

THE OFFICIAL PUBLICATION OF THE MICHIGAN AND BORDER CITIES GOLF COURSE SUPERINTENDENTS ASSOCIATION

A PATCH OF GREEN

MAY/JUNE 1994





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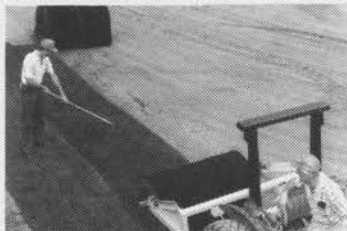
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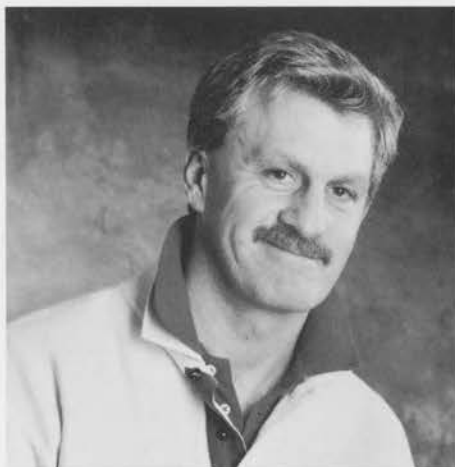
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HOLD THE DATE

MBCGCSA Annual Picnic
August 9 at Kensington Metro Park
FIELD DAY
August 18 at Michigan State University





*Tim McAvoy, Superintendent,
Fox Hollow Golf Club, Somerville, New Jersey*

IN NEW JERSEY'S "BROWN PATCH ALLEY... I'VE HAD GREAT SUCCESS WITH DACONIL 2787®."

"This part of New Jersey might be called 'Brown Patch Alley,'" exclaims Tim McAvoy, certified golf course superintendent at Fox Hollow Golf Club in Somerville, NJ. "The terrain, the soil, and the grasses we grow seem to make us more susceptible." Fortunately, Tim has found that Daconil 2787® Flowable Fungicide from ISK Biosciences Corporation "has a great ability to stop Brown patch every time."

Stops Dollar spot, too!

Fox Hollow's greens are bentgrass, Tim says, "and unfortunately, *Poa annua*." Recently renovated tees are 100% bentgrass, while the fairway grass is a combination of fescue, rye and *Poa*. That makes the fairways more susceptible, he believes, to Brown patch and Dollar spot.

"The fairways are where I use Daconil 2787 most," he says. "Starting in late June, I pretty much follow a 10- to 14-day preventive schedule for both diseases."

"We try to make good use of all the products and cultural practices available to us," Tim adds. "We use a slow-release urea-type fertilizer in the spring and then little or no nitrogen until September. We watch the water so we're not exceptionally wet, and we dethatch and do some other things to keep the microclimate as cool as possible when the turf is under the most stress."

Tank mixing saves time.

Besides great Brown patch and Dollar spot control, superintendents get still another important benefit from Daconil 2787: "The flowable formulation is compatible with so many other products," says Tim, "I can tank-mix and knock out two or three diseases. With so much acreage, tank mixing really helps me stay within my personnel budget."

And with Daconil 2787 as the cornerstone of Tim's disease-control program, he doesn't have to worry about disease resistance, either: "As far as Daconil 2787 is concerned, I don't think there's ever been a documented case of resistance. I've always had great success with Daconil 2787."

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By now, most area superintendents have applied their third or fourth applications of fertilizers to greens, tees and fairways. Furthermore, soil temperatures have raised enough to start applying your second summer patch preventive sprays to the fairways. We've all worked hard this spring scheduling and organizing for new renovation projects which included the loading and mixing pad which is required prior to 1994 spraying programs. After numerous meetings and seminars on this highly publicized addition, I hope we've all got this project under control or completed.

The greens crews are in place with the new members learning the skills of greenskeeping. Staff meetings have covered the "Right to Know" laws, hazardous waste management and MIOSHA safety regulations. It is imperative that all recently passed laws and regulations are brought up to date and records are available for future inspection by governmental bodies. Remember, these new regulations are in the best interest of everyone concerned.

Preventive maintenance of mowing equipment, on which our winter staff has so diligently worked, has included repair, sharpening, lapping and new paint applications to all equipment. The color of winter has been cut away and the glistening color of green has stepped up the enthusiasm of greenskeepers and all golfers. Spring is a time of new bright colors, and the landscape technicians are hard at work planning and planting the many varieties of annuals that add to the environmental aesthetics of the golf course.

The clubhouse and pro shop staff has been informed of construction and renovation schedules. Communications among other departments is invaluable during the short Michigan season, as is informing the membership of projects being considered and those under construction.

On a final note, the Special Olympics fundraiser was held at the Bald Mountain Golf Course. I hope everyone had the chance to attend! This event is dear to MBCGCSA because of the fine job the Special Olympics has done for the physically challenged. It's not only a great way to support this fine organization, but also a day of camaraderie. Many thanks to George and Gerry Preiskorn for extending their warm hospitality.

I wish everyone a great season in 1994 and hope the sun will shine down on us all. Remember, don't put off till tomorrow what you can do today, because you might find out that you like it, and you can do it again tomorrow.

Jay Delcamp

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By the time you read this, most of the shouting should be long over. But some of the doubts may linger. I am talking about the University of Iowa study that was released in February that suggested that golf course superintendents have a higher death rate than the general public because of their exposure to pesticides. The report also suggested that certain kinds of cancers were more common in this group than would be found in the public.

Well, of course, the media picked right up on this and had lots of fun inferring lots of things from the results of this study—things that were, in fact, completely false. We've been down this road before, and we will be again before too much longer. So let's do a quick review of what we know and what it means for our health, safety and well being.

First, you need to know that this was a statistical study and by its own admission does not try to establish any cause and effect. It is the media who are trying to do that. This report only looked at the reasons why these 618 superintendents died as listed on their death certificates. There was no follow up about lifestyles, family histories, work practices or the kinds of materials used in their profession. Although it may raise some questions about these issues, this study did not address them. Of course, the anti-pesticide folks tried to link this study with the Kansas/Nebraska and Iowa/Minnesota studies that also inferred a problem with pesticides. But it is critical that you remember that those studies were deemed flawed by the scientific community—not by pro-pesticide advocates, but by impartial scientists who reviewed the data. In fact, a soon-to-be-released report from the Science Advisory Panel and the Science Advisory Board will say that a connection between 2,4-D and cancer is only "weakly suggestive," a category that many everyday materials could fall into.

Also, you may have seen other articles in newspapers and magazines that have picked up on a report from the Journal of the American Medical Association (JAMA) written by the Department of Health and Human Services. According to these articles, "A white male of the baby-boom generation has twice the risk of developing cancer as his grandfather.

"Farmers incur chronic exposures to potentially harmful compounds, such as engine exhausts, chemical solvents, pesticides, fuels, animal viruses and sunlight," note researchers in the JAMA article. "Could increasing exposures to similar materials in the general population account for the fact that some cancers that are elevated in farmers are also increasing in developed countries?"

The response from the American Cancer Society, how-

Not So Fast!

by Tim Doppel

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researchers in the JAMA article. "Could increasing exposures to similar materials in the general population account for the fact that some cancers that are elevated in farmers are also increasing in developed countries?"

ever, is very telling: "We should focus on the things we know are of major importance—smoking and diet." Certainly Americans are exposed today to materials in everyday living that our grandparents never even dreamed of years ago. And so much of it is beyond our control. This gives great importance to doing the little things with our lifestyles that will minimize our risk of developing serious diseases.

And, of course, be sure to do those things on the job that minimize any risk of exposure to the materials we use. Using proper personal protective equipment when mixing, loading and applying pesticides will go a long way to reduce, if not eliminate, any chance of exposure to pesticides. That's just good common sense.

Although the media and other forces will jump at the opportunity to cry wolf about the safety of pesticides, we can just as quickly cry out, "Not so fast!" The whole story of mortality in the U.S. is more than just about pesticide use. Be sure you are examining everything clearly, rationally and with all the available information before you go jumping to any conclusion. And be sure you are helping to get that rational information to your relatives, neighbors, club members and co-workers.

First, you need to know that this was a statistical study and by its own admission does not try to establish any cause and effect.

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Good activities such as this don't "just happen." Many plans need to be made and you must be a partner in these plans. The collection day will be in September. If you want to participate and dispose of pesticides, you must register your interest as soon as possible. Please call your County MSU Extension Service office and ask to receive the "Clean Sweep Pesticide Disposal Packet." All the information you will need is included in this packet.

You should be aware that the EPA has allocated limited funds for this program, and we will be charged disposal fees for every unit disposed of. The application to participate, included in the packet, should be mailed back as soon as possible.

Good activities such as this don't "just happen."

Representatives from the seven-county area will meet and review the requests in order to determine grant overages. Following this review, you will be sent information relative to your delivery point and scheduled time to arrive.

We know there will be a great demand for this activity and trust you will understand the reason for the need to follow the procedures exactly as we move through the program. We are relatively certain that we do not have sufficient funds to meet the expected demand. You may be asked to share in a small portion of the disposal cost. If you want to participate, do not delay your response!

Call your county MSU Extension office ASAP. Check the Government (blue) section of your telephone book under County Government-Cooperative Extension for your county's telephone number.

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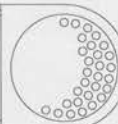
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Away Course - Use the boxes for two rounds. Write an "A" in the 1st CSE box, the course rating in the 2nd score box and the slope in the 2nd CSE box. Circle the completed score.

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CSE #4 - CHAMPIONSHIP	CR =74.5	SLOPE =134

MEMBER NAME	1st ROUND	2nd ROUND	3rd ROUND
	SCORE	SCORE	SCORE
ABELE, DAVE	87	88	83

MEMBER NAME	1st ROUND	2nd ROUND	3rd ROUND
	SCORE	SCORE	SCORE
ABELE, DAVE	86 ²	88 ⁴	81 ³

MEMBER NAME	1st ROUND	2nd ROUND	3rd ROUND
	SCORE	SCORE	SCORE
ABELE, DAVE	91 ^A	71.6 ¹²¹	

MEMBER NAME	1st ROUND	2nd ROUND	3rd ROUND
	SCORE	SCORE	SCORE
ABELE, DAVE	43 ^{F1}	44 ⁸²	

MEMBER NAME	1st ROUND	2nd ROUND	3rd ROUND
	SCORE	SCORE	SCORE
ABELE, DAVE	81 ^{T1}	87 ^{T2}	

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"Just fine."

"Good. What can I do for you?"

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"How many is that?"

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"Okay. Thanks, Kate."

"Sure. Anytime."

HIP* REMOVAL FROM RINSE WATER:

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TODAY, THE
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HAS BEGUN TO
CLOSELY
MONITOR THE
DISCHARGE
RESULTING
FROM TURF
EQUIPMENT
MAINTENANCE
OPERATIONS.**

The presence of herbicides, insecticides and pesticides (HIP), which contaminate the wash and rinse water, are posing a threat to the ground and fresh water supplies. Concentrations of HIP in typical rinse water resulting from equipment cleaning will normally range from 300 ppm (parts per million) to 1,500 ppm.

The Water Quality Act of 1987 amended the Clean Water Act to prohibit the discharge of pollutants to surface water bodies unless a permit has been issued by the city or state environmental agency. Before a permit is issued, however, the water must meet certain water discharge standards. The discharge standard for HIPs are traditionally very low, generally below 1 ppb (parts per billion) with some as low as .001 ppb.

Processing rinse water containing upward of 1,500 ppm to reduce the HIP levels to below 1 ppb is nothing short of a monumental task. Therefore, it is safe to assume that many of the golf course equipment washing operations are presently exceeding the allowed discharge limit. Worse yet, failure to do so could result in EPA fines, civil fines and soil and water clean-up costs, not to mention the possible negative publicity generated by the non compliance initiatives.

More and more golf course facilities today are realizing that the easiest, most cost efficient alternative to non compliance or obtaining a permit is to capture the wash water and not to discharge it at all, but to treat the water or remove the contaminants and reuse it.

Traditional removal technology of HIPs from water is by using Granular Activated Carbon (GAC), which is an EPA-accepted method. GAC systems generally function by exposing the HIP contaminated water to carbon particles; the organic HIPs are absorbed onto the carbon and thus removed from the water. Large GAC systems can process up to 50,000 gallons before GAC replacement is necessary, based on 800 ppm HIP contamination. Assuming a pressure cleaner operates at 5 gpm (gallons per minute), the GAC would be exhausted in less than 167 hours of operation, and GAC replacement costs range between \$700 and \$1,000. The addition of detergents or cleaning agents will tend to blind and consume the carbon even faster.

This method of water treatment used alone would prove to be economically unfeasible for most golf course facilities since they are continuously washing down their golf course maintenance equipment six to seven days a week, many with year-round operations located in warm climates.

Numerous studies have tried to qualify the ability of GAC to remove HIP from water; however, the problems are numerous such as:

- *Various HIP compounds (numerous chemicals)*
- *Fouling factor (blinding from dirt, algae, etc.)*
- *Flow rate (often slowed by solid materials)*
- *Breakthrough curve (useful life of carbon before HIPs pass through)*
- *pH (effectiveness varies with pH)*
*Contact time (may be too short for proper absorption to occur)
- *Temperature (extreme temperatures may affect the effectiveness)*
- *Influent concentration (a spike could overload carbon)*
- *Bacteria growth (carbon fosters algae and growth which*

blinds the carbon)

- *Channelling flow patterns (paths are formed limiting full use)*
- *Inefficient backflushing (without mechanical mixing, back flushing is difficult)*

Since the operating parameters are unique for each golf course, the real problem occurs in the field where they are numerous and often change simultaneously, resulting in unplanned and unknown breakthroughs or exhaustion of the GAC. This is of serious concern when dealing with recycled water because the contaminants may seep through putting the applicator at risk. Another concern is the proper disposal of spent GAC which will be contaminated with HIPs.

Several other methods of treating HIPs in wash water have been developed, none of which have had widespread use or acceptance in the golf course maintenance wash water arena.

Evaporation has been explored and natural evaporation ponds have had reasonably good results, however, they take up a large area. Forced evaporation can result in transfer of the HIP to the air, which is a serious concern in addition to the air discharge which presents permitting problems. Biodegradation also has been tested with some positive results, however, the process is slow and requires a large tank and monitoring. Reverse osmosis also has been used to reduce the volume of HIP successfully. The problems occur with cost, maintenance and removal of the concentrated HIPs.

Solar Photodecomposition is another method with encouraging results that have been documented utilizing simulated sunlight (UV) to promote oxidation reduction reactions. However, the process is slow, requiring up to four hours for low level reduction.

The ideal concept would be to add an additional technology to the GAC and to destroy the HIPs by oxidation (i.e., converting the contaminants into biodegradable or inert matter), thereby creating no waste or disposal problem. Oxidation has been the recent technology of choice in dealing with

(Herbicides, Insecticides, Pesticides)

by Ronald G. Fink, president, RGF Environmental Group

the international problem of Polychlorinated Biphenyls. Early in the PCB quagmire, GAC was considered the Best Available Technology by the EPA; by the late 70s oxidation was proven superior and remains so today.

EPA case studies have shown greater than 99% destruction of the pesticides DDT, PCP, PCB and Malathion with ozone and UV radiation technology. It should be noted that this is actual destruction and not adsorption or a transfer to GAC for later disposal.

Ozone has been used for years and is well documented as an oxidant for water treatment in lieu of chlorine throughout the European community and, more recently, in U.S. municipal water treatment plants. Ozone or O_3 is an oxygen molecule with an extra unstable atom of oxygen which is aggressive to organic compounds. As an oxidant, ozone ranks very high.

COMMON OXIDANTS RELATIVE TO CHLORINE

Fluoride	2.23
Hydroxyl Radical	2.06
Ozone	1.78
Hydrogen Peroxide	1.31
Permanganate	1.24
Chlorine	1.0
Bromine	.80
Iodine	.39

The above chart indicates the relative rate of effectiveness.

Studies performed in London on low level pesticide removal in drinking water have found 80-95% removal of atrazine with contact times of 2-10 minutes utilizing ozone doses of 1-5 ppm and hydrogen peroxide doses of .5-2 ppm combined. Full-scale ozone/peroxide studies for pesticide removal in France document similar findings.

In addition, certain combinations of key oxidants have been shown by further advanced studies throughout the U.S., Europe and Australia to produce positive results in the oxidation or virtual destruction of micropollutants such as pesticides and chlorinated solvents.

KEY OXIDANT COMBINATIONS STUDIED ARE:

- UV Radiation + Ozone+Hydrogen Peroxide
- UV Radiation + Ozone
- UV Radiation + Hydrogen Peroxide

One of the most promising findings for the golf industry is the development of hydroxyl radicals (the second-strongest known oxidizer) which develops when hydrogen peroxide reacts with UV radiation. The combination of hydroxyl radicals and ozone provides an extremely powerful oxidation atmosphere to react with organic HIPs and organic detergents. The by-products of this oxidation reaction are carbon dioxide and water.

Naturally, by utilizing a combination of the treatment technologies described above, the effectiveness of elimination of the HIPs will increase substantially. The most advanced technology present today is the Catalytic Oxidation Process CO^3P^TM which consists of a combination of these oxidation treatment technologies.

The treatment of golf course wash and rinse water, however, presents some unique problems for water recycling. The wash water, typically, will contain dirt, fine grass particles, oil, grease, detergents, etc. These contaminants must be removed or reduced significantly prior to advanced oxidation treatment. Otherwise, they will foul the GAC and reduce the effectiveness of the UV oxidation or other processes. An effective recycling system for golf course equipment wash operations also must contain pre-treatments capable of removing these suspended solids.

In the advanced CO^3P^TM process, the wash water is pre-treated to remove the solid contaminants. Then it is stored in a 500-gallon tank where ozone is bubbled with a micro aerator capable of producing bubble sizes of 1 micron. In addition, hydrogen peroxide (H_2O_2) is injected to provide a predetermined concentration. The water, O_3 and H_2O_2 are then passed over a UV light/quartz tube which converts the dissolved oxygen into hydroxyl radicals. This process is continued 24 hours per day, which results in HIP and detergent destruction as well as substantial reduction in suspended solids (TSS), dissolved solids (TDS), chemical oxygen demand (COD), BOD, color and turbidity. The ability of CO^3P^TM to destroy organic detergents is a major breakthrough in technology since, to date, expensive reverse osmosis systems were required to remove dissolved detergents from water.

After the water is treated, it then can be pumped back into the pressure washing system for safe, clean and continuous reuse of the water.

The golf course industry is no different than any other in its desire to find and use the most effective, safe and economical means and technology to operate equipment maintenance facilities. By borrowing a safety concept from our aerospace and nuclear industries, the ideal system should have triple redundancy in order to ensure the elimination of the HIPs and other contaminants from the wash water that can cause harm to us and our environment. In other words, if GAC, ozone, hydrogen peroxide, hydroxyl radical and UV radiation all remove HIP from water, why not utilize all as a fail safe system?

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Bruce Wolfrom Again Wins Regional Environmental Stewardship Award

by Mark Wildeman
Superintendent,
Fazio Course
Treetops/Sylvan Resort

It is important to publicly recognize those who are involved in conservation and wildlife enhancement activities. It is even more important to recognize the achievements and leadership of our peers and colleagues in this profession.

With this thought in mind, I am honored to announce that Bruce Wolfrom, CGCS/Golf Course Manager at Treetops/Sylvan Resort, Gaylord, Michigan, was awarded the regional environmental stewardship award (Great Lakes region) for the second straight year. This prestigious award, along with others, will result in thousands of dollars donated to the Golf Course Superintendents Association of America's Scholarship and Research Fund.

To qualify for this award, Bruce had to implement innovative practices demonstrating environmental stewardship, such as setting aside wildlife areas, state-of-the-art pesticide facilities and upgrading water management programs by use of a weather station and computerized irrigation system. This was combined with regular community involvement to heighten awareness of environmental concerns.

Bruce has taken a very proactive stance toward the environment and has initiated programs on the resort from tree harvesting to educating our guests on the resort's environmental commitment. He is also the driving force behind the fact that a portion of golf green fees are donated to the MTF for continued research on environmentally sound practices. His community involvement includes serving on the Otsego County Water Quality Committee and the DNR's Environmental Stewardship Program, called Michigan Clean Stream. This committee identifies waterways most vulnerable to impact from pesticide management practices and designs voluntary programs to protect water quality.



Bruce believes golf course superintendents on an individual basis are the best avenue to promote and educate the public about our profession and impact on the environment. I find it difficult to argue with that. It is simply a matter of being responsible stewards of the land—something entrusted to all golf course superintendents.

The keys to improving the quality of our environment are communication and involvement. Bruce has taken steps to build the bridge between these two keys by actively addressing environmental concerns and then implementing programs and projects to address them.

Many of the programs Bruce has implemented are unbelievably easy, and he invites anyone interested to contact him. They are the kinds of things you would do anyway to save money, especially if you knew how much you could save. This is most exemplified by his efforts with the New York Audubon Society. The end result is that Treetops has become a certified Audubon Cooperative Sanctuary.

Bruce's leadership should motivate all of us to do something about environmental problems. Attacks by environmental activists and coverage by the media have put the turf industry on the defensive. Yet, we all have seen the most difficult problems solved when people get involved.

This decade already has made many of us aware that large institutions and organizations alone can never solve the problems that result from the "inconsequential" actions of millions of individuals. But, remember, as much as the individual is the root of the problem, he/she also is the genesis of its solution. In this profession and industry, Bruce Wolf from is an excellent example.

Bruce's leadership should motivate all of us to do something about environmental problems.

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Diseases, Fungicides and Cultural Control

by James E. Merrick
CHIPCO Field Development Representative

Controlling diseases is very simple. All you have to do is select a suitable grass species for your environment and apply the correct fungicides at the appropriate times, right? Wrong.

Although fungicides are very effective tools, and selecting appropriate grasses is important, there are a great number of other factors that contribute to disease emergence. And, unless you pay careful attention to these factors, you're only addressing part of the problem.

IMPORTANCE OF HEALTHY TURF

Diseases are caused by "opportunistic" pathogens, which most readily invade turf that has been weakened, lacks proper fertility or is under some other type of stress. Therefore, one of the best ways to combat diseases is to maintain healthy, vigorous turf.

FERTILITY

One of the most important ways to maintain healthy turf is to monitor fertility, this is best accomplished through soil tests or tissue analyses. Of the two, tissue analyses are more accurate indicators of nutrient levels, especially on sandy soils. Too much fertilizer can be as harmful as not enough. In fact, the single greatest fertilization error is to over-apply nitrogen, which causes excessive growth of the succulent tissues that diseases love to infest. Excess nitrogen is closely associated with diseases such as *Drechslera* (*Helminthosporium* spp.), *Fusarium* blight, *Rhizoctonia* brown patch, *Pythium* blight and snow molds.

Inadequate nitrogen can promote the development of severe outbreaks of rust, *Sclerotinia* dollar spot and red thread.

Since soil PH influences the effect of fertilizers, try to keep your soil between a pH of 6.5-7.0—generally considered ideal range. Keep in mind that if soils are too alkaline, they also can neutralize the efficacy of some fungicides.

IRRIGATION

Watering is a universal area of concern for golf course superintendents. Underwatering can result in drought stress and encourage disease development, especially for *Helminthosporium* leaf spot and *Fusarium* blight complex. Overwatering enhances diseases by creating the excessively moist, non-aerobic conditions in which fungal pathogens thrive. Although watering requirements vary greatly depending on climate, golf course design and even turf species, there are some good rules of thumb. For example, make sure that your turf does not "go to bed wet" at night. Repeated research has shown that free moisture on leaves during the evening or at night is a key component to disease infestation. Very early, pre-dawn waterings are usually the best time for irrigating turf. However, it is important to not irrigate deeper than the length of the plant's root system.

CULTIVATION

Although a thin layer of thatch is beneficial, anything more than one-half inch reduces water and nutrient movement into the soil. In addition, heavy thatch can help harbor insects and disease pathogens.

Practices such as vericutting and coring not only help reduce thatch, but also sever plants, thereby encouraging them to reproduce vegetatively.

CONSTANT VIGILANCE

Unfortunately, many fungal diseases remain ever-present and viable in soil, simply waiting for the right conditions in which to emerge. When they do emerge or when conditions are particularly conducive for their emergence, it is important to apply an effective fungicide before the situation gets out of hand. In general, a very effective, broad-spectrum fungicide is the best choice as your "foundation treatment."

UNDERSTANDING FUNGICIDES

Understanding how fungicides work can help you to select the ones which are most appropriate for your needs. Contact fungicides coat the plant's surface and kill pathogens as they try to enter. But as the plants grow, they leave new, untreated areas that are vulnerable. For this reason, contacts need to be reapplied fairly frequently during the active growing seasons. Generally speaking, they are used for curative applications.

Another characteristic of contact fungicides is that they have multiple-site activity, which means that they interfere with several aspects of the fungal spore's biochemical processes.

Most systemic fungicides work by moving throughout the inside of plants, giving them better absorption into tissues and making them better preventive products. Unlike contacts, systemics usually have single-site activity against pathogens.

ADDITIONAL TURF-HEALTH TIPS

No matter what types of products you use to control diseases, the best results always will come from integrating a broad variety of sound management techniques.

Here is a partial list of the most important ones:

- **Improve soil drainage.**
- **Improve air circulation with fans or by reducing tree canopies surrounding greens.**
- **Maintain proper pH.**
- **Avoid excessive thatch.**
- **When mowing, remove no more than 1/3 of the leaf height at any one time. Also, ensure mower blades are sharp to minimize plant injury.**
- **Avoid excessive nitrogen applications.**
- **Employ periodic core aeration.**
- **Remove excess shading in areas prone to disease.**

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As a practice run, the field was first installed for the final game of the U.S. Cup '93 at the Silverdome last June. At that time, it marked the first and only time in world history in which a major sporting event was successfully played on such a field.

Preliminary research to build and maintain the portable field was conducted by Michigan State University during June-July 1992 at the Pontiac Silverdome. Starting in the autumn of 1992, and continuing through to the present, additional research has been conducted by Michigan State University in the MSU indoor turfgrass dome at the Hancock Turfgrass Research Center in East Lansing. Grass species, soil types, fertility and lighting requirements were among the variables tested to determine the maintenance requirements for indoor turfgrass.

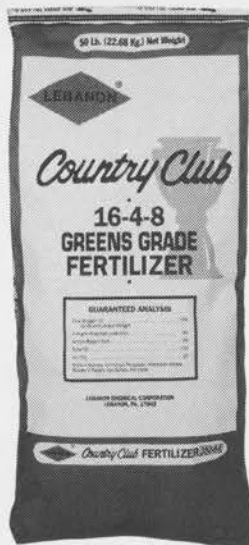
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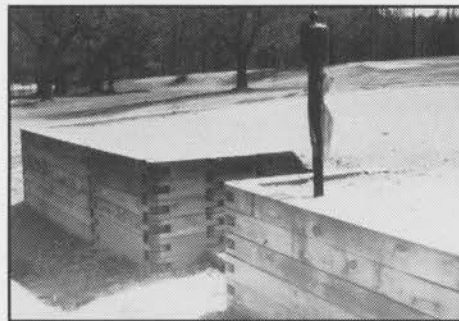
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The Growing of World Class Turf

In January 1993, a 320ft (square) portable, indoor playing field was installed inside the research dome to stimulate the installation planned for the Pontiac Silverdome. The field for the US Cup '93/'94 was constructed in the parking lot of the Pontiac Silverdome beginning March 1993. More than 1,850 steel hexagonal trays were placed in the shape of a field and filled with soil.

Each tray has a six inch depth and seven and a half foot diameter. The walls of the trays are removable for player safety. Ten to 30 people worked for nearly four weeks to load and compact the soil. Most of the labor was donated by Detroit area golf courses, lawn care companies and MSU turf students.

From April 12-20, the field was sodded using a mixture of Kentucky bluegrass/perennial ryegrass. The grass, only five months old, was shipped from California in refrigerated trucks. Approximately 12,000 ft (square) of sod was laid each day, all of it cut to fit each individual tray. Between April 20-June 7 the field was maintained by MSU staff and students. The field was mowed on a daily basis and fertilized biweekly. Grass height was initially maintained at two inches and eventually brought down to nearly one inch prior to installation of the field inside the stadium. The field was watered daily using six travelling sprinklers. Handwatering was performed nearly daily around the field edges. The field was topdressed and rolled five times over a five week period to help level the surface and stabilize the sod. Individual seams between sod pieces within modules were topdressed by hand to facilitate knitting of the sod.

By the end of May, the sod had developed a dense root mass down to the bottom of the trays.

Installation of the field inside the Silverdome was started June 7. Thirty to 40 people were split into several crews to complete each stage of the installation. Fork trucks were used to load the trays onto flatbed trailers, five trays per trailer. Approximately 370 trailer loads were driven into the stadium during a four and a half day period. Fork truck operators inside the stadium removed the trays from the trucks and set them in a line parallel to the field. As the steel walls, or rings, were removed from each tray, a second set of forktrucks moved each module into place to form the field, one row at a time. One hundred rows, each having either 17 or 18 modules, were eventually installed for form the field.

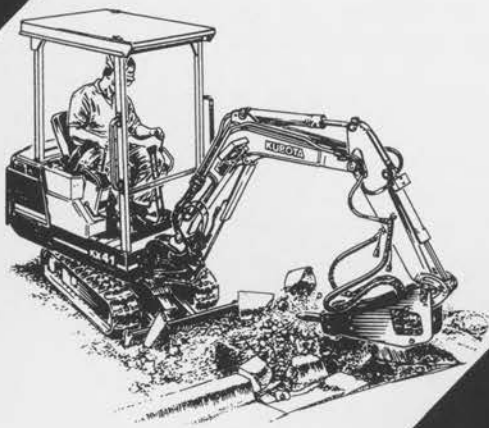
By noon on June 11 all the trays had been moved into the stadium. Over the next three days the field was rolled to smooth out seams between the trays. When necessary seams were topdressed by hand to create a uniform playing surface. The field was mowed daily at approximately one inch height. All clippings were removed. No irrigation was necessary inside the stadium due to a low evapotranspiration rate. On June 16 the field was lined and the goal posts installed. Due to the lack of sunlight and air movement, the lining paint had to be dried using leaf-blowers.

After the games the field was moved back outside to the stadium parking lot. During the summer, it was maintained as an athletic field with mowing and watering performed by groundskeepers. Fertilization and pest controls were applied periodically. In December, a snow cover was placed over the field to prevent winter desiccation.

In June 1994, the field was once again be installed inside the Pontiac Silverdome for the entire world to see, showcasing Michigan and the Michigan turfgrass industry.

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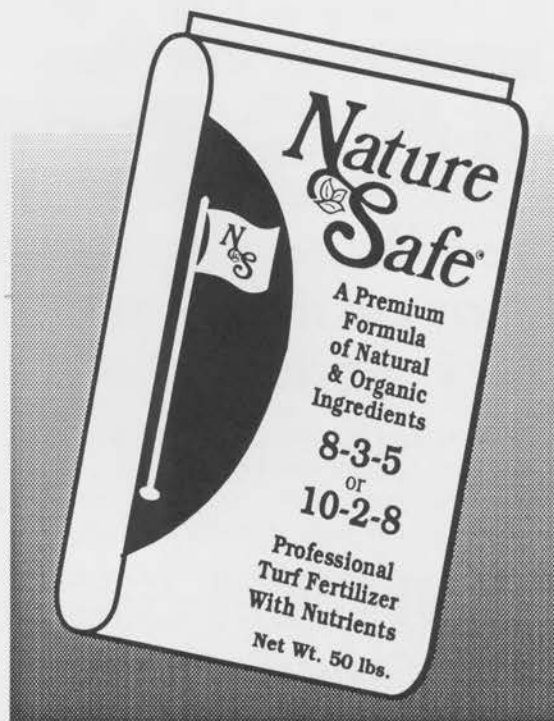
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The Future Is Now

by Kevin Dushane, CGCS
Bloomfield Hills
Country Club

If you could look into the future, what would it hold for you? Riches? Fame? Working in the grass growing business

is not going to make you rich or famous. And it won't get you to the moon. What you should be looking for is something a little more realistic and attainable.

If I were 50 years or older, would be looking toward retirement, albeit grudgingly. If I were between 35 and 50, I would be considering methods to put my children through college. If I were in my 20s, I would be looking to invest in a house. The gist of this line of thought is about saving for your and your family's future—whether it's a house, a college education or retirement.

If you are a young person just getting started in the turf business, you are the object of this essay. You could be married and have a young child or are considering starting a family soon. You might be a golf course superintendent or an assistant. You have very little money in the bank, and your wage scale is low to mid-range. With the low interest rates of today, you may have bought a house. It may not be everything you were looking for, but you have a start. Some equity is building up. Good move.

That is the direction I followed when I was in my early 20s. Looking back, I can honestly say that I did everything possible to have a decent standard of living. I reached many of my goals and had fun doing it. I am concentrating heavily now on getting two children through college in the next eight years. Developing and sticking to a savings plan will help me realize this goal.

Saving money is not always easy. The cost of living is always going up and salaries and wage increases are lagging behind. You finally get caught up with your monthly payments when those unforeseen expenses jump up and get you. It isn't easy living from paycheck to paycheck. Figuring out how to put that money to good use is the challenge.

Having the perseverance to build a nest egg can be difficult. Unless you received a lot of money from an inheritance or hit the lottery, chances are your funds are limited. So,

it's necessary to start a savings program and stick to it. The amount doesn't have to be big, just something to

build on. It's surprising how a cash reserve can grow in a few years. As your wages increase, add a little more to your reserve.

There is such a diversity of investment schemes available that it's not practical to discuss them now. The key point is that there are strategies for saving money. You just have to find the one to fit your needs.

Your place of employment may offer a savings plan such as an IRA or a 401K. If you don't have such a plan, make every effort to get your business to participate the next time you are negotiating your annual salary. It's surprising how investing a few thousand dollars every year will grow into a large sum of money in 30 years.

If you recently graduated from college, you know what financial strains a student goes through to survive. Just imagine how it's going to be 20 years from now, when your son or daughter decides to go to college. It's hard enough getting a decent job with a college education. It's even tougher without one. Putting away money for their future education should start right now. As Saving toward a college fund can be commensurate with your wage increases. By the time your children are ready to attend college, you'll have funds available. They can attain that higher education without putting an economic burden on your family.

There are many avenues to follow when saving money. A financial planner or even your parents can get you started. After all, they went through this routine already. There is a lot of good advice available. Seek it out. Set your goals and make it happen.

Living for today is a good motto, but when your future is at stake, living for today is no help at all. Think about it. You may have wished you lived for tomorrow 30 years from now. Do a little of both.



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(It's about time.)

FACTS ABOUT SEXUAL HARASSMENT

Sexual harassment is a form of sex discrimination that violates Title VII of the Civil Rights Act of 1964.

Unwelcome sexual advances, requests for sexual favors and other verbal or physical conduct of a sexual nature constitutes sexual harassment when submission to or rejection of this conduct explicitly or implicitly affects an individual's employment, unreasonably interferes with an individual's work performance or creates an intimidating, hostile or offensive work environment.

Sexual harassment can occur in a variety of circumstances, including but not limited to the following:

- *The victim as well as the harasser may be a woman or a man. The victim does not have to be of the opposite sex.*
- *The harasser can be the victim's supervisor, an agent of the employer, a supervisor in another area, a co-worker or a non-employee.*
- *The victim does not have to be the person harassed, but could be anyone affected by the offensive conduct.*
- *Unlawful sexual harassment may occur without economic injury to or discharge of the victim.*
- *The harasser's conduct must be unwelcome.*

It is helpful for the victim to directly inform the harasser that the conduct is unwelcome and must stop. The victim should use any employer complaint mechanism or grievance system available.

When investigating allegations of sexual harassment, EEOC looks at the whole record: the circumstances, such as the nature of the sexual advances, and the context in which the alleged incidents occurred. A determination on the allegations is made from the facts on a case-by-case basis.

Prevention is the best tool to eliminate sexual harassment in the workplace. Employers are encouraged to take steps necessary to prevent sexual harassment from occurring. They should clearly communicate to employees that sexual harassment will not be tolerated. They can do so by establishing an effective complaint or grievance process and taking immediate and appropriate action when an employee complains.

FILING A CHARGE

Charges of sexual harassment may be filed at any field office of the U.S. Equal Employment Opportunity Commission. Field offices are located in 50 cities throughout the United States and are listed in most local telephone directories under U.S. Government. Information on all EEOC-enforced laws may be obtained by calling toll free at 800-669-EEOC. EEOC's toll-free TDD number is 800-800-3302.

If you have been discriminated against on the basis of sex, you are entitled to a remedy that will place you in the position you would have been in if the discrimination had never occurred. You may be entitled to hiring, promotion,

reinstatement, back pay and other remuneration. You also may be entitled to damages to compensate you for future pecuniary losses, mental anguish and

inconvenience. Punitive damages may be available, as well, if an employer acted with malice or reckless indifference. You also may be entitled to attorney's fees.

The above information is available on a fact sheet in the following formats: print, Braille, large print, audiotope and electronic file on computer disk. For further information, call the Office of Equal Employment Opportunity at (202) 663-4395. *This information was distributed at the March membership meeting at Salt River Golf Club.*

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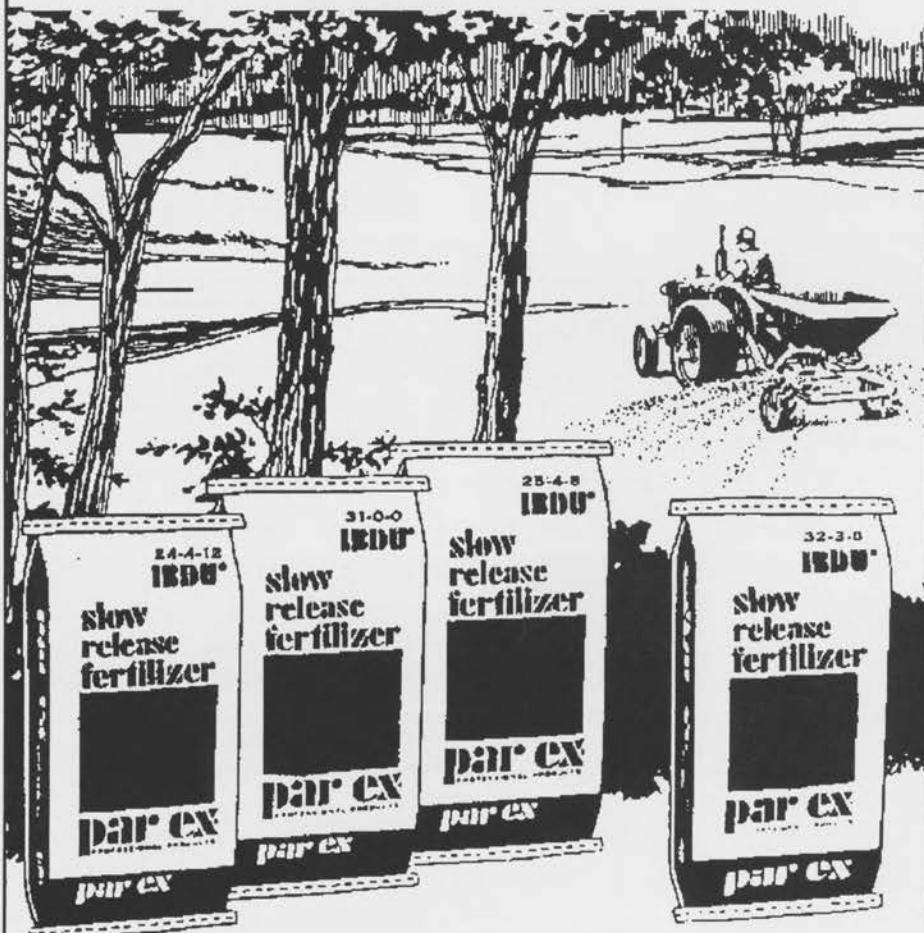
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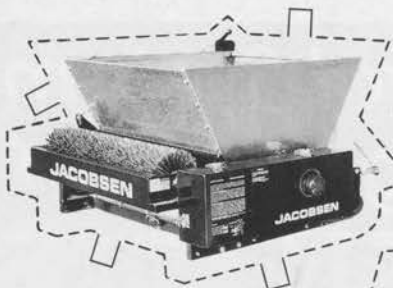
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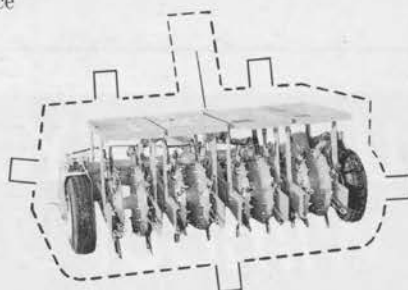
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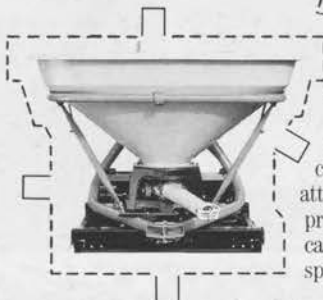
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