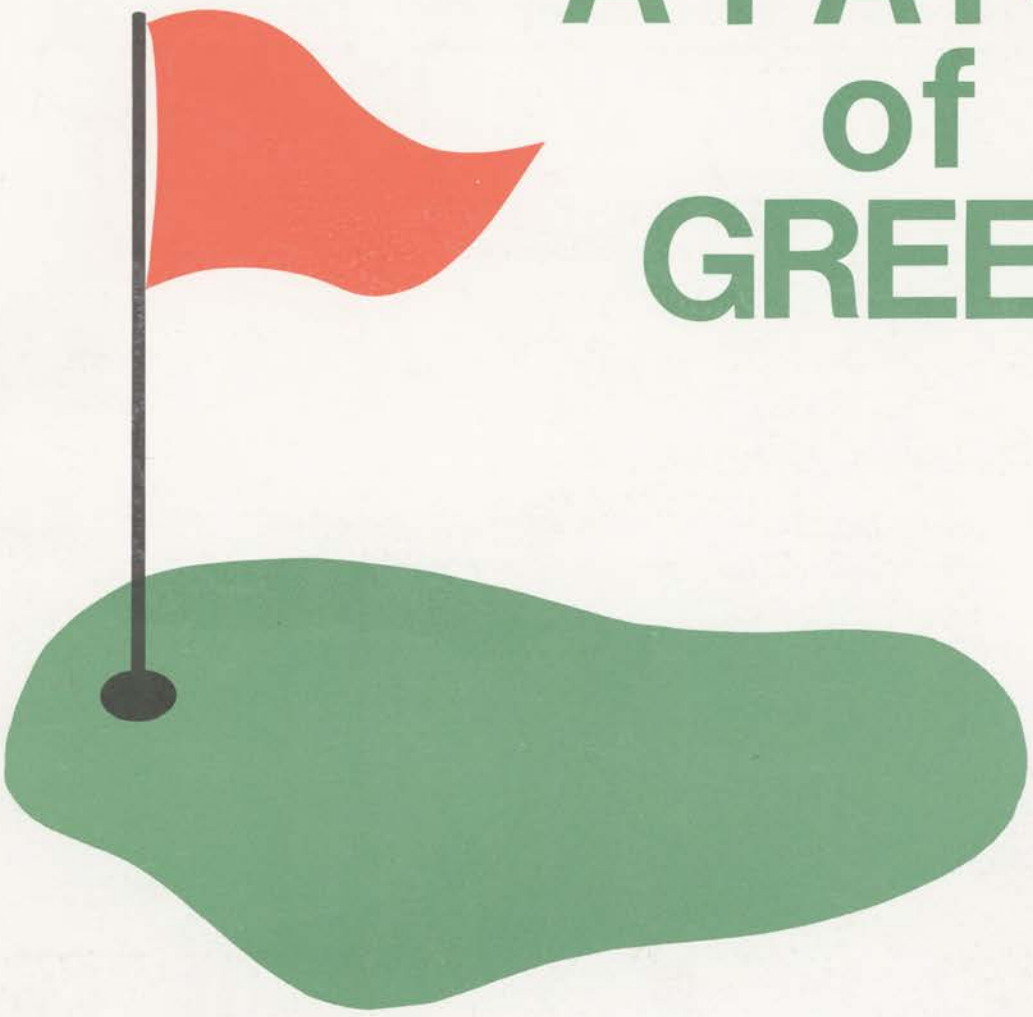
September/October 1990

Our 65th Year

A PATCH of GREEN



GOLF COURSE SUPT. ASSOCIATION
BORDER CITIES
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GOLF COURSE SUPERINTENDENTS ASSOCIATION OF AMERICA

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PRESIDENT'S MESSAGE

It's hard to believe that the 1990 golf season is almost over. The leaves are changing and falling. The plans are being made to blow out the irrigation system. Construction projects are either underway or are being studied.

Fall is the time of year we as golf course superintendents need to pause and evaluate where we've been and in what direction we are headed. As with any professional, we have to look at what we did right and what we did wrong in 1990 and determine how to get better in 1991.

The 1990 golf season will go down in history as one of the best for course conditions. Most people would assume that the weather contributed the most to the successful season, and it did. Others would assume that turfgrass research was the main contributor to great playings conditions, and it is. Still others state that with great sums of money spent on golf courses, they should look good, and it does. But, the people that really understand the golf business know that a professional adapts and uses the weather conditions to his/her advantage. A professional uses turfgrass research and money as tools in managing and organizing a sound maintenance program. The golf course conditions that were found in 1990 were because the golf course superintendent is more experienced and organized than ever before.

Now, where are we going? The coming winter months will provide considerable opportunity for our members to improve themselves. On November 8, 9, 1990 we will have a GCSAA Seminar on Managerial Productivity in East Lansing. During the winter months MBCGCSA will have an educational series of meetings for Class A and B Members. The Michigan Turfgrass Conference will be held January 21, 22, 23, 1991. The GCSAA Convention will be held February 5-12, 1991.

I would like to thank all of our members and Boardmembers that contributed to one of the best organized and more successful golf days on record. Thanks to their efforts, along with the superintendents and their crew's at the participating clubs, we have raised approximately $18,000 for turfgrass research.

"A PATCH OF GREEN"

Published Bi-Monthly by the

MICHIGAN AND BORDER CITIES GOLF COURSE SUPERINTENDENTS ASSOCIATION

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MBCGCSA HOLDS FUND RAISER FOR THE MTF

The 1990 Fundraiser for the MTF was held on October 1, at the following golf clubs:

Detroit Golf Club - Supt. Clem Wolfrom
Lochmoor Golf Club - William Roberts, CGCS
Red Run Golf Club - Gary Thommes, CGCS
Wabeek Country Club - Ken DeBusscher

Over 275 people attended the affair for a fun day of golf, dinner and prizes. Dinner was held at Roma's of Bloomfield with the accommodations and food being terrific.

The following vendors helped support the Fundraiser this year and the MBCGCSA thanks them:

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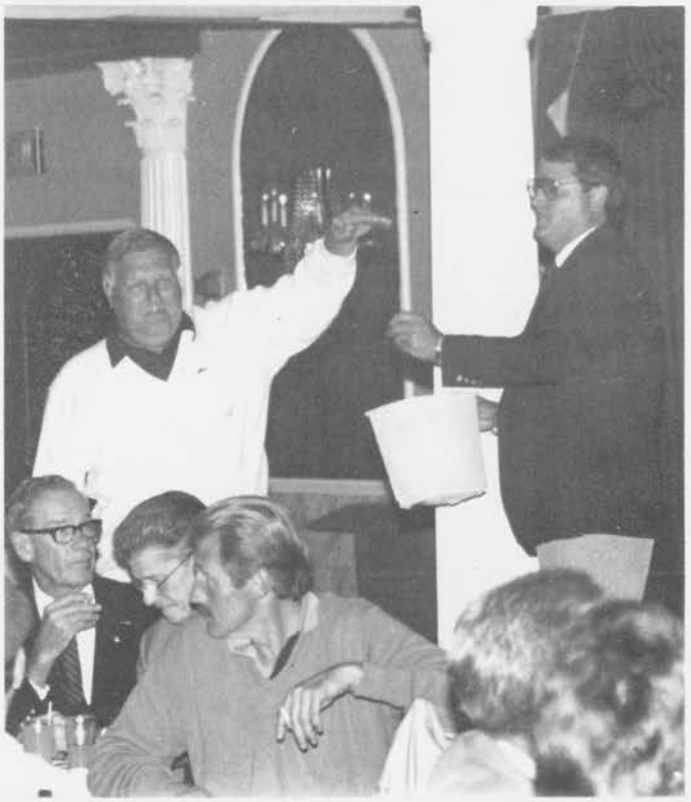
Lebanon Fertilizers

The following committee members also need to be recognized for helping organize this fun day of golf and dinner:

Jay DelCamp
Gary Thommes
Kurt Kraly
Ken DeBusscher
Keith Richards
Paul Kolbe
Doug Johanningsmeier
Mike Bay
Cary Mitchelson
Jim Eccleton

The Michigan and Border Cities thanks everyone for their support in this worthy cause. Well over $15,000 will be donated to the Michigan Turfgrass Foundation from your support. Once again, thank you.



What Should Be In Your Job Contract?

Chuck Palmer, Attorney
Troutman, Sanders, Lockerman & Ashmore
Atlanta, Georgia

As a preliminary matter, you must first know whether or not an employment contract is even necessary. Many states are "employment at will" jurisdictions which means in general that an employee can be fired at any time for any reason, no matter how arbitrary (there are various exceptions to this general rule, such as "whistleblower" statutes). Therefore, in order to provide stability in your employment situation, a contract setting forth the conditions of your employment is essential.

Make sure your contract is in writing. Club boards change and club managers change. In order to ensure the items you agree on today are provided two years from now, those items need to be set forth in writing to avoid the potential for dispute. Make sure your contract specifically states to whom you are responsible. Do not let your self be caught in a tug-of-war between the club manager, the green committee and the club president. Whenever possible, you should draft the contract. When you draft the contract, you are able to insert items which were not negotiated that you may not be able to get otherwise. You can also draft the agreement such that points which have been negotiated are slanted to your benefit.

In most instances, you are better off getting more of your compensation in fringe benefits such as vehicles, insurance payments, etc., than in straight salary, because many of these fringe benefits do not constitute taxable income to the superintendent. To illustrate, if you are in the 28 percent tax bracket, it would cost you $10,000 of pre-tax income to procure $7,200 worth of fringe benefits that the club could provide to you tax-free at a cost to the club of only $7,200. Both you and the club gain from this latter arrangement.

There is another potential area of compensation from which superintendents would be well advised to steal an idea from the golf professionals. Consider having some of the same incentives via which pros are compensated contained in your contract as well. For example, suggest to the club that you should receive a percentage for cart revenues or a certain fee for every round played on the course.

Golf course superintendents should make sure their employment contracts contain an idemnification clause. An idemnification clause essentially provides that the club will assume any liabilities, including attorney fees, that the superintendent may incur in the event injuries or damages suffered by third parties, including employees.

A superintendent can even be idemnified against injuries that arise as a result of his own sole negligence, except in certain instances. However, there are certain legal restrictions that limit one's ability to be idemnified. Therefore, an idemnification clause should be reviewed by a lawyer in order to ensure it is enforceable.

Ask that your contract include an arbitration clause, which essentially provides that disputes under contract are resolved by arbitration and not in the courts. The reason this is of benefit to the employee is that the judicial process is lengthy and costly, and often the employer is in a much better position financially to wait for a dispute to be resolved than is the employee.

Any termination of the contract by the club should be "for cause." The grounds for your termination should be set forth in writing, and you should be satisfied these grounds would justify your being terminated. Try to avoid having a "for cause" termination be triggered by simply "unsatisfactory performance." As for provisions allowing you or the club to terminate the contract for any reason upon 30 days notice, remember such clauses cut both ways and you apy a price for this flexibility.

Credit: Conference Proceedings
GCSAA, 61st International Golf
Course Conference and Show

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ADJUSTING PH THROUGH THE IRRIGATION SYSTEM

What do you do when you've tried everything in the book to lower your soil pH, but turf still won't grow on your course? When all else fails, you might be willing to try anything — even if it involves adding sulfuric acid to your irrigation water. Several golf courses around the country, especially in the Southwest, have done just that. The results are dramatic.

This procedure is an option only for those situations in which all other methods of lowering pH have failed. Do not take lightly the highly caustic nature of concentrated sulfuric acid.

PROBLEM WATER

In arid regions, water for irrigating turf generally has high pH and high salt content. In some locations, irrigation water may have a pH of 7.4 to 10.4. In extreme cases, soil in these areas may show a buildup of white deposits of calcium carbonate (calcite). The first inch of soil can have the same pH as the irrigation water, or in many cases, it can be much higher.

Water may be so alkaline that turf and ornamentals may lose their leaves. Rhizomes of stressed bermudagrass may refuse to root. The problem can be so severe that whole greens and fairways show stress and turf loss. As many as 60 percent of newly planted ornamentals may have to be replaced within the first month.

On highly alkaline sites seeded with bentgrass, bermudagrass, or ryegrass, germination was poor. In some areas, seed failed to germinate.

Many of these situations have been traced to soil pH, but the problem seems to start with high-pH-irrigation water having high concentrations of calcium and bicarbonate ions.

TREATING THE PROBLEM

Generally, there are two accepted methods for controlling soil pH:

• You can apply elemental sulfur or a sulfur-containing compound that can be oxidized to the sulfate ion, forming excess hydrogen ions in the process. (Remember, the sulfate ion, SO42-, does not provide the acidification. It is the oxidation of the sulfur to sulfate ions that provides the hydrogen ions.)

CONTINUED PAGE 22

GCSAA Announces New Legacy Awards Program

The Golf Course Superintendents Association of America has announced a new member benefit: the Legacy Awards Program. The program offers educational aid to the children and grandchildren of current GCSAA members through GCSAA Scholarship & Research, Inc. for the 1991-92 academic year. Awards may range from $500 to $5,000 for one academic year, depending on financial need of the student.

Eligibility requirements for the GCSAA Legacy Award are:

1. One or more of the applicant's parents or grandparents must be an active class A, B, C, EA, EB, or AA member of GCSAA for five or more consecutive years. Children or grandchildren of deceased members are also eligible if the member was currently active at the time of his or her death.

2. The student must be studying or planning to study in a field unrelated to golf course management (i.e., a field outside the scope of the regular GCSAA turfgrass management scholarship process).

Selection Criteria:

1. The student must be enrolled full-time at an accredited institution of higher learning or, in the case of high school seniors, be accepted at such an institution for the next academic year (verification required).

2. The student must have a cumulative GPA of 3.0 or higher on 4.0 scale (verification required).

3. The student must demonstrate a broad sense of interests, including involvement, volunteer activities and outside employment.

4. The student must complete a short (500 words) essay on his/her parent or grandparent's involvement with GCSAA.

Selection Committee:

Applications for the scholarship shall be reviewed by an outside committee of three educators and/or collegiate administrators. An independent assessment of financial need (College Scholarship Service) shall be forwarded to the committee who shall review them and make the final determination. All decisions of the committtee shall be final.

Interested parents or students should contact the GCSAA Scholarship and Research Office for more information or additional applications.

Soil Compaction and Aerification

Dr. A. Martin Petrovic
Dept. Of Floriculture and Ornamental Horticulture
Cornell University

Traffic across a turfgrass site creates two stresses, wear of the shoots of the turfgrass plant and compaction of the soil. It is easy to see wear injury, but soil compaction is often called the hidden problem.

When soils receive traffic from either people or maintenance equipment, the physical properties can change dramatically. Compacted soils have a higher bulk density, moisture holding capacity, and resistance to penetration compared to non-compacted soil. In addition, there is less air-filled pore space (aeration) and a slower infiltration and percolation of water into and through the soil. Compacted soils also warm slower in the spring and retain heat more in the summer (higher temperature).

The turfgrass plant will alter both shoot and root growth when the soil becomes compacted. Soil compaction affects turfgrass root growth in the following ways:

1. Alters the root distribution pattern.
With moderate compaction there are more roots in the surface 2" of soil, but less 4-10" deep. Heavy compaction means less roots at all depths.
2. Increases the porosity of the root.
More air spaces between the cells so oxygen can enter the roots from the shoots. This is a survival mechanism.
3. Reduces the elongation rate and root hair development.
4. Reduces water uptake.
5. The roots are shorter and thicker.

With a change in the soil environment and the slow alteration of the root system following compaction, the turfgrass shoot is also affected in the following ways:

1. There is a variable affect on clipping yield.
On sandy soils with moderate compaction, yields actually increase. With heavy traffic or fine textured soils yields decrease. The effect on yields is immediate.

2. There is lower visual quality due to less shoot density.

3. There is a reduction in both rhizome and stolon growth.
Rhizome growth is reduced by 37%.

4. Uptake of nutrient is altered.
There is less uptake of K, N, P, Ca, and Mg but more uptake of sodium. Light but frequent application could help reduce this problem.

5. Uptake and status of water are altered.
Under compacted conditions the water use is 20 to 50% less because; less soil volume occupied by roots, less demand for water due to less shoot growth, reduced stomatal density, stomates are closed due to lower oxygen levels, and slower movement of water to the roots.

6. Carbohydrate (CHO) reserves are altered.
In cool weather there is no effect of compaction on CHO levels. In mid-summer there are 23 to 50% less stored CHO with compaction. Less CHO means less recuperative potential during stress periods.

7. Increase in canopy temperature.
During August, daily canopy temperatures are between 1 F (cloudy day) to 6 F (clear day) higher on compacted sites which translates into more heat stress.

8. Sod establishment is greatly reduced on compacted sites.

9. Compaction alters the composition of the plant community. Weeds like goosegrass, knotweed and annual bluegrass are more prevalent on compacted sites.
Red fescue and colonial bentgrass declined in compacted areas, whereas perennial ryegrass and Kentucky bluegrass improved.

There are several options available to turfgrass managers to deal with compaction problems. The following is a list of options:

1. Reduce the traffic load to only the most critical uses.
If it is athletic fields, this often means using the site for only games and not for band practice or intramural events.

2. Change or rotate the traffic problem. This may mean more frequent changes in the cup placement to adding berms or fences to channel traffic.

3. Soil cultivation to disrupt the compacted zone of soil.

4. Soil codification to change the rooting zone to resist compation. This may range from partial modification (topdressing) to complete rebuilding.

5. Addition of chemical soil conditioners to alleviate soil compaction. This method has not proven very successful.

Cultivation, in terms of turfgrass sites, refers to the mechanical disruption of the soil without destroying the quality of the turf. Alleviating compaction by cultivation is based on the special distribution of compaction in the soil profile. Compaction of the surface of the soil is greatest at the surface (the higher bulk density the more compacted) and is confined to the top three inches (7.5cm).

Cultivation helps reduce the negative aspects of compaction like poor infiltration and percolation by punching through the compacted zone thus allowing better water and air movement into the soil. If the depth of the compacted soil is deeper than the depth of cultivation, the cultivation will not reduce the problems of compaction.

There are several forms of cultivation equipment available to turfgrass managers. Two general types of cultivation equipment are ones that remove a core of soil and ones that just make a hole in the soil. An example of the type that removes soil is the core cultivator or some times called an aerifier. Core cultivators come in many sizes with different tine sizes and spacing. Selection of one depends on the size of the area to be cultivated and how fast the job needs to be completed. Deep tine core cultivators and drills are becoming very popular with the advantage of being able to cultivate deeper into the soil over the conventional equipment.

The other form of cultivators are ones that only make a hole but do not remove soil. This group includes soild-tine core cultivators, slicers, spikers and verticuters. This type can punch through the compacted zone of soil to reduce the problems associated with compaction BUT they are not as effective as core cultivators in alleviating compaction.

Two common questions are often asked in relation to cultivation — How often? and At what time of the year should we cultivate?. On sites that have the traffic confined to one season like fall football, cultivation is recommended just before and at the end of the season. When the traffic is more uniformly distributed during the year, then spacing out the cultivation treatments is desirable. On lawns without either much traffic or thatch, cultivation may never be needed. If the site is to be cultivated only once or possibly twice during the year, it might be good to cultivate during the active rootgrowth periods of early spring and mid-fall to encourage the development of a more extensive root system. Times of the year to be careful are just prior to or during a severe stress period. This relates to midsummer and late fall. Opening the soil to greater surface area for evaporation can further stress the turfgrass plant during these periods of dryness.

In summary, compaction can dramatically reduce the quality of turfgrass sites. There are several options to deal with the compaction problem including some form of cultivation.

OUT OF SIGHT,

OUT OF MIND?

Hidden beneath your course, an underground storage tank can be easy to forget — until trouble arises. If your course is faced with clean-up costs and liability claims from an accidental leak, are you prepared?

Before you answer, consider this: Few, if any, general liability policies cover the cost of a leak from a UST. What's more, all golf courses with USTs must prove complete financial responsibility for those tanks by October 26, 1991.

If your course has a gap in its existing liability insurance, GCSAA now sponsors a specially developed UST insurance program that meets or exceeds all EPA standards in covering clean-ups from motor fuel, heating and waste oil leaks. It also covers third-party liability and legal defense costs. Even better, the GCSAA program will work within your courses's existing insurance program through your current agent.

Close the gap in your operation's insurance and meet an important compliance deadline. Act now to get GCSAA-sponsored UST insurance and preserve your peace of mind.

For more information, contact Jardine Insurance Brokers, Merchants Bank Building, Suite 1212, Topeka, Kansas 66612 — Telephone: 800/727-0250.

GOLF COURSE SUPERINTENDENTS ASSOCIATION OF AMERICA

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A General Electric Financial Services Company

Submitted for publication in the A PATCH OF GREEN by Rena M. Pomaville, Ph.D., R.E.M., Envirotherm

CURBING REQUIREMENTS FOR ABOVEGROUND FUEL STORAGE

Envirotherm has had a number of inquiries from the membership regarding above the ground storage of fuels, in light of the stringent rules and large expense of underground fuel storage. Recently, I obtained a copy of Act 207 which outlines the regulations governing above the ground fuel storage in Michigan.

Rule 30 of Act 207 requires diking for a tank exceeding a capacity of 1,000 gallons of a flammable liquid and exceeding a capacity of 10,000 gallons for a combustible fluid. However, it also contains a provision which allows the Fire Safety Board to require curbing for tanks of a lesser volume if a release would endanger an important facility, adjoining property, or surface or groundwater. In a nutshell, the Fire Marshall can require curbing, whenever his department sees fit.

Rule 30 also prohibits the automatic draining of a diked area. This means that automatic sump-type devices cannot be utilized as a means of evacuating a curbed area. Instead, a pump which requires manual start-up is required.

For members in Washtenaw County a local regulation stipulates containment of aboveground fuel tanks. I would propose a concrete or steel structure that contains 100% of the liquid material and has a manual drain for removing rainwater. For additional club protection, I recommend documenting the date and time of diked area drainage, as well as a notation on the log, as to the presence or absence of a sheen on the water to be drained. This will provide county authorities some assurance that indiscriminate draining is not occurring. Remember, if your aboveground tank is properly contained, this material will not be counted in the Community Right-To-Know inventory and thus reduce the annual fee paid by the club.

For members outside of Washtenaw County, if aboveground storage is allowed (call your township fire department or planning commission to check), I would recommend constructing a system similar to the type required in Washtenaw County. It is only a matter of time before the regulations spread to other counties, and we, as a group will be prepared and compliant. If your club does not wish to install the curbing, I urge, at the least, placing a concrete pad beneath the tank and the equipment charging area, to prevent minor spillage from seeping into the ground. Small spills will fall on the concrete, and hopefully evaporate before contact with the soil.

Copies of the inspection list the Fire Marshall utilizes to evaluate aboveground storage tanks are available to the membership from our office. Please call 313-229-7522, if you are interested in receiving a copy.

From The Pennsylvania Turfgrass Council, Inc.

KING APPOINTED EXECUTIVE DIRECTOR

Christine King has been promoted to executive director of the Pennsylvania Turfgrass Council, Inc. The appointment was announced by Dennis Watkins, president of the Council. In this newly-created position, she will be responsible for the development and coordination of Council programs and activities and those co-sponsored with The Pennsylvania State University.

During her 13 years with the Council, King has served as secretary, secretary-treasurer, and executive secretary-treasurer. Prior to joining the Council, she was employed in the agronomy department at the Pennsylvania State University.

The Pennsylvania Turfgrass Council is a non-profit, educational organization dedicated to the improvement of the entire turfgrass industry. Its intent is to organize all those in turfgrass into one strong organization that is representative of the entire turf industry. The Council serves as the voice for all turfgrass interests in the Commonwealth and contributes financial aid to the turfgrass program at Penn State. The Council is governed by an elected Board of Directors with research, teaching and extension personnel from Penn State serving in an advisory capacity.

In the past ten years, the Pennsylvania Turfgrass Council has grown dramatically. Individual memberships have increased from 300 to 850 and sustaining from 80 to 190. Contributions to PennState have gone from $25,000 to $100,000. The ability to provide funding to Penn State has increased due to the number and size of P.T.C.'s fundraising activities.

As conferences, trade shows, and memberships have grown, the P.T.C. office has reached a point where additional personnel and space are needed. Consequently, in August, the office of the P.T.C. has been moved to the Landscape Management Research Center on the Penn State Campus where Mrs. Bambi Gates will provide part-time assistance to P.T.C. Chris King, will maintain her office in Bellefonte, Pennsylvania, but the office on Campus will function as P.T.C.'s primary business location.

GREATEST SHOW ON TURF COMES TO LAS VEGAS

Attendance is expected to top 17,000 at the 62nd International Golf Course Conference and Trade Show, scheduled February 5-12, 1991, in Las Vegas, Nevada. The golf course industry's main event, hosted by the Golf Course Superintendents Association of America (GCSAA), will include nearly 50 educational sessions and seminars, a two-and-one-half-day trade show, a gala banquet featuring a performance by Neil Sedaka, the association's annual meeting and election of officers, and the 1991 GCSAA Golf Championship.

Conference week opens with the annual GCSAA Golf Championship, scheduled February 4-5 at five Scottsdale, Arizona, golf courses. A field of about 600 will compete for individual and chapter team honors in the national tournament.

Topics range from turfgrass disease control to environmental regulations will be covered in 41 one- and two-day seminars that will be offered during the first four days of the conference, February 5-8. Six concurrent education sessions are slated for Saturday, February 9.

Mark H. McCormack, sports marketing entrepreneur, will keynote the Opening Session on Friday, February 8, at the Riviera, the GCSAA Conference and Show headquarters hotel. McCormack is chief executive officer and chairman of International Management Group, a 14-company, multinational conglomerate, and the author of **What They Don't Teach You At Harvard Business School.**

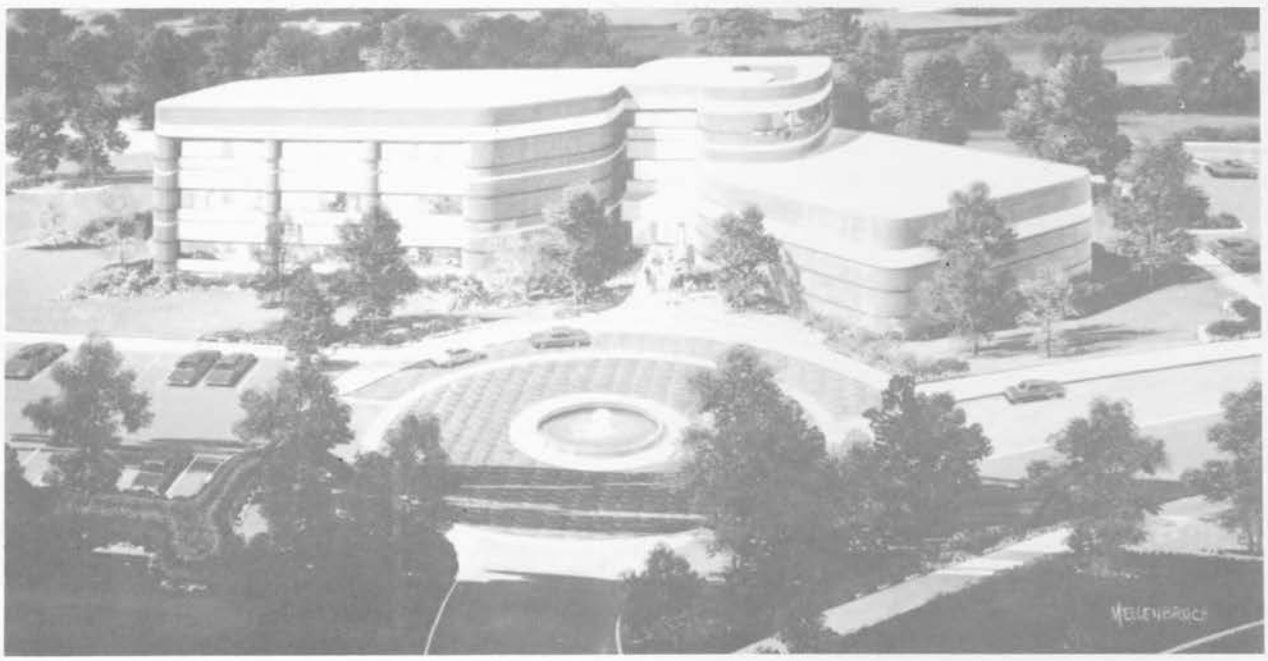
More than 500 manufacturers and distributors of golf/turf industry products, supplies and services are expected to exhibit at the trade show, which runs February 10-12 at the Las Vegas Convention Center.

Legendary pop singer/songwriter Neil Sadaka will perform at the formal closing banquet on Tuesday, February 12. The versatile performer penned some of the biggest hits of the rock'n'roll era, including, "Breaking Up Is Hard To Do," "Laughter In The Rain" and "Happy Birthday Sweet Sixteen."

The highlight of the gala evening will be the presentation of the Old Tom Morris Award, GCSAA's highest honor, to William C. Campbell. Campbell is the only American ever to have served both as president of the United States Golf Association and as captain of the Royal and Ancient Golf Club of St. Andrews, Scotland.

Last year's conference and show, held in Orlando, Florida, drew more than 17,300 people. Nearly 1,600 of those attending were international visitors and guests, representing 39 countries outside the U.S. Attendance for the Orlando show broke GCSAA's attendance record, set in 1989 at the conference and show in Anaheim, California.

Headquartered in Lawrence, Kansas, GCSAA is a 10,400-member, international professional association dedicated to promoting the principles and techniques of responsible golf course management. Its members are the men and women who manage the playing fields of golf.



Construction Work Going Well

Brick work is progressing on time at GCSAA's new headquarters complex, and metal for aluminum windows and entrances has arrived. HVAC rough-in is 95-percent complete on all floors, and interior framing and electrical rough-in are underway. The roofing membrane and roof pavers are installed, and cylinders for elevators have arrived. Curb work is more than half completed, and asphalt paving for the parking lots is scheduled to begin soon.

62nd International Golf Course Conference & Show

★ Trade Show Golf Championship ★

★ Educational Seminars GCSAA Annual Meeting ★

February 5-12, 1991
Las Vegas Convention Center
Las Vegas, Nevada

For conference, seminar or exhibitor information, call 800/472-7878 or 913/841-2240.
Golf Course Superintendents Association of America
1617 St. Andrews Drive, Lawrence, KS 66047

Information, Please

By James M. Latham, Director
Great Lakes Region, USGA Green Section

American golf courses are better than ever and I can prove it. If not, why does our office get more inquiries about sand bunkers and bunker sands than anything other than new construction. It seems paradoxical that course conditions can remain high when maintenance programs continue to be hampered by pressure to reduce the use of pesticides, fertilizers and water. Evidently, golf course superintendents have responded to the pressures by working smarter than ever with the high quality products which are available.

The pressures are not going to let up, though. Pesticide posting laws are in force in some state and some versions will follow in others. There are other potential legalities regarding pesticides which could hamper our means of communication with golfers. A recent GAO publication evaluating EPA performance listed the things that lawn service operators **CANNOT** say about the products they apply to lawns. They are:

- Any statement implying that a pesticide is recommended or endorsed by any Federal Agency
- A true statement used in such a way that it is false or may mislead a customer
- Claims about the safety of a pesticide or its ingredients such as 'safe', 'nonpoisonous', 'harmless' or 'nontoxic' to humans or pets, **with** or **without** the phrase 'when used as directed'
- Non-numerical or comparative statements on product safety, such as 'contains all natural ingredients', 'among the least toxic chemicals known' and 'pollution approved'
- 'Approved by' any Fedreal Agency
- 'Low in toxicity', 'will not harm beneficial insects', 'no health hazard' or 'ecologically compatible'.

Just remember that EPA considers no pesticide safe since all of them are supposed to kill or adversely affect the growth of something.

To follow these guidelines, how would you answer Mr. and Mrs. Golfer when they ask if the stuff being sprayed by the Man From Mars is safe? What will they do when you hand them a label or MSDS and stand mute? Will this satisfy their Right to Know?

We have some information on this through the publications by Watschke, Petrovic and Cohen, but we still do not have the whole story. For example, we don't know what becomes of pesticides after they are applied to turf and run their course of action. What are the products of their decomposition in soils? In sands? Under anaerobic conditions and at what pH? Several years ago Milwaukee began applying a digested sludge to farmland a consulting engineer subjected some of the treated soil to delicate testing for nonmetallic compounds. He found none of the toxic organics he anticipated, but did see the presence of some "unidentified compounds" which **Might Be Harmful**. The bottom line was a recommendation that application be suspended until further tests were conducted to identify the material and determine its toxicty. Of course, **he** would do the testing (at a tidy fee) for a few years.

Charlatans abound whenever an emotional issue arises which deals with unknown, potentially hazardous materials. These folks are usually better speakers and writers than knowledgeable scientists and do not have to prove anything. When faced with data from University research, they simply say that it is tainted by the influence of the antienvironmental agrichemical combined. Period.

To cope with this kind of reaction and to provide factual information for those truly interested in environmental issues, the USGA Executive Committee has charged the Research Committee, now headed by Dr. Mike Kenna, with another national level research program. The 3-year project will develop information to help us:

- Understand the effect of turfgrass pest management and fertilization on water quality and the environment,
- Evaluate alternative pest control measures in Integrated Turf Management Sysytems, and
- Determine the human, biological and environmental factors that golf courses influence.

The proposed budget for 1991 is almost a million dollars, with similar amounts planned for 1992 and 1993.

The intriguing thing about this project is that it seeks the unvarnished truth. If our present practices are faulty, golf will have to clean up its act and if not we will have full confidence in any statement we make to Mr. and Mrs. Golfer or anyone else. In addition to information gathering, a manual will be developed by USGA and GCSAA staffs to provide consistent information on integrated turfgrass man-

agement practices that ensure environmental quality, to be updated as field tested research results become available. The program is not meant to cast doubt on recent research efforts, but rather to expand the scope of research and involve all areas of the country.

In the meantime, how are we to cope with accumulated grass clippings, tree trimmings and the like? Will manure spreaders (for clipping dispersal in roughs) become standard equipment on golf courses?

Now that mudholes and swamps have been upgraded to prtected wetlands, what shall we call the mosquitos?

We will need more and more information to stay current with questions already asked and those which are to come. It comes from research programs on state, regional **and** national levels which must be supported by **all** individuals in golf as well as organizations.

Local-level research is necessary to help us cope with problems unique to specific areas as well as those which can be useful to a general audience. These programs need and deserve the support of golf and golf course superintendents associations within their sphere of influence. National level funding is more difficult since we expect some sugar daddy to kick in enough for all of us. Perhaps this is the time for everyone to become involved on a more personal basis.

The USGA Associates Program is a way to support this research as well as other programs benefitting golf. Membership is affordable to anyone, beginning at only $25. The Associates are for everyone in golf, superintendents, agronomists, sales people and researchers as well as golfers. After all, our livelihood depends on the viability of golf as an industry. The alternative is akin to those good ole days of weed pickers in bib overalls or something equally depressing.

THINGS DEVELOPERS AND BUILDERS SHOULD KNOW IN ORDER TO AVOID KILLING TREES:

- The fey feeder roots of trees are in the upper twelve inches of soil in wooded areas.
- Tree roots may extend three times the width of branches.
- Adding layers of soil over the root systems of trees can kill a large tree within three years.
- Grading soil away from the root zones of trees (by use of heavy equipment, parking trucks, etc.) may do the same.
- Trenching within root zones may do the same.
- Changing grades, even well away from trees, may alter water levels and reduce the life expectancy of the trees.
- Wounding tree trunks and branches will also cause trees to die before their time.
- Tree wells around trunks, without properly installed networks of perforated tile to provide oxygen to roots, are worthless.

— from the **Dawes Arboretum Newsletter**, June, 1990

If you have changed your address, please let us know so we can keep our addressing plates up to date.

Present Address:

NAME

ADDRESS

CITY STATE ZIP

Fill In New Address:

NAME

ADDRESS

CITY STATE ZIP

Mail this form to:

A PATCH OF GREEN
31823 Utica Road
Fraser, Michigan 48026

Most of us are well aware that our time is valuable. Not all of us, however, are equally conscious that other people's time is valuable too.

Recognizing that time is money — other people's time as well as our own — is a constructive way to encourage people to use their time more wisely.

For example, what do you do about the people who want to talk with you — or vice versa? We mean subordinates — people who report to you and look to you as their boss. Do you call a number of these people to your office (or have your secretary do it), then talk to them one at a time while the others wait? Yes, your time is valuable, and this is one way to be sure none of it is wasted. When you're through talking with one person, the next one will be waiting.

But what about their time? If they have to wait around, cooling their heels, doing nothing while waiting to see you, it certainly doesn't make them feel that their time is very important, does it? At least, not compared to yours.

Recognizing that other people's time is valuable is a subtle way to help them realize it too. And isn't that one of the things you have to strive for if you want an efficeint operation? Your concern for other people's time makes them feel important. They are needed, wanted, and part of the team. What they do with their time is important, at least in your mind. Obviously, it should be important to them too.

If you're busy when people want to see you, do you usually let them wait? It's wiser, and makes a much more positive impressions, if you find out immediately what they want. Maybe it's something you can handle in a few seconds. If not, suggest that they come back later when you can see them right away. Either that or you'll drop by and see them. You don't achieve anything — including better attitudes — by forcing them to cool their heels for a half hour or so.

And how about the times when you are really tied up with very important matters? They are urgent, and you don't want to be disturbed by other matters if you can possibly help it. All right — think first of the people who might want to see you. Check to find out if they need you opinion or OK on anything before you become unavailable. Then delegate authority to someone else to handle the other matters that may come up. Make it possible for life to go as smoothly as possible, even though you won't be available to make all the decisions you normally would.

Are there some matters that are so important you don't want anyone else to make the decision? Then you better change your mind about not being disturbed. Don't expect the rest of the world to come to complete stop just because you're busy. Somebody should be appointed to decide whether it's wise to interrupt you. Otherwise you may have a lot of expensive people doing nothing, waiting for you to be available again.

From **Bits & Pieces**, January, 1985

GCSAA NEWS

GCSAA EDUCATION PROGRAM EARNS NATIONAL ACCREDITATION

The continuing education programming offered by the Golf Course Superintendents Association of America (GCSAA) has earned official accreditation from the Accrediting Council for Continuing Education and Training (ACCET). ACCET is recognized by the U.S. Secretary of Education as the official accrediting agency for non-collegiate continuing education.

"Receiving accreditation confirms our belief that GCSAA offers topflight educational benefits to our members," said John M. Schilling, GCSAA executive director. "Few professional associations take this extra step to ensure quality education for their members."

GCSAA's senior director of education and marketing, Colleen Smalter Pederson, added that, "We chose to pursue accreditation to get public verification of the scope and quality of GCSAA's educational programs. It is important to us to have our programs measured against established standards."

The ACCET Accrediting Commission voted August 18 to approve GCSAA for full accreditation status, culminating a two-year preparation, application and evaluation process. Full accreditation recognizes the association's current curriculum of more than 50 one- and two-day seminars designed to provide information on up-to-date golf course maintenance practices and to sharpen the management skills of golf course superintendents.

GCSAA's correspondence coursework is also included under the accreditation. The association introduced its first correspondence course, covering media relations for the golf course superintendent, last year; correspondence training courses for underground storage tank management and hazard communication are planned for 1991.

Nearly 3,500 participants attended GCSAA's 38 conference seminars and 30 regional seminars during the 1989-90 academic year. Another 81 seminars are planned for 1990-91.

• You can apply nitrogen in the form of ammonium ions from ammonium nitrate or ammonium sulfate or from ammonium-producing fertilizers such as urea, urea formaldehyde, methylene ureas, etc. The ureas are converted to ammonical nitrogen, NH, or NH4, but the acidification comes from the oxidation of the ammonical nitrogen.

Whether you use nitrogen fertilizer or sulfur, oxidation must take place in order to produce hydrogen ions. Four variables determine the success of these processes:

- Soil mixture
- Temperature
- Oxygen concentration in the soil, and
- Application rate

During the winter in the Southwest, many facilities operate at their peak. When soil temperature is low, conversion of materials used to control pH is slow, at best. Because of this slow conversion rate, many managers over apply acidifying material in an attempt to lower pH.

The problems resulting from such over applications may not be seen until late spring or summer because all material could not be converted at the lower temperatures. As the soil temperature increases, however, the conversion rate increases so fast that the soil pH may be lowered to 2.0 or 3.0.

The application of granular or spray materials to control pH may be inconsistent because of over application of material, overlap in the application pattern, or buildup of material in tight soils or low areas.

The crux of the problem is controlling the addition of the proper amount of acidifying material. The material added must offset the pH of the irrigation water and, at the same time, lower the soil pH and maintain it at the desired level. When sulfur or ammonical nitrogen are applied to control pH, the ideal balance exists for only short periods of time.

A POSSIBLE SOLUTION

One possible answer is direct pH control of irrigation water using sulfuric acid or urea-sulfuric acid. This method is not new. Acidifying irrigation water with sulfuric acid and, in some cases, spraying the soil directly with concentrated sulfuric acid solutions have been used for some time in Arizona agriculture to reclaim extremely alkaline soils.

The present system is designed to handle water with a pH as high as 11.00, bring it down to 6.8 and maintain the irrigation water at a set value.

As irrigation water pH was lowered to 6.8, pH control systems produced results like these in the leaves:

- Phosphorous concentration increased greatly
- Sodium concentration decreased

CONTINUED PAGE 24

KILLER FUNGUS FROM JAPAN SLAUGHTERS GYPSY MOTH CATERPILLARS IN BTI EXPERIMENT

ITHACA, NY - Scientists have used a fungus of Japanese origin to kill off up to 85 percent of the gypsy moth caterpillars attacking oak trees in an experiment conducted in a woodlot in Ithaca.

The success raises the possibility that the fungus could be used as a lethal biological weapon against the gypsy moth, according to scientists at the Boyce Thompson Institute for Plant Research, a private independent research organization based at Cornell University.

They also found the same fungus living in soils on the southern shores of Cayuga in Ithaca and Seneca Lake in Watkins, Glen, NY, indicating that the fungus is much more widespread than previously thought.

The gypsy moth was first brought to Massachusetts by a Frenchman more than a century ago to establish a silk industry in the United States, but the insect became a forest pest. Over the decades, the creature has stripped untold acres of forests in the northeastern states. In a major outbreak in 1980-1981, for example, it defoliated an estimated 12 million acres in the northeast.

The Japanese fungus, called **Entomophaga maimaiga**, so named because the word "maimaiga" means gypsies in Japanese, is a deadly natural enemy of gypsy moths in Japan, Korea and northern China, said Ann E. Hajek, an Insect Pathologist working at BTI as a visiting scientist.

The experiment, which was conducted from early May through mid-July, marked the first time that the fungus has been deliberately pitted against the leaf-devouring caterpillars at a site where the fungus does not occur naturally.

This past spring, Hajek collected soil samples containing the gypsy-moth-killing fungus from the Ward Pound Ridge Reservation in Westchester County, NY, where large numbers of gypsy moths died of a fungal attack last year. She also used similar soil samples from Massachusetts for the test.

The experiment was conducted in a woodlot near Cornell's Laboratory of Ornithology in Sapsucker Woods. Hajek spread about 12 pounds of the fungus-containing soil around the bases of five oak trees under attack by gypsy moths in early May. In addition, she put scores of caterpillars infected with the fungus on two additional oak trees.

It was not until mid-June, more than one month after application, when the fungus started attacking the gypsy moths. Beginning June 21, the fungal epidemic spread rapidly among the caterpillars.

The fungus produces microscopic spores that invade the skin of the caterpillar and then multiply quickly as a bead-shaped fungus, devouring the insect from the inside. Once infected by the fungus, the caterpillar dies within a week or so, Hajek said. The fungus also produces another type of spore that remains in a dormant state all winter, to develop in the spring.

The experiment, she said, clearly demonstrates that the fungus could be used successfully as a gypsy moth biological control agent that is harmless to other animals, because it attacks only gypsy moths and a few closely related moths.

"What's most exciting is that we can manipulate the fungus to start a deadly epidemic in gypsy moth populations in infested areas," she said.

News From
AMERICAN SOCIETY OF GOLF COURSE ARCHITECTS

BROCHURE DISCUSSES ORIGIN, CONSTRUCTION AND MAINTENANCE OF GREENS

The most delicate playing surface in sports today — the golf course putting green — is the topic of a 24-page brochure now available from the American Society of Golf Course Architects.

The **Evolution Of The Modern Green** is a reprint of the fascinating four-part series, written by Michael J. Hurdzan, past president of the ASGCA. Dr. Hurdzan discusses all aspects of engineering, design, construction, and maintenance in the full-color brochure that covers the following topics:

Section One: The historical development of golf greens in the U.S. and how turf managers keep them in top playing shape.
Section Two: The research and development of various methods of green construction.
Section Three: How and when to rebuild greens and how to avoid the most common construction errors.
Section Four: The turfgrass art and science of establishing and maintaining a delicate living playing surface.

The **Evolution Of The Modern Green** is available for $5 by sending a check or money order to: The American Society of Golf Course Architects, 221 N. LaSalle St., Chicago, Illinois 60601.

• All metal ion concentrations generally were more unchanged

All these changes took place while the ion concentration in the soil remained virtually unchanged.

CHEMICAL REACTION

Waters to which the pH system technology have been applied are high in both bicarbonate and calcium ions; pH is high and there are higher salt concentrations.

When both pH and salt concentration are high (water EC values of 3.5), the processes associated with salt buildup in the soil are compounded when anions, such as bicarbonate or carbonate, are present in the irrigation water.

A precipitation reaction of calcite (calcium carbonate) takes place, which seems to restrict water flow through the soil layer. A co-precipitation of materials like calcium phosphate seems to occur with the calcite as the seed crystal (a site on which the phosphate begins to crystallize).

High evapotranspiration conditions compound this formation of salt deposits near the surface. As the soil dries, the concentration of dissolved salts reaches the saturation point, and the precipitate begins to form. Usually, this material is calcium bicarbonate that, as it dries in basic solution, forms calcium carbonate.

As calcium carbonate builds up in the soil, it alters the complete soil chemistry. Soils that began as sand or sandy loam can become rich in carbonates, and the processes that normally move salts are much less effective. In some cases, water movement is essentially stopped.

When the pH of irrigation water has been lowered and maintained between 6.5 and 6.8, results are dramatic. The precipitation reaction of carbonates is retarded as bicarbonate becomes more stable at the lower pH.

Deposited carbonate salts can be dissolved quite rapidly, if necessary, by controlling the pH at 6.5 or even 6.0 for a short time. The lower pH provides extra hydrogen ions to react with the deposited calcite. Now it is possible to add fertilizer for the plant, rather than to control the pH.

IMPLICATIONS

When you can control water pH as you irrigate, soil pH can be lowered in a regulated, easily monitored, step-by-step procedure. When you maintain the pH at a set value, fertilizer efficiency is increased. Plant stress, which opens the door to pest problems, will decrease. You will be able to manage your turf and ornamentals fertilizer program without having a soil pH problem.

Article by Tom Lubin, chemistry department, Cypress College, as seen in **Rub of the Green,** February, 1990, and used as such by us, from **Thru The Green,** August, 1990.

Seven Ways to Get More Done During the Normal Work Day

Here are a few suggestions by Dr. Roger Fritz, President of Organization Development Consultants in Naperville, Illinois, to help make your time more productive. One may work well for one individual; another for someone else. Experiment with each technique to find the one that works best for you.

1. **Do it immediately.** Rush jobs do deserve priority. . . but all work should be weighed for relative importance.
2. **Don't avoid unpleasant tasks.** The problem with avoiding an unpleasant task is that you carry its emotional burden with you until it's done. . . and that slows you down.
3. **Take care of the easier jobs first.** For the slow-starter, this can be a good way to "build up a head of steam". . . and hopefully, the momentum will keep you going. A good list of accomplishments, early in the day, can provide an emotional uplift for more trying tasks ahead. There are other situations in which this technique is useful. At a meeting where controversial decisions must be reached, for example, better relations may result if the easier problems are resolved first.
4. **Do jobs in the order of their importance.** This can be an excellent approach unless all the important jobs are tiring and/or boring. It is not an excuse to put off the item of lessor priority, however, so be sure that all tasks are handled within a reasonable period of time.
5. **Alternate difficult and easy tasks.** Alternating the difficult with the easy provides you with an occasional rest and with something to look forward to. The variety can increase your motivation.
6. **Group similar tasks.** It's just good sense to complete several tasks that require the same data, the same materials or the same personnel before going on to something else. It reduces duplication of effort and provides you with "momentum" from one task to the next. However, be sure that you don't use this approach as a means of avoiding other, less appealing tasks.
7. **Change tasks about every two hours.** This approach can be helpful when you are doing routine, monotonous tasks. A different type of work can relieve the boredom, lift the spirits and give you something to anticipate.

Clearing House Newsletter, May, 1987

It is nice to be important, but it is more important to be nice.

PATCH DISEASE OF GOLF COURSE TURF

Dr. Peter J. Landschoot
Department of Agronomy,
Penn State University

Patch diseases caused by root and crown-infecting fungi represent a newly recognized and highly destructive group of turf diseases on golf courses in the United States. Symptoms usually appear as circular areas of dead or dying turf with a tuft of healthy grass in the center, creating a fog-eye or ring-shape pattern. Some patches may be devoid of healthy grass in the center or appear as crescents or ribbons in the turf. On individual plants, a distinct root and crown rot are the first indication of disease activity. Unfortunately, these symptoms are not observed unless plants are thoroughly cleaned and examined with a microscope. As a result of the root and crown rot, the leaves will turn yellow or red and gradually become a tan or straw-brown color as the plants die. Large patches of declining turf will often appear suddenly with nor indication of previous disease activity.

Summer patch is becoming one of the most destructive diseases of **Poa annua** turf in the northeast as well as in other areas of the country. This disease is caused by a root-infecting fungus called **Magnaporthe poae**. Once established, summer patch destroys the roots and crowns of affected plants leading to the death of large areas of turf. Thus, the appearance and playability of greens and fairways are compromised.

On greens, summer patch symptoms may begin as small (2 to 3 inch) circular patches which progress to larger (10 to 12 inch) patches if conditions favor disease development. More often, large patches will appear suddenly with no indication of previous disease activity. In severe cases, the patches may coalesce and destroy large areas of turf. The patches initially take on a yellow color, then turn tan or a straw-brown color as the plants die. On greens with mixed **Poa annua**/bentgrass populations, the bentgrass will usually colonize the center of patches of affected **Poa annua**, creating a frog-eye or ring-shape appearance.

On fairways, summer patch may appear as distinct circular patterns or as irregular patches of declining **Poa annua**. The later symptoms can easily be confused with other disorders such as insect damage,

stress, or even other diseases.

The earliest and most reliable diagnostic features of summer patch are the vascular root discoloration and the presence of dark brown mycelium called runner hyphae on the root surface. Unfortunately, the roots must be thoroughly cleaned and examined under a microscope to observe these features.

Summer patch usually occurs during extended periods of high temperatures (83-95 degrees F) and high humidity. The peak disease activity often occurs following saturating rains during the summer months. Summer patch is more frequently observed in heavily trafficked areas such as the margins of greens and areas where golfers walk onto the green from the fairway or rough. The greens and fairways which tend to be severely damaged by this disease are in areas with poor air circulation and/or with poor drainage.

Since summer patch is a root disease, cultural practices which promote good root growth will aid in reducing disease severity. Increased aerification and improved drainage on compacted and poorly drained soils will alleviate some root inhibition and enable the turf to better resist infection by **Magnaporthe poae**. Because low mowing heights are conducive to shallow rooting, raising the height of cut may result in less summer patch injury. Reducing **Poa annua** populations and encouraging more resistant species such as creeping bentgrass or perennial ryegrass is another means of reducing summer patch injury.

Summer patch can be controlled with fungicides provided that applications are properly timed, the most effective products are used at the correct rates, and the fungicides reach the roots and crowns before these tissues are extensively invaded. In most areas of the northeast, fungicide applications for the control of summer patch should commence in mid to late May, followed by repeat applications on 30-day intervals until the peak period of disease activity has passed (usually mid-August). In most cases, curative applications of fungicides (treatment after symptoms appear) are not effective in controlling summer patch. The reason for this is that by the time foliar symptoms appear, the root systems have been destroyed.

Results of fungicide tests conducted in the U.S. have shown that Banner; Bayleton; the benzimidazoles (Tersan 1991, Fungo 50, and Clearys 3336); and Rubigan are effective (to varying degrees) in controlling summer patch. Since results have varied among test sites it is suggested that you contact your turfgrass extension specialist for information on the most effective treatments in your area. Because the product rates required to control summer patch are relatively high, caution should be used so as not to exceed label rates or to apply successive applications over short time intervals. Some of these fungicides have growth-regulating properties and excessive amounts applied to turf may cause a reduction in growth, abnormal growth, and/or a decline in turf quality.

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The most effective means of distributing fungicides into the root zone is with the application of large amounts of water (up to 10 gallons of water/1000 ft^2 depending on the amount required to infiltrate into the root zone). Similar results can be obtained by irrigating immediately after fungicides are applied.

Necrotic ring spot (NRS) is primarily a disease of Kentucky bluegrass lawns in the northeast. Although there have only been a few cases of NRS reported on golf courses, the frequency of occurrences appears to be increasing.

NRS is caused by a root-infecting fungus called **Leptosphaeria korrae**. This fungus is also the casual agent of a disease of bermudagrass known as spring dead spot. NRS can affect most cool-season grasses, however, the grasses most often damaged by this disease are Kentucky bluegrass, fine fescues, and **Poa annua**. A few cases of NRS have been observed on **Poa anuua** greens on golf courses in the New York City and New Jersey areas.

Patches of turf affected by NRS are generally circular, often with ryegrass or bentgrass colonizing the centers. Patches usually range from 6 inches to 18 inches in diameter. Leaves and stems of affected turf appear yellow or red in color, afterward turning tan as the disease progresses. Roots and crowns of diseased plants are rotted and regrowth in affected areas is slow. Occasionally, fruiting bodies called pseudothecia are found on diseased tissues. When roots and rhizomes are observed under a microscope, dark brown runner hyphae and vascular discoloration are apparent.

NRS usually occurs in late spring and/or early fall. The disease has also been observed in the summer on drought-stressed turf. Research is currently underway to determine other factors responsible for disease development.

Very little information is available concerning the control of NRS on golf course turf. Most studies have been conducted on Kentucky bluegrass managed as a lawn turf. As with summer patch, relieving plant stress and improving rooting through the use of cultural practices such as aerification and improved drainage will allow the turf to resist this disease to a greater extent.

The most effective control of NRS has been with the use of systemic fungicides. The sterol-inhibiting fungicides, Rubigan and Banner, have shown the most consistent control of NRS on Kentucky bluegrass in studies conducted throughout the U.S. However, another sterol-inhibitor, Bayleton, is not effective in controlling this disease. As with summer patch, the fungicides should be applied in large amounts of water about 3-4 weeks prior to the onset of symptom development. Keeping careful records of when the disease occurs can help in planning a more effective fungicide program.

In summation, patch diseases caused by root and crown-infecting fungi are destructive diseases of golf turf. The first step in the successful management of these diseases is to obtain an accurate diagnosis. Once

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the identity of the disease has been established, the appropriate cultural and chemical control measures can be employed.

Research on patch disease management is in progress at several universities throughout the U.S. Most efforts are being directed towards improving diagnostic procedures; examining factors associated with disease development; and determining proper fungicide timings, rates, and methods of application. Hopefully, this work will lead to a better understanding of these complex diseases.

Dr. Landschoot is a specialist in the area of patch diseases and will be speaking at the 1991 MTRF Conference in February. This article is an excerpt from the New York State Turfgrass Association, Bulletin 138.

THE OHIO STATE UNIVERSITY GOLF COURSE MAINTENANCE SHORT COURSE

The fifth annual OSU Golf Course Maintenance Short Course will be conducted January 7-11, 1991, at the Parke Hotel in Columbus, Ohio. This short course will provide general and basic information on golf-turfgrass maintenance. Emphasis will be placed on principles of agrononmy, soils, entomology and plant pathology. The short course is designed for all golf course personnel including golf course employees, foremen, assistant superintendents and superintendents seeking a more formalized training in the basics of golf-turfgrass maintenance. Attendees will qualify for recertification credits from the Ohio Department of Agriculture for Licensed Pesticide Applicators. Certified Golf Course Superintendents (CGCS) will qualify for continuing education credits from the GCSAA. The registration fee is $350.00. The deadline to register is December 12, 1990, or until 50 applications are received. Lodging facilities are available at the Parke Hotel or other hotels in the area. For more information, please contact Sue White at 614/292-7457 for course content, or the Department of Conferences and Institutes at 614-292-4230 for course registration.

PRUNING TREES AND SHRUBS

Nature has provided pruning techniques for most plants, but these are not always free of problems. For instance, in nature the weak, thin branches die and fall off plants, but occasionally larger branches die and heal slowly at the junction with the trunk or larger branches. This slow healing can result in heart rot that may result in the decline of the plant. In some instances, branches are broken or damaged and this permits an easy entry point for borers and other damaging insects. Corrective pruning therefore is used to give smooth cuts that heal rapidly and reduce invasion from insects and diseases.

REASONS FOR PRUNING

- Reduce the size of trees or shrub.
- Restore the natural form which is needed in particular landscape situation.
- Remove dead, diseased, or injured branches.
- Stimulate larger and more abundant flowers and fruit.
- Rejuvinate old trees and shrubs by stimulating new growth.
- Remove crossed branches to allow uninjured development of other branches.
- Restore shape to topiary and espaliered plants.
- Remove low branches to reveal outstanding characteristics of certain plants, such as the trunks of birch, crape myrtle, and wax myrtle.
- Create a better balance top and root system on newly planted plants.

WHEN TO PRUNE

- Corrective pruning to remove dead, broken, or diseased branches should be done as soon as evident.
- Light pruning or shaping of evergreens may be done anytime during the year. Late pruning from mid-August to October sometimes stimulates tender growth which is often damaged during the winter.
- Evergreen plants that produce flowers or berries should be pruned lightly each year so that severe pruning can be avoided. Heavy pruning will destroy flowers and fruit since both are produced on the past year's growth. For example, heavy pruning of a Buford holly, pyracantha, or nandina will greatly reduce the fall berry crop.
- Shrubs and trees that flower before June 1 should be pruned immediately after flowering. Examples - azaleas, spireas, forsythias, and flowering quince.
- Shrubs and trees that flower after June 1 should be pruned in late winter. Examples - Crape myrtles, gardenias, altheas, and bush roses.
- Overgrown evergreen shrubs which require severe pruning (within 12 to 18 inches of the ground) should be pruned in late winter.

HOW TO PRUNE

To reduce plant size and maintain natural shape, cuts should be made inside the shrub with the cut being just above a side branch. If pruned correctly, pruning cuts will not be visible. Cuts made several inches above a side branch result in a dead stub that can allow entrance of diseases.

Severly pruned plants cut back to within 12 to 18 inches of the ground should have uneven branches with lower branches near the outside and taller branches in the center of the plant. When new growth begins, the plant will have a rounded natural appearance.

To prune berrying plants, such as pyracantha and nandina, remove about one third of the growth each year.

Narrow leaf evergreens, such as junipers and arborvitae, require a special rule. A branch must be cut so that at least one side branch remains on it after pruning.

In pruning hedges and other plants that require shearing, trim so that the base of the plant is broader than the top to permit light to strike all surfaces.

To prune rose bushes, such as hybrid teas, floribundas, and grandifloras, first remove all dead and diseased branches, and then remove thin spindly canes and those that are very old. The vigorous canes remaining should be topped at 15-24 inches, depending on the vigor of the plant. Vigorous plants can be left at 24 inches.

EQUIPMENT FOR PRUNING

Hand pruners are ideal for pruning branches ½inch or smaller. Branches between ½ and 1 inch can easily be removed with loppers. Branches larger than 1 inch will require a pruning saw. A narrow blade saw is useful to cut larger branches in tight places. Hedge clippers should only be used on hedges. If electric clippers must be used, it is wise to use hand clippers every second or third pruning to open the plants for better light penetration.

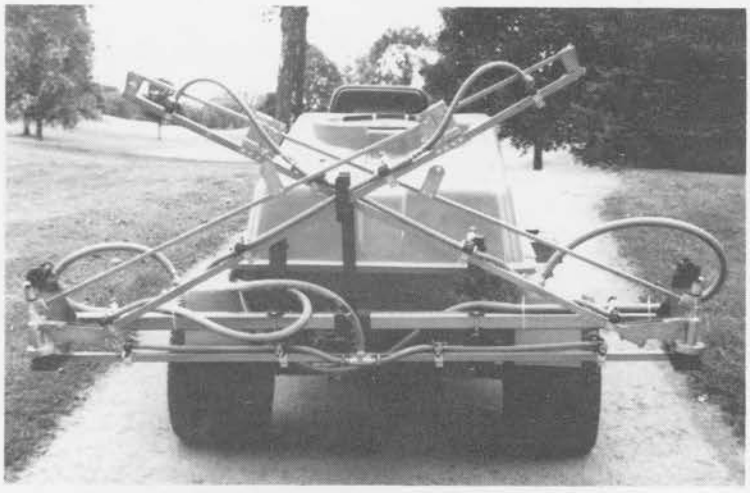
prepared by **J. P. Fulmer and E. V. Jones**
Cooperative Extension Service, Clemson University

From **Three Rivers Green, Vol. X, No. 3**

Spray Star 1600

SMITHCO *Standards You Trust*

SPRAY STAR



PUMP:

High volume centrifugal,
60 gpm, 0-70 psi
OR
3-Cylinder piston,
diaphragm, 25 gpm, 0-200 psi

CONTROLS:

Standard with super control valve system; master "on/off" individual boom controls
OR
Raven 440 computerized sprayer control system

POWER:

18hp twin-cylinder Kohler Magnum gas engine
"2-Year Warranty"

TRANSMISSION:

Manual syncro-mesh;
3-speed forward, 1-reverse

CONFIGURATION:

4-Wheel,
Front Wheel Steering,
Rear Wheel Drive,
60" Wheel Base

COMPARE TO THE COMPETITION:

Ultra low profile tank design for visibility and stability.
The strongest spray boom ever built, manual or hydraulic control.
Dual ground speed control [no more foot clutch].
160-Gallon Fibreglass tank; low profile, 5-year guarantee.
Wide rear flotation tires 24x1300x12 Super Softrac available.
SMITHCO Torque Master automatic clutch [no more tricky foot clutch].

LAWN EQUIPMENT SERVICE & SALES

151 N. PERRY
PONTIAC, MICHIGAN 48058
(313) 858-7700

Certain death for the dinosaurs.

The new Jacobsen Tri-King 1684D makes heavy cumbersome 84″ mowers things of the past.

Jacobsen ushers in a new age in heavy-duty 84″ triplex mowing with a truly lightweight, highly maneuverable package. So now you can say goodbye for good to those costly, one-ton monsters the competition turns out.

Lightweight and compact, this agile, rear-wheel steering machine maneuvers around trees and other obstacles in a hurry. A foot-controlled hydraulic lift with automatic reel shutoff makes cross-cutting fairways and striping sports fields quick and easy. Plus, the wide 10″ overhang simplifies trimming around traps, while optional on-demand 3-wheel drive smoothes out tough hills. And the Jacobsen Tri-King maintains a productive mowing speed in 3-wheel drive, so it trims circles around bulky, sluggish would-be competitors.

Simple, cool-running hydraulics deliver exceptional control of cutting frequency. This smooth, consistent power and a choice of 5- or 10-blade fixed or floating reels produce a uniform, carpet-like cut — even in dense, wet grass. Unlike heavier competitors, the 1684D's balanced, lightweight design and wide tires minimize turf compaction. And optional easy-on/easy-off grass catchers make clean-up a breeze.

A liquid-cooled 16.5 hp diesel provides plenty of power with longer life, simpler maintenance and better fuel economy.

Or choose the 1671D, a unique, durable 71″ triplex with all the same quality features of the 1684D. Yet smaller reels cleanly cut tricky undulating terrain and those really tight spots.

Don't be saddled with a dinosaur of a triplex when you can have the advanced new 1684D. Ask your Jacobsen distributor for a demonstration today. Attractive lease and finance plans available.

Jacobsen Division of Textron Inc., Racine, WI 53403.

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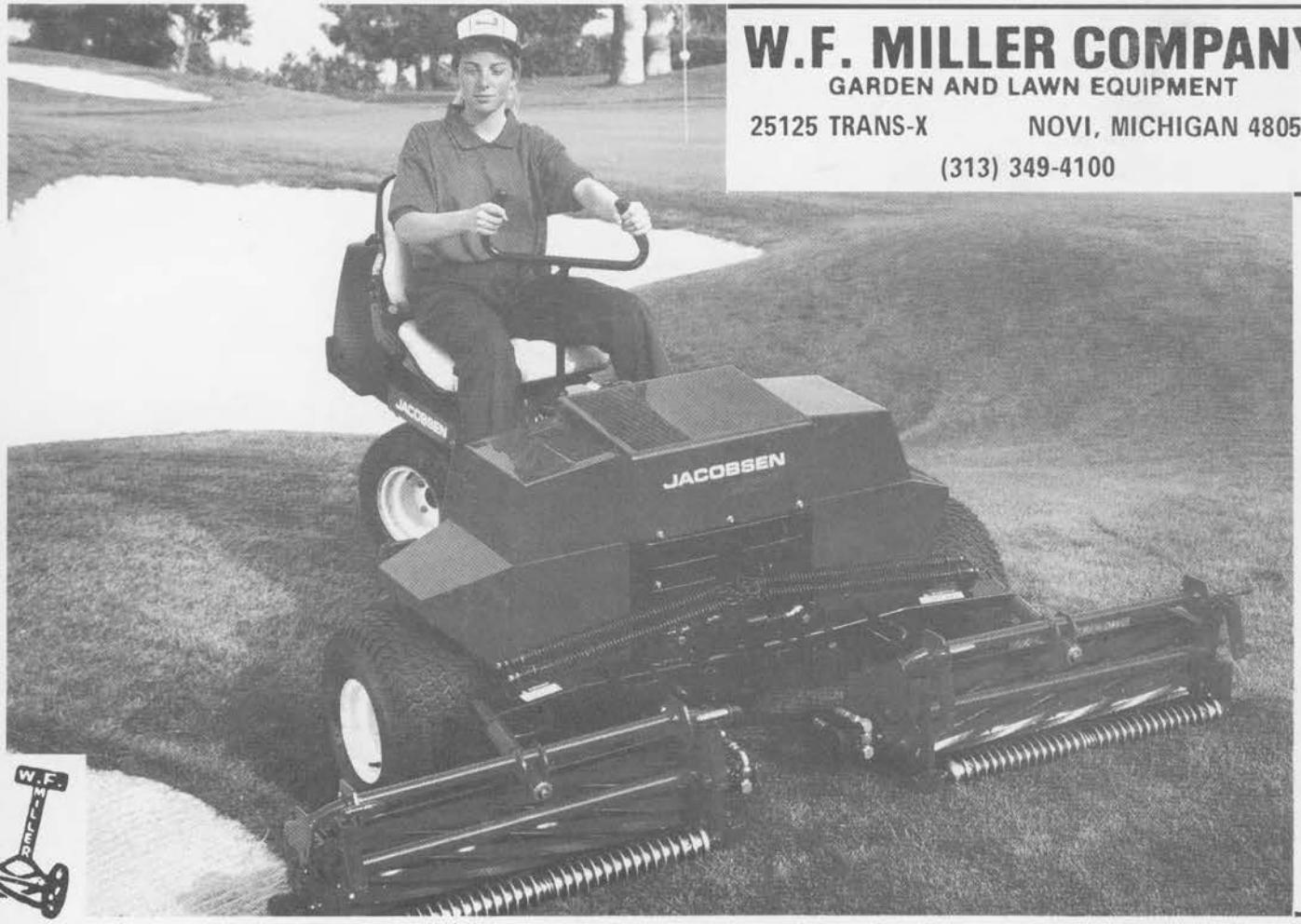
TEXTRON
Jacobsen Division of Textron Inc.



W.F. MILLER COMPANY
GARDEN AND LAWN EQUIPMENT
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(313) 349-4100

"A Patch of Green"
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FRASER, MICHIGAN 48026

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