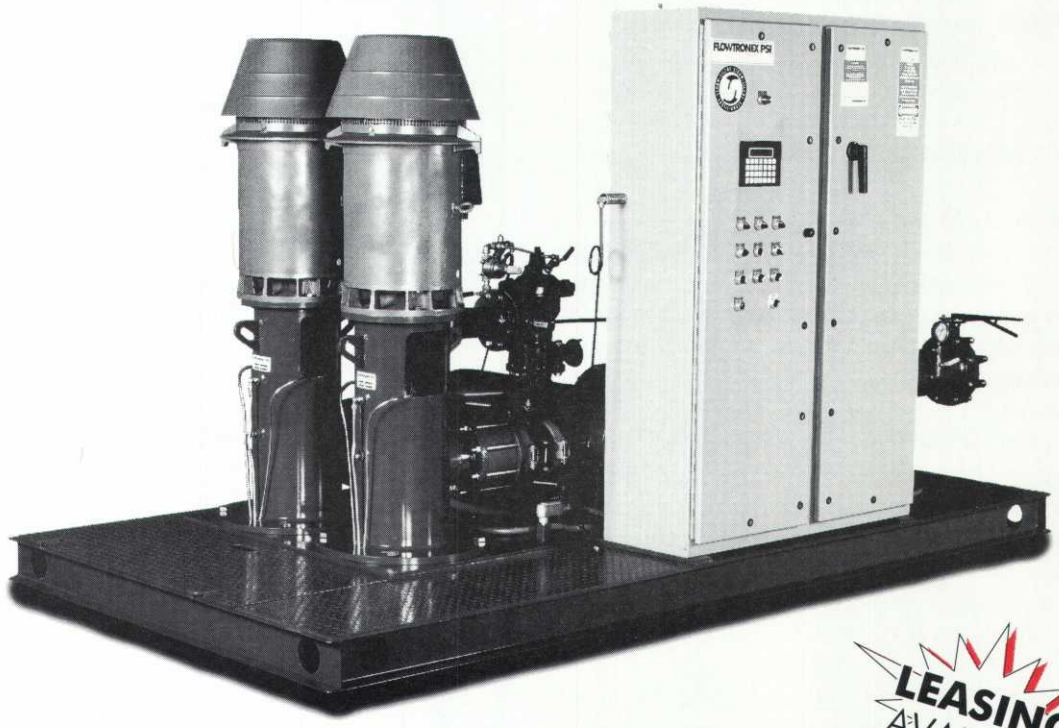

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Low Input—

(Continued from Page 10)

page that does not have a compound that contains phosphorus. Every once in a while minors are mentioned, but gee, most soils really don't need them, do they?

You can truly have a soil with no calcium and a PH above 7. Magnesium raises PH 1.4 times as much as an equal amount of calcium, and potassium also has a significant effect on soil PH. Potassium can replace many of the functions of calcium in a cell, although poorly. Unfortunately there is not much profit to be made in selling lime rock.

I would recommend that you all read a book by Neil Kennsey called "Hands On Agronomy." This book is published by Acres U.S.A., P.O. Box 8800, Metairie, Louisiana 70011, ISBN: 0-911311-39-4, Library of Congress: 92-076121.

It is the least voodoo/snakeoil/foofoodust/cosmic free energy/radionic/orogne energy/ideas your poor mind just can't handle, of them all, in its approach and, is a very good introduction to a possibly saner approach to plant culture.

I can't prove to you that these methods work. In a totally disrupted soil it could take years to restore it to a functioning ecosystem. The first step is to stop poisoning your soils with chlorine. If you use KCl in any of your fertilizer blends, stop on a portion of your course. One hundred pounds of KCl or murate of potash contains close to 40 pounds of chlorine. This same amount on an acre of soil would be a pound and a half of K per thousand and a pound of chlorine.

If you run the math on this, you have a concentration of chlorine that's many times the parts per million that you would find in a swimming pool. In short, you have just sterilized the top several inches of your soil. This is unfortunately the zone where most of the microbes that could do your plants some good live.

This is the zone where the aerobes (needing oxygen) that fix nitrogen live. This is the zone where the aerobic microbes that digest thatch live. This is the zone that the aerobic microbes that produce antibiotics that keep disease organisms in check live. This is the zone that if it is anaerobic (lacking oxygen) due to compaction or that horrible sand that compressess to leave no pore space will stunt your grass every bit as much as if you had sterilized it with clorox. This is the zone where life happens.

We are even taught in school that KCl should be avoided. Yet when we enter our profession, it is almost impossible to avoid it. Even highly respectable fertilizer companies use it in their "Fairway" or "Rough" grades. Almost all the ag. grades we use on our roughs contain it.

This is the saddest situation of all. Our roughs are mostly low maintenance turf and the area that is most likely to achieve a sustainable ecosystem if it was not routinely whacked by KCl in cheap ag grade fertilizer. If you remember what the Romans did to countries that were giving them trouble, they salted their fields! This is exactly what we're taught to do in school.

More and more this does not seem right to me. Perhaps this is why fertigation is so effective with one-third or less the fertilizer applied. You put down so little "salt" at any one time that the microorganisms are not affected adversely. To sum up, I feel I have been lied to for a long time.

I recently spoke to a trained soil scientist on the East Coast that had come to the conclusion that he had wasted his entire life after reading my article and speaking with me on the phone. He spoke with the people I had been talking to, and he has read the same books I have. Everything that he had seen go wrong in the field and the resulting problems all came in to sharp focus.

For him, a man with thousands of hours of doing soil analysis and making recommendations, the reality of what had to be heinous collusion of fertilizer and chemical companies motivated by profit and not good agronomy, was apparent beyond a shadow of a doubt.

Is he right? I think he is.

1996 MGCSA MONTHLY MEETINGS

Monday, July 8
IZATY'S GOLF & YACHT CLUB
GARSKE SCHOLARSHIP SCRAMBLE
Host Superintendent: Steve Schumacher

* * *

Wed.-Thurs., August 7-8
MTGF EXPO '96
Resurrection Cemetery

* * *

Monday, August 12
ST. CROIX NATIONAL
MGCSA CHAMPIONSHIP
Host Superintendent: Kevin Clunis

* * *

Sunday, September 15
MADDEN'S ON GULL LAKE
STODOLA RESEARCH SCRAMBLE
Host Superintendent: Scott Hoffman

* * *

Monday, October 7
FOX HOLLOW GOLF CLUB
Host Superintendent: Chuck Molinari

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Wed.-Fri., December 11, 12 & 13
MTGF ANNUAL CONFERENCE
Minneapolis Convention Center

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The Use of Bioaugmentation In Pond Management

By Jim Beer
AquaScape
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Bioaugmentation is the process of improving water quality by the addition of naturally occurring micro-organisms. Water quality is increased by alleviating such strains as organic sludge build up, anaerobic decomposition and excessive plant and algae growth. Micro-organisms such as bacteria cultures, enzymes and essential nutrients break down organic sludge, eliminate noxious by-products of anaerobic decomposition and limit plant and algae growth.

Leaves, grass, fish waste, dead aquatic plants and airborne particles all contribute to the organic load on a pond. Depending on the amount of organics deposited in a pond and the concentration of bacteria and enzymes in the water, an undesirable sticky, black sludge may result at the bottom of the water column. Enzymes, produced by bacteria, break down organics into simple nutrients which the bacteria use as nutrition. A variety of enzymes are necessary for the chemical break down of complex molecular organics. Lipase will break down animal or plant fats and greases, protease attacks proteins, cellulase degrades cellulose while amylase transforms carbohydrates and starches. The results of these reactions are increased nutrient levels which are able to sustain a healthy bacteria population and a dramatic reduction in the presence of organic sludge in the pond.

Many bacterial cultures require oxygen as well as organics to survive. These organisms are classified as aerobic bacteria. Aerobic bacteria use oxygen to digest nutrients by the following simplified reaction:

Organics + Water +Enzymes + Water Soluble Nutrients + Oxygen + Bacteria = Water + Carbon Dioxide.

This reaction shows the importance of oxygen and how it relates in breaking down organic waste without odorous or noxious byproducts. An additional benefit of aerobic decomposition is that it is considerably quicker than anaerobic decomposition. For this reason it is highly recommended to use bioaugmentation products in conjunction with some type of aeration equipment.

Excessive aquatic plant and weed growth in a pond is due to several factors. For plant life to flourish, the water must contain essential nutrient levels, beneficial light, carbon dioxide and be within a certain temperature range. Bacteria compete with plants for nutrients such as ammonia, nitrates, nitrites and phosphorus. Bioaugmentation converts these nutrients to nitrogen gas which evaporates to the atmosphere. Therefore our competing plants for these nutrients.

Results of one test conclude reductions in ammonia concentrations from .337 to .289 milligrams per liter, nitrate levels were reduced from .272 to .176 milligrams per liter and Kjeldahl nitrogen was reduced from 5.9 to 4.2 milligrams per liter. The significant drop in nutrient level is a clear indication of the improving water quality. Other findings conclude significant decreases of chlorophyl (75%), phenophytin concentration (85%) and turbidity (70%). The above test is representative of only one body of water and is independent of any other pond.

It is important to realize this bacteria will continue to reproduce only when the following conditions exist:

1. A water medium containing food (organic waste)
2. Dissolved oxygen levels of at least 5 parts per million
3. pH level between 6.5 and 8
4. Water temperature of at least 60°F

Bioaugmentation is one of several methods of controlling water quality. The addition of naturally occurring micro-organisms increases water clarity, reduces odors and controls the population of aquatic plant life. Although this is a viable, environmentally safe means of managing a pond, it is important to consider each individual application when determining the best method for controlling water quality.

Bats Are Good Neighbors

Courtesy of Field Notes, Audubon Cooperative Sanctuary System

There are 40 species of bats in North America and none deserve its negative reputation for getting tangled in people's hair, drinking blood, or always carrying rabies. Less than 3% of bats sampled with rabies are found to carry the virus. In fact, bats can be good neighbors and a vital resource for controlling pests and pollinating flowers.

Bats are furred, warm-blooded mammals with body lengths of 3-6 inches and wingspans varying from 8-12 inches. Most bats hunt flying insects and navigate by emitting pulses of sound through the mouth. Their sensitive ears hear the echoes reflected from even tiny insects. This allows them to steer towards prey and avoid obstacles. Bats also have keen eyesight on which they rely for long-distance orientation.

Bats in North America eat primarily insects such as cut worms, corn borer moths, potato beetles and mosquitoes.

A single bat can catch up to 600 mosquitoes in just one hour and consume up to 3,000 insects per night. Given this appetite, you can easily see why bats are the most important natural controller of insect pests that fly at night.

Unfortunately, nearly 40% of America's bats are on the Federal Endangered Species List.

Destruction or disturbance of bat roosting sites (hollow trees, old buildings, barns and caves) and pesticide use targeted at the insects upon which bats feed have threatened these creatures. Because most bats raise only one "pup" per year, their populations do not increase quickly.

You can help to ensure the survival of bat species in your area by:

1) Supporting bat conservation efforts to protect existing natural nest sites.

2) Mounting "bat boxes" to provide additional nesting and roosting sites. A bat box is a simple wooden structure much like a bird nesting box. It can be placed in a variety of locations, but bats prefer sites that are a few hundred yards from streams, lakes or wetlands. If conditions are right on your property, an invitation to bats will be rewarded with hours of insect control.

This year, incorporate bats into your pest management plan. Both you and bats will benefit.

Irrigation Maintenance Ideas

Golf course irrigation can be a very time-consuming task with newer systems becoming larger and more complex. Even the existing systems cost a lot of time. To help free up some hours, here are a few methods you may want to incorporate into maintenance routines.

On a daily basis:

• Use your entire crew to help spot trouble. The fairway mowers and the rough mowers see every square foot out on the course and are a good source of infomration for wet spots and dry areas. A few wire flags on each vehicle go a long way in time spent searching for any particular reported trouble spot (a worker spots something and simply plants a flag in the ground and reports it). A single wire flag also prevents a lot of ruts in a hidden wet spot.

• Cup-cutting personnel provide excellent feedback on the moisture content of the greens' soil. A small amount of time in training to identify wet plugs is a good investment.

• Tune in to reading dew patterns. If you can spot problems the first thing in the morning, chances are you will only miss one watering because you have all day to make the repair.

• And don't forget the obvious; cart paths will show "what was watered last night."

Also periodically check your irrigation equipment. Check your pump station for adequate pressure. Install a pressure gauge for a quick visual if need be. Keep your filters clean and lubricate the motors and bearings. A pressure gauge attached to a quick coupler key is a convenient tool for spot checks on the course.

If you have a central controller, test the communication to the field satellites. Look at your field controllers to see if they are keeping correct time. Send a signal to your station to check the sprinklers. Check each sprinkler for proper rotation and proper pattern from nozzles. A quick removal of a nozzle obstruction can keep your turf from stressing and turning brown.

Using these techniques may save some time and trouble for the one who is responsible for the irrigation system. A routine of checks and tests can involve more than just that person. And, most importantly, your golf course can remain green and growing.

—Northern Ohio Turf

MEMBERSHIP REPORT

NEW MEMBERS—JUNE 17, 1996

Class

Donald Bisch
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P.O. 112, Sturgeon Lake, MN 55783
W: 218-485-8442

Kevin Wold
Hillcrest CC C
4468 Helena Way N., Oakdale 55128
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Darin Miller
Pebble Creek CC . . . . . Student
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Jamie Olson
White Bear Yacht Club . . . . . Student
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Brent Belanger
Majestic Oaks GC . . . . . Student
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Coon Rpds., MN 55448
H: 612-755-6530

Brad Johnson
Olympic Hills GC . . . . . Student
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W: 612-576-4770

Daryl Gunnarson
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W: 320-274-5502

Scott Patterson
Peterson Seed Co. . . . . F
13521 Glasgow Ln., Apple Valley 55124
W: 612-432-7309

John Baker
John Baker Performance . . . . . F
8054 Premo Rd., Webster, WI 54893
W: 715-866-8114

Matt Johnson
River Falls GC . . . . . D
705 Brickingham Dr., St. Peters, MO 63376
W: 319-266-2638

Gary Hart
Standard Golf Co. . . . . Affiliate
2400 Interlachen Rd.
Spring Pk., MN 55384
W: 612-479-2272

Matt Hurley
T.L. Stevens Inc. . . . . Affiliate
705 Brickingham Dr.
St. Peters, MO 63376
W: 319-266-2638

RECLASSIFICATIONS
JUNE 17, 1996

Denise Kispert
Highland Park GC . . . . . C to B

Tim Morris
Albert Lea GC . . . . . D to C

Charlie Miller
Crystal Lake GC . . . . . D to C

Eric Peters
Southbrook G&CC . . . . . C to B

Orville Larson
Windom CC . . . . . A to AA

Cal Polsean Jr.
Westward Ho CC . . . . . A to AA

David Sime,
MGCSA Membership Chairman

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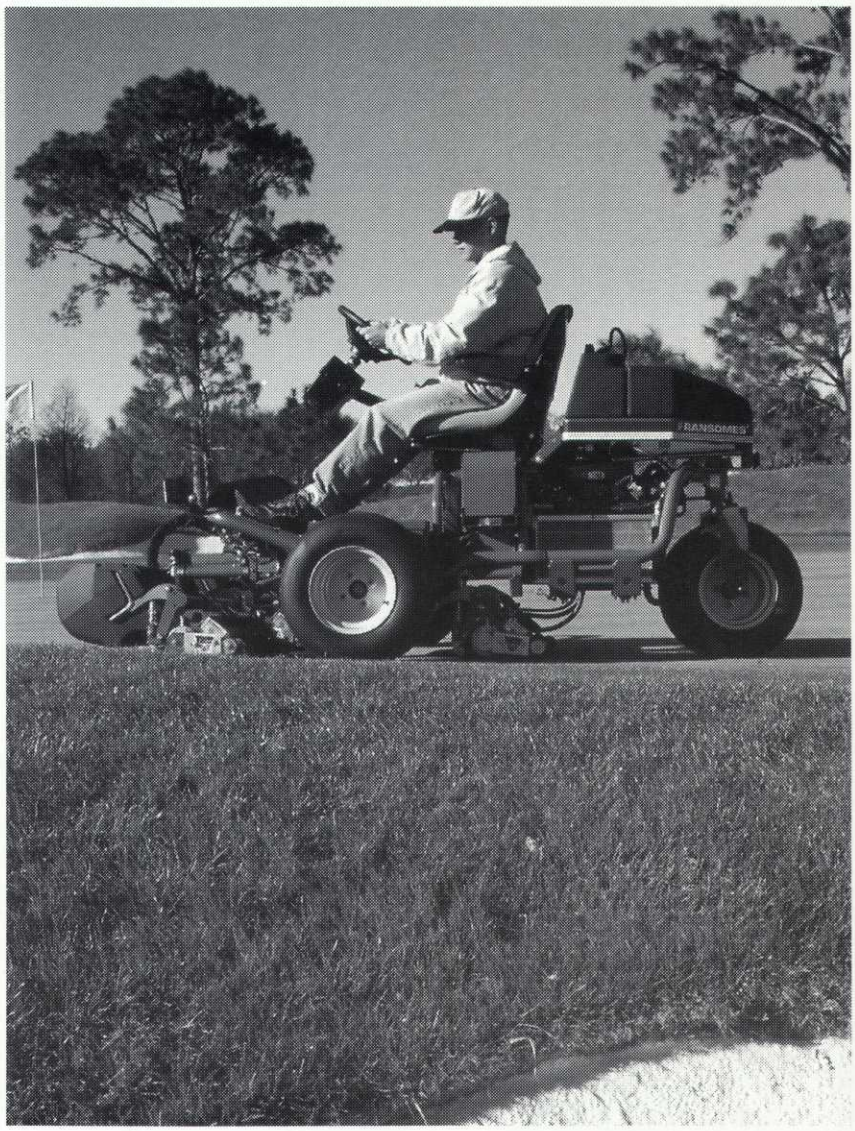

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Turf, Natural Grass. . .What's the Difference?

By Dale Wysocki
Minnesota Vikings

When people think of the Minnesota Vikings playing football, they often think that the Vikings play on synthetic grass (commonly called Turf by the players) in the Hubert H. Humphrey Metrodome and why on earth would there be a need for a person to do exactly what I do?

Well, first thing you understand is that over 90% of National Football League players prefer to play on Natural Grass. Keeping this in mind and by overlooking the two natural grass playing fields here at Winter Park, which were built to modified USGA Greens specifications in 1981, there is a need for a person with an agronomic background to do what I do. But, the position does not just specify growing grass. Included in the package are maintenance of the field house, with Turf kept at an ever exacting .500" height of cut and a telephone system named after a mythical wizard (maybe he was the only one to figure out how to work it) In addition to the landscaping, parking lots and building maintenance, there is game day set up.

The two natural grass fields that the Vikings practice on are kept at a lengthy 1.50." As a matter of fact the shortest turf we have at Winter Park is the Turf at .500." With the natural grass being kept at a height of cut that most golf courses usually maintain their rough at, sometimes you would think, now what on earth could go wrong? Aside from the stray Pythium visit or maybe a little patch problem, disease is usually held in check. However there is one visitor that happens twice a day in early May for three days, and various camps throughout the summer months, and then the BIG ONE in mid August. It's the final days of training camp and the beginning of the NFL's regular season. The practices start at about 1:00 p.m. and go until 4:45 p.m. and there is just a little RIPPING, TEARING, SPIN MOVES, RIP MOVES AND SWIM MOVES. When you think of torque, think of a finely tuned professional athlete, all tensed up awaiting the cadence of the quarterback, then imagine the average weight of each offensive lineman settle on 12 square inches. Does the word COMPACTION ring a bell? Imagine if you will, a place within your own worst nightmare, a four-wheeler across a putting green. Yes, that's bad, but maybe think of John Randle busting through the line to pay his respects to a Brett Favre look-a-like. Scary thought! Then think of all the equipment available to the players. Normal spikes on the bottom of football shoes are .500," but in cases of grass fields being slightly wet or slippery 5/8" cleats will be installed, or if you're playing at 3-Com Park at high tide, .750" cleats are installed. I don't think Soft Spikes will make in the NFL.

Fields are a very important part of the players daily routine, especially when you consider there are 40.7 million dollars worth of players. I personally feel that the fields not only have to be the absolute best, but they must also

be safe. In my opinion the field should free of ruts. Divots are replaced and a seed-oil mixture added. During down time from play or practice the fields are aerified with GA-60 using 5/8" tines and a 2.5" x 2" pattern. Prior to aerification, an application of 70% KBG/30% PRG is applied to the field at a rate of 2 lbs. per 1,000 sq. ft. After the cores are broken up, Milorganite is applied at a rate of 1 lb. N per 1,000 sq. ft. and 70% KBG/30% PRG is applied at a rate of 4 lbs. per 1,000 sq. ft. Then the topdressing begins. Using Leitner's 70% micro sand with 30% hypnum, about 22 cubic yards of material is applied to a field.

During the off season (June until mid-August) seeding and topdressing takes place once a month, with applications of specific fungicides with micro-nutrient packages happening every 14 to 21 days or as needed. The fertilizer applications revolve around an application of Milorganite applied between the numbers every three weeks, then 17-3-17 is applied once a month. Just prior to the start of the season 2 lbs. of slow release K will be applied along with a 13-13-13. Then it's time for the grass to acclimate for winter, but you still have to get the grass to grow so the fields heal. About the first of September the only seed used is 100% PRG, at a rate of 8 to 10 lbs. per 1,000 sq. ft. Any divot that anyone makes is filled in with a seed and soil mix, and covered with Penn-Mulch. As winter starts moving in and as the days start to shorten and cool off, a Typar blanket is laid from one end zone to the other to help stimulate germination. This, of course, is done after the area between the hash marks where the team has been practicing has been aerified and seeded.

Years ago in Sod School we were taught the fundamentals of turf-grass management, aerification, topdressing, slicing, seeding, rolling, mowing, irrigation and fertilization. When you remember the basics and how to apply them properly to your particular situation, your job can be made a lot easier.