Northwest **TURFGRASS TOPICS**

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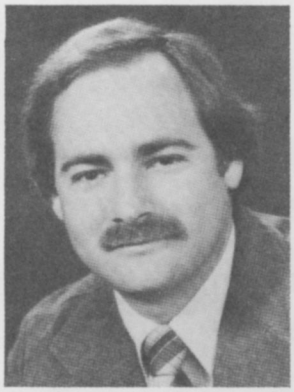


PRESIDENT'S CORNER

Bo Hepler

The snow has melted and spring has arrived early. It's time to get out of the office or those mechanic clothes and get out tending to that beautiful green turfgrass we all love so much. The green turf is so important to what sets off a beautiful landscape. Sure the flowers, shrubs and trees are beautiful as they blossom in the spring, but they are just the icing on the cake for the real beauty of well-maintained turfgrass. WHAT A GREAT PROFESSION WE ARE IN!

My congratulations are extended to our colleagues in the north who have recently experienced the most successful conference of their twenty-five year history as the Western Canada Turfgrass Association. They put on a great show recently in Vancouver, B.C., and made those of us from the states who were fortunate enough to attend feel very welcome. I extend a hardy welcome to our Canadian friends and their wives for our conference this September at Salishan Lodge in Gleneden Beach, Oregon.

Deepest thanks goes out to those of you who recently went to Olympia as lobbyists protesting and/or testifying against the Pre Notification Bill. If this Bill were passed into law, it would not only have been a great inconvenience, but also would have been very expensive to each one of us, and still would not have served much of a purpose. If passed, the Pre Notification Bill would have affected golf courses, lawn care, parks, schools and the entire turfgrass industry. If you were not aware of such action, be aware of it, and be active in the best interest of our industry. (Please read the "BE AWARE" article in this issue).

In search of some assurance that the State of Washington is going to continue to support the Turfgrass Program in this state, I have written letters and have met with the Washington State University Department Heads interested in making sure that the Turfgrass Specialist position will be filled when it is vacated by the retiring Roy Goss. My next step is to write letters representing the private sector, my employer, Senske Lawn and Tree Care. I strongly urge each one of you to do the same thing; the university needs to know how important the Extension Turfgrass Specialist is to the Northwest turfgrass industry. Please write and make our needs known.

"A REBUTTAL"

Dear Mr. Carney:

As President of the Midwest Association of Golf Course Superintendents of the Greater Chicago Metropolitan Area, I have been elected by our membership (totaling 470) to write you a letter. This letter is in rebuttal to your recent article that appeared in the January 1987 issue of *Golf Digest* entitled "MY SHOT - A case for banning temporary greens." Let's say that Robert Carney is granted one wish: All superintendents are going to ban temporary winter greens. In so doing, you remove one of the superintendents alternatives for winter golf play, and leaves him with just two choices: 1) The golf course, including the greens, would be open and played the same in winter as in summer and, 2) the golf course would be closed during winter and reopened only when the greens were fit to play.

In *some* cases, the superintendent has no choice, the powers to be force him to keep the greens open at all times. This is the type of golf course you need to locate, join, and become a life-time member, because they cater to people like you. They are concerned mainly with optimizing revenues, and have little regard to course conditions. In *most* cases, the superintendent will decide when people can or cannot play greens in the winter. This decision should be made by the expert, the one who knows the golf course and its conditions better than anyone, and that person is the golf course superintendent.

Your lack of knowledge about golf-green construction and maintenance is quite obvious. I'll guarantee you there are no two golf greens alike anywhere. How can you possibly compare one course to another with the numerous variables involved? Remember, putting greens consist of millions of small turfgrass plants that are living tissue, anchored and growing in a living soil medium. These plants continue to live throughout the year. In this region of the country, bentgrass becomes dormant during late November and breaks dormancy in mid-April. When mechanical or physiological damage occurs to the plant during dormancy, no recovery can occur until late April or May when temperatures are favorable for regrowth. Most of the damage is superficial, but when the crown or growing point of the plant is damaged, recovery will be slow or non-existent. The damaged areas provide a place for weak annual weed grasses, such as *Poa annua*, to germinate and develop, thus reducing turfgrass quality.

It's not that we don't want to be bothered with winter golfers, the turfgrass plants and the putting surface cannot afford to be damaged by winter golfers. The price for restoring the greens to tournament quality is prohibitive when considering the small number of people who cause the damage and benefit from winter play. If everyone had 45 holes similar to Gordon Witteveen (Toronto, Ontario — ED.), or even 27 holes, you would see a few superintendents allow winter play on 9 holes. However, this is not the norm, it is an exceptionally rare case.

(Continued on Page 3, Column 1)

WE MUST SAY GOODBYE TO ROY, BUT LET'S NOT SAY GOODBYE TO HIS POSITION

By Skip Ferrucci, Superintendent of Parks, Pierce County

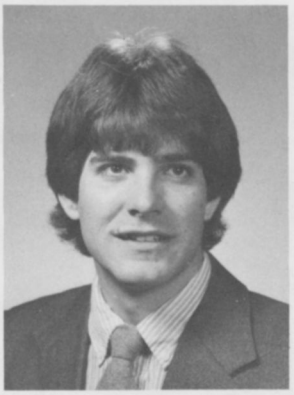
For all of us who have had the tremendous fortune in our careers to use, abuse, lean on, besiege with questions, probe for answers, or given our best excuse to, have realized that at some time our careers will have to continue without Dr. Roy Goss.

Yes, we all know, after many years of exemplary services, Roy will be retiring in January of 1988. Although the man himself is irreplaceable, it is up to all of us as professionals involved in turf, that we do not lose the extension specialist position at Puyallup that he fills. I am told there is a possibility this could happen. True, there is only one extension turfgrass specialist, and we probably stretch it like a rubber band, but what if it wasn't there at all? Many of us near the Puyallup Valley area can take advantage of the tremendous research staff available through Washington State University, but without the Extension Specialist position, who would be able to lend support to the county agents, come on site and see our problems, or disseminate the truly fine research being done by a great staff.

I think it is up to us to make the decision makers aware how badly we need this position even in the tough fiscal times we are facing. Please take the time to express yourself to the following people and anyone else that you think may help.

Dr. Arlen D. Davison, Superintendent, Western Washington Research and Extension Center, Puyallup, WA 98371. Dr. Harry Burcalow, Assistant Director - Agriculture and Natural Resources, Cooperative Extension Service, Washington State University, Pullman, WA 99164. Dr. H. H. Cheng, Acting Chairman, Department of Agronomy and Soils, Johnson Hall, Washington State University, Pullman, WA 99164. Dr. J. C. Engibous, Acting Director, Cooperative Extension Service, Washington State University, Pullman, WA 99164. Dr. J. L. Ozbun, Dean, College of Agriculture and Home Economics, Washington State University, Pullman, WA 99164. Dr. Albert C. Yates, Vice President and Provost, Washington State University, Pullman, WA 99164.

You might also take a few moments of your time and thank Roy for all the things he has done for you. Thank you, Dr. Goss, for your many years of superior leadership, you will be deeply missed. Thank you for all your help in this endeavor.



SCHOLARSHIP AWARD TO DON ELLIS

Don Ellis, one of the Northwest Turfgrass Association Scholarship Award recipients, is a student at Oregon State University. Don Ellis is a junior in Landscape Horticulture, who transferred to OSU from Linn Benton Community College where he received an A.S. degree in Horticulture. Don is originally from Dufur, Oregon and has extensive experience in landscape maintenance to go with a 3.58 GPA at OSU. He is currently making plans for his internship experience in the Portland area in the summer of 1987. Don has a strong interest in all phases of landscape, including design, construction, and maintenance.

Rebuttal *(Continued from Page 1, Column 2)*

How can you possibly take one example and make a case for everyone to ban temporary winter greens? Each club has different policies and procedures. The superintendents are striving to do what is best for the good of the club, the golf course, and the great majority of its members by providing temporary greens. If you ban temporary winter greens, then we basically have just one choice, and that is to close the putting greens and the golf course until further notice.

James E. Evans, President, MAGCS

EDITOR'S NOTE: This article has been reprinted from *The Bullsheet*, Vol. 40, No. 10, March 1987.

Dr. Watson, vice president of customer relations and agronomist at The Toro Company, receives the 1986 Man Of The Year Award from Denne Goldstein, publisher of *Landscape and Irrigation* magazine.

DR. JAMES WATSON RECEIVES MAN OF THE YEAR AWARDS

Dr. James Watson, Vice President of Customer Relations and Agronomist for The Toro Company, Minneapolis, Minnesota, has been named 1986 Man Of The Year by both *Landscape and Irrigation* and *Weeds, Trees, and Turf* magazines.

Watson, 66, is one of the nation's leading figures in the development of the turfgrass industry. He was the first person in the country to receive a Ph.D. in turfgrass science, which he earned in 1950 at Penn State University. Since then, Watson has been one of the industry's leading proponents of the need to research water conservation and turf management.

Since joining Toro in 1952, Watson has been part of the company's product development team. "He has been a real source of innovation," said Ken Melrose, President of The Toro Company. "Having an agronomist advising us on trends has given as a great advantage. He is very much involved in product development, distributor relations and customer service."

Watson is a "Fellow" in the American Society of Agronomy and the Crop Science Society, and is currently an Adjunct Professor in the Department of Horticulture and Landscape Architecture for the University of Minnesota.

EUROPEAN CRANE FLY CONTROL RESEARCH

Stanton E. Brauen

The European crane fly was first recorded in the United States in 1966, and it is now become well-established from British Columbia to as far south as Salem, Oregon. It is primarily a turf and pasture pest. Currently, Diazinon and Dursban have special local needs registrations for control of this insect in turf. *Preventative* applications are successful in the fall between October 1 and October 31 for sod industries to prevent possible shipment of crane fly to uninfested areas or preventive applications are useful for areas, such as golf greens, where costs of repair are expensive. Control applications are recommended in spring in other turf areas after a survey has been made in early spring (usually March) or earlier if crane fly activity is observed due to earlier periods of warm temperature. When the average number of crane fly larvae exceeds 25 per square foot, a chemical treatment should be considered to reduce larvae numbers and reduce or avoid turfgrass injury. The number of larvae can be estimated by sampling 4 or 5 locations in the turf with the standard cup cutter, counting the larvae in each cup, determining the average number of larvae from the cups and multiplying the average by 12. This will give an estimate of the number of larvae per square foot.

Studies have been continuing at WWREC to assess the effectiveness of insecticides on the control or survival of European crane fly and how application volume and irrigation following insecticide application may alter larvae survival. In these studies, Turcam, Oftanol, Sevin, Proxol and Cyfluthrin have been evaluated. With most of these insecticides application volume has not had a significant effect upon the control of crane fly larvae; however, irrigation following application has usually reduced the effectiveness of control, although good control has been achieved. The application volume seems to increase the effectiveness of Cyfluthrin, a synthetic pyrethroid that mimics a naturally occurring insecticide produced by some plants, while irrigation following application seems to decrease its effectiveness. Formulations of Turcam, Oftanol, Proxol and Sevin have registrations for turfgrass use. Check the product label for the current registrations for European crane fly control. Cyfluthrin is not registered.

BE AWARE

Cindy Maitland Deffe'
Technical Director Senske Lawn and Tree Care
Spokane, Washington

As professionals in the lawn care industry, it is important for us to stay on top of pesticide issues in our state legislature. Most of us rely on the safe use of pesticides to protect our property and our livelihood. If unnecessary regulations are put on pesticides by our cities, counties and states, our expenses will skyrocket and our use of these valuable tools will be limited.

On Thursday, January 15, 1987, Representative Jolene Unsoeld proposed five bills to the Washington State House of Representatives. All of these bills pertained to the use of pesticides in Washington State. Three of the bills were sent to the Environmental Affairs Committee and the other two were sent to the House Agriculture Committee. The Environmental Affairs Committee set January 23 as the hearing date for the three bills sent to them.

The wording of the bills is quite lengthy, so I have summarized the main points of this legislation. The three bills sent to Environmental Affairs are HB 69, HB 72, and HB 73. The two that were sent to the Agriculture Committee are HB 70 and HB 71.

HB 69

This amendment increases the penalty of a second pesticide offense by a certified applicator to a Class C Felony. It also changes the maximum civil penalty for a pesticide offense from $1000 to $2500. This bill also requires written pre-notification to adjacent property owners 72 hours before any pesticide application in residential areas. "The notice shall contain information on the anticipated time, date, and place of the application and the anticipated pesticide to be used." Within 48 hours after the application has been completed "certified applicators shall give adjacent property owners written notification of the time, date, and place of the application and the pesticide used." "Failure to give notice required. . . is a violation of this chapter." This bill also required that the WSDA maintain a file of complaints against all certified applicators and that this file be available to the public

HB 72

This bill allows any city and/or county to require special licensing for all state certified pesticide applicators. A representative from this licensing body must be allowed access to any premises to inspect equipment, lands exposed to pesticides, storage and disposal areas. This representative must be allowed to investigate complaints of injury or to sample pesticides to be applied. If this representative is not allowed access as required, a search warrant may be obtained for this purpose. This bill also states, "In cases seeking a civil penalty for chemical drift, there is a rebuttable presumption of a violation of this chapter with presumed damage to the property contaminated." The director may bring an action for a violation or "threatened violation" to the superior court of that county.

HB 73

This bill deals with landlord-tenant agreements with regard to pesticides. A landlord must give the tenant 48 hours prior written notice of intent to apply pesticides. "The notice shall contain the time, date and place of anticipated application; the

(Continued on Page 5, Column 1)

(Continued from Page 4, Column 2)

type of pesticide to be used; and information on potential health risks.'' ''Where the application of a pesticide presents health risks to the tenant, the tenant may request a nontoxic alternative be applied. If the tenant requests a nontoxic alternative and an equivalent treatment is available, the landlord shall apply only the nontoxic alternative.'' If the landlord fails to comply and is convicted, he may be fined up to $1000.

HB 70

All certified applicators must have a written contract with each customer at least 3 days prior to making any pesticide application. This gives the customer time to reconsider the contract and cancel. Certified applicators must provide all customers with a list of pesticides that will be used along with all known health effects that could be caused by these pesticides.

HB 71

Certified applicators must provide all customers with appropriate Material Safety Data Sheets for any pesticides that will be used prior to the application.

On Friday, January 23, over 100 representatives from pest control and greens industries from throughout the state met at the Environmental Affairs hearing to address the three bills in this committee. Many even got a chance to testify to the committee on the importance of pesticides and the problems that this legislation could cause. Art Losey, the Assistant Director of the State Department of Agriculture, testified against the poor wording of the bills eg. ''nontoxic alternative'' when nothing is truly nontoxic. House Agriculture Committee Chairman, Margaret Rayburn, also testified against these bills. She discussed how unworkable and unnecessary this legislation is. Pete Tovoli, President of the Washington Chapter of the International Pesticide Applicators Association, piqued the committee's curiosity by passing out branches covered with tent caterpillar eggs and explaining how they move out in ''armies'' during peak seasons. Many other devoted industry representatives explained proper uses and pointed out that most misapplications and problems are caused by homeowners and non-certified applicators. The ''rebuttable presumption of a violation'' in regard to drift is unconstitutional. This is saying you are guilty until you can prove yourself innocent!

Our lobbying forces were very effective at stopping this legislation for now. The bills in the Environmental Affairs Committee are dead—for this session anyway. The bills that went to the Agriculture Committee were never brought up, and according to Margaret Rayburn, they won't be. Many thanks to all who helped us lobby against these bills. For those of you who were not aware that this was even happening, PLEASE try to keep in touch with your legislators. Some of the amendments suggested in these bills have been adopted in other states and if we don't all work together, some may slip by on us.

HELP! HELP! HELP!

We need 10,000 sq. ft. of weedy turf for herbicide research—the more the weeds, the better. The closer to Puyallup, the better. Please call Dr. Stan Brauen at 593-8511 or try 593-8538.

THANK YOU!

WILD OAT CONTROL IN BLUEGRASS SEED FIELDS

W.J. Johnston and Doug Crook
Washington State University

In addition to turfgrass management research, at Washington State University in Pullman we also conduct research in the area of grass seed production. This research eventually has an impact on the turfgrass industry and the price you pay for grass seed.

Kentucky bluegrass is a specialty crop in eastern Washington. Eastern Washington's climate, with its winter precipitation and dry summers (during the time of grass seed harvest), is favorable for the production of excellent quality Kentucky bluegrass seed.

An estimated 75% of all Kentucky bluegrass grown in the U.S. is produced in the Pacific Northwest. The Inland Empire area of eastern Washington and northern Idaho is ranked 1st in the U.S. in total production of bluegrass seed. In 1985, Kentucky bluegrass was grown on 34,000 acres in Washington and the average price paid to growers was $1.02 per pound.

We have been conducting research at WSU for several years to identify herbicides for the control of wild oats (*Avena fatua* L.) in newly established seed production fields of Kentucky bluegrass. Wild oats is a very competitive weed, and if left unchecked it can essentially eliminate bluegrass seedlings during establishment.

Field studies were conducted in 1985 and 1986 by Doug Crook as part of a M.S. Thesis at Washington State University to evaluate MSMA, difenzoquat, and barban for use in seedling and established Kentucky bluegrass stands. The studies consisted of a factorial arrangement of treatments of herbicide rates and wild oat timings following emergence. In studies conducted in seedling bluegrass fields, wild oat control, Kentucky bluegrass injury, and wild oat and Kentucky bluegrass plant counts were determined. In established Kentucky bluegrass fields (one-year-old stands) we determined seed yield, bluegrass and wild oat injury, and herbicide effects on bluegrass maturity.

Results of our research indicate that difenzoquat and MSMA both showed promise as selective wild oat herbicides in newly established seed production fields. Both gave wild oat control better than 85% with low phytotoxicity to seedling bluegrass. Control of wild oats was best if herbicides were applied after the majority of the wild oats were in the 5- to 7-leaf stage of growth. Temperature did not affect difenzoquat control of wild oats, but MSMA worked best if high temperature was present at the time of application (over 28 C). Difenzoquat and MSMA also gave control of wild oats in the 2- to 3-tiller stage; however, with these later applications some bluegrass injury did occur. This injury was offset by removal of wild oat competition and an increase in bluegrass stand density.

MSMA and barban in established one-year-old bluegrass seed fields should be used with caution. MSMA hastened, and barban delayed, maturity of the stand. This resulted in reductions of seed yield and seed weight for both MSMA and barban. On the other hand, there was a trend toward increased seed yield with difenzoquat; however, further research will be necessary before it can be recommended for use in bluegrass seed fields to increase seed yields. Also, difenzoquat timing before harvest and rates of application are not known that would give the best enhancement of yield.

Hopefully, research such as this will eventually mean increased bluegrass seed yields in the Inland Empire and ultimately greater availability of quality seed for the turfgrass industry.

The authors would like to acknowledge the partial support of this research by a grant from the Intermountain Grass Growers Association.

MANAGING ANAEROBIC SOILS

Roy L. Goss

An article entitled "The Black Plague" appeared in the November 1986 edition of *Golf Course Management*, and a similar article entitled "An Update on the Black Layer" appeared in the February 1987 edition of *Golf Course Management*. Unless I am badly mistaken and being mislead from what I read, we all should be embarrassed to admit to the world that we have forgotten the fundamental concepts of managing soil and grasses. Isn't this problem of "Black Layer" or "Black Plague" simply one of an anaerobic condition developed through neglect of one to several management practices?

Soils in the Coastal areas of northern California, Oregon, Washington and British Columbia commonly develop anaerobic conditions between October and April of each year unless they are properly managed. This time frame is characterized by heavy winter precipitation, low evaporation, low light intensity and continued use of turfgrass facilities throughout the winter.

When soils become compacted, particularly under saturated or near-saturated conditions, the oxygen diffusion rate into these soils is near zero. Organic materials, which have accumulated in the surface few inches of these soils, may break down anaerobically and many of their components are not oxidized, but are reduced. There have been comments from some writers alluding to the fact that sulfur applications are part of the problem. It should be common knowledge to these people that most of the soil's sulfur is held in reserve in organic matter. Regardless of whether we apply the material as elemental sulfur or the plant gets it from break down of organic matter is irrelevant from the standpoint of oxidation and reduction. Under anaerobic conditions sulfide ions are formed instead of sulfate ions and one of the end products is hydrogen sulfide, which is a very foul-smelling substance. Usually, the resulting color is also black. There isn't much question that under this total neglect of soil drainage and aeration that additional sulfur will cause problems. However, hydrogen sulfide can be produced without the addition of any elemental or extraneous sulfur applications. Sulfide ions can also interact with iron and other micronutrients to form insoluble sulfides. It is also common knowledge that most of these insoluble metal sulfides are usually black.

The reports from areas of the country affected by "Black Plague" indicate that the soils are somewhat compacted, whether they be sands or heavier textured soils, wet, no roots on the turfgrass, and eventual death of both *Poa annua* and bentgrass on putting greens. It is generally conceded that *Poa annua* dies first, followed by bentgrass. It was also alluded to by some of these people that the condition was significantly improved following intensive aerification. I think now we are getting down to the real root of the problem.

WHAT IS LEADING UP TO THIS "BLACK PLAGUE"

Many golf superintendents around the country have been obsessed with developing the fastest greens in town and the other golf superintendents have been forced to follow suit because their neighbor's greens were faster than theirs. The usual method of developing fast greens are to 1) cut the grass as closely and as frequently as possible, including double and triple cutting, 2) verticutting, 3) elimination of aerification - maintain firm to hard surfaces, topdressing, etc. Reduction in irrigation water will also make the green surfaces firmer and increase ball speed. What do we do, however, when the surfaces are hard and compacted and excessive rainy periods occur? We should all remember that the respiration rate of turfgrass roots increases with increase in temperature. In the summer when we get higher temperatures and rainfall, added to compacted soils, I think we are spelling doom unless we have extremely good drainage and good gaseous exchange with the soil.

The algae factor has also been mentioned. It is not at all uncommon to observe thick algae scums that are slimy and slippery when wet, leathery and hard when dry, and literally impermeable to water or air. Algae usually follows thin turf and bare ground. These algal scums can definitely produce anaerobic conditions if the surface is not properly managed.

There was also comment about sand layering over slower draining, finer textured soils. To my knowledge, this condition has never been observed in the Pacific Northwest where we probably have as long a history or longer than any other part of the country in sand topdressing putting greens, tees, fairways, sports fields and other areas. If you place 1 to 4 inches of sand through topdressing programs over slow draining, fine textured soils, you will achieve greater surface stability during most of the year, but it may not necessarily always be dry. Wet sand is generally considered to be more stable than wet fine textured soil since we can destroy the structure of normal soils containing silt and clay and sands have no structure since they are single grained. If anaerobic conditions develop at the interface between sand and heavier textured soil, it is obvious that we need to improve our drainage situation. Since it is nearly impossible to drain deep, fine textured soils on flat grades through artificial drainage techniques of drain tile, it is important that we try to practice subsoiling, deep aerification or other methods of relieving the saturation, or simply build deeper profiles of sand. I would ask you, how else can it be done on a practical basis.

Mr. Tom Lubin wrote an article for *Divot News* from the Southern California Golf Course Superintendents a few months ago describing similar conditions that occur in southern California generally in August of each year. The symptoms on greens are yellow, especially the *Poa*. After a period of time, if not treated, the *Poa* will die, but the bent still has a healthy look. The root system is shortened, and there is a black or dark brown color to the soil, sometimes in bands. The soil samples have the smell of a stagnant pond. The symptoms do not respond to fungicide applications. He also indicated that in areas of poor water quality or high salt content in the soil that salt levels were found to be high enough to cause severe problems due to lack of drainage. We all know that good infiltration and permeability and good subsoil drainage is most essential to the reduction of salts to a level where plants can survive. Mr. Lubin also points out that good aerification and water management programs can shift the equilibrium to one of oxidation over reduction and create healthy conditions frequently as early as one week.

I hope that the foregoing discussion will help to clear up any questions that our readership may have in mind, and I would hope that turf managers around the country would remember to practice good management of soil aeration, compaction reduction and good internal drainage to prevent these problems - there is no mystery here.

MANAGEMENT OF NECROTIC RING SPOT

Gary Chastagner

A major part of our research on necrotic ring spot (NRS) has focused on the development of effective fungicide controls for this patch disease of bluegrass and fine leaf fescue turf. Although fungicides are frequently relied on to control turf diseases, it is important to remember that they are only one part of a total disease management program.

Development of turf diseases requires that four criteria be met. A pathogen, susceptible host and favorable environmental conditions must be present for a certain period of time. Disease will not develop if one or more of these criteria are not met. Based on these criteria, there are four basic methods which are used to control turf diseases. These are: 1) exclusion or preventing the introduction and establishment of a pathogen, 2) modification of environmental factors through cultural practices to favor the growth of the host and not the pathogen, 3) altering host susceptibility through the use of resistant varieties or by using mixtures and blends, and 4) by protecting the host during periods favorable for infection with fungicides.

There are numerous cultural factors such as site selection and preparation, variety selection, establishment method, fertilization, mowing frequency and height, water management, soil compaction, soil pH, and thatch accumulation which affect disease development in turf. A sound turfgrass disease management program should consist of an integrated approach based on the cultural practices which alter conditions so they are unfavorable to the pathogen, while at the same time favor the growth of the host. Necrotic ring spot, caused by the fungus *Leptosphaeria korrae*, is a disease which damages turfgrass root systems. Thus, cultural practices which encourage deep rooting of the turfgrass during periods of root growth (spring and fall) and preserve well developed root systems during unfavorable conditions (summer) should be an important part of any management strategy to control this disease.

Limited research has been done on the effects various cultural practices have on the development of NRS. NRS is frequently associated with sodded turf and research in other areas has demonstrated that the disease can be present on sod at the time of lifting. Avoiding diseased sod is an important part of managing NRS.

WHAT ABOUT RESISTANT VARIETIES?

Greenhouse studies have shown that there is considerable variation in the susceptibility of bluegrass and fine leaf fescue cultivars to this disease. Perennial ryegrass and tall fescues appear to be resistant to NRS. Dr. Gayle Worf, at the University of Wisconsin, has been evaluating the susceptibility of several bluegrass cultivars to NRS under field conditions since 1982. After two years, limited disease had developed on Adelphi, Majestic, Merion, Midnight, Mystic, Park, Vantage, and Wabash. Intermediate levels of disease had developed on Ba-

(Continued on Page 9, Column 1)

Necrotic Ring Spot *(Continued from Page 8, Column 2)*

ron, Eclipse, H-7, I-13, Merit, Newport, and N-535. High levels of disease had developed in Dr. Worf's plots on Birka, Columbia, Georgetown, Glade, Haga, Nashau, Ram I, Sydsport, and especially Trampas.

After two additional years of testing, Dr. Worf feels that turf managers should avoid highly susceptible cultivars such as Trampas, Ram I, Glade and Sydsport. Limited disease has developed on Midnight, Wabash, Park, Eclipse, Adelphi and Majestic, and turf managers in the Wisconsin area are being encouraged to utilize these varieties in an attempt to try to minimize the development of NRS.

Some of the research funds received from the Northwest Turfgrass Association during 1987 will be used to establish field plots to determine the effectiveness of using resistant cultivars of bluegrass and ryegrass in controlling NRS.

FUNGICIDAL CONTROL

As indicated, fungicides are only one part of a total disease management program. When they are used, certain information is needed. This includes accurate disease identification, proper choice of fungicides, methods of application, timing and frequency. Because there are several patch diseases that can be confused with NRS, turf managers may need to send a sample to your local Cooperative Extension agent or contact a knowledgeable consultant for accurate diagnosis.

In four years of testing, we have only found two fungicides which are currently registered for use on turf that will control NRS. These are Rubigan and Fungo 50W. Since NRS attacks the turf's root system, it is important that these materials be watered in to insure the best control possible.

According to the Rubigan label, Rubigan 50W should be applied at 2 oz per 1000 square feet. Applications should begin one to two weeks prior to anticipated appearance of disease symptoms and continue at 30-day intervals for as long as conditions for disease continue. (Although the Rubigan label indicates that applications should be repeated at 30-day intervals, our studies have shown that a single application in the spring will provide seasonal disease control, but frequently, this control is not readily apparent until late in the summer and fall.) Applications should be applied to turfgrass and thoroughly irrigated to a minimum soil depth of one inch.

In using Fungo 50W to control NRS, turf managers need to follow the directions for Fusarium blight. These indicate that Fungo 50W should be applied at 4-8 oz per 1000 square feet and watered in to the root zone by irrigating thoroughly immediately after application. Label directions indicate that two applications should be made at 10-14 day intervals beginning when the disease first appears. In our tests, we found that a single application of Fungo 50W in either April or May provided effective disease control during late summer and fall.

Unfortunately, we have not had adequate disease development during the spring to assess the effectiveness of spring applications of these fungicides in controlling the late spring-early summer phase of NRS. However, spring applications of Rubigan and Fungo have been effective in controlling the development of NRS during late summer/early fall.

SCHOLARSHIP AWARDED TO PYATT POTUZAK

Pyatt Potuzak was awarded a scholarship this winter from the Northwest Turfgrass Association Research and Scholarship Committee. Pyatt graduated from Redmond High School in June 1977 and worked at Sahalee Country Club on the maintenance crew for two years. Pyatt began his studies at WSU in August 1984 in the Agronomy Department, in the turfgrass option. He will receive his B.S. degree in Agronomy in May of 1988. He has been working as timeslip help for Bill Johnston on the turfgrass project at WSU in Pullman during the school year.

DAYTIME VERSUS NIGHTTIME IRRIGATION FOR TURFGRASSES

By Roy L. Goss

Every year, about the time we start our irrigation season, the question arises — which is best? Daytime or nighttime irrigation? Before delving into the question itself, we need to know a little bit about our soils and some of the factors affect irrigation water efficiency and effectiveness. In general, people start irrigating in the spring before the soils and grasses actually require any additional water. I have seen sprinklers operating when soils were essentially at field capacity moisture. This can only produce problems of oxygen starvation to the root system, excess leaching of plant nutrients, lowering the soil temperature at a time when we hope the soil temperatures are rising, and causing inconveniences to users of our turfgrass areas, only to mention a few.

Spring is the best time to initiate any changes in your irrigation practices. If you have practiced late fall fertilization of turfgrasses and withheld fertilizer applications in the spring as late as possible, your turfgrasses should have developed their maximum depth of root system. Healthy turfgrasses with fewer weeds and other problems can be maintained if we remove most of the available water within the root zone (8-10 inches deep) before recharging the soil reservoir. Light, frequent and excessive irrigation can cause shallow or surface rooting (obviously roots grow where there is more oxygen near the surface) and turfgrasses can suffer during brief droughty periods or possibly only short periods without irrigation.

Many acres of turfgrasses are irrigated when only small areas have become excessively dry. Usually these are localized dry spots or annually occurring hydrophobic areas. These areas are very common on contoured putting greens, sand-based sports fields, and almost any turfgrass area with sloping ground. When these areas are known, it is best, in the Pacific Northwest, to begin wetting agent application as early as mid-April and continue with monthly applications through the irrigation season. You will be able to save a significant amount of water and pumping costs and do your grass a favor as well.

IRRIGATION EFFICIENCY

The efficiency of the irrigation system is simply the amount of water used by the turfgrass plants (evapotranspiration) divided by the amount of water delivered out the nozzles. There are a few losses encountered in delivering water to the turfgrass surface, and these are the things that affect the efficiency.

1. Wind - Wind can cause drifting of the water particles or cause distortion of the sprinkler pattern.
2. Evaporation - Evaporation rates are much higher during daytime hours than at night.
3. Runoff - Precipitation rate is exceeding the infiltration rate of the thatch and soil.
4. Irrigating sidewalks, streets and waste areas.
5. Wetting the soil profile below the root zone.
6. Uniformity will increase efficiency when the exact same amount of water is applied to every square foot of the area. If the uniformity of the irrigation system is low, some areas will receive excess water while others are receiving just the right amount.

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There are a number of other factors that can enter into these equations, but these are some of the practice applications.

NIGHTTIME EFFICIENCY IS BEST

It has been amply shown by irrigation engineers and practitioners in the field that nighttime irrigation of turfgrasses is best for several reasons.

1. More water with higher pressure is available at night from municipal or public water systems.
2. Wind speed is often near zero as compared to higher wind velocities during daytime.
3. Temperatures may be as much as 30F to 40F lower at night than in day, resulting in much less evaporation loss.
4. Relative humidity can be as much as 40-50% higher at night than in daytime, resulting in less evaporation loss.

As a general rule, turfgrasses in the Pacific Northwest show few, if any, adverse effects from nighttime watering. Powdery mildew can become more severe with wet foliage, but this problem is observed only occasionally in the Northwest and should not be considered an important factor. It is a different matter with many of our flowers and ornamentals - most horticulturists advise daytime watering to allow the foliage to become dry before nightfall to help inhibit many diseases.

A major disadvantage of nighttime watering is not knowing whether or not all valves and irrigation heads function properly during their cycles. Problems of this nature do not, as a rule, surface until turfgrass areas start showing water stress. For this reason, automatic systems should be checked frequently during daylight hours to visually observe their operation or to employ flow meters to monitor the amount of water used with each irrigation.

In conclusion, when we consider all factors, nighttime irrigation for turfgrasses is decidedly best.

NEW BOOKS AVAILABLE

TREE CARE - A NEW TREE BIOLOGY: Facts, Photos and Philosophies about Trees, their Problems and Proper Care (597 pages, 633 photographs), . . . and

A NEW TREE DICTIONARY: Terms, Topics and Treatments for Trees (176 pages, 239 subjects).

These two new books written by Dr. Alex Shigo present new information on wetwood, heartwood, discolored wood, Dutch elm disease, fire blight, tree starvation, fertilization, pruning, hazard trees, selections for tough trees, energy flow, timing of treatments, wound treatments, and other subjects based on Shigo's 30 years of research and study of trees. The books, which will be available by Fall 1986, are being offered at a prepublication discount: A NEW TREE BIOLOGY - $39; A NEW TREE DICTIONARY - $10.50 (plus $2 for postage and handling). These books can be ordered from: Shigo and Trees, Associates, 4 Denbow Road, Durham, NH 03824.

TURFGRASS FIELD DAYS

Golf Courses

Tuesday, June 23
10 a.m. - 1 p.m.
Farm 5, Puyallup

General Turfgrass Field Day

Wednesday, June 24
10 a.m. - 1 p.m.
Farm 5, Puyallup

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