THRU THE GREEN

EDITOR
JEAN LADUC
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PRESIDENTS MESSAGE

When things go well, we are doing our job and expected to move on to the next problem, real or imagined. This is about something that went well, so congratulations are in order. The Superintendent/Pro held July 13th at Lake Merced Country club was by all accounts a good time had by all. Our Association would like to take this opportunity to thank Lou Tonelli and his staff for the excellent conditions and the work it took to host our tournament. The Members of Lake Merced are appreciated for allowing us to use their truly wonderful golf club. Thanks is also given to all the participants who turned out to test their skills or endurance in this tournament. Ross Brownlie is congratulated for winning our Associations highest honor for golfing excellence, the Ayrshire Trophy. As a three time winner of the award , Ross has established himself as the finest stick in the organization.

The person who also deserves a great deal of thanks id Mike Basile for all the fine work it took to put the tournament together and make it work. I am sure Mike is very relieved that it went well and is completed. We will give him about a month to rest on his laurels and begin preparing for next years tournament.

Expect to be receiving information soon regarding the upcoming Institute sponsored by U.C. Cooperative Extension and the GCSANC. It will be held at Asilomar in Pacific Grove, the 11th and 12th of November. The weather will be perfect and the classes informative. This will be the fourth Institute and we hope to make it one of the finest of its kind in the country. The inspiration for the Institute is to recreate the extraordinary series of conferences held at Asilomar from 1973 through 1979. These conferences were sponsored by the University of California and the NCGA. The intent was to bring together as many of the Superintendents in all of California and the turfgrass experts within the University of California for a week of mutual instruction in the science and the art of golf course maintenance. i was able to attend five of these conferences. The instruction received and the friends I made have proved invaluable to me over the years. Anyone who attended these conferences will tell you that the give and take between teachers and students and between fellow superintendents left us all as better superintendents. For those of you that missed the opportunity to attend a conference at Asilomar I would highly recommend that you attend. It is truly a special place.

Early bird registration packets have already arrived for the National,I mean International Golf course Conference and Show. I was a Superintendent for twelve years before I ever attended by first GCSAA Conference, since then I have only missed one. I feel that conference attendance including four day seminar classes is required to maintain the skills necessary to do my job in a professional manner. Every year the changes in equipment and technology have made advances which require first hand knowledge to stay abreast of the changes in our field. Any golf course which is not requiring attendance of this conference the the Superintendent is certainly penny wise, pound foolish.

Rod

USING YOUR CONTROL SYSTEM EFFECTIVELY

The objective of any golf course irrigation control system is to provide the amount of water required by the turf root zone within the time limits available for watering, and within the system's hydraulic limits for operation. If your control system involves dragging a hose around or connecting sprinklers into a quick coupling network, your water management technique is labor intensive and time consuming. Uniformity, efficiency water schedule adjustment, and operating costs are difficult to evaluate and manage using this type of system. If your system utilizes mechanical or electronic controllers that automatically activate valve systems for your sprinklers, you don't have to devote as much labor time to activating each control zone and your ability to make schedule adjustments or evaluate your system is connected to a computerized central monitoring station that communicates with your field controllers, you have the ability to evaluate and adjust your water application on a daily basis, you can record and analyze system operation and performance, and you may be able to directly link your system into equipment that will accurately monitor and respond to your system's flow characteristics or the current weather conditions on your course. Regardless of which control system your course employs, a few simple steps should be taken to organize your programming process into a manageable sequence.

The first step in organizing your control system programming involves categorizing areas of your course that have similar characteristics. A common list of major categories to start with might be Tees, Greens, Fairways, roughs, Driving Range, and Clubhouse. Each of these categories should then be evaluated for similar conditions or special considerations. Tees, Greens, Fairways, and Roughs can be sub-categoried into the "front nine" and "Back nine". Fairways can b e broken down into further sub-categories such as landing areas, major slopes, and swales; roughs can be separated into shallow rough, deep rough, waste areas,a and so on. This categorization process will help you identify areas that should be grouped together into specific watering or controller programs. Each sub-category should be ranked by importance to help you determine which areas may require special attention.

A simple listing of each program categories in outline form will assist you in organizing your program format. An example of this may be as follow:

Program I. Tees
- A. Front Nine
- B. Back Nine

Program II. Greens
- A. Front Nine
- B. Back Nine

Program III. Fairways
- A. Front Nine
- B. Back Nine

Program IV. Rough
- A. Front Nine
- B. Back Nine

Program V. Other
- A. Driving Range
- B. Clubhouse

If you have followed the processes described in earlier articles for developing baseline programs for each of these irrigation zones, you will be able to determine the approximate total run time required to irrigate your course within a one-week seasonal time period. this can be accomplished by determining the total number of zones for each sub-category and multiplyng by the weekly run items required for each zone. For example, if weekly run time for Tee Zones in June is 28 minutes:

Program I. Tees

A. Front Nine

1. 40 zones x 28 min/wk 1120 mins/wk

B. Back Nine

2. 38 zones x 28 min/wk = 1064 mins/wk

Therefore, the total weekly run time for tee zones in June is approximately 2184 min/wk (36.4 hrs/wk). By continuing this process for each program category, you will determine total weekly run time required by your golf course.

Because a golf course is a playfield, you are only allowed a certain amount of time to irrigate without disturbing the players. The next step in the process is to determine how much time you have available for irrigation each week. You may find that after totaling the weekly run times, the figures indicate that you cannot possibly irrigate your golf course because there isn't enough time available. If your system was designed properly, this time dilemma will be solved by running more than one zone at a time.

Next Month: Considering Time and Hydraulics In Irrigation Programming

Doug Macdonald is an associate design consultant with Russell D. Mitchell & Associates, Inc., an irrigation system design and consultation firm in Walnut Creek, California.

BIOLOGICAL CONTROL OF ANNUAL BLUEGRASS

The most serious weed pest on golf course turfs throughout the world is *Poa Annua* or annual bluegrass. Whereas it has become an acceptable turfgrass species in most of the temperate climates out of necessity, the majority of golf course superintendents would gladly rid their golf courses of annual bluegrass, if there was a safe economical means of doing so.

Several products have been used over the years to eradicate annual bluegrass from golf course turfs. These have included the arsenical, endothal and sulfur. All have met with limited success and some have killed desirable turfgrass species as well as the annual bluegrass. None of these products are used to any great extent today.

The plant growth regulators like Cutlass and TGR are currently the most widely used p-=roducts to try and reduce the annual bluegrass populations on golf courses. Prograss, a herbicide with pre and post-emergence activity, is also widely used today particularly on perennial ryegrass turfs and to a lesser extent on creeping bentgrass turfs to try to eradicate annual bluegrass. All have met with some degree of success.

A biological control of annual bluegrass was developed and tested at Michigan State University. It is a bacterium known as *Xanthomonas campestris*. The Mycogen Corporation has obtained the rights from Michigan State University to market the bacterium. They are currently conducting research on their own as well as supporting research at several universities to obtain an EPA label for the product.

The bacterium has shown excellent control of the annual type *P. annua* var. *annua* under laboratory and field conditions. The bacterium has shown excellent control of the perennial type *P. annua* var. *retans* under laboratory conditions but poorer control under field conditions. Studies are currently under way to increase the efficacy of the bacterium on the perennial type annual bluegrass under field conditions.

Article by J.M Vargas, Jr. Ph.D. Michigan State University, East Lansing, Michigan. Co-written by David Roberts, J.M. Vargas, Jr., A.R. Detweiler and J. Hubbard. Article from GCSAA Conference Proceedings.

GOLF COURSE ARE TARGET AREAS FOR CONSERVATION

The Executive Committee of the United Sates Golf Association recently approved continued and increased support for the Audubon Cooperative Sanctuary Program for Golf Courses. The support totals $100,000 for the year 1992. The grant will directly fund the golf program, including hiring additional staff to keep up with the expanding program, increasing, and enhancing educational materials for the program, and expanding efforts to increase golf program contacts.

The goal of the program is to inform golfers, golf course superintendents, professional golfers and anyone else connected with golfing about wildlife and environmental conservation issues on golf course lands. Aside form promoting a reduction in intensive management activities that require large quantities of chemical and water sue, the program promotes the increase of wildlife habitat and general conservation efforts. Finally, the program publicly recognizes those courses that are already involved or that become involved in projects that improve the quality of an area's environment.

New York Audubon believes that golf courses, if managed in a sensitive manner, can be one of the better uses of developable land. They permanently serve to protect large areas of open space and, therefore, a diversity of habitats. Other potential land use may pave over habitats or place former areas of woods and grasses under the roof of a new shopping mall.

For further information of the Cooperative Sanctuary System contact the Audubon Society of New York State, Inc., Route 2, Box 131, Selkirk, NY 12158.

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SALES ENDS JULY 31st, 1992

EXPOSURE TO 2,4-D: APPLICATORS & THE PUBLIC

One of the popular brands of throat spray contains phenol, a compound similar to the pheonoxy of 2,4-D. When these two products are compared at the same concentration levels, the sore throat spray has a lower LD50 (higher Toxicity). this spray will also kill weeds.

A review of all factors in risk assessment came up with insufficient evidence to conclude that tumors in rats were related to 2,4-D exposure.

A study (1971-1985) of 70,000 farmers in Saskatchewan who had applied herbicides (including 2,4-D) to wheat showed that the farmers were more healthy than other sements fo the population except there were more skin cancers due to exposure to the sun.

Within groups of farmers, fuel exposure indicates a slight increase in cancer risk.

A 1990 Nebraska study showed a link between use of 2,4-D and bystanders conducted in various settings (with and without protective clothing, etc) concluded that there was no apparent relation between amount of granular or liquid material applied and exposure received. Any exposure to applicator was still below World Healther Organization minimum figures aceeptable. There was no bystander exposure noted. This should relieve public concern in this area.

Posting treated sites is based on the assumption that people are being exposed by walking on the grass. This is not likely.

A study of bystnaders with various types of clothing (shorts, slacks, shoes, barefoot, etc) who walked on treated plots showed little exposure and only small amounts of dislodged chemical.

Article from Lawn Institute "Harvests".

NAUMANN'S NORCAL NEWS

Ken Sakai has left Sunnyvale Municipal Golf Course to become the Director of Golf Maintenance Operations (on mainland US) for Nitto America. Some of the golf courses they own are Peacock Gap GC, Calabassas CC, Suboba GC. Ken has moved to the LA area and is working out of the main office in Santa Monica...**Bill Davis** has left Spyglass Hill GC to become the new Supt. at Peninsula G&C in San Mateo. Replacing Bill at Spyglass is **Jeff Gorham** who was Bill's assistant prior to his promotion...**Ron Mahaffey** has accepted the Supt. position at Oakhurst CC in Clayton replacing Tim Sedgley. Ron was the assistant at Riviera CC in Pacific Palasaides prior to his move. **Manuel Cordoza**, Supt. at Cypress Point Golf Club has decided to retire and will be enjoying the good life. Joining him on the park bench is **Dave Griffiths** from nearby Pacific Grove Golf Course who is also retiring. Good luck to both of you....

FOR SALE

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A LOOK AHEAD

September 14 Pasitiempo CC

October 8 Sierra Nevada Chapter joint meeting

November 11,12GCSANC /UC CooperativeExtension Golf Course Institute

December 4 Christmas Party

FERTILITY MANAGEMENT OF SAND AS A GROWING MEDIUM FOR TURFGRASS

The development of high sand content sports fields and golf greens has been heralded as a major advance toward the multipurpose, all-weather utilization once thought possible only with artificial turf. It seems, however, that these rugs have as many problems as natural turf except inside domed stadia.

The sands are far from foolproof and finding the right components for a mixture does not end problems in a sand-based program. Fertility management can be difficult and the related problems as insidious as any faved by a turf manger. The major problems are related to high leaching potential, low cation exchange capacity, nutrient balance difficulties and other problems related to pH levels. These things were considered to be worthwhile trade-offs when compared to problems associated with highly compactible, poorly drained (and aerated) soil mixtures used in the past.

High sand-growing media are supposed to support traffic and drain readily. That same porosity make s nutrient retention quite difficult and nitrogen is particularly subject to loss due to the very nature of the sandy substrate. Ammonium ions (NH4) are rapidly converted to nitrate ions (NO3) in the well-aerated sand. the nitrates have no physical attraction to negatively charged soil or organic matter and are readily washed out of the root zone by the sand's high permeability.

At first face this leaching loss indicates that slow release nitrogen sources are naturals for porous media turf growth. This is not always the case, since sand is essentially sterile or at least has a small population of microorganisms. the relawes of nitrogen from sources requiring microbiological breakdown is consequently, slow for a while. these products are ureaformaldehyudes, methylene ureas, process tankages, sewage sludges, etc. Encapsulated particles, IBDU, etc., are not so limited. The restriction release does not last long, but must be considered in the early stages of use. Combinations of soluble and insoluble sources of nitrogen produce the best results until the population of microorganisms grows.

Another penalty to be reckoned with is low cation exchange capacity. We have lost the forgiveness of soil. Clays and organic matter have a tremendous capacity to absorb cationic nutrients, which reduces leaching loss. In sandpeat mixtures, though, the total Cation Exchange Capacity is around 5 and that means that this mode of nutrient retention is very low. Additionally, the normally weak adsorption of potassium on clay or organic matter is readily overcome by irrigating with hard water, which contains high concentration of calcium and magnesium ions. Furthermore, we have always heard that phosphorus does not leach but accumulates in the upper root zone. This does not occur in sands. The phosphates go right on through - just like the nitrates. Trace elements or minor nutrients may be lost in the same way, but the manner of their availability is not as clear because the chemistry of these nutrients has not been worked out in this medium or with turfgrasses.

One of the most confounding problems with sand relates to its pH. We usually expect sand to have a neutral pH of 7, but this is seldom the case in the central U.S. Soil test show pH levels up to 8 or more, indication high calcium levels. Sands with alkaline reaction are subject to close observation and careful application of trace elements thought to be needed. In most cases, it is iron. These nutrients should be applied individually to determine the reaction of the turf. Shotgun mixtures are not recommended, because of potential toxicity from overapplication of the wrong nutrient, but don't forget that the alkalinity also offers some protection against toxicity due to excess copper and zinc levels.

Nutrients should be applied as in hydroponic gardening until the root system is well established and has cycled through death and reestablishment of new roots several times. The residual left by dead roots is the best potential for maintaining nutrient stability throughout the root zone. it also provides the nutrition needed to develop adequate populations of beneficial organisms. Only then can a stable plant community be established and dependable nutrient balance based upon a well established fertility management program be developed.

One final word of caution is needed in relation to optimum use of sand. That is the possibility of contamination. These growing media with little or no buffering capacity are susceptible to contamination by poor chemical water quality, overuse of pesticides, and even silting in by dust storms or muddy water. All in all, sand as a growing medium for turf is a major advance in our field. It is imperative, however, to select the sand carefully, approach nutrition programs with knowledgeable caution and revise almost everything one has learned about turf management using natural soils. Since we have lost the forgiveness of soil, we must make up for the loss by a better understanding of the material with which we now work.

Article by James M. Latham, Director, USGA Green Section, Great Lakes Section.

GUIDELINES FOR CONTROLLING MOSS IN GREENS

The quality of golf course greens by present day standards is often determined by greens' speed. Golf course superintendents are mowing greens shorter and keeping the nitrogen fertility lower than ever before to obtain faster speeds. A consequence of these practices has been a reduction in turfgrass vigor to a point whereby the greens are much more prone to weed encroachment. One of the more troublesome weeds to have become a problem is moss.

Until recently, the only known means of controlling moss was through the use of mercury products. With the support of the Metropolitan Golf Association, research was conducted to look at means of controlling this serious weed. This research identified both chemical and cultural tools that could be used in a moss eradicating program.

CHEMICAL CONTROL

Pesticides and other materials offer hope in controlling moss on bentgrass greens. In the early spring, moss commences its growth much earlier than bentgrass, giving it an early competitive advantage, Hydrated lime applied in late March at 3 to 5 pounds per 1000 square feet will burn back the moss during this period. The lime can be spread easily if mixed with a dry sand topdressing.

An effective treatment for moss control would be the Scotts Goosegrass Control; a betasan-ronstar combination. Labeled for use on bentgrass greens, this product provided 83% control from only a single application. While this product will cause some discoloration, it appears to be one of the more promising moss control products.

Siduron (Tupersan) and bentazon (Basagran) provided from 53 to 74% control of moss. While they were not quite as effective as the Scotts products, both siduron and bentazon were much safer since no injury occurred for either product.

You should note that with the exception of bentazon the most effective treatments are preemergence herbicides. While it can't be determined from these trials whether the effect is pre- or post-emergent, it should be mentioned that the herbicidal activity of these materials on moss was chronic. It was several weeks before we noticed any significant decrease in moss populations.

CULTURAL CONTROL

Chemicals only offer a partial solution to the moss problem. Unless cultural steps are taken to increase turfgrass vigor, chemical control of moss will be ongoing battle. We designed studies to look at the effects of cultivation techniques and fertility on moss eradication. The results clearly demonstrated that culture can be changed to the detriment of moss.

While silvery thread moss will tolerate dry conditions, it is favored by an abundance of free water. Core cultivation immediately followed by sand topdressing would create a system of "vertical drains" that would facilitate a rapid water removal of the surface. We found that moss removal was hastened where this practice was followed compared to core cultivation alone. Deep spiking was also beneficial compared to core cultivation alone.

Nitrogen and iron are the most important tools in a moss eradication program. Moss control improved as the rate of nitrogen was increased. Moss was eliminated over two growing seasons from plots that were inititially 40% moss by increasing nitrogen rates to about 0.8 lbs. per 1000 square feet per growing month (6 lbs. N/year). Iron applications at a rate of 6 ounces per 100 sq. ft. per month were beneficial during the first year, especially at the higher rates of nitrogen. Iron had no effect on moss in the second year.

While we didn't measure greens' speeds, these high nitrogen treatments no doubt resulted in slower speeds. The bottom line though, is if you have moss, you are going to have to at least temporarily increase nitrogen rates. Effects on greens' speeds can be minimized by careful control of water, double cutting, or increasing potassium levels.

Moss control research has until know looked at fertility and herbicides independently. Studies will be conducted this year to look at combinations and nitrogen fertility in moss eradication "programs". Perhaps this research will identify more reasonable nitrogen rates to use in conjunction with a herbicide program to eliminate moss from greens.

In summary enough information is known for a superintendent to develop a legal moss control program. Early spring applications of hydrated lime, followed about a month later and in the early fall with a herbicide are the first steps in controlling moss. Increasing your nitrogen levels during this period will no doubt improve the competitive advantage of desirable grasses at the expense of moss. Furthermore, control your soil moisture levels through careful irrigation and by providing good drainage throughout the soil profile.

Credit: Our Collaborator, Northeastern GCSA, Sept. 1990