

NORTHWEST TURFGRASS TOPICS

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President's Message

A big thank you to all who supported the Third Annual Columbia Cup at Indian Summer Golf and Country Club on July 21st. Through your efforts, the tournament raised over \$6,000 for turfgrass research.

A Special Thank You to Tom McCarthy and his great staff for preparing the golf course to such immaculate condition.

Oregon State University, Washington State University, University of Washington, city administrators and professional landscapers came out in support of the Columbia Cup.

Several of our friends from Canada came to play and, I am told, had a great time. Bob Wick, Executive Director of the Western Canada Turfgrass Association had some very nice comments to make about our cooperative research efforts. He also brought a few bottles of their private label wine for prizes.

The Oregon Golf Course Superintendents Association had a very large turnout. It was especially good to see some of my young friends and, of course, one old one.

Inland Empire and Western Washington Golf Course Superintendents Association also supported the Columbia Cup in an outstanding way. My sincere thank you.

I would be remiss in not mentioning the support of all suppliers whose help is critical in the performance of our jobs. The Columbia Cup was sponsored by Western Equipment - TORO® and the lunch was hosted by Softspikes®. The meal was well prepared and presented by the clubhouse staff of Indian Summer.

Thanks to the efforts of Greg Crawford, Media Director, we had the largest turnout (12) of people representing print, television and radio. There were people from Portland, Wenatchee, Tacoma and Seattle. I personally talked to most and they all enjoyed themselves very much.

It was indeed a pleasure to have the Oregon State Golf Association, Pacific Northwest Golf Association, United States Golf Association and Washington State Golf Association represented (See editor's comment). We all came together to have fun on July 21st and that we certainly did.

Finally, Don and Linda Clemans were on hand to take care of registration, distributing the tee prizes (a beautiful Cutter and Buck golf shirt and two logo golf balls) and address any concerns of the participants. Without the hard work of Linda and Don Clemans, Greg Crawford and Tom McCarthy, this event would not have been as successful. In fact, they are already gathering information for next year's tournament. On behalf of the Board of Directors, it is our pleasure to thank them and you very much.



Columbia Cup winners, (l to r) Don Scott, Grays Harbor G & CC Jeff Gullikson, Overlake G&CC and Rick Carbonatto, Caledon Golf Course. Shane Riley, JR Simplot, not available for photo

In This Issue.....

President's Message	3
Editorial Comment	4
Columbia Cup Standings	5
TurfComms - Root Zone Mixes	7
The Ten Commandments of Course Remodeling	8
Walla Walla Community College Info	9
Edmonds Community College Info	10
Central Oregon Community College Info	10
Are Natural Fertilizers Better Than Synthetic Organic Fertilizers for Dollar Spot Suppression?	11
Sunriver Summer Activities	15
Sunriver Program	16-17
Sunriver Conference Registration Form	19
Sanctuary System Program Helps Protect Wildlife Habitats	21
Rootzone Construction and Drainage Principles	22
1997 WCTA Demonstration Research Projects	26

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Editorial Comment

Summer is upon us and fall will arrive before you know it. The Northwest Turfgrass Association is celebrating the beginning of its "Second 50 Years". To commemorate this "beginning", your Board of Directors has approved some new amenities for the up-coming Conference at Sunriver Resort, October 12-15, 1997.

First, please note on page 19 that the conference attendee may or may not currently be a member. The price is the same. Also, the registration fee includes the "Get Acquainted Reception" on Monday night, a Continental Breakfast and coffee break on Tuesday and Wednesday mornings, lunch at the Annual Meeting on Tuesday, and the Banquet with Dr. Larry Helms returning as our banquet speaker.

This year's Conference has been pared down from three and a half days to two and a half days, including the Roy L. Goss Golf Tournament. Now you will have time to play another Sunriver golf course (the



Dr. John Wagner, President, Washington State Golf Association.

Editor's Note: I put this "Quarterly Quote" in the *OGCSA Newsletter* last month and wanted to share it with you. It has a special meaning for me -



"A hundred times a day I remind myself that my life depends on the labors of other men, living and dead, and that I must exert myself in order to give, in the measure as I have received, and am still receiving." -

Albert Einstein



Meadows or Woodlands course) on Wednesday afternoon! Throughout this issue of *Turfgrass Topics*, check out the brief descriptions of the events: Roy L. Goss Golf Tournament at Crosswater, the Turf Tour, the Companion Program and the Conference Program. Registration this year has the option of "Invoice Me" or "Payment Enclosed" and the registration itself may be mailed or faxed to my office. Either way, faxed or mailed, **you will be obligated to follow the "Refund Policy"** as stated on the registration form.

Your Board is already working on 1998's Conference at Coeur d'Alene Resort.

On July 21, 1997, the Third Annual Columbia Cup Tournament was played once again at Indian Summer Golf & Country Club in Olympia, Washington. Vice President and host, Tom McCarthy and the gracious members at Indian Summer treated us to a grand day on the links. During the winners presentation ceremony, Washington State Golf Association, represented by Dr. John Wagner, Jack Challender, Bill Mays and John Bodenhamer, made a check presentation to Northwest Turfgrass Association for \$43,000 to support research in the Pacific Northwest. "The first such cooperative research funding between a state golf association and a turfgrass association in the United States," said Larry Gilhuly of the USGA to the assembled crowd. Larry also told the group that this "industry support" played a critical part in Washington State University's decision to replace the research position vacated by our retiring Lifetime Honorary Member, Dr. Stan Brauen, from the Puyallup Experiment Station. (See letter to President Wolff from John Hinds on page 6.)



\$43,000 check presented to the NTA by the Washington State Golf Association
Left to right WSGA President, Dr. John Wagner, Bill Mays, Past President, Don Clemans, NTA Executive Director, Jack Challender, WSGA Vice President and Tom Wolff, NTA President

COLUMBIA CUP STANDINGS

The Columbia Cup was awarded to Washington this year. The individual low net scores were tallied, the lowest four scores from each state or country were added together as a team and the Washington team's total was 320 and the Oregon team's total was 335. The team superintendents were:

Washington

Don Scott, Grays Harbor CC
 Shane Riley, JR Simplot
 Jeff Gullikson, Overlake G & CC
 Rick Carbonatto, Caledon GC

Oregon

Mike Conklin, Persimmon Golf Club
 Max Williams, Willamette Valley CC
 Walter Mattison, Widgi Creek Golf Club
 Tom Cook, Oregon State University

Individual Competition

Low Gross

Don Scott, Grays Harbor CC	1 st
Matt Allen, Oregon Golf Association	2 nd
Tom Baty, Bend G & CC	3 rd
Walter Mattison, Widgi Creek Golf Club	4 th

Shane Riley, JR Simplot	5 th
Jeff Gullikson, Overlake G & CC	6 th

Low Net

Dick Smith, Lewis River Golf	1 st
Roy L. Goss, NTA, Exec. Dir. Emer.	2 nd
Randy Longnecker, Stihl Northwest	3 rd
John Hinds, Riverside G & CC	4 th
Curt Chandler, Spokane Parks	5 th
Ken Rindal, Barnett Implemet	6 th

GOLF ASSOCIATION TEAM

USGA Team: Craig Calvert, Larry Gilhuly, John Zoller and Andy Soden **1st Place**

WSGA Team: John Wagner, John Bodenhamer, Bill Mays and Jack Challender **2nd Place**

PNGA Team: Dick Kanda, George Jonson, MG Davis and Bill Barton **3rd Place**

OGA Team: Jim Gibbons, Stan Buratto, Dave Weiner and Matt Allen **4th Place**

MEDIA COMPETITION

Jim Moore, <i>Seattle PI</i>	1 st Low Net
Mike Rice, <i>KEX Sports</i>	2 nd Low Net
Kerry Eggers, <i>The Oregonian</i>	3 rd Low Net

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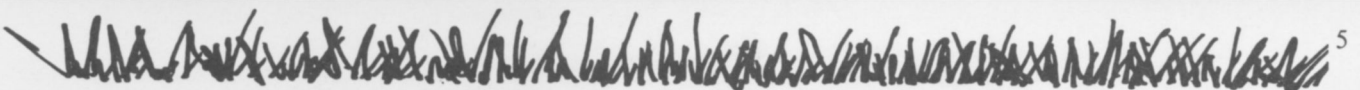
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July 23, 1997

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Dear Tom,

I was very impressed with the Columbia Cup Tournament that your organization held on July 21, 1997.

As a golf coach, golf show promoter, Board of Directors of a private club, and fellow golfer it was wonderful to participate in such a worthwhile event.

My compliments to Don Clemans, Greg Crawford, and especially Tom McCarthy, and the entire staff at Indian Summer Golf and Country Club.

It is my hope that the golfers in Oregon can someday match the \$43,000 that was presented to you from Washington golfers, and I hope my small donation of \$100 will show you that you are doing a great job - keep up the good work.

Sincerely,

John D. Hinds

**From Dr. Doug Hawes - TurfComms
Root Zone Mixes,
A User's Comments by Gary Grigg:**

"I thought your last issue of TurfComms was very informative. I have several opinions on several of the subjects and will lend them to you for whatever my experience is worth." (Ed. Comment, if Gary's comments aren't worth reading whose are?)

What will I think after 10 years?? who knows. Right now I would have to be talked out of doing them any other way in South Florida. Cost savings is around \$100,000 per 18 hole course."

"On the subject of California root Zones: over the last 3 years we have reconstructed 41 greens here at Royal Point-ciana Golf Club. The first were total USGA with choker layer. The next 19 were USGA without choker layer. The short course practice area greens (3) were built with, I guess what I would call modified California style. We cored out these greens 12' deep and doubled the typical amount of drain tile. We used .25" gravel around the drain tile to the level of the sub-grade. We used a USGA size sand mix - 85% sand with 15% peat moss. Laid the root zone mix directly on the sub-grade and drain tile. After three years, these greens have a much better developed root system. The greens without the choker layer are not as good but closer than those with the choker layer. The full USGA greens have at best 1/3 the root system of the "California" greens.

The California greens never have an algae problem - which is one of our largest problems. They do tend to stay drier but we have double heads around the greens and can water greens separate from the surrounding area. I think this is a key to making them work.

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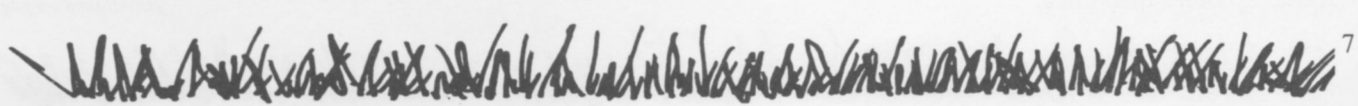
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THE TEN COMMANDMENTS OF COURSE REMODELING

By Bo Links, Keynote Speaker at the NTA's 51st Conference in Sunriver

1 Thou Shalt Seek Out Objective Analysis

If you really want to know where you stand regarding the condition of your golf course, bring in an objective, outside evaluator, such as the USGA Turfgrass Advisory Service (TAS) for a full day's visit. Consultation with knowledgeable, objective experts will save months of research and avoid guesswork. Arm yourself with the facts before proceeding further. The key issue is: Do you need to do anything, and if so, what?

2 Thou Shalt Educate Committees

Make sure the Green Committee participates in all meetings with outside professionals, including all TAS visits. They can't do their job without knowing the status of the golf course and how to address diagnosed problems.

3 Thou Shalt Educate the Golfers

Course remodeling can be an emotional issue, and it may take time to make the golfers fully aware of problems that have been diagnosed. Go slowly, pay attention to everyone's varied concerns, and be sensitive to the fact that many golfers may not at first appreciate the seriousness of the problem. Give them time. Proceed golfer by golfer, talking to people on an individual or small group basis.

4 Thou Shalt Develop a Plan and Stick To It

If the data support some form of remodeling or renovation, don't ignore the problem and, equally important, don't rush to cry out, "Let's remodel!" Decide what is needed, develop a realistic plan to accomplish specific goals, and make every attempt to finance the work without having the price become the main issue. Before submitting a plan, know the scope of the work, the true cost, and a realistic schedule.

5 Thou Shalt Understand the Economies of Scale

Keep in mind that it may be most efficient to do all the needed work at one time, rather than spreading it out over several years. A course can achieve substantial savings by having one crew and a single deployment of equipment. There also can be sizeable savings through *bulk buying* when it comes to purchasing the various supplies needed to do the job. If there are related tasks the golf course is contemplating (improvements to the sprinkler system, new irrigation pipes, etc.), consider doing the work at the same time as the remodeling job so as to minimize the inconvenience to the golfers. The only thing worse than having your golf course torn up is having it torn up more than once.

6 Thou Shalt Select a Cohesive Project Team to Do the Work and a Small Committee to Oversee It

Make every effort to have a cohesive team in place. If the architect you select has a preferred contractor, give that recommendation serious consideration. Price may be a factor here, but consider that having a team working together - rather than one beset with internal friction - will likely save money in the long run and, more important, produce a superior end product. In addition, have a small committee oversee the project. No orchestra ever played a symphony with multiple conductors twirling the baton at the same time, and no remodeling job ever succeeded with an army of armchair architects "supervising" the real architect. Use the committee as the interface between the architect, contractor, and the golfers. While opinions from knowledgeable golfers about playing conditions and potential changes in course design can be helpful, they should be filtered through the committee, rather than having the architect and contractor besieged by *golfers' input* during the job.

7 Thou Shalt Respect Mother Nature

Realize that seasons change and so does the weather. Winter is not a good time for heavy construction work (rain is a four-letter word to golf course contractors). Anyone reseeding needs to give the grass enough time to *grow in* before the rainy season arrives. While no one can predict the weather, careful planning can allow the work to be done during the spring, summer, or fall - during a dry period and a good growing season - when earth moving can be done easily and efficiently, and the grass can be in place before trouble (in the form of rain) arrives. While this may entail cutting into the course's *busy season* and the remodeling work may result in some loss of revenue, in the long run it will be an advantage to have new fairways, bunkers, and greens in place with the grass *rooted* before the rains come.

8 Thou Shalt Be Reasonable With Respect to the Difficulties of the Job

Understand that there will be unforeseeable events. The contractor may encounter bad weather, unmarked utility lines, and so forth. Make every effort to anticipate these items and arrange for underground services to be marked ahead of time, but keep in mind that the unexpected can and will occur. No job is perfect, but the more reasonable people are about seeing the task through to completion, the better off everyone will be.

(Continued on page 9)

9 Thou Shalt Keep Thy Golfers Informed

At most courses, even the *naysayers* eventually come to support the project. The key to producing a turnaround is informing everyone, including the doubters, and keeping them informed as the job moves forward. Take golfers on tours of the course and show them the work in progress, explaining how the greens are being built and how the new drainage system beneath the greens and bunkers is being installed. They can see for themselves how substantial the improvements are and how efficiently the contractor is proceeding to complete the job. One tip worthy of note: If possible, have the contractor complete areas visible from the dining room first, so visitors can see the progress, rather than be constantly exposed to plowed dirt. And note: Make sure your golfers know what to expect once the job is done; perhaps the greens will be slow at first, and maybe there will be some plugged lies in bunkers. For an excellent reference, see "Avoiding the Hazards of Golf Course Renovation," *Green Section Record*, July/August 1995.

10 Thou Shalt Make Arrangements for Golf Play During Construction

One of the biggest problems is making sure golfers can play golf while the remodeling work is ongoing. This can be done by making arrangements with neighboring courses or by constructing first-class temporary tees and greens within the existing golf course. Note: The issue of providing access to golfing facilities is especially important for older golfers, who may feel their course is being taken from them during their *last years* of being physically able to play. Aside from helping them understand that their present-day sacrifice will provide for their grandchildren, it helps to accommodate their needs so they not only can watch the future being built, but play their way into it at the same time.

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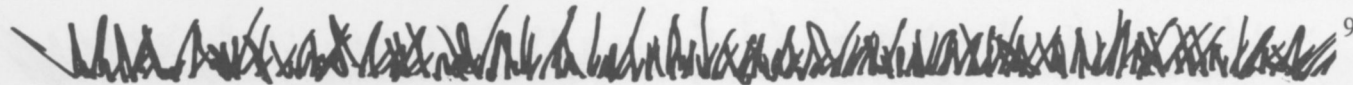
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ARE NATURAL ORGANIC FERTILIZERS BETTER THAN SYNTHETIC ORGANIC FERTILIZERS FOR DOLLAR SPOT SUPPRESSION ?

P.J. Landschoot and A.S. McNitt, Pennsylvania State University, Department of Agronomy

Over the past few years there has been a lot of interest some may say hype --in using natural organic fertilizers (fertilizers derived from plant and/or animal by-products) and composts for turf disease suppression. The theory behind this is that natural organic products contain microorganisms and/or enhance the build-up of indigenous soil/turf-inhabiting microorganisms which inhibit certain turf diseases. While there is not enough research-based information to substantiate these claims for most turf diseases, the use of natural organic products for dollar spot suppression has been studied extensively and appears promising.

Studies at Cornell University by Nelson and Craft (1992) found that some natural organic fertilizers and composts were highly suppressive to dollar spot when applied preventatively as topdressings on putting greens. The authors suggested that dollar spot suppression following applications of some of the treatments likely resulted from microbial suppression. Although these results are encouraging, the authors did not compare the treatments used in the test with synthetic organic or inorganic (non-organic) nitrogen (N)containing fertilizers to see if the disease suppressive effects were related to N nutrition.

In a different study in Canada, Liu et al. (1995) looked at the effects of several N-containing fertilizers, including ammonium nitrate (an inorganic fertilizer), Sustane and two Ringer products (natural organic fertilizers), on dollar spot suppression and microbial populations in turf foliage, thatch, and soil. Treatments providing the greatest disease suppression-ammonium nitrate and two natural organic fertilizers (Ringer Turf Restore and Ringer Greens Super) - yielded higher microbial populations in turf and soil than other treatments. The authors concluded these fertilizers play a role in boosting microbial populations and can suppress dollar spot, but that the actual means of suppression is not well understood. It could be that N nutrition, as well as microbial suppression, played a role in reducing dollar spot in this study.

At Penn State, we conducted a three year test on dollar spot suppression on bentgrass putting greens using four natural organic fertilizers and two synthetic organic fertilizers. Our objective was to determine if suppressive properties are more pronounced with the fertilizers derived from natural organic sources than with the synthetic organic fertilizers when applied at similar timings and rates of N. Below is a summary of how we conducted the test and our results.

Description of fertilizers used. Six fertilizer products were used in this test. Four of the fertilizers are derived mainly from natural organic sources and two are synthetic organic sources. They are described as follows:

Natural Organic Sources:

Ringer Commercial Greens Super (10-2-6) is a formulation of feather meal, blood meal, wheat germ, bone meal, liquid fat, D-limonene, and potassium sulfate.

Ringer Compost Plus (7-4-0) is composed of wheat midds, calcium carbonate, dried molasses, bone meal, urea, and liquid fat. This product also contains two species of bacteria, *Bacillus subtilis* and *Bacillus licheniformis*.

Sustane (5-2-4) consists of composted turkey litter. Product literature states that Sustane contains over 1.5 million bacteria per gram of dry weight of product. Individual species are not listed.

Milorganite (6-2-0) is an activated sewage sludge produced aerobically digesting screened waste water followed by settling the biomass into thick fibrous cakes. The biosolid cakes are subjected to temperatures between 454 and 648°C and then are dispersed into granules.

Synthetic Organic Sources:

Nitroform (38-0-0) is a trade name for ureaform, the product of a chemical reaction involving urea and formaldehyde. Approximately one-third of the N in Nitroform is quickly available, whereas the other two thirds are slowly available.

Urea (46-0-0) is a quick release fertilizer produced by reacting ammonia gas with carbon dioxide in the presence of a catalyst.

Description of experiment. This study was conducted at Penn State from 1992 to 1994 on "Penncross" creeping bentgrass maintained under typical golf course putting green management conditions. All fertilizers, except Nitroform and one urea treatment, were applied four times per year at 28 to 33 day intervals at two rates, low rate of 0.5 lb. N/1000 ft² and a high rate of 1.0 lb. N/1000 ft². Nitroform was applied twice each year at 56 to 66 day intervals a rate of 2.0 lb. N/1000 ft² per application. One of the urea treatments was applied at 0.5 lb. N/1000 ft² every 14 to 16 days (eight applications per season). The total amount of N applied during each season was 4.0 lb. N/1000 ft² for the high rate treatments and 2.0 lb. N/1000 ft² for the low rate treatments.

A fungicide treatment was included in this study for com-

(Continued on page 12)

parison with the fertilizer treatments. Daconil was applied every 14 -days (eight applications per season) during 1992, 1993, and 1994. Control plots did not receive any N during 1992, but in the spring 1993 and 1994, control plots received 0.5 lb. N 1000 ft² of urea prevent thinning of turf.

Plots were rated for dollar spot severity on a scale of 1 to 10, with 1 = no disease and 10 = 100% of the plot area affected. In 1992, dollar spot was rated when differences among treatments became apparent. In 1993 and 1994, disease was rated every week, beginning when symptoms were visible until September when plots were sprayed with Daconil to control the disease and hasten recovery the turf.

Color ratings and foliar N analysis served as indicators of turfgrass response to N. Turf color was determined by visual observation on a scale of 1 to 5, using half units, with 5 representing the darkest green color obtainable and 1 representing a bronze color.

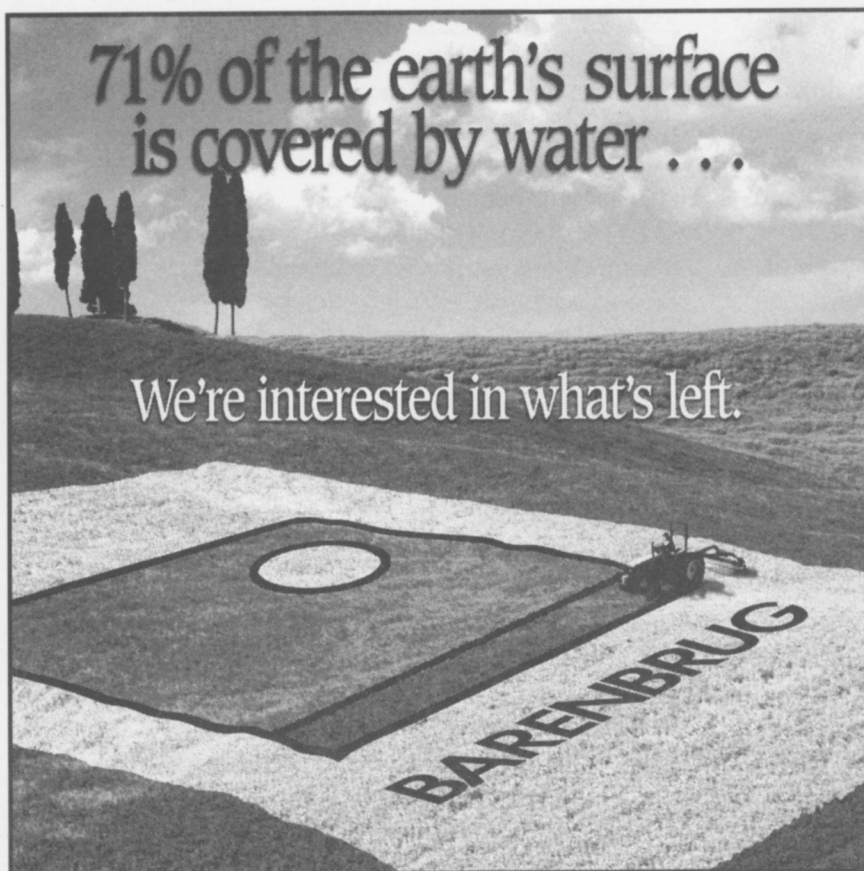
Results of the test. Differences in dollar spot disease, when expressed as a cumulative rating over the entire season, were found among the fertilizer treatments included in this study. (Table 1). Results for the 1992 season showed that none of the fertilizer treatments provided

disease suppression when compared with untreated control. In 1993, the high rates of Ringer Compost P and urea (28-33 day intervals) were the only treatments that provided lower disease ratings than the untreated control. During the 1994 season, all fertilizer treatments gave greater suppression dollar spot than the untreated control. Also in 1994, all of the high rate fertilizer treatments, except urea, provided superior disease suppression compared to low rate treatments of the same products.

Whereas none of the fertilizers suppressed dollar spot to a greater degree than the fungicide treatment at any time during the study, the high rate of urea (28-33 day interval), the 0.5 lb. N 1000 ft² (14 day interval) urea treatment, the high rate of Ringer Compost Plus, and the high rate of Ringer Commercial Greens Super gave better disease control than other fertilizer treatments in at least one year of the test. (Table 1).

Results showed that on the majority of rating dates there was a good relationship between turf color and disease (Table 2). In general, as color became darker the disease incidence decreased, indicating that as more N becomes available to the plant, dollar spot is not as severe. This relationship became more pronounced in September, when disease severity tended to peak.

(Continued on page 13)



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Although the trend for increased disease suppression with darker green turf held for urea and the natural organic fertilizers, this was not the case for Nitroform. Nitroform produced a dark green turf for much of 1992 and 1993, but did not provide disease suppression comparable to urea and the Ringer products. The lack of dollar spot suppression with ureaform fertilizers has been observed in previous studies (Cook et al., 1964 and Markland, et al., 1969).

Assuming that a dark green color is an indication of increased foliar N concentrations, our findings suggest that N availability is strongly associated with disease suppression. To confirm this assumption, correlation analysis was performed on turf color ratings and foliar N concentrations (expressed as % foliar N) for all fertilizer treatments and the untreated control on two rating dates (2 September, 1993 and 9 September, 1994). Results showed that turf color was significantly correlated with % foliar N (data not shown).

Conclusions. This study demonstrated that urea, a synthetic organic N fertilizer, provides equal or better control of dollar spot disease than fertilizers consisting primarily of natural organic by-products. These results are similar to those obtained by Liu et al. (1995) in which ammonium nitrate showed equal or better control of dollar spot than the natural organic fertilizers Ringer Greens Super, Milorganite, and Ringer Lawn Restore. Results from our study showed that, in most cases, disease suppression was associated with dark green turf, presumably a response of the turf to N. This finding indicates that the suppressive effects of urea and some natural organic fertilizers may be due, at least in part, to N availability.

There is ample evidence to show that N plays an important role in plant disease resistance. Nitrogen is essential for the production of many compounds involved in resistance, including phenolics, phytoalexins, growth hormones, cellulose, and carbohydrates (Huber, 1980). Nitrogen may also help turf to escape severe dollar spot damage by allowing plants to "outgrow" the pathogen and by promoting quicker recovery from disease injury (Liu et al., 1995 and Monteith and Dahl, 1932).

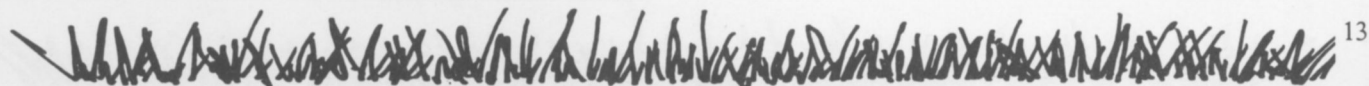
Currently, there is little information concerning the relative contributions of N availability and microbial suppression resulting from fertilizer applications to the reduction of dollar spot severity. Few studies have been designed to take into account the effects of N use by the plant and microbial suppression both together and independent of one another. Nelson and Craft (1992) assumed that dollar spot suppression obtained from some com-

posts in their study was due primarily to microbial effects, but did not monitor plant responses to N. Liu et al. (1995) reported that the higher microbial populations found associated with certain fertilizer treatments may have been related to disease suppression, but acknowledged that increased turf growth due to increased N levels could affect expression of dollar spot symptoms by allowing the grass to outgrow or recover from infections. Other studies, including ours, have concentrated on the turf response to N, but not on microbial suppression. The low amount of disease suppression with Nitroform in our study may indicate that N assimilation is not the only factor responsibility for a reduction in dollar spot severity. Although there is evidence that dollar spot can be suppressed by certain microorganisms (Nelson and Craft, 1991), disease reduction by means of increased resistance resulting from applications of inorganic, synthetic organic, or natural organic N-containing fertilizers and composts is potentially important and should not be overlooked in dollar spot control programs.

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(Continued on page 14)



(Continued from page 13)

Table 1. Cumulative dollar spot ratings for the 1992, 1993, and 1994 growing seasons. Numbers for each treatment were generated by plotting disease ratings for individual dates over the course of a growing season and calculating the area under the disease progress curve. The higher the number, the more disease that was present on the plots over the growing season.

Treatment	Rate per Appl.	Application Interval	Cumulative Dollar Spot Rating		
			1992	1993	1994
	-lb N/1000 ft ²	-days-			
Ringer C.G.S.+	1.0	28 - 33	191.8	167.0	144.3
Ringer C.G.S.	0.5	28 - 33	177.8	204.3	219.0
Ringer Compost Plus	1.0	28 - 33	178.8	130.3	159.0
Ringer Compost Plus	0.5	28 - 33	200.5	208.0	203.2
Milorganite	1.0	28 - 33	191.7	189.3	197.0
Milorganite	0.5	28 - 33	204.3	194.2	221.0
Sustane	1.0	28 - 33	195.8	191.2	150.3
Sustane	0.5	28 - 33	206.8	217.7	205.5
Urea	1.0	28 - 33	191.8	136.3	150.3
Urea	0.5	28 - 33	200.8	199.7	215.0
Urea	0.5	14 - 16	195.5	219.8	159.0
Nitroform	2.0	56 - 66	191.8	226.3	197.3
Daconil	--	14 - 16	63.3	69.5	46.5
Control	--	--	195.2	209.3	247.3
LSD@P = 0.05			28.5	46.9	22.1

+Ringer Commercial Greens Super

Table 2. Correlation coefficients (r) and levels of significant for correlations between dollar spot and color ratings on all disease rating dates in 1992, 1993, and 1994. For r values, the closer the number to 1.0, the stronger the relationship between dollar spot and turf color. A negative number indicates that as color became darker green, disease was less severe.

1992		1993		1994	
Date	r	Date	r	Date	r
July 24	0.43NS ++	Aug 15	-0.22 NS	Aug 5	-0.51*
July 31	0.11 NS	Aug 20	-0.38 NS	Aug 12	-0.77***
Aug 7	0.09 NS	Aug 27	-0.52*	Aug 19	-0.69**
Aug 15	-0.50*	Sept 2	-0.86***	Aug 26	-0.65**
Aug 20	-0.47 NS	Sept 9	-0.72***	Sept 1	-0.70**
Aug 28	-0.64 **			Sept 9	-0.81***
Sept 4	-0.58*			Sept 16	-0.91***

+Pearson correlation coefficients for color and disease ratings generated from untreated control and fertilizer treatments. Data from fungicide treatment was not included in analysis.

++NS = not statistically significant, * = statistically significant at 0.05 level, ~ statistically significant at 0.01 level, **** = statistically significant at 0.001 level.

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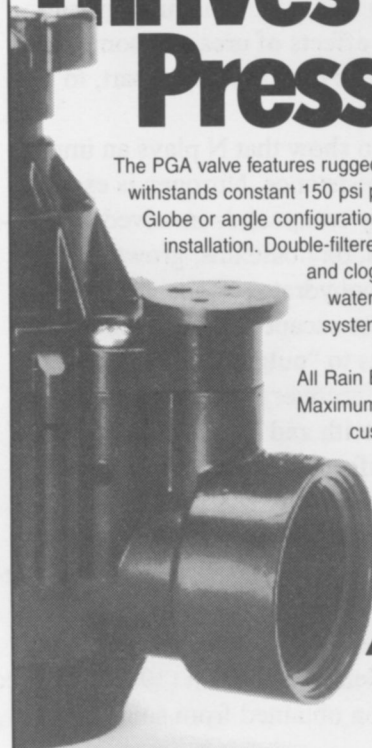
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ORIENTEERING COURSE: Map & compass course. Saturdays & Sundays.

BIKE RENTALS EXT. 4388
30 miles of paved bicycle paths. We rent tandems, suspension and regular mountain bikes, children's bikes, trailers and more. We have everything you need including repair and retail service. Open weather permitting.

	Lodge Guests		General Public	
	1-hour	24-hour	1-hour	24-hour
1-speed bikes	\$3	\$11	\$4	\$13
Mountain bikes	\$4	\$13	\$5	\$15
Multi-speed tandems	\$8	\$24	\$10	\$29
Trailers	\$4	\$13	\$5	\$15
Alley Cats	\$4	\$13	\$5	\$15

FLY FISHING EXT. 4100
If you're after trophy-sized trout, catch one of our daily fly fishing classes or guided trips.

GOLF TEE TIMES: 593-4402
Sunriver Resort is the premier 54 hole golf destination resort in the Pacific Northwest, featuring the Crosswater, Woodlands, and Meadows courses. Crosswater was voted the #1 New Resort Course in 1995 by Golf Digest. Crosswater and the Woodlands have also earned top 5 rankings in the state of Oregon for 1995.
Information about lessons, clinics, and current rates: 593-3750.

MARINA 593-3492
The Sunriver Marina offers canoe, raft, and kayak float trips down the scenic, calm Deschutes River. We'll pick you up down river and bring you back to the marina. Operates mid-April to mid-October, weather permitting.

	Lodge Guests	General Public
1-hour paddle	\$22/boat	\$24/boat
2-hour, 6-mile float	\$35/boat	\$37/boat
Raft float trip (reservations)	\$47/boat	\$49/boat

SADDLEBACK STABLES 593-6995
Open daily 8am-7pm Memorial Day to Labor Day. Sleigh rides, trail rides, pony rides and lessons. Reservations required.

	Lodge Guests	General Public
1/2 hour trail ride	\$13	\$15
1 hour trail ride	\$20	\$22

2,4,6,8 hour rides also available.

SWIMMING 593-4609
Our new pool is exclusively for Lodge Guests. Located in the Lodge Village complex. The North and South community pools are also open during the summer and available to all Sunriver Lodge Guests at no additional charge.

TENNIS 593-4609
Five outdoor tennis courts keep players busy from April through October. Exclusively for Lodge Guests. 26 additional community courts are available, also at no additional charge to Lodge Guests. Lessons and clinics offered during the summer season.

WHITEWATER RAFTING 593-2161
Sun Country Tours located at the Sunriver Marina offers family oriented whitewater rafting trips on the scenic Deschutes River. 3-hour thriller or all day trips. Operates May - September. Reservations required.

	Lodge Guests	General Public
Big Eddy Thriller		
adults	\$30	\$35
children	\$30	\$30

(\$30 per person group rate available to groups larger than 13.)

All Day Deschutes

Weekdays: adults	... \$80	children ... \$70
Weekends: adults	... \$85	children ... \$75

YOUTH PROGRAMS EXT. 4609
KIDS CLUB (for kids ages 3-10) is offered daily all summer long from 9am to 4pm and in the evenings.

	Lodge Guests	General Public
9am-4pm programs	\$30	\$40 (includes lunch)
5-9pm with dinner (KK)	\$20	\$25
6-9pm without dinner (KK)	\$14	\$18

GUIDED ADVENTURES (for kids ages 11-15) is offered Monday through Friday. Mid-June through Labor Day. 9:30am-3:30pm.
(lunch not included) Lodge Guests: \$25 General Public: \$30

All Youth Program sessions are based on a theme and include nature study, adventure, crafts, and games. Reservations are required for all youth programs. The summer is busy. Please reserve early to ensure a spot.

RESTAURANTS & SHOPS

MEADOWS 593-3740
Casually elegant family dining. Located in Sunriver Lodge.

OWL'S NEST LOUNGE 593-3730
Open daily. In Sunriver Lodge.

THE UNDER THE SUN RESORT SHOP 593-3750

SEASONAL GOLF CAFÉS
At the Meadows Course, the Woodlands Course, and the Crosswater Clubhouse

GUEST SERVICES

593-4609 OR EXT. 4480
Special arrangements, gift baskets, assistance and reservations as well as general information. A "one stop" call for anything you might need. Check in at the Guest Services desk in the Lodge if you are staying in a private home or condo with us.

OTHER ACTIVITIES

High Desert Museum	..... 382-4754
Hiking Tours/Sightseeing (Wanderlust Tours)	..... 389-8359
Massage	..... 593-4609
Mini-Golf	..... 593-5948
Nature Center	..... 593-4394 or Ext. 4394
Observatory	..... 593-4442
Mountain Bike Tours	..... 383-5058
Photography	..... 593-3705
Rock Climbing	..... 389-7937
Scenic Flights	..... 593-1860
Video Arcade	..... Ext. 4388



SUNRIVER PROGRAM

MONDAY, OCTOBER 13, 1997

ROY L. GOSS TOURNAMENT FOR RESEARCH.....10:00 SHOTGUN
CROSSWATER GOLF CLUB with LUNCH SPONSORED by
WESTERN EQUIPMENT-TORO-PAC WEST

TURF TOUR 12:00 NOON

GET ACQUAINTED RECEPTION 5:30-7:00 PM
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TUESDAY, OCTOBER 14, 1997

HOSTED CONTINENTAL BREAKFAST 7:15 - 8:00 AM

KEYNOTE SPEAKER - BO LINKS 8:00 - 9:00 AM
Golf's Longest Shadow - "The Hogan Legacy"

COFFEE BREAK (SPONSORED) 9:00 - 9:25AM

DR. PETER LANDSCHOOT -
"Shedding Some Light on Anthracnose Basal Rot" 9:25 -10:25 AM

PAUL BACKMAN- WSU 10:25-11:00AM

JOHN BODENHAMER - "The PNGA-NTA Alliance" 11:00 -11:30AM

HOSTED LUNCH - Annual Meeting..... 11:30 - 1:00PM

DR. BOB SHEARMAN - "NTEP - Now and the Future" 1:00 - 2:00 PM
University Of Nebraska

DR. GWEN STAHNKE - Washington State University-Puyallup..... 2:00-2:45 PM

LARRY GILHULY, USGA, "Turf Tips and Flops" 2:45-3:30 PM

RECEPTION -No Host 6:00 PM

HOSTED BANQUET 7:00 - 8:30 PM
Entertainment - Dr. Larry Helms

WEDNESDAY, OCTOBER 15, 1997

DR. PETER LANDSCHOOT -

“Using Compost to Improve Turf Performance” 8:00-9:00 AM

COFFEE BREAK 9:00-9:25 AM

DR. BOB SHEARMAN - “Managing Intensively Trafficked Turfs” 9:30-10:30 AM

TOM COOK, OSU(MELODIE PUTNAM) 10:30-11:30 AM

BOB CUPP - Cupp Design 11:30-12:30 PM
(PUMPKIN RIDGE, CROSS WATER, THE RESERVE VINEYARDS AND GOLF CLUB)

CONFERENCE CLOSES - LUNCH ON YOUR OWN



LODGING PRICES

Lodge Village Guestrooms

Single:	\$ 95.00
Double:	\$ 95.00
Loft Suite:	\$155.00

Homes and Condominiums

2 Bedroom Condo:	\$149.00 - \$169.00
2 Bedroom w/ Loft Condo:	\$159.00 - \$179.00
3 Bedroom Condo:	\$179.00 - \$205.00
3 Bedroom Home:	\$195.00 - \$229.00
4 Bedroom Home:	\$235.00 - \$259.00

The rates above are not inclusive of the current 12% occupancy tax and local recreation assessment.

Call for information and reservations: Sunriver Resort 1/800-547-3922

HE'S BACK!!!.....

If you attended the 1992 NTA Conference in Sunriver and /or the Conference in Skamania in 1995, you will remember Dr. Larry Helms. We have invited him back for this year's conference because we had so many favorable comments. Dr. Helms will be our Banquet Speaker on Tuesday night and will also speak to the Companions at a coffee on Wednesday morning. Don't miss him!!!

1997 TURFGRASS TOUR

Kay Kinyon, NTA Secretary and Chairman of the tour program has planned an interesting outing for those interested conference-goers who don't choose golf on Monday. The tour will include stops at Bend Parks and Recreations sites, Widgi Creek Golf Club's state-of-the-art equipment wash water recycling station and Crosswater's maintenance facility. A box lunch will be provided as part of the tour package.

COMPANION TOUR

Come along on a bus tour with us to the High



The
**High Desert
Museum**

Desert Museum and a shopping/sight-seeing stop in Sisters. Many changes have come about at both our

stops in the years since our last Conference at Sunriver.

The High Desert Museum has added a new dining room called the Rimrock Cafe and Terrace and greatly expanded their gift shop, Silver Sage Trading. The Brooks Gallery exhibit during our visit will be entitled "Rising From Tradition", an exhibit of modern Indian artists. The Wildlife exhibit area is just a brief walk outside. The Museum is a must for all who visit the Bend/Sunriver area.

After approximately 2-2 1/2 hour stay at the Museum, we will board our bus, enjoy a box lunch along the way and travel to Sisters for an afternoon of enjoyment there. Sisters has added many new shops and an afternoon spent there is just not long enough!!! Jean Welles, nationally know quilter, has moved her "Stitching Post" to a new location and has combined it with a shop called "The Wild Hare". You're gonna' love it!!!

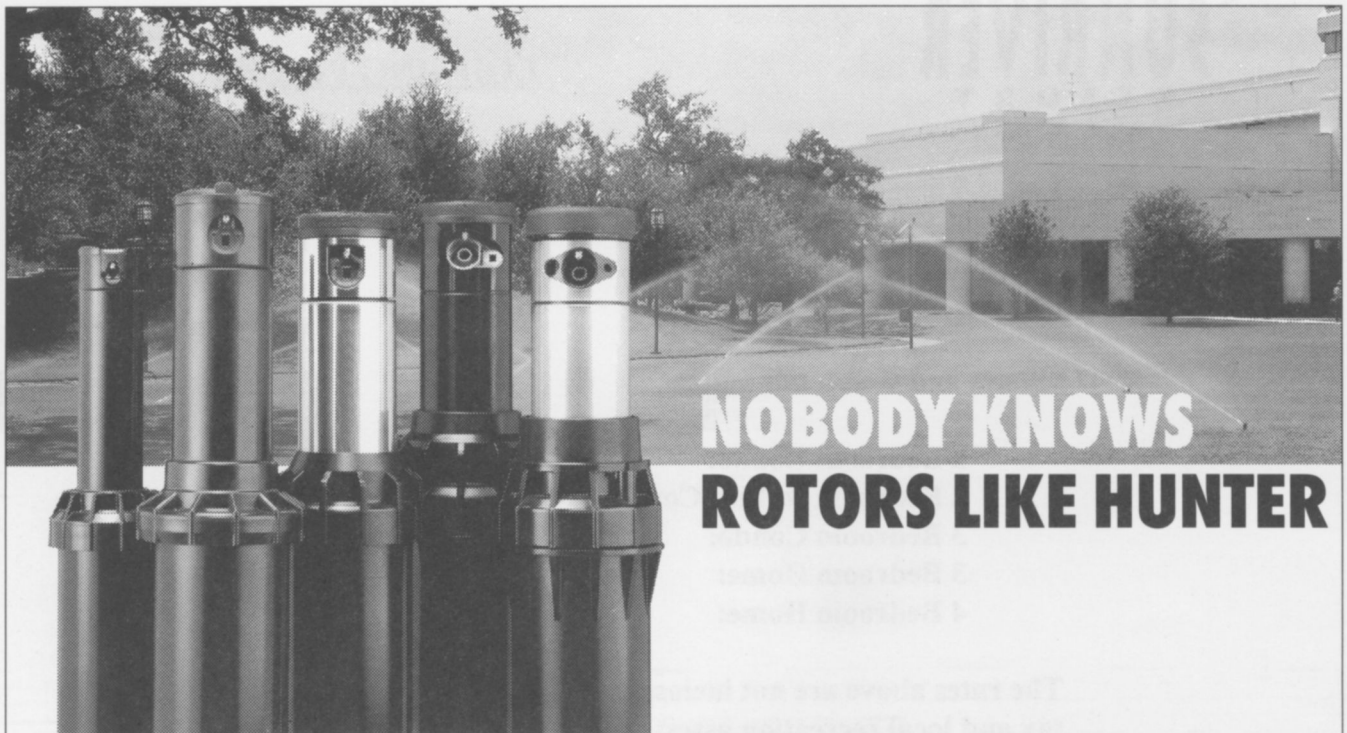
GOLF AT CROSSWATER

Jim Ramey, CGCS, will host this

year's Roy L. Goss Golf Tournament.

The beautiful Robert Cupp design course combines dramatic mountain views and meandering rivers in such a spectacular layout that *Golf Digest*

named it "America's Best New Resort Course". Priority will be given to those conference registrants who wish to make reservations.



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Any questions?
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	Conference Attendee	Student	Lifetime Honorary Member	Turfgrass Tour	R. L. Goss Tournament (Cart Included)	*Get Acquainted Reception* Tickets	Extra Companion Program	Banquet Extra Tickets	
Registered by October 1, 1997	\$195*	\$65**	Free	\$20	\$115†	\$18	\$30	\$40	
Registered after October 1, 1997	\$215*	Same	Free	\$25	\$125†	\$20	\$35	\$45	TOTALS

First Name	Nickname	Last Name							
TOTALS									

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*Includes "Get Acquainted Reception" Monday evening, Continental Breakfast and Lunch on Tuesday at the Annual Meeting, the Banquet on Tuesday evening and Continental Breakfast on Wednesday.

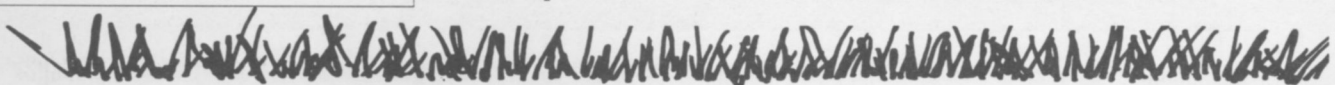
** Does not include Banquet ticket.

†Priority given to Conference attendees. Field limited to 128 players.

REFUND POLICY: Full refund with written request (Mail or Fax) for cancellation by Sept.15, 1997. 75% refund with written (Mail or Fax) request between Sept.15 and Oct.1, 1997. **No refunds** after Oct. 1, 1997.



Pay This Amount



These questions came straight from the customers of lawn care operators, pest control operators and other professional pesticide applicators across the country—and probably reflect the concerns of your customers. The more your customers know about the products you use, how you use them and how much is used, the more confident they will be in you and your service.

Communicate With Your Customers

Your customers expect you and your employees to be credible and knowledgeable sources of information about your products. Take time to talk with them about your safe and responsible use of pesticides.

Studies show that most people don't know that pesticide products are among the most highly tested products sold. The U.S. Environmental Protection Agency (EPA) registers only those uses of pesticide products that pose minimal risks.

- Emphasize that pesticide products must undergo stringent government-monitored testing before they can be sold. It is a long and costly process. For example:
 - It takes a chemical manufacturer eight to 10 years to test and register a product, at an average cost of \$30 million to \$50 million.
 - As many as 120 tests or more are performed, many specific to health, safety and the environment.
 - Only one potential pesticide in 20,000 makes it from the research lab to the market.
- Explain Integrated Pest Management (IPM) to your customers. Most do not fully understand the concept. Point out that a successful IPM program stresses prevention, pest identification and selection of the best method of pest control, which may require the use of pesticides. Tell how you incorporate IPM into your pest management practices.
- Identify the specific pesticides you use and the pests they control.
- Indicate that professionals use an array of products, many the same as those used by homeowners.
- Assure customers of the benefits pesticides provide for turf, trees and ornamentals, and in the home. For example:
 - Termites cause over \$1 billion in structural damage each year.

“Are the pesticides you use safe?”

“Are the pesticides that professionals use stronger and more toxic?”

“When is it safe for my children and pets to return to an area after a pesticide application?”



- One large, pest- and disease-free tree has the same cooling effect as 15 room-size air conditioners.

- A well-maintained lawn and landscape adds as much as 15 percent to a home's value.

- Discuss your safe and responsible use of pesticides as a professional applicator. Note the many steps you take to ensure that the pesticides you use are used properly.
- Advise your customers that you closely follow label instructions. The label contains instructions for only those uses approved by EPA.
- Outline the extensive training that is mandatory for professional applicators in order to apply specialty pesticides. Applicators are required by law to undergo training, certification and licensing, as well as to keep records of each job performed.

- Explain what happens to pesticide containers once a job has been completed. Note that containers are disposed of properly.

What Else Can You Do?

Provide your customers with materials such as newsletters, brochures, fact sheets and bill stuffers that communicate these messages. Be sure that someone at your company, who has a basic knowledge of the products and application methods your company uses, is available to answer questions.

RISE Is A Resource

RISE is the voice for the specialty pesticide industry. Its members include manufacturers, formulators, distributors and other industry leaders.

RISE works in cooperation with your national, state and local user/applicator associations and is an additional source of information regarding issues facing pesticide users. We can help you in your role as a knowledgeable and credible information source to customers and to the public. A brochure on communicating about pesticides with your customers is available. Contact RISE to receive your copy.

We urge you to take an active part in your state and national association(s). We work together to support your business.



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Sanctuary System Program Helps Protect Wildlife Habitats

News USA

(NU) - It's been said that the world is our classroom.

No one has taken this more to heart than Audubon International, the Golf Course Superintendents Association of America (GCSAA) and Rain Bird.

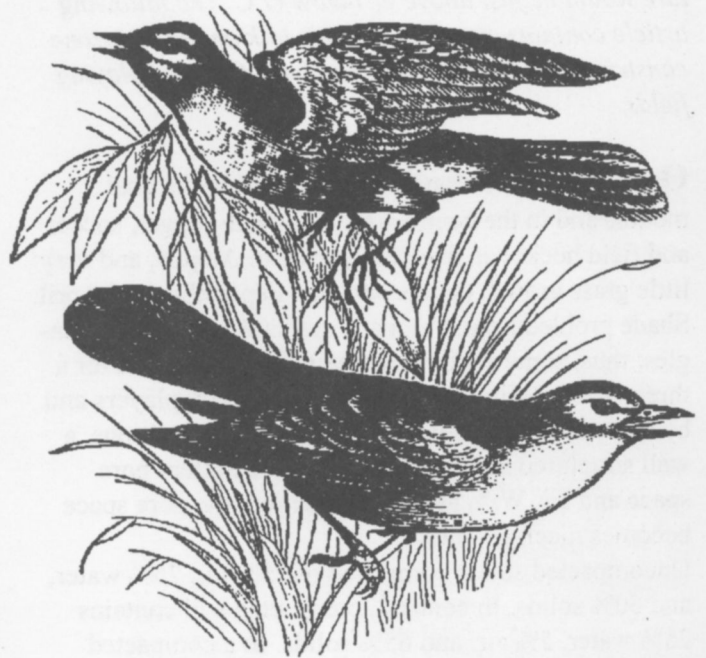
Based in Selkirk, N.Y., Audubon International launched its Cooperative Sanctuary System to work with private landowners in implementing environmentally sound practices to preserve and enhance natural resources. Audubon International developed such programs for businesses, homes, schools and golf courses.

"Though many people believe that state or federal government agencies and their staffs have sole responsibility for wildlife and habitat protection, it is clear that the majority of real property is owned by private individuals and organizations", says Audubon International President and CEO, Ron Dodson. "Most state agencies do not have the resources to manage private lands. This is why AI launched the Audubon Cooperative Sanctuary System."

The golf course superintendent profession has been a leading participant in the Cooperative Sanctuary System through Audubon International's school and golf course

programs. As a national sponsor for the Audubon Cooperative Sanctuary Program for Schools, GCSAA has partnered with Rain Bird to provide funding and services to promote awareness and participation in the program. The school program is a hands-on approach for community leaders, such as the golf course superintendent, to work with students, faculty, parents and the community to promote environmental stewardship.

By creating a sanctuary on school grounds, students, faculty and parents are able to learn firsthand the tech-



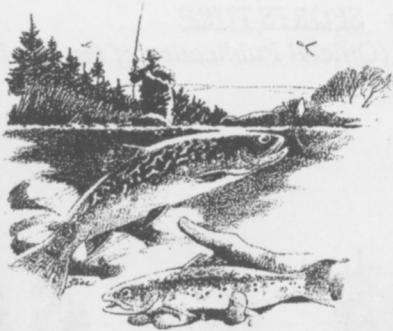
COME JOIN US IN SUNRIVER!!!

Whether you arrive by car, or land at the Redmond Airport, or Sunriver's own private airport, the fun at Sunriver starts right away. Enjoy the comfort of a wood-burning fireplace in a guest room or suite at Sunriver Lodge Village. Or give the whole family

room to stretch in one of their private resort homes or condos.

For real adventure, try horseback-riding, cycling, white water rafting, canoeing, hiking, fly-fishing, or tennis. Explore the cultural

and natural heritage of the area at the Great Hall or the Sunriver Nature Center. You can even view the stars at the observatory. Check with the main desk for schedules of the various activities.



niques that lead to success. To become certified in the program, schools must meet established requirements in environmental education, wildlife habitat management, waste management and resource conservation.

People from the community, such as golf course superintendents, provide resources, expertise and supervision to transform school facilities into a certified sanctuary. Projects include recycling, bird nest boxes, butterfly gardens and nature trails, among others.

Along with the Audubon Cooperative Sanctuary Program for golf courses, sponsored by the United States Golf Association, the school program was born in 1991 to protect and enhance the quality of the environment on the school grounds.

For additional information about the ACPS for Schools, contact Audubon International at 46 Rarick Road, Selkirk, NY 12158, or call (518) 767-9051.

Contact GCSAA at 1421 Research Park Drive, Lawrence, KS 66049, or call 1-800-472-7878.

Rootzone Construction and Drainage Principles By Steve Baker

We were pleased that Dr Steve Baker was able to join us for the 1997 Ontario TurfGrass Symposium. He is an Associate with the Sports Turf Research Institute in Bingley of Yorkshire, England. The Institute started in 1929 and is situated on a 5-hectare site. A staff of 50 conducts research on a whole range of sports. They receive 1000 mm of rain per year. Lowest winter temperature would be just above or below 0°C. The following article contains excerpts from his talk on turf rootzone construction and drainage principles for sand playing fields.

On soccer fields, wear is concentrated in the goal mouths and in the centre area. Play with rugby, soccer and field hockey is from early May to August, and very little grass growth occurs between September and April. Shade problems exist in many stadia due to low sun angles; thus, some stadia can receive almost no sun for a three month period. Wear is contributed by players and by maintenance machinery. Under these conditions, a well structured soil is required with sufficient pore space and air. With heavy compaction, the pore space becomes much smaller.

Uncompacted soil is composed of 25% air, 25% water, and 50% solids. In contrast, compacted soil contains 25% water, 5% air, and 65% solids. In a compacted state, soil becomes anaerobic, and root penetration suffers. Root zone material is sand-dominated. Larger pores are lost, the soil drains poorly, and the soil becomes waterlogged. Why? Because the compacted top layer of 2.5 cm in depth does not allow rainfall to disperse. Another characteristic common to natural soil fields is a significant decrease in ball bounce with longer playing seasons. All of the above result in player dissatisfaction, poor playing conditions and cancellation of games.

Not surprisingly, many more sand fields are coming into play. They require less laborious mixing of sand and soil, and result in better drainage and consequently, better plant growth. Advantages to the sand root zone are superior drainage, airfilled pore spaces, increased root development and consistencies of playing conditions. The major disadvantage is that natural soil fields are prone to the vagaries of weather. Potential problems with sand that Baker noted were drought, lack of balanced nutrition, and decreased stability-particularly if grass cover is lost.

Tips for constructing sand playing fields

- Sand topdressing - use sand that has been carefully selected for size and uniformity of grains - this allows for a high rate of drainage and adequate aeration for plant and / or root growth
- slit drainage - get the water off the surface by way of slit drainage - this is usually negated if no sand-dressing has been applied to the surface

Specifics

- Pipe drainage - install 5-15 m apart, 60 cm in depth, backfill gravel close to surface, then add 15-20 cm sand
- Slit drainage (50 mm diameter) - sand at surface, gravel underneath, heavy sand topdressing (150 tons), trenching 30 cm deep, remove the material taking caution not to cap slits

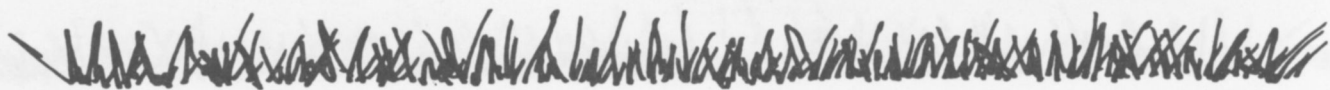
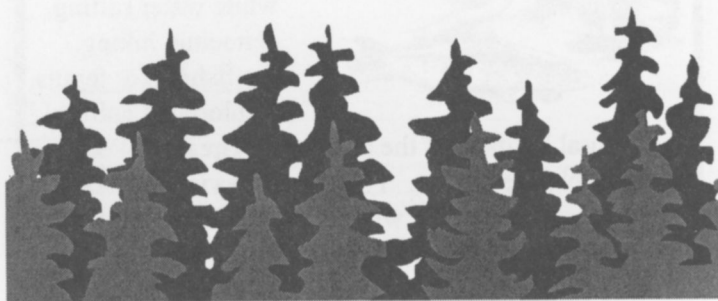
Research Abroad

In England, they use a mixture of three different ryegrasses, and an angular type of gravel rather than rounded (not limestone).

In 30 soccer fields that have been built, an underheating system was installed consisting of pipes filled with water connected to a heating system, and seeding was used instead of sod.

The Research Institute has tried several plastic support systems which help to reinforce the surface when grass cover is lost. Their mesh element trial is the first ever. Care must be exercised as cleats get locked in the material. Desso System from Holland, a polypropylene, is recommended. With slit drainage and heavy application of sand, fields were usually still in good condition after three months (using once a week aeration). 225 kg/ha of nitrogen per year was proposed for sand-dominated root zones-- applications much above this figure are considered wasteful and promote excessive top growth and very little root growth. Below this level, growth is too weak to counter the rigors of play.

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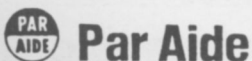
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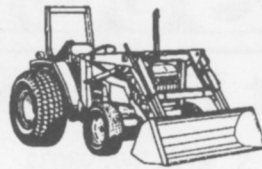
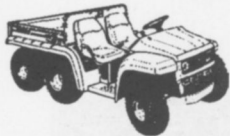
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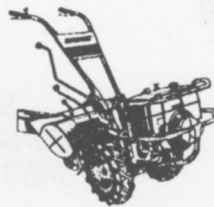
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Sunriver Notes

SPEAKING OF SPEAKERS...

Our **Keynote Speaker, Bo Links** is an attorney at law and USGA Green Section Committeeman. He comes to us from Lake Merced Golf & Country Club in Daly City, California. An exciting and exceptional speaker and golf historian, Bo will speak Tuesday morning and open our educational program. His topic - "Golf's Longest Shadow - The Hogan Legacy"

Dr. Peter Landschoot, Associate Professor of Turfgrass Science at Pennsylvania State University, will speak on both Tuesday and Wednesday. Dr. Landschoot

received his doctorate in Plant Pathology, he is an ex-Assistant Superintendent at the Country Club of Rochester (N.Y.) Major professor to **Paul Backman**, new WSU Research Associate in Turfgrass Management. Their subject, "Shedding Some Light on Anthracnose Basal Rot," should be of interest to all.

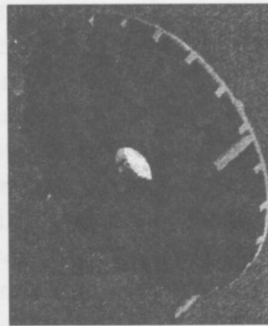
Paul Backman, Northwest Turfgrass Association scholarship recipient in 1992, ex-Assistant Superintendent at Everett Golf & Country Club and crew member at Overlake Golf & Country Club and Indian Summer Golf & Country Club. Here is a product of the NTA membership charge,

"-dedicated to maintaining effective funding in the development of consistent, quality research projects and educational opportunities which benefit the golfing community." Paul represents a return on your investment. Come, welcome him back to the Pacific Northwest! Paul will be working on the Northwest Turfgrass Association-funded cooperative research project, Oregon State University - Washington State University with Tom Cook and Gwen Stahnke. **Dr. Robert Shearman**, Professor from the University of Nebraska, has not been with us as a speaker since 1990. Bob is also the Executive Director of NTEP (National Turfgrass Evaluation Program). Some of you may know that Bob grew up just up the road from Sunriver in Redmond, Oregon - Welcome home, Bob! Additionally, we have **Dr. Gwen Stahnke**, WSU, **Melodie Putnam**, Chief Diagnostician, Plant Disease Clinic, OSU, **John Bodenhamer**, Pacific Northwest Golf Association, **Larry "Clear Cut" Gilhuly**, USGA, and last, but not least, **Bob Cupp**, of Bob Cupp Design. Bob's work has become famous locally at Pumpkin Ridge (site of the US Amateur and Women's US Open), The Reserve Vineyards and Golf Club is scheduled to open the first 18 holes in August of 1997 in Aloha, Oregon. Here at Sunriver, the Crosswater, *Golf Digest's* "Best New Resort Course - 1995" is to be our Roy L. Goss Tournament site.

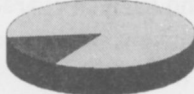
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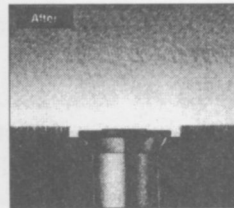
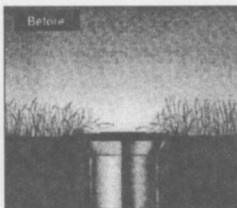


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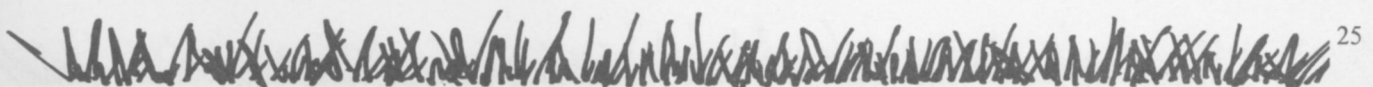
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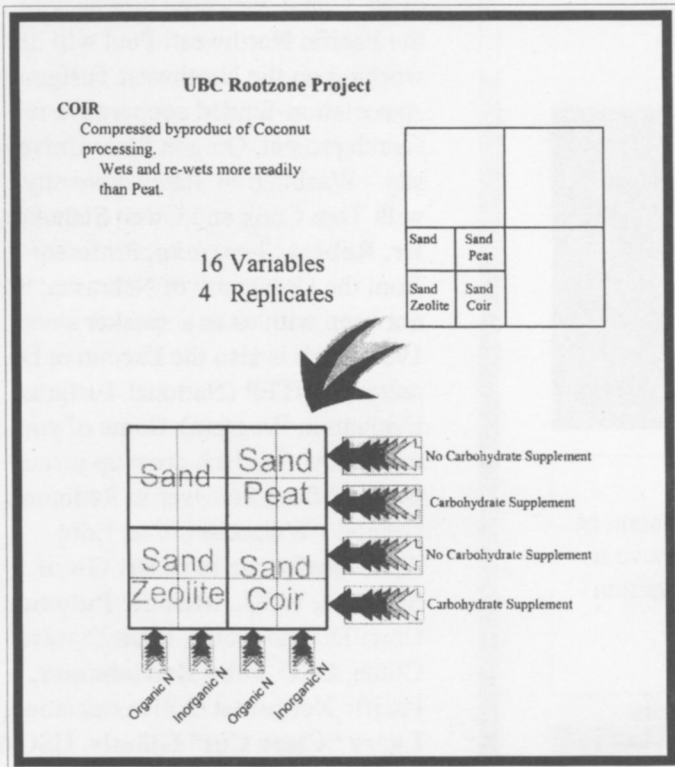
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1997 WCTA DEMONSTRATION RESEARCH PROJECTS

The WCTA Research Committee under the chairmanship of Joe Veller is pleased to announce the following projects that are currently being funded by the WCTA. These projects represent \$15,000 and are consistent with the new direction in WCTA policy whereby members can apply for an approved demonstration project funding.

In addition to the demonstration projects, Dr. Brian Holl has been approved for a two year project, in cooperation with the Northwest Turfgrass Association, each association will fund \$10,000 CDN per year. The 1997-1998 project is **Nutrient & Rhizosphere Management of Amended Sand Green**. This will focus on the im-



pect of amendments and fertilizer on stand quality, plant health and the activity of the associated rhizosphere microbial population. (See illustration above.)

1997

MEMBER DEMONSTRATION PROJECTS **Apron FL on Perennial Ryegrass Seed to Control Pythium:**

Dave Bittner, Dawson Seed Company.

Objectives: Exploring to determine if metalaxyl (Apron®FL) treated perennial ryegrass seed will perform better than untreated seed monitoring the germina-

tion rate, germination time, disease level, plant population, root mass and top growth. The testing will be done on 3 sites, golf courses and sportsfields, on Vancouver Island, Lower Mainland and the BC Interior.

Determination of Pythium species in Disease Turfgrass by PCR and Traditional Microscopic Methods:

Janice Elmhirst, BCMAFF

Objectives: To determine what species of *Pythium* are detected by PCR in samples from British Columbia golf greens diagnosed by *Pythium* root rot disease by traditional microscopic methods; and to determine what pathogenic or saprophytic species of *Pythium* are detected in samples diagnosed with other diseases or abiotic disorders. This will provide more practical testing for the DNA diagnostic tool developed by Andre Levesque with the funding by the WCTA.

Benefits of Turfgrass Quality with the use of Ecolite as a Soil Amendment/Topdressing Material:

Dan Rolfe, Belmont GC.

Objectives: To determine the benefits of overall turf quality by using zeolite (Ecolite) as a soil amendment top dress material. The testing will be done on a putting green and will assess root development, visual and functional qualities as well as the recuperative abilities of the turfgrass.

Improvement of Wear and Compaction (traffic) Problems on Sand-Based Fields.

Elisabeth Deom Eldridge.

Objectives: Compare the efficiency of new soil amendments in alleviating soil compaction and improving turfgrass wear tolerance on athletic sand fields; and to evaluate amendment treatments for compaction levels (Clegg impact tester) and playing quality across a playing field on the basis of ball and surface characteristics. The amendments included in this project are: crumb rubber, pumice and diatomite (Axis).

Iron Sulphate, a Blessing in Disguise.

Kristian Sorenson/Dennis Pellrene at Capilano G&CC.

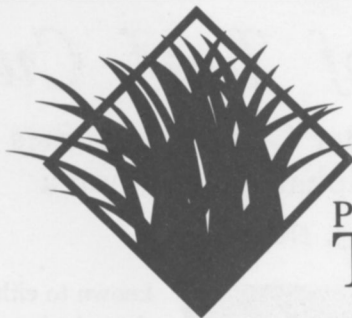
Objectives: Clearly document the effects of monthly applications of iron sulfate to 3 Capilano fairways and some rough areas to determine if these applications of iron can diminish the fusarium incidence throughout the fall; and to determine its effect on worm castings. Tests are also being done as to the effect of speedwell and clover control with higher rates of iron sulfate.

Renovation of 100% Sand-Based Sportsfield with Zeolite Amendment & Overseed 1/2 Goal Mouth with *Poa Supina*.

Jim Plasteras, Coquitlam Parks.

Objectives: To treat one-fourth of a baseball outfield/ soccer pitch with 300 pounds/1000 square feet with ze-

(Continued on page 27)



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olite (Ecolite) following a core aeration; and to over-seed *poa supina* into the goal mouths to determine quality, establish hardness (Clegg impact tester) wear tolerance and persistence of the *poa supina*. The tests are being conducted on a field in Burnaby.

The Effects of Soil Amendments/Top-Dressings on Turf Performance, Impute Factors, and Soil Microbial Activity in Sand and Sand/Peat Based sports-fields and in Sand Bases Sod Field.

Ken Ng.

Objectives: To evaluate amended sand and sand/peat fields in terms of the following: Turf quality re: above ground quality, root quality and presence or absence of disease (especially *Pythium* root rot, *Fusarium*, red thread); impute factors: re: water use and fertilizer; and microbial activity re: overall bacterial and fungal populations and beneficial microbial populations. The tests are being conducted on Vancouver Parks Board fields.

In the fall information will be communicated to the WCTA membership and deadlines for 1998 demonstration projects. Start thinking and planning now so that you can be involved next year. If you have any questions or require an application form please call Joe

Veller at (604) 888-9389 or Bob Wick at (604)467-2564. It is the goal of the Research Committee to have \$25,000 for 1998 WCTA Demonstration Projects in addition to funding for university research projects.

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The A B C of Turf Culture

Lime in Sand, Soil or Water Often Overcomes Acidic Properties of Sulphate of Ammonia

By O. J. NOER

CLOVERS are lime-loving plants and do not grow well on acid soils. This fact makes it possible to rid greens of clover, because the bent grasses appear to thrive on soils sufficiently acid to discourage clover. Acid producing fertilizers, such as sulphate of ammonia, are commonly used on greens to create conditions unfavorable to clovers and weeds. Yet in many instances this treatment has not been effective.

Soils Become Acid Slowly

Soil acidity develops slowly. Soils have a remarkable power of resisting change and hence acidity is slow in asserting itself. Loam and clay soils possess this power of resistance to a marked degree and develop acidity more slowly than sandy soils. One application of sulphate of ammonia is not sufficient to create the conditions desired, and it is only when repeated applications are made that a neutral or alkaline soil develops the desired acidity.

Lime Often Added to Greens in Sand, Soil or Water

In many instances, particularly in limestone regions, the sand and soil used in top-dressing mixtures contain sufficient lime carbonate to entirely overcome the acid producing power of the small amount of sulphate of ammonia used. The local water supply in such regions may contain sufficient lime to produce the same result. Since it is not possible to increase the rate of application of sulphate of ammonia without danger of injuring the turf, care must be used in selecting sand and soil for top-dressing use if acid soils are desired.

Last fall, casual inspection of a sand used in top-dressing mixtures, showed the presence of lime rock particles. This sand came from a pit which supplies large quantities of sand to the Chicago district. Upon analysis it was found to contain 20 per cent lime carbonate. Each time a green received 500 pounds of this sand in the top-dressing mixture it was equivalent to applying 100 pounds of crushed agricultural limestone. The green chairman and greenkeeper on this particular course would commit murder rather than scatter a 100 pound bag of crushed limestone on the green. Yet the greens had received repeated applications of lime un-



O. J. Noer

Editor's Note: For the past four years Mr. Noer has investigated the value of various fertilizers in relation to golf turf at the Soils Department, University of Wisconsin, under a fellowship established by the City of Milwaukee.

known to either of them. The same condition obtains on many courses in the Chicago district and undoubtedly in other districts also. Soils in limestone sections often contain 2-5 per cent lime carbonate and here again the greens receive a generous dose of lime whenever such soil is used in the top-dressing. If 2000 to 3000 pounds of this soil is applied to a green it receives about 100 pounds of lime carbonate which is capable of counteracting soil acids. At least 65 pounds of sulphate of ammonia must be applied for each 100 pounds of lime carbonate simply to overcome the alkaline properties of the lime. Additional sulphate must be applied to create acidity. Such heavy applications are never made, and as a result greens do not become acid even though sulphate of ammonia is used repeatedly. If acidity is desired any sand or soil used in top-dressing mixtures must be tested for lime carbonate.

In limestone regions it is often difficult to find local supplies of sand free from objectionable lime. If acid soils are desired it may be necessary to obtain sand from other areas. Acid soils, however, are often encountered even in limestone areas.

Rough Test for Lime in Sand and Soil

The presence of lime carbonate in sand or soil can be easily detected. Whenever an acid is poured onto lime carbonate a gas called carbon dioxide is liberated. The liquid froths and the gas escapes into the air. To test a sample of sand or soil procure some muriatic acid from a nearby drug store and pour it on the suspected material. If lime carbonate is present carbon dioxide gas will be liberated and escape. The amount of gas liberated serves as a rough measure of the amount of lime carbonate present. Often a few tiny bubbles emerge at the surface even though the sand or soil does not contain lime carbonate. This is escaping air which was trapped by the liquid. In case of doubt hold the dish to the ear. If a hissing sound is audible the material undoubtedly contains some lime carbonate.

Accurate determinations of the amount of lime carbonate present can be obtained by submitting samples to

A B C of Turf Culture

(Continued from page 18)

a chemist, or the State Agricultural college. Most state colleges test samples without charge. The samples should be carefully labelled and forwarded in good containers, together with a precise statement of what is wanted.

Very little can be done with water supplies containing lime, so far as removal of the objectionable lime carbonate is concerned. No more water should be used than is absolutely required by the turf. Larger amounts simply increases the quantity of lime carbonate in the soil, and makes the development of acidity more difficult.

NOTICE TO READERS—This is the fifth of this series of authoritative articles on turf culture and the chemistry of the soil. It is the most up-to-date and complete information published on this subject. Order your back numbers now before they are all gone. Price 25c each.

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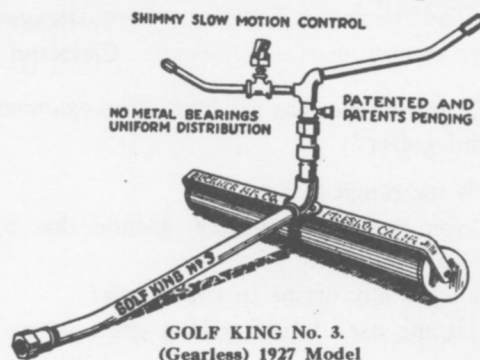
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This column is operated in connection with the Employment Bureau of the National Association of Greenkeepers of America.

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GREENKEEPER desires position. Exceptional experience construction and maintenance. Ohio preferred. Box 153, this magazine.

POSITION wanted as course Superintendent, Swiss-American. Have 17 years experience in constructing and upkeep of Golf Courses, also worked 5 years Potanich in Berlin, Ger., and am A-1 Swiss gardener. Have laid out many Golf courses. Wish to change position. Can give the best of references. Address Box 160, National Greenkeeper.

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Greenkeepers who desire to secure positions through the Association Employment Bureau should submit with their applications an account of their experience, proper references and approximate amount of salary requested.

The Classified Advertisement column of THE NATIONAL GREENKEEPER offers a suitable medium through which applicants for positions as greenkeepers, assistant greenkeepers or golf course mechanics may get in direct touch with opportunity.

When the Dub Golfer Asks Questions

By ROBERT E. POWER, *Chairman*
Cleveland District Green Section

WHAT greenkeeper has not been cross-examined by the dub golfer?

Why is the rough so long?

Can't you run your wagons around the course without making ruts?

Haven't you any drains in your traps?

What is the use of having long grass around the greens?

Why do you topdress the greens about every week?

Why doesn't your tractor stop when I'm making a shot?

Those boys who foot the bills take their golf seriously.

If they make the hole in seven they may win a quarter, and if they don't it may be the greenkeeper's fault.

Patience with these new golfers who take up the game in middle life is a virtue that will earn the diplomatic greenkeeper a halo in the hereafter. It's like having three hundred employees and trying to please them all—even when orders are contradictory.

Not being a greenkeeper I can speak from the player's standpoint. Having been a Green committee chairman off and on for fifteen years I appreciate the position of the greenkeeper, and the extraordinary tact and diplomacy he must exercise in keeping his golfing family happy.

We have a foursome playing at the Westwood Country Club where Fred Burkhardt is greenkeeper and where I was Green committee chairman for seven years. They play every day—their average game is around one hundred, and if Fred was an athlete training for the Olympic games he couldn't have more intensive coaching than this quartet gives him. Yet in club meetings and locker room discussions they fight for him, and woe

betide the member who dares to criticize the golf course in any particular.

Fred has learned to be patient with them and courteous at all times and I bring this example to the attention of other greenkeepers who may be sensitive and brood over criticisms and suggestions on the course.

The policy to pursue is one of frankness and honesty. If the greenkeeper is at fault he should admit it and correct his mistake or oversight at the first opportunity. If the player is at fault he should be told why as courteously as possible, and if he declines to see it, he should be referred to the chairman of the Green committee for further explanation.



My greenkeeper always reported to me any discussions of importance with members, and if at all serious I straightened them out in a way to please and satisfy the member. I felt I owed it to the greenkeeper to stand between him and unjust criticism, but I would not permit him to have any altercation on the course. The chairman should fight all battles and it is his job to keep harmony among the members and to insist upon the greenkeeping crew being allowed to do their prescribed work without interference.

I cannot close without mentioning John Morley, your president, and to comment on the real affection and regard in which he is held by the members of the Youngstown Country Club. Every member is his friend and his modest conscientious manner and unflinching courtesy has won a place in their hearts that nothing can duplicate.

Which brings me to the point—a greenkeeper's value to his club is not only his knowledge of greenkeeping but his ability to co-operate with the officers in making the club a smooth running, efficient organization.



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- Scotts POLY-S core is surrounded by a patented *two-tier coating* that releases the nutrients with incredible consistency and safety
- The result is the ultimate in controlled-release feeding

Scotts POLY-S has quality *inside* ... but it's what's *outside* that delivers the unsurpassed controlled-release action. For further information, contact your Scotts Technical Representative:

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800/793-8873

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