Green is Beautiful

Ontario Golf Superintendents Association

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WINTER 88/89

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THE CUTTEN CLUB, GUELPH
BY CAROL EDWARDS

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ROD TRAINOR CGCS

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From the Editor

Where did the "S" come from? The word "Green" which when used in that form ("Greens") refers to a broad section of the Golf Course Industry.

Somewhere back in time the letter "S" became a part of the word and now seems to be a permanent fixture. We don't have Green Committees anymore or Green Chairmen, but instead they are now known as Greens Chairmen and Greens Committees. Should we change our titles to Supersintendents? I for one have a traditional streak in me and now find myself correcting my members, Club officials and peers on the correct usage of the word. While I'm on the tradition kick, there are sand traps — or should they be "bunkers"? If anybody out there would like to add to this or would like to dispute it please write me and I'll be glad to print it.

With summer half over we are way ahead of last year. After a wet and warm June all traces of last year's heat wave are practically gone. It has been a great spring to grow grass. While many courses experienced good growth there were many whose winter damage was so severe that full recovery was not possible. Early spring was too cold for ice-damaged greens to get new growth, and by the time the good weather arrived – so did the golfers. They usually don't mind temporary greens in April but by May things had better be ready to go. So the battle goes on. Proper drainage and elimination of "poa" seem to be the key.

Where stands the battle with pesticide regulation? The Green Industry has presented their case and it is now in the hands of the government. One thing we do know for sure is that regulations will be much tougher. Tougher not only with pesticides but also in the whole work environment. "WHMIS" will make us be more careful in the way we select and train staff. Storage and disposal of all materials and substances in the shop is coming under the watchful eye of the government. The regulations are in place but as to when enforcement will take place nobody is sure — but it is coming and we must prepare now.

Rod Trainor, CGCS

WANTED:

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Mail colour prints to
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From the President

I recently had the privilege of presenting a plaque to Vince Piccolo for hosting the Ontario Amateur at the Brantford Golf and Country Club.

I hadn't previously had an opportunity to talk with Vince on a personal level, and I found Vince to be both candid and refreshing.

Vince has practiced his craft at Brantford for thirty-two years, and I could sense his immense pride as he gave me a tour of his course — a pride that I must mention was most deserving.

Vince has managed to maintain his course in impeccable condition without the resources most of us take for granted. His short term plans call for intense modernization and I certainly look forward to a return visit to Brantford.

Vince is appreciated greatly at his club and the Ontario Golf Superintendents Association is equally proud to have such a professional member as Vince in our fold.

Neil Acton

Annette Anderson
Turf Extension Specialist
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Ontario

THE ART OF HANDWATERING

by Gary Sayre, CGCS
Overlake Golf and Country Club, Washington

"HANDWATERING?" Did someone say, "Handwatering"? In this day of spending hundreds of thousands of dollars on one automatic irrigation system, some believe handwatering on the golf course is passé. Not quite yet.

There are many reasons for modern-day handwatering. Perhaps the main one is to compensate for a poorly designed automatic irrigation system. Other reasons include water conservation, soil textural differences, syringing to cool the grass plant, and handwatering makes possible consistent quality putting surfaces under certain conditions, such as severe elevation changes. There are many more.

Handwatering is still the best way to place a specific quantity of water on a specific area of turf. All it takes is a discerning eye, a soil probe, a hose, nozzle, valve key, and, of course, a source of water. It would be interesting to know how many of the 12,000 golf courses in the United States handwater at least some putting surfaces during a growing season. It would also be interesting to know the principal reason for handwatering.

Each of the four golf courses where I have worked handwatered putting greens and occasionally tees and fairways. The membership at Overlake G & CC appreciates optimum turf conditions. As a result, we put in approximately 300 man-hours each summer handwatering putting greens and tees. It's an important part of our program.

Some of the reasons for handwatering deserve closer scrutiny.

POOR SPRINKLER COVERAGE:

Some of us have irrigation systems that are not quite what we would like. We must compensate so that we do not end up with muddy spots or areas that are so dry turf loss is possible. Some of our automatic irrigation systems don't give us proper coverage because of improper spacing, improper operating pressure, poor maintenance practices and poor or inadequate programming potential. As a result, we must do supplemental handwatering to compensate for the deficiencies in the automatic system.

SOIL TEXTURE DIFFERENCES:

Some of the putting surfaces on our golf courses have different textured soils. As a result, we must irrigate for the putting surface as a whole unit. The results vary with dry aprons, wet aprons and even localized dry spots on both greens and aprons. The soils have different permeability rates, which affect our watering schedules. We must compensate, therefore, by handwatering the areas that do not receive enough water. Some of our soils take water so slowly we must water them until runoff occurs, then come back and water them again 30 to 60 minutes later.

WATER CONSERVATION:

During the summer of 1987, many Seattle golf courses were required to cut back automatic irrigation because of a severe water shortage. This ocurs more frequently today, and we must have alternative watering techniques that will apply water in the exact amounts we need at the proper places. Many Seattle golf courses found out in 1987 that handwatering is the best alternative.

TO COOL GRASS PLANTS THAT ARE UNDER STRESS:

Many times during the summer, temperatures, hourse of intense sunlight, and wind combine to dry out turf to the point that it literally wilts. Some courses have added irrigation that will cool the air automatically in the vicinity of the greens. The idea is to lower the temperature around the leaf surfaces by fogging the air and allowing the grass plant to continue a balanced transpiration rate. Those of us who cannot do this automatically must have experienced personnel who can spot these conditions and act quickly. Remember, we are only cooling off the leaf tissue, not wetting the soil. Technically, this is called syringing.

TO KEEP CONSISTENT PUTTING GREENS:

This is one very important reason for handwatering. I say this because it embodies all the reasons already discussed. As one who provides a service to people who want to enjoy the game of golf, I feel one of my most important goals is to provide the best putting greens I possibly can. This includes a number of cultural practices, one of which is irrigation. It is of the utmost importance that we make every effort to provide putting surfaces that are smooth, true, of consistent speed, and that will hold a properly struck golf shot. Even the best-designed irrigation system will not produce a green with uniform moisture content throughout. They usually provide too much water to the middle of each green. Furthermore, many greens have high areas and low areas which result in localized dry spots and wet spots. Another problem encountered is hydrophobic areas on greens.

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There is no escaping these without good management, which includes proper handwatering and some type of spiking or aeration.

Is there a right way and a wrong way to handwater? There certainly is. Handwatering the wrong way can do as much damage to the playing surface as no watering at all. A workman is asked to go out and handwater new seed or certain dry areas on greens. All he takes with him is a one-inch hose, a quick coupler, and his thumb. The hose is hooked up. The water gushes under high pressure, and his thumb soon grows tired or cold in trying to break up the flow. He does not apply the water in a showering manner, but instead directs the high-pressure flow right into the turf, as if to force its penetration. The turf soon looks bedraggled and not unlike a gully-washer has passed by. Too much of this and erosion begins to set in and the playing surface is ruined.

Every morning I take a walk on the course while my crew is doing the greens mowing and bunker raking. While I am walking, I look at every green and tee, and take soil probe samples to test the soil moisture level. I also observe the surface for leaf color and hardness of the surface. I watch the mowers and their effect on the surface, and I also ask the person setting cups what the soil moisture level seems to be like to him. This first trip around the course helps me see areas that could become a problem if the weather conditions are just right. Throughout the day, I monitor the wind, speed, and temperatures.

I have been at Overlake Golf and Country Club long enough now to recognize where the hot spots usually occur, and we tend to concentrate our observation on these areas.

Each day we usually handwater greens twice and tees once. We must be flexible and do whatever we feel we need to as often as necessary.

I train anywhere from four to six people on my crew on how to handwater so they do it in the most efficient and effective manner possible. We use 100 feet of one-inch hose and a cooling or shower-type nozzle for the majority of our handwatering. At least one person goes out on each nine around 10:00 a.m. and again at 12:30 p.m. They go in reverse order and occasionally skip around until they have done all of the greens and tees.

Occasionally, we will treat dry spots with wetting agents to aid water penetration. We will spike the areas with ¼-inch aerifier tines to help the water penetrate and keep our greens as uniformly consistent as possible.

When we handwater, we are careful not to apply so much water it lies on the green for longer than one minute. It just so happens that the time of day we must be out handwatering coincides with the time of day our golf course tends to be the busiest, and we do not want to interfere with play any more than necessary.

I have been trying for years to find ideas that can make handwatering necessary only on rare occasions. I have not made much progress so far. Some of the ideas we tried have been successful in cutting down labor, but they don't allow us to eliminate handwatering totally. Most golfers at private clubs want tournament putting conditions, and they do not want to contend with golf course workers when they are on the course. Does this situation sound familiar? We do not exactly have that happening at Overlake, but we seem to be pleasing the golfers, and here's how we do it.

We have a state-of-the-art automatic irrigation system that was designed by an excellent engineer. We try to schedule it in a manner that will furnish optimum irrigation at least for the lower and more level areas on the course.

We apply liquid wetting agents through the irrigation system about once every two to three weeks. We aerify greens twice each year, except the dry, hard or too wet areas which get spiked two or three times more.

We topdress our greens with good-quality 30/50 sand eight to 10 times a year during the growing season.

And, of course, we handwater our greens as needed to keep them healthy and, foremost of all, playable.

Our Stimpmeter putting speeds range from 7½ to 8 feet in winter and 8½ to 9 feet in the spring, summer and fall.

If you want consistent, playable greens, you must consider handwatering as part of your routine putting green maintenance. Try it and I think you'll agree, it's an art worth perfecting.

We apply most of our fertilizer at ⅛ to ¼ pound of potassium and nitrogen per 1,000 square feet evey other week in a spray solution. We verticut greens very lightly with groomers twice each week. We mow greens every day at 5/32 of an inch during the growing season.

NEW MEMBERS

Jay Kulak, Port Colborne CC	Class B
Peter S. Dickey, Glenway Estates GC	Class B
Robert MacGrandles, Ridge Pine Park	Class B
Jack Austin, Canadian Irrigation Consultants	Class E

Irrigation: Rules & Regulations

The following is a summary of a talk given by Richard Vickers of the Ministry of the Environment (MOE) at the Ontario Horticulture Crops Conference, February 14. In his presentation, Mr. Vickers primarily dealt with the taking of water under "The Permit to Take Water Program (MOE)" and the construction of dams, diversions, and ponds regulated by the Lakes and Rivers Improvement Act (Ministry of Natural Resources – MNR).

Legislating the regulation of water takings (designated as Section 20 of the Ontario Water Resources Act (RSO, 1980), ensures that everyone gets a fair share of water. By regulating withdrawals and settling interference complaints, the program not only guarantees water for all who require it but helps to protect the natural functions of the stream.

In most cases (there are few exceptions) when taking more than 50,000 litres (approximately 10,000 Imperial gallons) of water per day from ANY ground or surface source of water supply or combination thereof, a "Permit to Take Water" is required.

Mr. Vickers defined the "taking of water" as the pumping or drawing of water from a well, lake, stream, or other surface water body, or as the storage of water into a pond by means of works such as dams, diversion channels, gravity intakes, etc. with the main intent to take water for specific consumptive or non-consumptive uses.

Water to be taken for the purpose of irrigation of nursery stock (as well as any crop grown for sale) exceeding 50,000 litres per day requires a permit.

Besides requiring the MOE permit, the construction of dams, ponds, diversions, and channelizations that are on or connected to a watercourse, you will need a Ministry of Natural Resources approval. Dug-out ponds and other offstream works are normally exempt. By-pass ponds, located adjacent to a watercourse and connected by channels or culverts, and on-stream ponds, located directly on a watercourse, require MNR approval. While a dug-out pond is independent from a watercourse and is, therefore, exempt from MNR, permit from MOE may still be required to irrigate from a dug-out pond.

If you are planning to expand your irrigation system this year, check your plan with MNR and MOE to ensure that you are not responsible for any watercourse interference before they come and check up on you!

From **OMAF Nursery and Landscape Notes,** March 1989.

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Ottawa Valley News

by Alex LaBelle

Ice for 90 days. Record low temperatures in January. Lowest snow accumulation to date. Deepest frost penetration (4 feet) in forty years. April received only 3/10 of an inch of rainfall at an average of 2/10 of an inch per day. One week of searing temperatures and high winds for the third week of May with red leaf spot and dead grass everywhere.

And here we are today. What are we doing here? The obvious answers are:

1) Getting caught up with an explosion in growth of established grasses;
2) aerifiying, verticutting and overseeding until dark;
3) sodding those large areas that refuse to recover;
4) watering renovated areas like there's no tomorrow;
5) fungicide stem to stem;
6) all of the above.

Time is distorted. We have members out there (greens chairmen among them) that don't realize that we are officially six weeks into the season but agronomically it's only the 21st of May. Give us a chance, guys! The poa hasn't even overwhelmed us yet. The only thing on schedule are the blasted weeds.

I had a conversation with a member (amateur) the other day. "That's knotweed," I said to him. "It is so a weed," he retorted. As with most items of golf business, I had to spell it out for him. No, you can't resod a tee and play on it a week later. Yes, when you overseed an entire green it has to stay temporary for at least a week — men's league be damned. No, it will not be the same speed as the others for quite some time — just hope it comes up green.

This is a scenario being played out across the valley. Other than that, I guess things are fairly staid.

OMAF TURF HOT LINE (519) 767-1211

The OMAF Turf Hot Line began April 7, 1989. It is a 3-minute recorded message on turf management that will be available to the turf industry through the 1989 season.

The objective of the Turf Hot Line is to provide timely information on turf problems that have been occurring as well as what problems we may expect to develop in the next week or two and appropriate turf management tips that apply.

Hot Line messages will be updated on a weekly basis. Calls can be made any time **after 10:00 a.m. each Friday, April to September** to receive information on topics such as insects, diseases, weeds, cultural practices and important upcoming events.

* * * * * * * * * * * * *

Editor's Note: The OMAF Turf Hot Line is an information service and therefore needs information. If you know of anything that has happened in your area with regards to a specific problem then place a call to Annette Anderson so that information can be included on the Hot Line.

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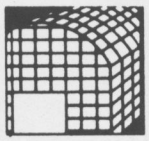

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PEOPLE + TRAINING = SUCCESSFUL TURFGRASS MANAGEMENT

by Larry Cummer

Before you read this article, consider the following questions:

1. Am I interested in maintaining and improving the turfgrass conditions at my facility?

2. Is turfgrass management continuing education relevant to myself or my employees?

3. Am I interested in utilizing Provincial incentive funding to attain these goals?

If you answered YES to any of the above, then read on!

CASE IN POINT: — in 1988 three employees at the Weston Golf and Country club wanted to attend the 20th Annual Turf Manager's Course offered at the University of Guelph. Meanwhile, an Ontario Skills Development Office training consultant, the golf course manager (superintendent), the course management and said employees developed a training plan which was approved. In February 1989 the employees attended the course and all were successful graduates with partial funding received shortly thereafter.

The concern for a growing shortage of sufficiently skilled labour in our Province has led to the Ministry of Skills Development and the Community Colleges forming a partnership and a strategy — **The Ontario Training Strategy.** Essentially, Ontario companies (in our case the Turfgrass Industry), should be analyzing and planning training of employees, regularly, to maintain a skilled workforce that is current and competitive. The Ontario Skills Development Office, with satellites at your local Community Colleges, is mandated to assist you in planning effective employee training solutions. Two of the varied services offered are as follows:

Training Consultant Services — there are 52 O.S.D.O. locations across Ontario staffed with consultants and administered by Colleges of Applied Arts and Technology prepared to make an assessment to determine your training needs, assist in the development and approval of training plans; and provide evaluation and follow-up consulting to ensure the training programs have met the needs of the employee and the employer.

Ontario Skills — to encourage workplace training Ontario Skills covers a portion of the direct cost of training. You, as an employer, also make an investment; however, companies with up to 200 employees could receive up to 80% of the instructional costs. Companies with more than 200 employees could receive up to 60% of training costs. A funding application must be accompanied by a training plan.

The consulting service is free to companies with under 50 employees. A nominal fee of $250 is charged to companies with more than 50 employees who whish to have the consultant conduct a needs analysis or develop a training plan. Should you wish to develop and plan your own training then the consultant can simply validate your course of action and forward this to the Ontario Skills office for funding.

An interesting feature of this incentive program is that the employer chooses the trainer! This not only allows easier acces to training courses already in existence such as the Turfgrass Course previously mentioned but also provides incentive for highly skilled and tenured individuals in the Turfgrass Industry to prepare and offer seminars in "specific" areas. Those interested in attending those seminars would apply for their personal reimbursements through the funding mechanism. What a wonderful motivator for the sharing of skills, knowledge and experience.

Interested? For further information contact your local Ontario Skills Development Office for pamphlets. The TRAINING HOTLINE number is 1-800-387-5656.

WHAT ABOUT ROUNDUP?

First Of All, It Looks Like Hell . . .

A Memo from Paul Voykin to his Green Chairman at Briarwood Country Club near Chicago.

Submitted by Gord Witteveen.

Finished mowing around all trees with "weed eaters" and rotaries. Our method is to wait until the grass around the tees gets real tall, then we knock it down by mowing it right down to the bottom. This sudden shock from, say, 2 feet down to less than an inch or so knocks the plant's growth balance out of kilter for a long time. It never comes back quite as dense or tall as before, enabling a golfer who happens to get under a tree an easy swing through the sparse grass. We do this type of maintenance about three times a year. Oh, there are retardants which can be used. We tried them a few years ago and gave them up. No time was saved, and the retardants only diminished the perennials. They did absolutely nothing to annual weeds or grasses. That's the way it works. Bruce Williams of Bob-O-Link Country Club tried it for five years and finally quit using them two years ago for the same reasons that I mentioned.

Now, what about Roundup, a severe chemical that kills all types of vegetation?

(A) First, it looks like hell, with dead brown rings 18" to 24" or more around each tree. Some who have tried it had to spray a white ring around every tree afterwards because the members wanted a lift. Wow - a thousand trees with white circles. (The Midwest golfers are particular.)

(B) After the grass around the tree is killed, there is profuse invasion of dandelions and thistle because there is no more grass to hold them back.

(C) The ground around the trees, due to lack of any vegetation, begins to crack and many times roots of fast-growing trees become exposed. A few years ago Shoreacres Country Club sprayed Roundup on its famous bluffs to control vegetation and guess what happened? The plant foliage and the entire root system of the vegetation was killed off and the bluff eroded and covered part of a green and one whole tee. (East side of #2 rough where we did experiments about six years ago had cracks so bad that we had to reseed under the trees.)

(D) Insects like ants sometimes become a nuisance in the cracks and bare dirt.

(E) Any contact by the chemical with any green surface of a tree, such as young green trees, shrubs, and root level suckers of crab apple trees will suffer severe injury or evan fatality because the chemical Roundup is translocated through the vascular system of the plant.

(F) Any malfunction by the equipment, i.e. dripping tanks and hoses, worn-out gaskets, misapplication, etc., will kill everything. Worst of all, if a golf cart or mower drives under a sprayed tree even two or three days after and it is wet from dew or drizzle, it will kill where the tires touch the grass.

(G) And finally, many of our trees in spring have beautiful rings of flowers around them, such as "Spring Beauties", the State flower, Violets, and even Trillium (some species are on the restricted list). Once we kill them, these lovely natural plants will never come back again. Only unsightly weeds will prevail.

So you can see why I don't care for the Roundup method, which is sometimes used by superintendents, especially in the Bermuda grass states. In this area, the superintendents and golfers are more particular.

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WHAT DOES A GOLF PRO KNOW ABOUT TURFGRASS?

An excerpt from an article in "Golf Course Management" titled "How to Work With Your Superintendent"

by David Gould

"Through the years," comments Warren Chancellor, head pro at Oak Hills C.C. in San Antonio, "some golf professionals have come across as self-styled experts on agronomy. After you've spent all that time on golf courses, you get to know what they should look like and what they should play like," he states. "Pick up a little technical knowledge on top of that, and now you're dangerous."

In the opinion of Jim Hippely, greens chief at Salem (Ohio) G.C., "The pros understand turfgrass better than ever, because they have some training in it." Hippely says he and head pro Jerry Szwedko "find it easy to work together. The membership doesn't pit us against each other." On matters such as when the golf cars go out and when the course closes, Hippely's word is final. The pro and the greens chairman don't question it. If it were any other way, there would be a problem.

At Mt. Hawley C.C., Peoria, Ill, new superintendent Bill Gauwitz and head pro Tim Lonergan have weekly meetings to coordinate the golf schedule and the maintenance schedule.

"Tim is the kind of pro," says Gauwitz "who encourages maintenance efforts, even when they might conflict with active playing periods. If I say I'm thinking of aerifying a fairway, but it could wait, he tells me 'Do it right away!' "

Speaking for the record but asking that his name not be used, one PGA pro said there were still some superintendents whose motto is "It's-my-way-or-in-the-highway."

"I've been told by superintendents: 'We're doing it this way because that's our program, and I would explain why that is but you're not smart enough to understand the explanation.' "

But the door can swing the other way, too.

"How about the assistant golf professional," Sweda asks, "who takes three members to a course down the road, noticed that they've aerified a fairway with a smaller set of tines than we aerified with last week, and says to the members: 'See, they know the correct way to aerify, they don't make such big holes and pull up big plugs of dirt, like our guy does.'

"This assistant doesn't know the first thing about aerification, but he can set back a lot of cooperative efforts with one irrational comment." It is now policy at Beechmont C.C. that all new assistants spend one week working on the greens crew in the spring of their first season on the job, to give them a feel for the challenges faced by the superintendent.

Weston C.C.'s Morosco feels golf staffers must first learn never to blame the golf course for their own poor play.

"I've always felt that was tasteless, anyway," he states. "On top of that, it's yet another way to create bad feelings with the people wo maintain the course."

Chancellor and his superintendent, Neil Thraikill, start the year off on the right foot by riding the Oak Hills course and planning the mowing patterns they'll use that year.

"Between us, Neil and I know how to balance maintenance needs against playability values and come up with a great product," says Chancellor. "As the season progresses, we can both watch the mower lines to see that the contours we want are compromised as little as possible.

"For example, I may suggest we scallop a fairway line out toward a tree to bring the tree more into play," he notes. "Then I'll need him to say, 'We really shouldn't do that. At fairway height, this grass is in danger of thinning out, because that tree blocks all its afternoon sun.' "

DEW IS NOT DEW – PART I

by Tom Mascaro

The beautiful crystal-clear droplets that you see on a turfgrass leaf in the early morning is not *Dew*. They are droplets of exuded liquid being pumped out of the grass plant. Exudate is pumped out of the grass blades through its hydathodes. The hydathodes are located along the edges of the leaves.

Exudate is easy to see with the aid of a simple magnifying glass. You will see the precise location of each exudated deoplet along the edges of both sides of the leaf, and a large droplet at the tip of the leaf if it has been cut off. This liquid is crystal clear. It looks like a fine piece of jewelry.

Each droplet hides potency in its beauty. This liquid is not harmless water of condensation that we call dew. Dew is moisture from the air that condenses on a cold surface. Dew and exudate are completely different in composition. Dew is water of condensation and exudate is plant sap which is pumped out of the plant through the hydathodes. Dew can sometimes be found as a whiteish coating on the leaf surface. Exudate is found primarily along the edges of the leaf.

Dew is inert, because it is pure water of condensation. Exudate, on the other hand, contains all of the elements that are present in the plant sap, such as nitrogen, phosphorous, potash, calcium, magnesium and trace elements. With these salts, we can also find sugars, such as glutamine.

DEW IS NOT DEW. When the grass is covered with millions of droplets in the early morning hours, what we have been calling "dew" is actually exudated liquid.

The presence of salts in the elements contained in the plant sap can be demonstrated in a number of ways. With a clean glass or paper cup you can scoop up the exudate and pour it into a clean container. A sponge will also do.

The concentration of solids contained in the exudate will depend upon the fertility of the soil and how much is available to the plant.

Pour some exudate into a clean petri dish or saucer. Allow the water to evaporate. You may have to fill the dish a number of times, each time allowing the water to evaporate. When all of the water is gone, crystals of the salt present in the exudate will form, and can be observed closely with a low power magnifying glass.

Try pouring a small amount of exudate in the palm of your hand and allow it to dry. Feel how sticky it is.

Surprisingly, very little research has been done on the subject of exudate liquids. Dr. Randy McCoy, while at Oklahoma State University, wrote his thesis on how an extract from thatch could kill seedlings.

He gathered clean thatch from a well fertilized green and placed it in a clean glass container. He then filled the container with hot water. After allowing this to steep for a while, he poured off the water, which resembled a strong tea. Using this extract from thatch, he found that he could kill any plant seedlings by simply watering them with it.

Other experiments have shown that you can kill not only seedlings, but any young plant. This extract will also burn leaves and stems of mature plants as well.

Pour some pure exudate in a petri dish or small, clean saucer. In order to gather pure, uncontaminated exudate, use a glass tube or clean soda straw. Touch the end of the tube to the exudated droplet and it will be drawn into the tube by capillary action. After gathering a number of droplets in this manner, blow the liquid into your clean container. Cover the container and store in a warm place. Observe the fungi that germinate and grow in the pure exudate. Since fungi have no chlorophyl, they can only grow in a medium that has an abundant supply of ready made food. Exudated liquid is a perfect food for any fungal spores. These simple, basic experiments demonstrate how exudate and turfgrass management practices have a profound effect upon the health and growth of the turf.

When we take a glass of exudate and pour it on one spot we find that we can burn the turf. Great care must be exercised in the selection of fertilizer, especially its nitrogen content, and its rate of availability. Nitrogen that is quickly available will move into the plant cells and can be found in the exudate. This is the reason that quickly available nitrogen fertilizers must be applied with care. As we know, when it is applied it must be quickly watered in or it will burn the grass leaves and stems. When a lot of nitrogen is contained in the plant cells, it will move through the leaves and out of the plant as exudate. This falls on the lower leaves and stems, causing the same kind of chemical burn.

A slow release nitrogen fertilizer, either organic or inorganic, releases slowly and the exudate will have only small amounts of this nutrient at any one time. The danger of chemical burn at the time of application and in the exudate is greatly diminished.

Now, lets look at thatch and the experiments that Dr. Randy McCoy made. We must assume that the thatch, acting like a sponge, soaked up the high nitrogen exudates. Minimal surface watering allowed the salt concentration to build up to a point where the thatch literally changed into a potentially dangerous material. A torrential rain storm and high temperatures could release enough salts to cause a severe chemical burn. Another assumption would be that disease fungi would immediately begin to flourish in dying and dead grasses and therefore should be considered the secondary cause of the grass' demise. Obviously we need a great deal of research in this area of turfgrass culture.

What about Dr. Endo's research, where he demonstrated that fungal spores that germinated in water grew very slowly, while spores that germinated in droplets of exudate grew very rapidly. This research certainly demonstrated many things. Especially important to the golf course superintendent, it demonstrated why early morning syringing is important, because it dilutes the accumulated exudate by washing it off of the leaves and back into the soil.

We look at Dr. Mike Brotton's research and his graphic illustrations of how fungal spores germinate slowly in water, while spores germinated in water with sugar added grew more rapidly. When he added glutamine to a solution, spores germinated quickly and the mycellium from these spores grew many times faster. He found that glutamine is one of the ingredients in exudated liquid.

(continued)

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(continued from p. 11)

The presence of glutamine is known to every golfer, because his hands get sticky when the so called "Dew" is on the turf. The presence of glutamine also accounts for the fact that clippings accumulate on the mowers. Syringing the turf when exudate is present in the early morning will quickly wash this material back into the soil. Clean water dries more rapidly than exudate, therefore less clippings adhere to the mowers. It is interesting to note that over forty years ago, Dr. Fred Grau, after making a survey of member clubs, found that greenkeepers (as they were called then) that practiced early morning watering had far less disease than those that didn't. Today we know that it was not the time of watering, but that the washing off of the exudate minimized the incidence of diseases. Golf course superintendents have always been a very important part of turfgrass research. In practicing their science and art, they found many ways to combat problems that seemed to have no answers.

To mention a few, Carl Bretzlaf, Golf Course Superintendent of Meridian Hills, Indianapolis, and past president of GCSAA many years ago, had a reputation of having little or no disease problems on his golf greens. His secret was that he had a home made rig that consisted of two iron wheels and five layers of burlap bags that was pushed over the greens — to dry them off! O.J. Noer, agronomist for the city of Milwaukee, always preached that "mold never grows on dry bread" and on that basis Carl dried his greens. His men would then syringe the grass with water and then mow. What he was doing was physically removing the exudate, washing what remained on the grass back into the soil and then mowing.

At Merion Golf Club, Ardmore, Pennsylvania, superintendent Joseph Valentine, in addition to syringing the greens, would, during periods of stress, apply a little hydrated lime when the grass was dry and then wash it in. He always felt the pH in the thatch layer was important in relation to disease incidence. He also believed in frequent light topdressing to control thatch and disease. Years later, Dr. Ralph Engle's research at Rutgers, New Jersey, revealed that there was a correlation between pH and each disease organism that affects turfgrasses. Here, again, we see the need for basic research to explore the pH of thatch and exudate.

We need research to update the research of Dr. J. K. Wilson, Cornell University, New York, that he performed in 1923. Dr. Wilson was walking across campus early one morning and noticed that there was more "Dew" on some areas of the lawns than others. He suspected that it was due to soil moisture. However, when he analyzed the moisture content of the soils, he found, surprisingly, it was the same in the "light dew areas" and the "heavy areas".

These results piqued his curiosity, so he decided to investigate. His research disclosed that the droplets he found on the grass blades were not "dew" at all. It was liquid pumped out of the leaves.

This liquid, first found and reported in Egypt in 1893, was referred to as guttated water. Guttated water and exudated water are one and the same, and can be found reported either way in the literature.

Dr. Wilson also made another interesting discovery. He found that all grasses do not exudate at the same rate. He classified each of the turfgrasses in the following order: the Bentgrasses, Bermudagrasses, and Poa Annua were prolific pumpers of exudated fluid. The Bluegrasses were medium pumpers (except Poa annua). We can also include St. Augustinegrasses as medium pumpers. The Fescuegrasses, Zoysiagrasses and the ryegrasses were the low pumpers.

We have all seen these differences in the amount of exudate, when we look at an area of mixed grasses in the early morning. Can we not draw the conclusion from Dr. Wilson's

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work that there must be a correlation between grass species, exudate and diseases on turfgrass areas? More exudate means more problems. It is obvious that more diseases occur on Bentgrasses, Bermudagrasses and Poa annua. The Bluegrasses, excluding Poa annua, have less diseases than the foregoing species. Zoysiagrasses, Fescuegrasses and Ryegrasses have little or no problems with disease.

After sixty-five years, it seems that we have a great deal of research to catch up on. Golf course superintendents cannot do this research alone.

When we lose grass for some unknown reason, we need to find the answers. When 18 greens are lost overnight, we need to take a hard look at our management practices and an even harder look at research. We need research that gives us answers to problems and not just cures.

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Read Part II of "DEW IS NOT DEW" in the Fall Issue of Green is Beautiful.

TIME OF DAY TO WATER

From the standpoint of the turf, the best time to water is early in the morning. Often at this time, the grass is already wet with dew and guttated water forced from within the leaves during the night. Since guttated liquid contains nutrients that can promote fungus diseases, it's good practice to wash this from the foliage. Also, early in the morning, the humidity is relatively high and this reduces loss of irrigation water by evaporation. Should there be less wind at this time of day, this becomes an added advantage in cutting back on loss of evaporation.

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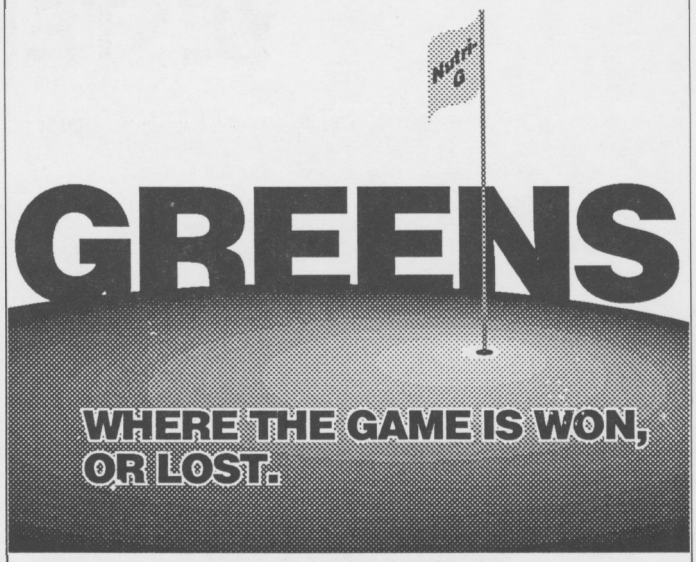

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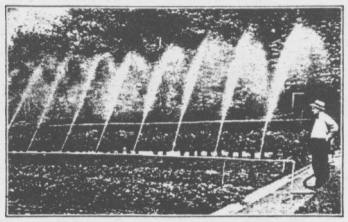

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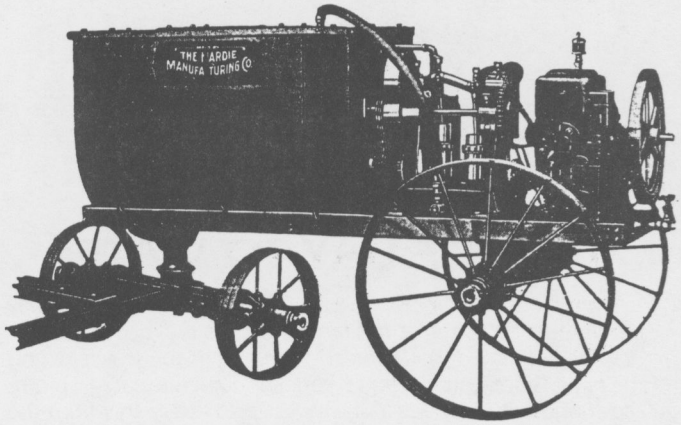

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While I drove him home, he sat in stony silence. On arriving, he invited me to meet his family. As we walked toward his home, he paused briefly at a small tree, touching the tips of the branches with both hands.

Then, opening the door, he underwent an amazing transformation. His tanned face was wreathed in smiles, he hugged his two small children and gave his wife a happy kiss.

After our visit he walked me to the car. We passed the tree and my curiosity got the better of me. I asked him about what I saw him do earlier.

"Oh, that's my 'Trouble Tree'. I know I can't help having troubles on the job, but one thing's for sure — troubles don't belong in the house with my wife and children. So I just hang 'em on the tree every night when I come home; then in the morning, I pick them up. Funny thing is, when I come out in the morning to pick them up, there aren't nearly as many as I remember hanging up the night before."

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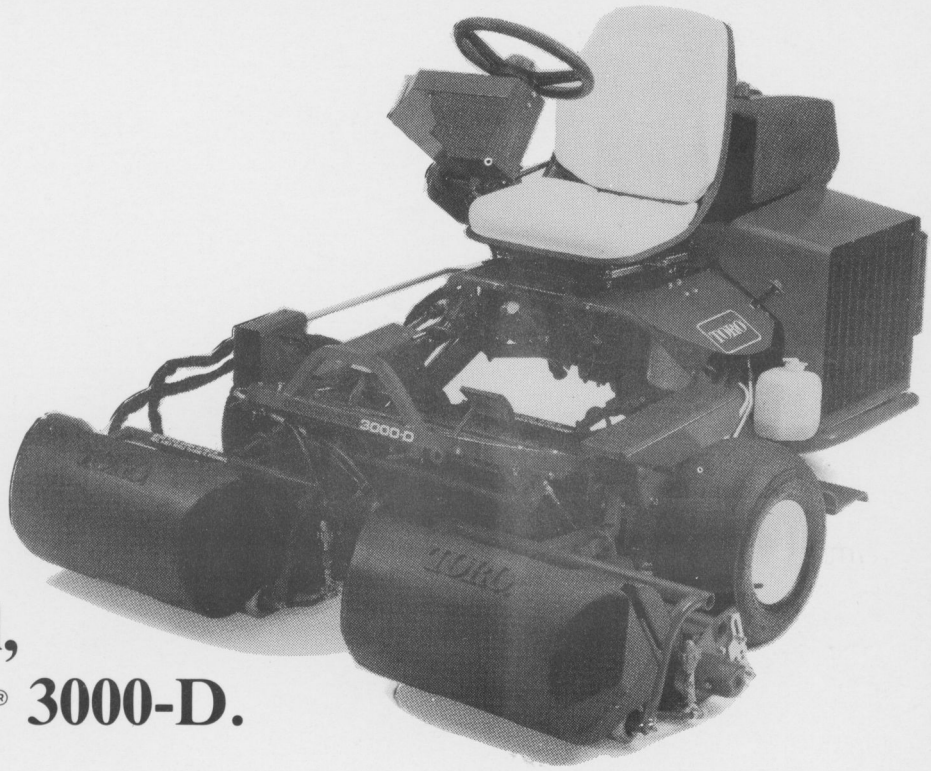

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OCTOBER 24, 1989
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