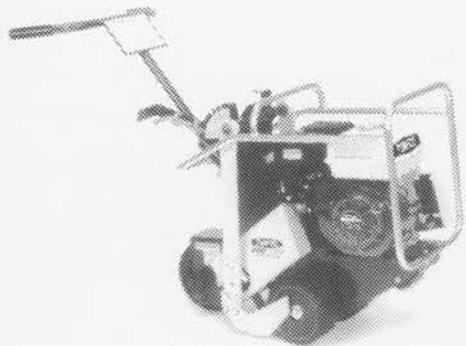


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CORRECTION: The article on the Salt River Meeting in the spring issue was written by Tim Dark, not Kate Mason

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Thank God it's Friday. Thank heaven for little girls. Thank God for Assistant Golf Course Superintendents. What...? Whoa...? Who the..? Yes, that's right, I said it, I meant it. Thank God for assistants! Who (besides my fiancée) gets to listen to my seemingly never ending complaints? Who (besides us Superintendents) gets to work long thankless hours? Did I say thankless? Well, shame on me! I hereby vow, that from this day forward, I will do my best to... Now wait a

minute! My fiancée hasn't even gotten me to say those words yet!

But seriously people, think for a moment about how important a role Assistant Superintendents play in your day-to-day operation. If I was a betting man, I'd wager it is more than just important, it is huge! These individuals are, for the most part, in a training position, striving to become head Superintendents themselves one day. All the while learning all they can about our profession, and they're making you look good at the same time.

So, I propose, show them your gratitude by assisting them to learn even more. Bring him or her along to as many association meetings as possible. Or, send him or her in your place if you are unable to attend. We need involvement on all levels to strengthen the quality and the usefulness of our monthly meetings. We need to set an example for them on the importance of involvement and of "giving back" to our profession in order to improve ourselves as well as our association.

Sometimes a fresh viewpoint is all that is needed to get things rolling. I feel that we need to tap into the minds of Assistant Superintendents to get a feel for the direction we should be head-ing in. We should allow them some input to insure that we are doing everything possible for their benefit. we have nothing to lose and everything to gain, in my eyes. Their involvement could possibly give us all a "kick in the pants" to express our views and to speak up and be a vocal part of discussions at our meetings. This could possibly guide us to step out of the background and into the limelight in our daily life on the job as well.

Hello...? Did I get your attention? Yes, I'm speaking to you... you hard working Assistant Superintendents. If you agree with me in the least way, do something about it! Ask to attend our monthly meetings. Inquire about serving on one or more of our committees. We want YOU! There is a wealth of knowledge and opportunity just waiting for you to utilize. Committee chairmen are listed in your roster book. Take some time to investigate and don't hesitate to call and inquire. The future you save may be your own.

REMEMBER: T.G.F.A.S. Thank God for Assistant Superintendents.

A handwritten signature in cursive script that reads "Paul W. Dushane". The signature is written in dark ink on a light background.

Paul Dushane



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Kate Speaking

Pete: Hi, Kate. Say, I hear that our association gives out an award to the superintendent who writes the best article for our *Patch of Green*.

Kate: That's right, Pete! The John Walter Award is given out annually, providing that superintendents submit articles for our publication.

Pete: You mean there are years when no articles are submitted?

Kate: Unfortunately, that is correct. I know that you guys are really busy, but I'm sure you all have a great deal of knowledge to share. Our publication would be greatly improved if more superintendents contributed to it.

Pete: Yeh, I sure do agree with that.

Kate: Well Pete, please give it some thought. Maybe you can motivate yourself to write about some of your experiences as a golf course manager. You could help advance your profession, and who knows, maybe even win the John Walter Award.

Pete: I'll give it some serious consideration, Kate. Thanks for the information.

Note: The John Walter Award is presented in the beginning of the year for previous year articles. A nice plaque and a \$100 stipend is presented to the award winner. Call Kate Mason for more information.

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Member Focus

by Mike Jones

When one arrives at Oakland Hills Country Club you know you are at one of the country's top golf clubs. With its rolling hills and intimidating greens there is no better test of golf. There is also no better test of growing grass than that of our country's premier golf tournament, the "U.S. Open". Steve Glossinger, the Golf Course Superintendent and a CGCS, is experiencing something many of us may have dreamed about and he is having fun preparing for this year's Open. With just a couple weeks left before the big week for the country, he is calm, organized, and actually has thoughts about how he will have the course ready for his members' invitational. It is evident, from the organization of the maintenance facility to the quiet confidence that his staff has in him, that he will accomplish what he desires.

Steve has been a golf course superintendent for 21 years. He became a superintendent at the

young age of 21 for Signal Point Club in Niles, Michigan. He remained there for 11 years. He then had a one-year stint at Battle Creek Country Club before he had the opportunity to work for Point O'Woods Golf & Country Club for seven years. He has now spent the last two years at Oakland Hills Country Club. With all of this experience, Steve is ready for the U.S. Open. "Preparing for the U.S. Open has been similar, yet bigger and longer than that of the Western Amateur, which I hosted at Point O'Woods", comments Steve.

Steve is also proud of his family, his wife Jackie and their three children Aaron, Jill, and Jodi. Steve enjoys playing golf, as well as reading about golf and its history. He has a large book collection on golf course architecture and history and continues to add to it.

He will have to add the one about him and the Oakland Hills 1996 U.S. Open to his collection.



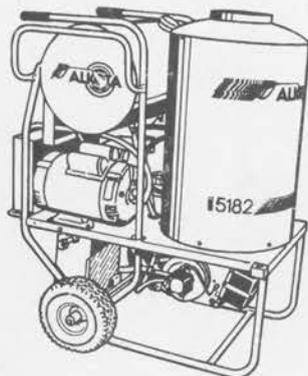
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Special Olympics What A Day!

This year's event, held May 17 at Bald Mountain Golf Club, raised more than \$15,000.00 for the Special Olympics. This year 135 golfers braved the weather and enjoyed a great round of golf, followed by a steak dinner, and of course, the auction of the golf packages and sports memorabilia. Talking home the much coveted Steve Yzerman autographed jersey was Tom Gill. It was not easy to buy, as Paul Dushane also wanted that shirt! As the price climbed, the bidding narrowed to a duel between the two. Tom came out on top with the bid of \$703.00! Thank you, Tom! Other hot tickets were also Red Wings items. An autographed Federov jersey, two Coffey pucks and one Yzerman puck were eagerly sold by auctioneer Don Fields. To top off the night, the Michigan Special Olympics presented the Greater Detroit GCSA with a lovely plaque honoring our 15 years of fund raising.

The committee would like to send many "thank you's" for the generous contributions of our vendors, fellow superintendents, club officials and other businesses who made this year's outing such a success. A special round of applause goes out to Bald Mountain Golf Club and all of their staff for helping to carry out this annual event.



Special Olympics Outing

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The View From M.S.U.

Ataenius And Aphodius Update

Nikki Rothwell
Department of Entomology

Introduction

Ataenius spraulus was considered an incidental pest in turfgrass prior to the 1970's. However, in more recent years this insect has become a serious pest of golf courses all across the United States and some provinces of Canada (Tashiroy 1987). *Ataenius* is a native pest whose typical Scarabaeid c-shaped larva chews on the roots of turfgrass. Water stress and grub injury to roots causes turf to die in small irregular patches sometimes leading to large dead areas. *Aphodius granarius* is very similar in behavior and appearance to the black turfgrass *Ataenius* and was often mistaken for the *Ataenius* grub. *Aphodius* was introduced from Europe and very little is known about this golf course pest (Tashiroy 1987). Since these two coleopteran pests are relatively new, more research is needed to learn how to manage these insects on turf.



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In October 1995, 250 surveys were sent out to public and private courses. From the 40 respondents, 26 golf courses had *Ataenius* or *Aphodius* grubs. Also from the returned surveys, there exists a relationship between the numbers of fungicide sprays and the populations of *Ataenius* or *Aphodius* grubs. It seems that as the number of fungicide applications increased, the grub populations also increased. The average number of fungicide sprays to fairways for golf courses with *Ataenius* or *Aphodius* grubs was 14.7 ± 12.0 , while the average number of sprays for golf courses with no *Ataenius* or *Aphodius* grubs was 11.7 ± 7.0 . By far the most commonly used fungicide for the 1995 season was chlorothalonil. This was followed by PCNB, propiconazole, iprodione and metalaxyl.

Hints for superintendents

Start looking for *Aphodius* grubs around the first week in June. Cup Cutter samples can be taken in the fairway near the edge of the rough. Samples taken in the beginning of June will help determine when the grubs are active. This is necessary due to temperature fluctuation from year to year,

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therefore making it difficult to predict exactly when damage will occur. Threshold levels of *Aphodius* are 3 grubs per cup cutter. Less grubs require no action. However, if the grub population exceeds 3 per cup cutter, spot treatments of an insecticide may be desirable.

Start looking for *Ataenius* grubs around the first week of July. Again, cup cutter samples should be taken in the fairway near the edge of the rough. Threshold levels of *Ataenius* are 5 grubs per cup cutter. If the grub numbers exceed this threshold, spot treatments should be applied. Recommended insecticides for turf can be found in the Michigan State Extension Bulletin, E2178. Also, a Handbook of Turfgrass Insect Pests has just been released by the Entomological Society of America. It is available from Turfgrass inc. at 1-800 521-8873 for \$30.00 per copy, plus shipping.

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Summer Research

I will be continuing my research this summer at Cattails Golf Club of South Lyon. I will be performing a mowing height experiment as well as a fungicide spray study. I also will be making 20 follow up visits from the survey to determine the distribution of *Ataenius* grubs. These visits will also be used to compare fungicide applications of each course to their grub populations. I am excited to start this summer's field season and am looking forward to meeting you.

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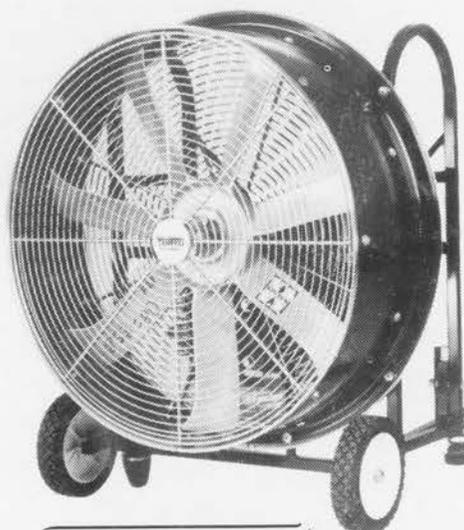
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by Tom Mason

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5. Noise. When wearing metal spikes many players will avoid walking on paths because it is uncomfortable and noisy. This can be a distraction to those playing in adjoining areas.

6. In 1996 there were improvements in the design of non-metal spikes. They provide considerably more traction than in previous designs. There continues to be a determined effort made by the non-metal spike companies to address the issues of traction, durability and comfort.

7. Damage to mowing equipment. The cost of a bed knife to a greensmower is approximately \$35.00. The cost of a reel to a greensmower is approximately \$250.00. Both of these costs do not include the labor to replace damaged parts or sharpen new parts. Each year hundreds of dollars and considerable time is lost making such repairs due to metal spikes.

8. The greens at Birmingham Country Club are small and have few areas for hole placements. Many times during the golfing season the less preferred areas of the greens have to be used for hole placement due to the wear that can be attributed to metal spikes (Also described as "What idiot put the hole there?").

9. Many golfers suffer from back pains. There are many things about golf that contribute to back pain. Obviously the golf swing is the most often thought of factor. There are some studies that also attribute walking on metal spikes as a source of back pain.

10. When one is presented with the opportunity to try something new that will contribute to the enjoyment of the game, will reduce long term costs, minimize the impact of ever increasing golf course usage, contribute to the etiquette of the game (similar to raking bunkers, fixing ball marks or replacing divots), then maybe an effort should be made.

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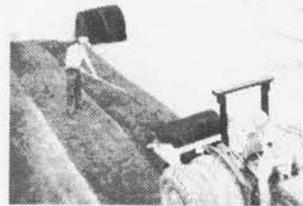
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The First Registered Biological Control Product For Turf Disease: Bio-Trek 22G

by G. E. Harman and C-T Lo
Cornell University

Diseases of golf green turfgrasses cause unsightly spots and discolorations that are undesirable and unacceptable to golf course managers and the golfing public. The development of highly effective turfgrass fungicides has revolutionized disease management of turf, especially on golf courses. However, high levels of fungicides are required. Fungicide usage on golf courses, and greens especially, is probably the most intense large-scale application per unit area in the US. Fungicide sales are about \$400 million annually in the United States, and about \$100 million is spent on turf applications, with 90% of this used on golf courses.

There are disadvantages to this heavy use. The most obvious of these is the frequent exposure of workers and users of managed turf areas to fungicides. In addition, there is the possibility of contamination of soil and water in and around golf courses and other areas of managed turf. This possibility of contamination is a matter of concern because much of the treated turf is in urban areas with high adjacent human populations. Wildlife may also be affected by contamination of soil or water.

In addition, a large and diverse population of soil microorganisms is important to plant health. Typically, populations of fungi and bacteria (including actinomycetes) predominate in soils. Generally, the greater the diversity and activity of these soil microorganisms, the greater the overall health and fertility of the soil. However, repeated fungicide applications can severely impair microbial diversity and activity in soils of golf courses and other intensively managed turf areas. In our preliminary studies, we found one area of golf course turf in which no fungi could be detected in soil or roots. This is very unusual, and aside from golf turf ecosystems we know of no other situation where such a drastic reduction in fungal populations has occurred. Specific undesirable consequences of this alteration of soil microflora are as follows:

- It is not uncommon (nearly 100 examples can be documented) to see increases in certain diseases following fungicide application for control of other disease. This increase is due primarily to detrimental effects on nontarget organisms.

- In soils where fungicides have not been applied at high rates, the diverse microbial communities present frequently provide a substantial measure of biological

control. The increase in disease noted in the preceding paragraph probably is due to destruction of nontarget beneficial microorganisms.

- Heavy fungicide use encourages the development of resistant populations of plant pathogens. There are numerous reports on the development of pathogen populations that are resistant to chemical fungicides, including cases where resistance was observed on golf courses. This would be expected given the heavy fungicide applications made to greens.

The development of Bio-Trek 22G

Clearly, alternatives to chemical pesticides are needed for turf disease management and other applications. The authors, in conjunction with Dr. E. B. Nelson, have been developing biological alternatives to chemical pesticides for turf disease management for several years, especially beneficial fungi in the genus *Trichoderma*. These fungi are present in nearly all soils and no doubt contribute to a lessening of disease where they occur. However, their numbers and physiological types are normally insufficient to give high levels of disease controls. About 10 years ago, we produced strain 1295-22 (also known as KRL-AG2) of *T. harzianum*, and this organism seemed to have a number of useful attributes. Not only did it have the ability to control disease when properly used, but it also was extremely efficient in colonizing roots. Once established on roots, it persisted for the lifetime of annual crops, and continued to colonize plant roots as they grew. Therefore, all parts of the root system were colonized. On perennial plants, such as turfgrass, the fungus survived on roots even over the cold winters of upstate New York. As a consequence, application of the fungus may substantially increase crop yield and increase root growth.

This fungus, and formulations based upon it, recently were registered with the US Environmental Protection Agency for plant disease control. It has received an exemption from tolerance for use on food crops, since toxicology testing has shown no observable toxic or pathogenic effects upon plants, mammals, or birds. Products based on *Trichoderma harzianum* are manufactured by TGT Inc, Geneva, NY (Editor's note: no relation to *Turfgrass TRENDS*, which is frequently

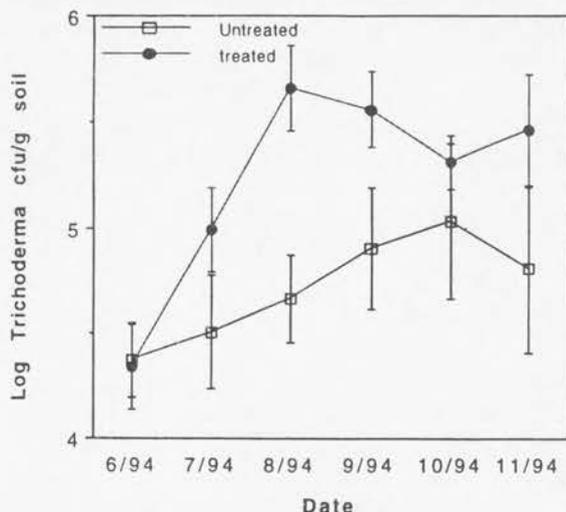


Fig. 1. Colonization of roots and soil of creeping bentgrass in a replicated trial on a creeping bentgrass golf green. Bio-Trek 22G was applied on the dates indicated, and root/soil samples were taken at monthly intervals. Note that *Trichoderma* persisted at a high level throughout the year. The y axis is a log scale, so each number given represents a 10-fold increase in *Trichoderma* levels. For example, log 5 represents 100,000 viable propagules of the fungus, and log 6 represents 1,000,000. The increase in *Trichoderma* levels in the nontreated plots over time probably is a consequence of spread of *T. harzianum* from adjacent treated plots. Data is from Lo, C-T, Nelson, E. B., and Harman, G. E. 1996. Improving the biocontrol efficacy of *Trichoderma harzianum* 1295-22 for controlling foliar phases of turf diseases by spray applications. Plant Dis. (in preparation)

abbreviated "TGT") and marketed for turf applications as Bio-Trek 22G by Wilbur-Ellis Co, Fresno, CA. Bio-Trek is the first EPA- registered biological disease control agent that is available commercially for turfgrass disease control in the United States.

The following is a description of tests and uses of Bio-Trek 22G, and an assessment of our expectations for future developments. It is also a story of the translation of basic biological findings at a university into commercial applications.

We first tested a granular formulation very similar to Bio-Trek 22G in 1990 and found that it reduced dollar spot incidence. Trials since that date in the Northeast, Midwest, and Far West have demonstrated continued efficacy. A critical aspect of this product's efficacy is the ability of *T. harzianum* to establish itself at effective levels on turfgrass roots. We expect that it can be established by one or two applications in the spring and that it will then persist over the following growing season. Data on establishment from our 1994 trials are given in Fig. 1. Two applications early in the year were sufficient to provide high levels of colonization of soil and creeping bentgrass roots that persisted at high levels throughout the year. We sampled this same area in August, 1995, and found *T. harzianum* at levels about 10 times higher than in adjacent turf areas. This indicates survival times of the biocontrol agent on turf roots for more than a year. However, in 1995, *T. harzianum* populations had dropped to levels necessitating another application. The cultivars used in these field trials were Pencross and Cobra.

This establishment of a biocontrol fungus resulted in reduced severity of several diseases. Dollar spot data are shown for 1993 and 1994 (Fig. 2), while control of brown patch and Pythium root rot are shown for 1994 (Fig. 3). In 1993, brown patch and Pythium were not evident.

Another benefit of Bio-Trek 22G was also evident in our trials. The product was applied in June and July, but in November the treated areas were easily recognizable: the plots that had received the granular formulation of *T. harzianum* were greener than adjacent plots. This turf had not been fertilized after mid-summer, so the enhanced color may have reheated the ability of a more vigorous root

system to provide better uptake of nutrients. This improved color persisted into 1995, and was still evident in August of that year, even though no additional *T. harzianum* had been applied to those areas.

These data indicate that Bio-Trek 22G can be a useful product for turf disease management. Its advantages are:

- It provides a means of establishing *T. harzianum* in soil and on roots, thereby providing a means of restoring beneficial microbes in turf soils.
- It reduces the level of disease organisms in soil, and so initial disease levels will be lower once the biocontrol fungus is established.
- It is nontoxic and nonpolluting, but has good persistence, so its beneficial effects can persist over an extended time period.

Based on our experience with both turf and other crops, it can enhance root health and growth. However, there are some things that this biological agent cannot do, and these limitations must be recognized as well. These are:

- Bio-Trek 22G is applied to soil, and the beneficial fungus becomes established in roots and soil. Therefore, it cannot control foliar diseases, or foliar phases of soilborne diseases such as dollar spot. Foliar diseases spread rapidly and are favored by frequent mowing and watering, so chemical fungicide sprays will have to be used to control them.

- *T. harzianum* is a living organism that must become established in soil and on roots of turf to be effective. However, some chemical fungicides are lethal to *T. harzianum*, and if possible they should not be used in conjunction with Bio-Trek 22G. A list of fungicides and their compatibility/incompatibility with *T. harzianum* is given in Table 1.

- In addition, like all living organisms, *T. harzianum* will be more active under some conditions than others. In particular, it will not be effective when soil temperatures are below 50°F. However, it survives on roots and becomes active when soils warm. It is most effective at soil temperatures between 70°F and 90°F.

The first commercial *T. harzianum* products were available for sale in 1995. These were granular formulations designed for broadcast application. Efforts to evaluate these

products in our lab were primarily concerned with assessing the level of establishment of the fungus on roots. Roots from sites around the USA indicated that establishment did occur.

There were some problems, however. First, the product was formulated for multiple uses and was quite dusty. This made broadcast application difficult. Second, while the product was quite effective for many applications, we found that transfer of the fungus from the granule to the roots was not as effective with broadcast application as it was when the granules were directly incorporated into soil. As a consequence, even though the fungus did become established, in some cases its population level remained at suboptimal levels.

Therefore, in 1996, TGT Inc. will formulate Bio-Trek 22G specifically for broadcast application to turf, and its properties will be different from the general use material. The turf product will have a larger particle size to facilitate broadcast application, the dust level will be substantially reduced, and its concentration of *T. harzianum* will be higher to enhance root and soil colonization. We expect that this product will be effective for its intended uses.

The development of future technologies

Bio-Trek 22G is highly useful: but, as noted above, it has limitations. Most notably, since the product is applied to the soil and the fungus is located in the root-soil zone, it cannot protect against foliar pathogens. With this factor in mind, we have begun testing a spray formulation that consists primarily of conidia (spores) of the fungus. The first trials, conducted in 1994, were successful. Levels of control were equivalent to standard chemical fungicides for brown patch, dollar spot, and Pythium root rot and blight (Fig. 4) when a surfactant (Triton X-100) was included in the spray mixture.

When disease pressure was light, a monthly spray schedule sufficed, but applications had to be increased to once a week when disease was more severe. As a bonus, this spray application resulted in root colonization that was nearly as effective as the granular product. These results give promise of a largely biological turf management option, but problems remain.

Difficulties were evident when we attempted to apply the 1994 findings to commercial golf course trials in 1995. Little or no efficacy was obtained; this problem appears at least in part to be related to toxic fungicide residues in the spray tank. As the biocontrol agent was suspended in tanks that have been used repeatedly to apply fungicides, some factor, probably low levels of residual pesticides, prevented spores of the fungus from germinating.

Other problems also remain. Technologies for large-scale manufacture of sprayable biological formulations at a reasonable cost are not fully developed, and so only prototype preparations are available now. Further, *T. harzianum* is useful only as a preventative application and cannot cure existing disease. Of course, like all materials available to golf course managers, this fungus will not be effective against all diseases. These last two factors indicate a need for the development of integrated biological-chemical control systems that reduce the need for chemical fungicides.

Research efforts at Cornell University will focus on the development of spray formulations for commercial golf courses. We will determine which chemicals cannot be used in sprayers employed for *T. harzianum* application, and attempt to devise methods for removal of the most important toxic materials. We anticipate that only a few of the incompatible materials in Table 1 will cause most of the problems. At least, we should be able to make recommendations regarding fungicides to be avoided.

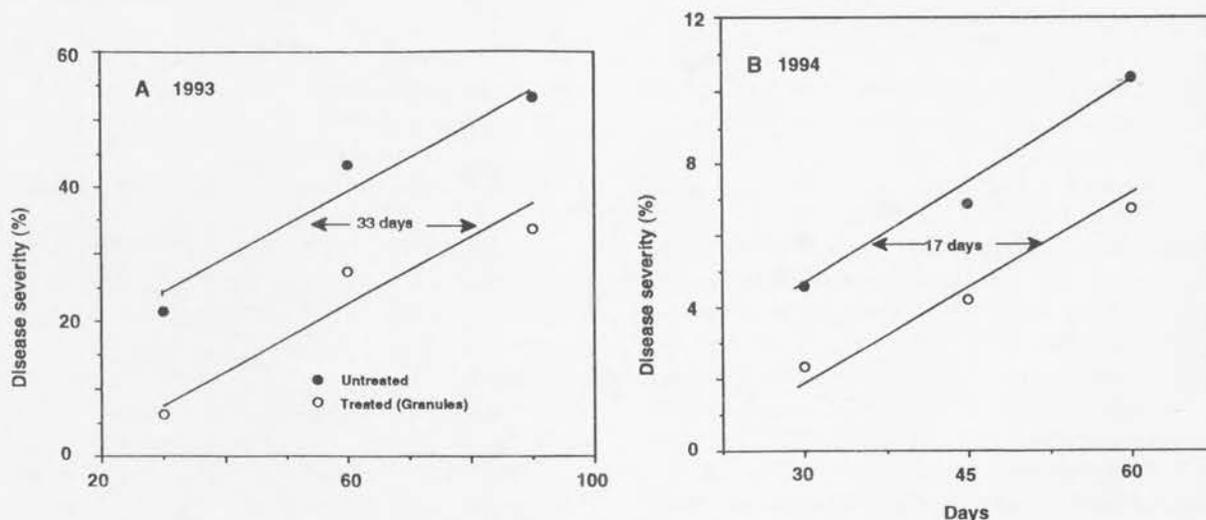


Fig. 2. Disease progress of dollar spot in replicated trials in 1993 and 1994 in the presence and absence of Bio-Trek 22G. Lines were fitted using the general models program (SAS, Cary, NC). Disease severity is defined as the percentage of total plot area with diseased turf. The differences between treatments and time required to reach specific disease levels were significantly different. These data are used with permission of the American Phytopathological Society, and are from Lo, C-T, Nelson, E. B., and Harman, G. E. 1996. Control of turfgrass diseases with a rhizosphere competent strain of *Trichoderma harzianum*. Plant Dis. (accepted for publication with revision).

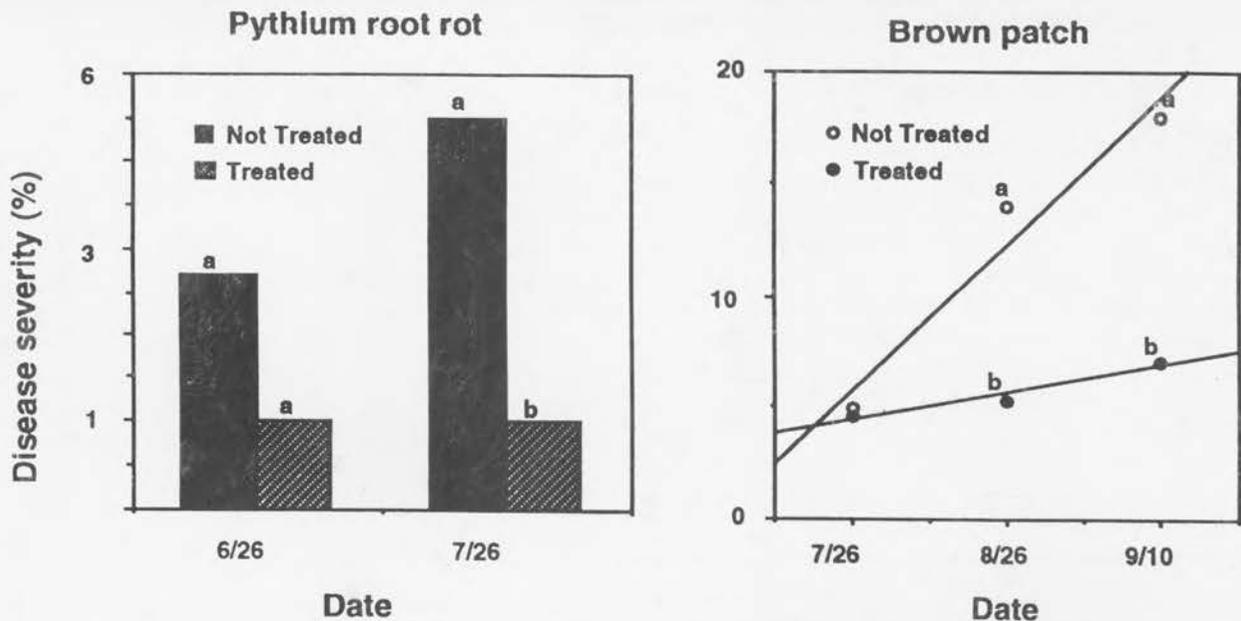


Fig. 3. Incidence of *Pythium* root rot and brown patch in replicated plots on a creeping bentgrass green after no treatment and treatment with Bio-Trek 22G. Disease severity is defined as the percentage of total plot area with diseased turf. Numbers followed by dissimilar letters are significantly different for the date shown. Data is from Lo, C-T, Nelson, E. B., and Harman, G. E. 1996. Improving the biocontrol efficacy of *Trichoderma harzianum* 1295-22 for controlling foliar phases of turf diseases by spray applications. Plant Dis. (in preparation).

Table 1. Fungicides compatible or incompatible with Bio-Trek 22G

<u>Compatible fungicides</u>	<u>Incompatible fungicides</u>
Chloroneb (e.g. Chloroneb, Terreneb)	Benomyl (e.g. Tersan 1991)
Etridiazole (e.g. Koban, Terrazole)	Propiconazole (Banner)
Iprodione (e.g. Chipco 26019)	
Mancozeb (e.g. Fore)	<u>Questionable, or no data</u>
Metalaxyl (e.g. Subdue)	Anilazene (e.g. Dryene)
Quitozene (e.g. PCNB, Terrachlor)	Chlorothalonil (e.g. Daconil 2787)
Triadimefon (e.g. Bayleton)	Fenarimol (e.g. Rubigan, Lesco Twosome)
Vinclozolin (e.g. Vorlan, Touche, Curalan)	Thiram (e.g. Spotrete)
Fosetyl Al (e.g. Aliette)	Thiophanate methyl (e.g. Clearys 3336, Fungo)

We will also test prototype commercial products and develop full dosage information for them. And we will determine spray adjuvants, primarily spreader/sticker materials, that provide the best results with *T. harzianum*.

With this information, we will develop recommendations for using *T. harzianum* that will be tested on golf courses and other commercial sites. In addition, we will investigate development of integrated sprays that combine reduced rates of a compatible fungicide with the beneficial fungus. An integrated biological-chemical system may lessen fungicidal use, provide some of the curative ability of fungicides, result in root colonization of *T. harzianum*, establish diverse microbial soil populations that promote plant health, and be competitively priced. We hope to begin research scale trials of both full biological and biological-chemical control systems this summer.

In summary

The first registered biological control product Bio-Trek 22G, for the control of turf diseases is now available. This product contains a strain of the beneficial soil fungus, *Trichoderma harzianum*, and is designed for broadcast application to turf. The fungus becomes established on the roots and in the soil of turf and persists for months after application. Once establishment occurs, it can become a component of a healthy soil microbial community and reduce soilborne disease. It cannot control foliar diseases, however, and therefore must be used in conjunction with compatible fungicides. We anticipate that Bio-Trek 22G will be the first of several biological products for turf disease control. Other biological and integrated biological chemical control products will be manufactured by TGT that will extend the usefulness of Bio-Trek 22G.

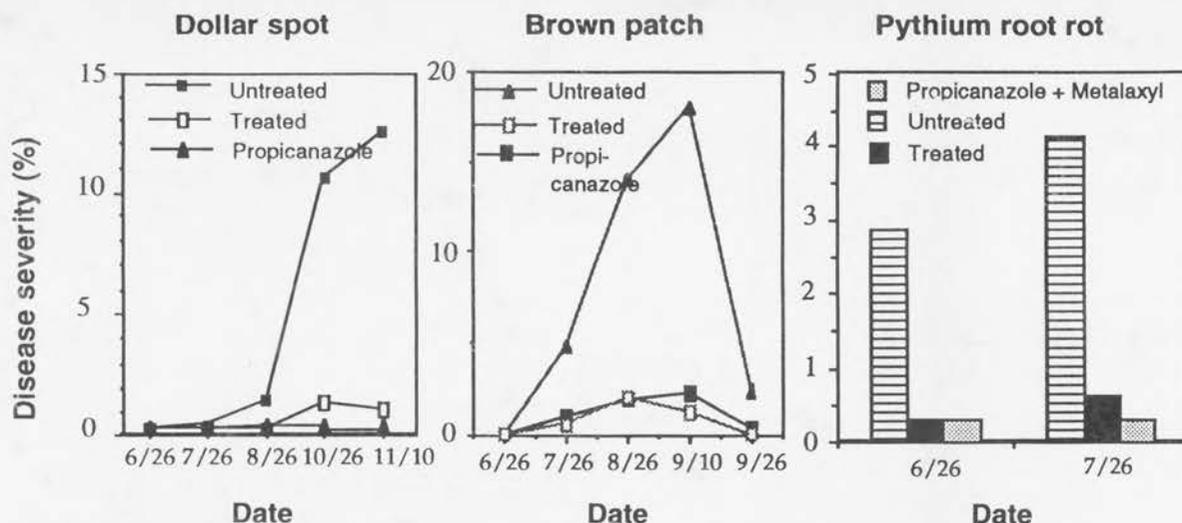


Fig. 4. Severity of dollar spot, brown patch, or Pythium root rot in replicated plots on a creeping bentgrass green after no treatment, treatment with a standard fungicide, or treatment with sprays containing spores of *T. harzianum* and Triton X-100. Disease severity is defined as the percentage of total plot area with diseased turf. *T. harzianum* treatments were applied monthly until July 26, and thereafter weekly. In all cases, the disease severity in nontreated plots was significantly different from treated plots, but fungicide and *T. harzianum* treatments were not significantly different. Data is from Lo, C-T; Nelson, E. B., and Harman, G. E. 1996. Improving the biocontrol efficacy of *Trichoderma harzianum* 1295-22 for controlling foliar phases of turf diseases by spray applications. Plant Dis. (in preparation).

Key Words

Trichoderma - is a genus of beneficial fungus that is common in soils. There are a number of types and kinds. *Trichoderma harzianum* (*T. harzianum*) strain 1295-22 is a selection of this fungus that is particularly able to colonize plant roots. It is formulated as Bio-Trek 22G for disease suppression in golf course management.

Non-target organisms - These are living components of the turf-soil ecosystem that, while not intended as targets for pesticides, can be adversely affected, sometimes even killed, by fungicide applications.

development of biological alternatives to chemical pesticides for a variety of applications, including perennial, row, and greenhouse crops, as well as turf. He has focused recently on identifying gene products that may be useful in agriculture, and developing biocontrol systems based on beneficial fungi. This is his first contribution to TurfGrass TRENDS.

Dr. Harman is a cofounder of TGT Inc., the company that produces Bio-Trek 22G.

Chaur-Tsuen Lo is an Associate Plant Pathologist in the Department of Plant Pathology at the Taiwan Agricultural Research Institute, Taichung, Taiwan, Republic of China. His major responsibilities are in biocontrol of plant diseases. He is currently completing his Ph.D. degree at Cornell University under the direction of Dr. Harman and Dr. Eric Nelson in the area of the biological control of turf diseases. This is his first contribution to TurfGrass TRENDS.

Gary E. Harman is a Professor in the Departments of Horticultural Sciences and Plant Pathology at Cornell University's New York State Agricultural Experiment Station, Geneva, NY. He has a B.S. from Colorado State University and a Ph.D. from Oregon State University. Dr. Harman has devoted much of his career to the

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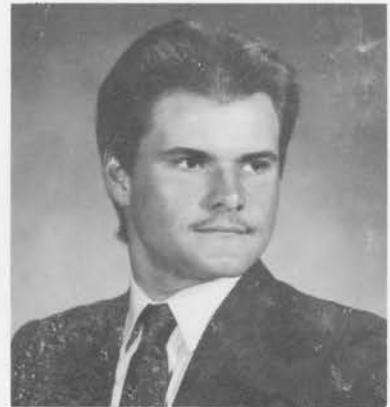
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The 7th Gene LaBelle Memorial Golf Outing will be held this year On Friday, September 6, 1996 at 1:00 p.m. at Wolverine Golf Club, located in Macomb Township.

The outing proceeds are awarded to deserving students at both Michigan State University and Macomb County Community College. Two non-scholastically based awards are given to MSU Turfgrass Students. The students are asked to respond to a question or theme posed by the Award Committee. The responses are accepted in the form of prose, poetry, sculpture, oils, watercolors, videos, etc. Two entrants are selected to receive a trophy and a cash award. The Committee also awards Black's Law Dictionaries (or a suitable substitute) to ten students enrolled in MCCC's Criminal Justice Program.

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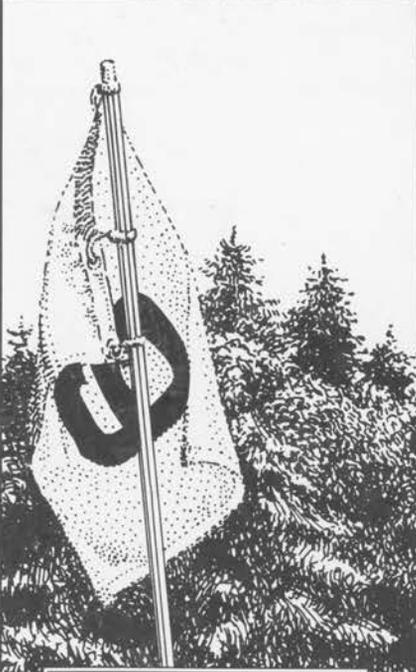
by Stu Cavender

I appreciate the opportunity to address a few issues that affect how we carry out our responsibilities of keeping long grass short and green. It is not often that I act to express my thoughts in this fashion. As a matter of fact, in my position I am rarely the person who is expressing himself. Being a service manager and dealing with equipment that is in need of repair inevitably means that the person I am speaking to has one less tool at his disposal to help him carry out his responsibilities. Fortunately, most repairs are minor and require little "downtime" of the machine. However, there are occasions when machines may be out of service for lengthy periods for major repairs. In recent years, the equipment that is used has become highly specialized and expensive. This has caused many of you to depend solely on one machine for each purpose. This amplifies the effect "downtime" has on your operation. My hope is that the issues I cover will prevent the inconvenience you experience when a piece of equipment can not be utilized.

All equipment, when shipped new, requires a period of time to "break in". This is a critical period of time for the machine. If the operator's manual specifies a hydraulic or engine oil and filter change in the first few hours, take the opportunity to inspect the entire machine. Many pieces of equipment are shipped with an extra filter just for this purpose. Inspect the oil that is removed and the filter for any contamination or other foreign material. Inspect the overall condition of the rest of the machine. Many operator's manuals contain step by step instructions on specific items to pay attention to. Those items usually include: fluid levels, belt tension, brakes, cutting plane, overall tightness of bolts and other fasteners. Following the initial "break-in" time refer again to the operator's manual and set up a maintenance schedule for that particular machine. Remember that with the equipment being more specialized than those in the past the maintenance of that equipment must be likewise as specialized.

Another area of concern that affects "downtime" of equipment is that of how much knowledge the operator possesses. The operator must be familiar with the operation of the equipment, all of its safety devices, and the intended use and limitation of the machine. Again, the operator's manual is the first place the operator should look for guidance in this area. Most of our machines are shipped with operator training videos for your convenience. Following a detailed review of the manual, the operator should familiarize himself with the machine hands-on. If the operator was not present at the time the machine was demonstrated, then an experienced operator should educate the new operator. Safety devices should be reviewed and never modified. These devices are put into place, not only for the operator's safety, but for those who may also be nearby. In some instances these devices act as a limit as to how and where a machine may be used. Operators should be instructed on the difference between engine speed and traction speed. In many cases the engine speed should be run at full throttle, yet the mowing speed may be at half speed. This is especially important when we are talking about reel-type mowers. In some cases an operator may believe that there is a problem with the machine, when what he is actually experiencing is a safety interlock performing its intended function. For example, on our new fairway mowers, in order to reach optimum clip frequency we program the machine to shut the reels off when traction speed exceeds that which would provide optimum clip for the desired height of cut. An inexperienced operator might think that there was a problem with the machine when the issue was really due to lack of product knowledge. Close attention needs to be given to the operators to make sure they are educated on the equipment that they are using. Operators should only use equipment for its intended purpose. Improper use of equipment can lead to equipment or property damage and/or possible injury to the operator or those nearby. Proper instruction on new equipment will prove beneficial to everyone involved with your operation.

As I close, I look out at the snow flurries that are falling and remember last spring when most all of the courses were ready for play in March. This spring, mother nature held off the opening of many courses until late April, giving many of us extra time to make sure the equipment was ready. I hope you all experience very little "downtime" and look forward to not speaking with any of you during the season.



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<i>Seeds</i>	Seed Research Grass Seed, Bloomcoat Wildflower Seed, Zajac Confidence Seed
<i>Spreaders & Sprayers</i>	Cyclone, Spyker, Wheely, Chem-Pro D.B. Smith
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(Michigan Only)

Truly An Environmental Friend

Fox Hills Superintendent, Robert Mateja, has recently been recognized by the Golf Course Superintendents Association for his efforts toward environmental excellence. He received the prestigious *Environmental Steward Award* in Orlando, Florida on February 8, 1996. It was through Bob's capable leadership that Fox Hills implemented a variety of projects which helped it become designated as a "Certified Audubon Cooperative Sanctuary" in 1995. Bob was one of 17 regional winners recognized for overall course management excellence, outstanding programs to maximize pesticide and fertilizer efficacy, and irrigation and equipment efficiency as well as wildlife preservation and habitat maintenance.



Fox Hills considers environmental concern a top priority and is extremely pleased with Bob's efforts on its behalf.

GDCSA Member Receives Professional Certification

Douglas H.S. Palm, superintendent of Cattails Golf Club, has been designated a Certified Golf Course Superintendent (CGCS) by the Golf Course Superintendents Association of America (GCSAA).

Palm has been superintendent of the South Lyon, Mich, course since 1990.

GCSAA instituted the certification program in 1971 to recognize outstanding and progressive superintendents. More than 1,500 active GCSAA members currently hold "CGCS" status.

Noted Landscape Architect Dies

Joseph F. Reske, a landscape architect who was known for his golf course designs, died Wednesday, April 17, 1996 at Genesys-Flint Osteopathic Campus in Flint.

He was 72 and lived in Grand Blanc.

During his 48-year career, Mr. Reske helped design Garland Golf Resort, Lewiston; designed expansions for Twin Birch Golf Club, Kalkaska, and Grand Blanc Golf Club, and, shortly before his death, finished the revision of St. Johns' Golf Course, Plymouth, for the Archdiocese of Detroit.

He owned Joseph F. Reske Designs and the old Birmingham Landscape Service.

Joe Reske was a member of the Northern MTA and was for years a member of MBC.

Survivors include his wife, Kathleen; three daughters, Judith Bell, Carol Maus and Marilyn Watson; two sons, Joseph Michael and John, two stepsons, Michael and Mark Rajewski; eight grandchildren, and a brother.

Pump Station Selection

by David B. Beck, P.E.

Irrigation pump stations are literally the heart of a golf course, pumping life sustaining fluid and in many cases nutrients to all the vital turf and landscape areas required to support the game of golf. A properly tuned pump station responds to water demands of an irrigation system with minimal fluctuation in pressure and do so with little hesitation and with a minimum of power consumption. In contrast, a poorly designed and maintained pump station is like a poorly tuned automobile engine. It wastes power, it hesitates when called upon, and it inflicts undue stress on the car's support systems with jerky stops and starts. Besides the mechanical operation of a pump station, several other factors influence a pump station's performance. The proper sizing of pressure and flow rate are essential for an efficient low cost pumping plant.

Every golf course is uniquely different in its pump station requirements. Site factors such as elevations changes on the golf course, elevation of the irrigation water source relative to the course itself, and total irrigated area vary from one course to the next. Additionally, variance in number of sprinkler heads and type of sprinkler heads, variances in pipe type, sizing, and routing occur with individual courses. Operation of the system can vary from course to course and from one season to the next. When sizing a pump station all operational and system components must be coordinated and analyzed to surmise a maximum expected flow rate and total pressure requirement. It is best to size a pump station so it meets the needs of the golf course with little excess capacity. Excess capacity in pressure will waste power and initial investment because pump horsepower will be too large as well as creating unnecessary stress on system components. Excess flow capacity will waste initial investment dollars in excess horsepower which is never utilized as well as consumption of more power than is actually required.

Factors involved in sizing for pump station pressure start with the irrigation sprinkler requirements. Added to the total sprinkler pressure can be elements such as exceedingly long distances from the pump station to the golf course or furthest irrigated golf holes. It takes energy to move water from one point to the next. As water flows through a pipe it loses energy through a pressure drop. In general, the longer the distance to move water, the higher the pump station pressure is required. Mainline pipe sizing also impacts pressure requirements. Smaller pipe sizes require more energy and therefore more pressure than larger pipe sizes for equal amounts of water flow. If a golf course's pipe sizes are generally undersized, a higher pressure will be required at the pump station than the same course with larger pipe sizes. The type of pipe used can also impact pump station pressure. The sides of steel pipe are rougher than PVC pipe and require more energy to transport water. Elevation changes on a golf course can have the most impact on a pump station pressure requirement. Since it takes energy to move water uphill, additional pressure must be provided at the pump station to

transport irrigation water to the highest locations on a course.

High pressure on a golf course can be as much a problem as low pressure. High pressure usually is a result of system elevations lower than the pump station elevation. Under static conditions, for every 2.31 feet in elevation change the mainline pressure will change 1 psi. If the mainline goes up 2.31 feet the mainline pressure goes down 1 psi. If the mainline goes down 2.31 feet the mainline pressure goes up 1 psi. Low areas on a golf course can result in high pressures which exceed pipe capacities, create a hazard with quick-couple connections, or exceed sprinkler and valve pressure capacities.

Equally as many factors are involved in sizing for pump station flow rate. Flow rate sizing starts with the irrigation schedule. To minimize water flow requirements an irrigation schedule must balance flows within water window and within golf course. The superintendent needs to create a relatively equal pump station flow rate throughout the irrigation period. Avoid turning on too many sprinklers at one time or too few. Too many sprinklers operating at the same time and location on the golf course can create excessive pipe flow rates resulting in damage to the pipe network and excessive pressure requirements at the pump station. Spreading operating sprinklers evenly throughout the entire irrigation system will avoid excess flow rates and velocities at locations in the pipe network and will help reduce the pressure requirement by keeping flow velocities as small as possible.

The most effective way to evaluate pump station performance is to build a computer model of the irrigation system and pump station. Computer models can be constructed to represent every irrigation pipe on a golf course along with most of the factors which influence pressure and flow rate. When coupled with simulated operation of the system the model can provide extremely close approximations of required flow and pressure at almost any point on the golf course's pipe network. Computer models can save on pump station expenses by properly sizing the station in flow and pressure insuring that the pump station capacity meets the needs of the irrigation system with very little excess.

In general, golf course pump stations don't use one pump because flow needs on a golf course can vary from 1 or 2 gpm to several thousand gpm. Several pumps are typically sized to meet specific needs such as hand watering, greens-only watering, fairways-only watering, and a full irrigation program. Both pump stations and control programs can be customized to meet the needs of the course and the operational preferences of the superintendent.

Two types of pump station control technology have evolved for golf courses. Variable Frequency Drive (VFD) and constant speed pump stations. An entire book can be written on the subject of VFD vs constant speed and the benefits and drawbacks associated with each. In general

however, variable frequency drives change the speed at which the pump turns. By changing the speed of the pump, the flow rate can be changed to deliver a uniform pressure over a wide range of flow rates. If the pump turns slowly only small volumes of water are pumped as if needed for only one head operating. As more sprinklers are operated, the pump speed increases. Several advantages are realized with the VFD control. Money is saved in power costs because VFD pumps don't need elaborate control valves to regulate pressure (it takes energy to push water through a control valve) and less energy is wasted in spinning the pump at unnecessary speeds. Additionally, VFD pumps provide much smoother transitions of flows. As the flow requirements of the irrigation changes with changes in operating sprinkler heads the speed of the motor changes similar to the acceleration of an automobile engine. The primary disadvantage to a VFD station is the higher station cost. The higher cost of the station must be offset by lower costs in system operation and maintenance. Since all golf course requirements are different, in many cases the additional cost of the VFD station can not be offset by operational savings.

Constant speed pump stations are pumps with motors which are either on or off. The advantage of the pump stations are the lower initial costs. The primary disadvantage of the station is the higher energy costs to operate the system and the less smooth transition of flows. It should be noted that many manufacturers of pre-fabricated constant speed pump stations have developed techniques to minimized the surges seen with these types of stations. Slightly higher power consumption is expected due to control valves and constant full speed of the pump motors. As with pump station

performance, it is best to evaluate variable frequency and constant speed stations on a course by course basis. Generally however, if you have expensive power and high water requirements, a VFD is more attractive. Low power costs and low water demands favor constant speed stations.

Many factors influence the selections and performance requirements of an irrigation pump station for a golf course. Irrigation engineers can be utilized to help analyze system components and operation and can assist in construction of computer models to properly size a pump station. Thankfully, over the past 10 to 20 years, manufacturers of pre-fabricated pump stations for golf courses have become commonplace. Evolving from local commercial and industrial and well pump contractors, these pump station manufacturers found a need to provide reliable, efficient, low maintenance pump stations for golf courses. These pump manufacturers have become very good at developing new pump and control technology as well as adapting existing pump and control technology to provide reliable pump stations. Further, they provide extensive service networks to provide emergency repairs and service.

A modern irrigation pump station should provide smooth reliable performance with a minimum of input and service. When selecting a pump station, use a reputable manufacturer of golf course irrigation pump stations. Proper station control will reduce wear and tear on golf course by minimizing surges seen with improperly sequenced pumps and poorly tuned pump station components. Every time a sprinkler head is turned off or on to some degree a surge is created and the pump station must adjust for the new flow regimen. Pre-fabricated pump stations offer reliable and fast manufacturer's service. Companies which deal almost exclusively in golf course pump stations know that when a golf course pump station has failed that it is imperative it be repaired immediately.

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Board Meeting Knollwood Country Club Wednesday, May 1, 1996

Finance (Szyndlar)

Checking - \$2,258.27
Savings - \$29,939.64
Foundation- \$76.98

Finance Committee (Szyndlar)

In process of establishing new accounting system with help from Rick Murphy.

Vendor Liaison (Skaife)

Skaife was welcomed as new Vendor Liaison. Concern: Advertisers questioning billing procedure for magazine. Answer: Dorner explained payments will be accepted per issue or for the entire advertising package. E.S. will contact concerned parties.

Membership (Jones)

Membership 389, Applications approved - 14, Nomination for E Class- Ron Detweiler of MSU approved.

Editorial (Dorner)

A Patch of Green - Advertising and collections going well. Spring issue has gone out. Board acknowledged a job well done.

Awards (Murphy)

John Walter Award - Article to appear in Summer magazine explaining criteria. Distinguished Service (Delcamp)- Presented to Dr. Joe Vargas at GAM meeting by Jim Timmerman.

GAM Seminar (Kolbe)

Was held Saturday, March 23, 1996. Site: Detroit G.C. Speakers included: Dr. Jeff Anderson, Henry Carnaby, Jim Houston, Bruce Matthews III, Dr. Paul Rieke, Dr. Trey Rogers, Dr. Joe Vargas. Bob Vavrek, Jr, and Ted Woehrl.

Clothing (Murphy)

Board members purchased matching ties to be worn at membership meetings. Affiliation logo was chosen. Inventory will have 2/3 Chapter Logo and 1/3 Affiliation logo.

Education (Hock/Jones)

Salt River Meeting - Good turn out. Speaker: Dr. Doug Pullman, Topic: Zebra Mussels. Article written by Tim Dark for magazine.
CanAm - Golf rained out. Lunch and meeting held. Topic: Research updates and Soft Spike Presentation

Member Relations (Jones)

Survey- Questions being compiled with help from Jim Timmerman. Referrals - In response to those concerns voiced re the policy in which the board supports a superintendent salary being at least 10-15% of operating budget and to avoid confusion, the Board has deleted that reference from its referral policy.

Special Olympics (Hock)

Date: Friday, May 17, 1996
Site: Bald Mountain. Mailing went out April 10, 1996.

Golf Day (Hock)

Date: Monday, October 7, 1996
Sites: Bay Pointe, Forest Lake, Red Run, Tam O'Shanter

Name Change (E.S.)

Filed for name change immediately following affirmative vote at Salt River meeting. Waiting for official response from MI. In process of changing everything over to new name.

Heritage and Relief Funds (Delcamp)

Awaiting confirmation from IRS.

GCSAA Affiliation (Dushane)

Mailing out info, related bylaw changes and absentee ballots w/June meeting notice. Vote will be taken at that meeting

Board Meeting Dates (Dushane)

Board agreed to meet regularly on the last Wednesday of each month at 3:00 pm. The Finance Committee will meet at 2:30 pm of that same day.

New GDGCSA Logo (Dorner)

Creation presented by Dorner. Approved by Board.

Voice Mail (E.S.)

The association phone system is now equipped with Voice Mail, so messages can be received when E.S. is on another call. Cost is minimal.

U.S. Open (Dushane)

Reception being planned for Steve Glossinger and staff during or possibly following The Open.

Picnic (Murphy)

Survey sent out to all members to determine consensus regarding interest, date and suggestions. Have received 20 responses.

Toro helps "Par" return to ESPN

The Golf Course Superintendents Association of America (GCSAA) announced that The Toro Company has agreed to return in 1996 as a supporting sponsor of the association's television show, "Par for the Course," which airs nationwide on ESPN.

"Par for the Course," which offers a look at the world of golf and its beauty, will return to ESPN for a second year in 1996. Twenty-five original, half-hour episodes will be produced this season. A new episode will air each Sunday morning at 7:30 Eastern from March 10 through August 25.

Toro also is the exclusive sponsor of GCSAA's annual members-only golf championship, as well as the sponsor of the Watson Fellowship Program administered by The GCSAA Foundation.

"Par for the Course" also will be shown weeknights on espn2 (check local listings for exact dates and times). ESPN International will translate the show into several languages for airing abroad.

Since 1926, GCSAA has been the leading professional association for the men and women who manage and maintain golf facilities in the United States and worldwide. From its headquarters in Lawrence, Kan., the association provides education, information and representation to more than 15,000 individual members from more than 50 countries. GCSAA's mission is to serve its members, advance their profession, and enrich the quality of golf and its environment.

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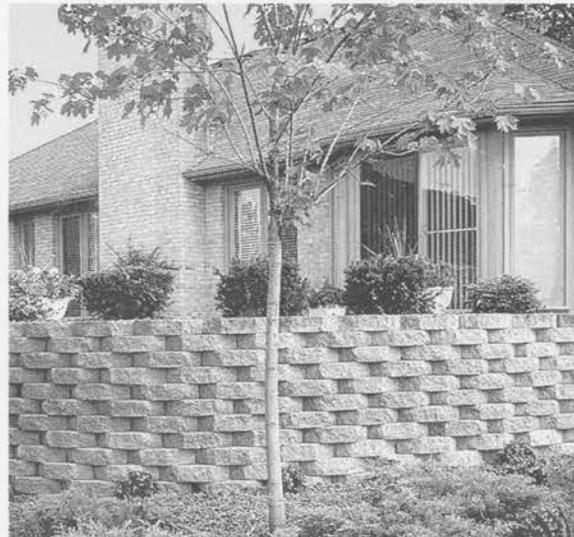
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Greater Detroit GCSA 1996 Calendar

June 10	Association Championship	Lochmoor Club
July 8	Joint w/WMGCSA	Polo Fields
August	Dinner Meeting	TBD
September	TBD	TBD
October 7	Turfgrass Fund Raiser "The Big Event"	Bay Pointe GC Forest Lake CC Red Run GC Tam O'Shanter CC
October 22	Annual Meeting	Maple Lane GC
November	GCSAA Seminar Topic: Preventative Maintenance of Turf Equipment	TBD
December	Superintendents Only	Birmingham CC
December 6	Xmas Party	Cherry Creek GC



Western Michigan GCSA 1996 Calendar

June 11	Thoroughbred Golf Club
July 8	Polo Fields (Joint Meeting GDGCSA)
Sept. 30	Gull Lake



Northern Michigan Turf Managers Association 1996 Meeting Schedule

June 3rd	Hidden Valley's Loon GC, Gaylord (MTF Fundraiser)
July 16	Alpena Golf Club, Alpena
August 13th	The Rose Golf Club, Leroy (25th Anniversary of NMTMA)
September 18	Treetops Rick Smith "Signature", Gaylord (MTF Fundraiser)
October	Boyne Highlands, Harbor Springs NMTMA Annual Meeting & Tuck Tate Championship

Mid-Michigan Turf Association 1996 Schedule

June 5 (Wednesday)	Verona Hills, Bad Axe
July 17 (Wednesday)	Goodrich CC, Goodrich
August 27 (Tuesday)	I.M.A. Brookwood, Burton
September	No Meeting
October 7 (Monday)	Fall Fund Raiser Warwick Hills, Grand Blanc
October 22 (Tuesday)	Annual Meeting - TBA
December 14 (Saturday)	Christmas Party Frankenmuth



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APPLICATION FOR MEMBERSHIP

I hereby apply for membership in the Greater Detroit Golf Course Superintendents Association, which is an Affiliate Chapter of the Golf Course Superintendents Association of America.

Name:	Spouse:	
Home Address:		
City:	State:	Zip:
Business/Club:		
Business Address:		
City:	State:	Zip:
Mailing Address: (Check One)	<input type="checkbox"/> Home	<input type="checkbox"/> Business
Home Phone:	Office Phone:	Fax:
Are you a GCSAA member?:	Are you a CGCS (Certified Supt.)?	

PRESENT POSITION

Title of Current Position:
Starting Date of Current Position:

PAST POSITIONS HELD

From/To	Title	Place of Employment	City/State

Each application must be signed (attested) by two members (SUPERINTENDENTS) of GDGCSA, who certify as to the reliability of the applicant's information as stated above.	
Attestor:	Date:
Attestor:	Date:

If accepted, I hereby certify that I will observe the constitution and by-laws of the Greater Detroit Golf Course Superintendents Association and the Code of Ethics of the Golf Course Superintendents Association of America.

Signature of Applicant:	Date:
-------------------------	-------

Do not include a check with this application

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Amt. Due:	Date Paid:
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Signature (Membership Chairman):	

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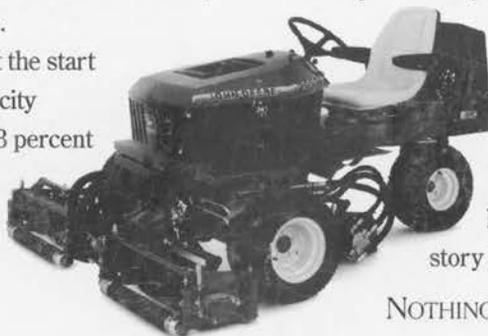
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animal. Plus, the higher-capacity system allows you to choose between John Deere 26-inch cutting units for standard trim work—or new 30-inch versions when extra productivity or overhang is desired.

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