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Special Concerns of Watering Bentgrass

Watering of bentgrass turf has been recognized as a most demanding and vital part of maintaining this species. Guidelines on bentgrass watering have been slow to develop because: (1) the ever-present threat of annual bluegrass; (2) the needs are difficult to pinpoint; (3) fundamental knowledge is lacking; (4) mechanical needs are very specialized.

We developed this lecture program on bentgrass watering to present both general knowledge and the changing methods on the subject. On this latter aspect, we examined the thoughts of (a) different watering needs at green sites for various types of turf conditions and (b) the possible use of mist watering rather than larger amounts when roots don't function in or near moist soil. We believe watering of bentgrass requires some non-traditional turf watering procedures.

High Sand Soils and Watering Comments of James Snow, Turfgrass Agronomist, USGA

More bentgrass greens are grown in sand only and there is general agreement on high sand content on greens for water and root penetration. Of

course, we must remember sand content influences greens watering. Water is the most misused practice on the golf course.

The nature of the plant and the high sand soil base mandates more frequent watering. Accomplishing this properly is a big challenge for the golf course superintendent.

Water Content of Soils Related to Turf Growing

Dr. Roy Flannery, Extension Soil Specialist, Emeritus, Rutgers University
Water is a large part of the bentgrass plant. The soil supplies most of this water and helps maintain a uniform supply. Water entering the soil carries oxygen downward for the roots and aides in exchange of gases. Water evaporation along with plant transpiration helps regulate soil temperature. Soil water is involved in nutrient availability to the

plant.

Soil water can have negative effects. In excess, it ruins soil structure, causes loss of valuable nutrients, increases soil erosion and becomes an unhealthy medium for turfgrass roots. Of course, wetness prevents proper mowing.

The high sand soils used for growing bentgrass make it necessary to adjust watering and management. Sandy soils hold less water per foot of depth. Sands accept and percolate water more rapidly. Their water content is given up readily to the plant. Also, less water remains in the sandy soil, and less water moves upward through the soil at the plant's wilting point. This contributes to the suddenness and severity of wilt. The very sandy soils tend to require

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Figure 1. The enigma of turf watering. Avoid severe dryness. Avoid excess wetness.

This paper is a series of summarized comments by various speakers in March 1990 whose backgrounds range through the general subject of bentgrass and related subjects. The breadth of subject matter was created to assure perspective on the many specialized aspects of water use. Other subjects related to watering such as conditioning of turf, soil profile, turfgrass cultivation, dry spot phenomenon, etc., are two-day subjects themselves.

OPINIONS AND COMMENTS

Observing Research at Turfgrass Field Days

We are in the season when most have a chance to attend Turf Research Field Days. What should we look for? All of us are impressed with a neat, well-manicured turf. This is something to appreciate, but it is not the mission of research. One research leader of years past had an exceptionally good foreman and crew, a good site for turf and he doted on attractive turf. His plots were largely impressive appearing. In fairness to all in research, it is difficult to design a test that will answer problems clearly. Also, often research results occur at a time when the action story cannot be seen. Dr. Funk's hybridization of Kentucky bluegrass was a big and basic story. Only those who were around from week to week saw the momentous happenings.

I ran preemerge crabgrass tests for more than 25 years. I had no set area for tests because research land was not available. This forced me to go from area to area (where there was water, where it was permissible to grow crabgrass, where no other herbicide residues were present, and hopefully where a field day was feasible.) One of the real problems was growing a uniform stand of crabgrass on the test site with a good mixture of turf. I especially remember that my three last years had some excellent crabgrass control plots that included the fenoxypop ethyl (ACCLAIM). The test treatments showed clear-cut control and were attractive. Young crabgrass plants were controlled very effectively in late spring

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Special Concerns of Watering Bentgrass

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more frequent watering.

Adding organic matter to high sand soils adds to their water retention, but this must be done with discretion as it can decrease water percolation. Organic materials can differ greatly in nature and content.

Remember soil layers influence water movement. A well-limed soil has better moisture characteristics than the same soil in a very acid condition.

Wetness and watering effects on turf disease

Dr. Eugene Varney, Plant Pathologist Emeritus, Rutgers University

Large brownpatch (*Rhizoctonia* spp.) and *Pythium* blight (*Pythium* spp.) are classic examples of turf diseases that are well known for their association with wet conditions. Summer patch (*Magnaportha* sp.) is favored by high temperatures and moisture and appears to be of increasing importance. Symptoms are commonly more severe on turf stressed by low cutting heights and heavy traffic.

There are reports by golf course superintendents from this area that evening watering causes more dollarspot than morning watering. Dr. Hodges of Iowa State has reported *pythium* problems with newer greens on high sand soils. He has theorized that this is caused by a lack of antagonists to turf pathogens (or disease organisms) in the new soil which is high in sand.

The disease situation will remain dynamic and fluid as cultural practices change and new cultivars are released. Studies on the epidemiology of turf diseases need to be explained.

[Summarized by REE.]

Water's Role in the Plant

Dr. A. Robert Templeton
Plant Physiologist, Aquatrols

Water is vital to living things and the turfgrass plant. It is the medium involved in nutrients entering the plant. These nutrients move through channels of water to the leaves of the plant. The plant foods produced in the

leaves move down as needed. Water is involved in the many reactions in the plant. It contains and carries oxygen which is involved in respiration.

Water is involved in transpiration which has a cooling effect. Without its availability, wilt becomes increasingly severe with increased temperature. We often forget that with deficient moisture, growth can become so slow that turf fails to recover from traffic and other injury.

Research Observations on Watering Bentgrass

Ralph E. Engel

My thoughts on bentgrass watering developed from my golf course observations, my research, and my technical reading and writing on the subject. Like most agronomists, I was taught that watering should be deep enough to re-wet the rootzone and the problems of excessive wetness should be avoided.

My first season in New Jersey was a very wet June and July. There was more than enough wet wilt for me to realize that timely light watering could save bentgrass and annual bluegrass. During the first years, I saw a lot of turf injury from wilt where there was plenty of soil moisture at a depth of one to two inches. These cases were very convincing lessons to me on over- and under-watering. I have heard many remarks that University personnel's advice is limited to "water deeply."

This was a side remark I heard again during the March

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OPINIONS AND COMMENTS

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and early summer (usually before late July). Results were poor on mature crabgrass. This information was written and reported to many who appreciate this valuable technique. Yet I am dismayed annually to see growers make the treatment too late.

This reminds us to watch for key factors in research. Look for side-by-side comparisons of the treatments and the check. Compare the standard, the good and the poor treatments. Listen to comments and questions. Take notes. Take pictures and review reports on things you would file for your use.

• REE

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meeting. Hearing and reading my thoughts clears this misrepresentation. I still say deeper watering is needed at intervals, especially with drier periods to flush salts and other chemicals deeper in the soil. The fresh water also carries dissolved oxygen in and helps flush other gases out of the soils.

The potential of light misty watering on bentgrass was demonstrated to me years ago on the turf research plots when I used 3/4 inch greenhouse pipes with mist nozzles on a dry border. Often we ran these 12 to 48 hours. Once, I left them on for approximately three days to determine if I could generate a problem. No harm ever developed on this site which had good air movement. Of course, this did not prove that none would ever occur. Surely the continuous wetness will cause problems with enough time, high temperatures, and poor air movement.

One of my conclusions has been that scarcely two golf course superintendents water alike. It is true that conditions vary from course to course, season to season, and local use; but this does not preclude respecting certain basic principles of proper watering. Everyone makes mistakes in watering, but fortunately not all bad watering "sinks the ship." Failure to prevent wilt and continuous wetness are probably the two most deadly mistakes. We should develop and use the best watering to leave room for error and to save water. We know continuous overwatering leads to the dangerous situation of relying on turf that is 90-100% annual bluegrass. With more research, we may learn to avoid more no-no's on watering with regard to turf disease control. This can reduce the amount of fungicide used.

My research and study taught me that water moving freely into the soil supplies most of the oxygen needed by bentgrass roots in our temperate climate. We also showed and reported that continuous wetness of soil at field capacity or saturation gives poor bentgrass. Simple observations show bent-



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grass does very poorly with dryness. Thus, wetness and dryness injury can occur during the same summer.

We would like to see more research on root failure. It is safe to assume that bentgrass roots often die or become nonfunctional in summer. Dr. Varney told us that many things contribute to root failure. Bentgrass and annual bluegrass roots are highly vulnerable to the summer stresses of sudden drying, excessive wetness, heat, and root diseases.

Bentgrass wilt can be prevented briefly with a light mist. This avoids serious injury when the grass plant gets too little or no water from the roots. The mist tests we reported in the August 1982 GCSAA issue showed fear of surface misting is overemphasized. Proper misting helps maintain turf quality despite root malfunction. Most importantly, misting reduces the chance of adding water to a soil that is already too wet for good roots and their best performance. Misting is not the way to recharge a dry soil — in case you start liking it too much.

Why I Renovated Fenway's Watering System Joseph Alonzi
Fenway Golf Club

My watering system at Fenway was old and needed a lot of repair. Also, I wanted a system with more flexibility that required less labor. Since this was a large project in time and money, I decided to include as many of the improvements as possible while the work was underway. As with Bob, it was my hope to develop the controls and layout that would give me maximum control

over watering. My installation was done the same year as Bob's. Both of us proceeded with similar layouts of controls. While I had an 18-hole course, I had the ugly complication of redoing all the main lines. This, plus rocks, rain and the anxiety of my members, made my summer very difficult. However, my use of the system to date has convinced me that I did the right thing.

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Special Concerns of Watering Bentgrass

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Changes in Watering Systems

Jim Barrett, Irrigation Engineer
James Barrett, Associates

Watering systems have changed in part because we are able to meet more of the desires and wishes of the golf course superintendent. Sensors and clocks have opened new possibilities. Also, better materials have become available. Irrigation engineers and installers will develop what you need. One of the biggest improvements has been our ability to give more variations in control.

A well-designed system is worth the time and money. Also, it can save water — a most valuable resource.

My Irrigation Installation and Purposes

Robert Alonzi

Winged Foot Country Club

Irrigation systems must be customized to coordinate irrigation with today's turf management practices. Water has become a limited and guarded resource, labor has become more expensive and golfers have become more sophisticated.

Today, an irrigation system must offer the flexibility of both automatic and manual operation so that the disparate needs of perimeters, collars, approaches, fairways, greens and tees can be individually satisfied.

Any system, new or old, can be customized to include a perimeter mist system, an approach compensating system, a syringing system and a tip-to-tip system for tees. The results will include highlighting of stress areas, reduction of overtime, use of less water, improved playing surfaces and increased bentgrass population on collars, approaches, fairways and greens.

Today's sophisticated technology can accommodate the innumerable variations that will allow the application of water where we want it, when we want it and how we want it, without waste.

Count the Water Lines

Multiple water lines with separate controls were installed at greensites by Robert Alonzi. He was seeking more personal control of watering, a minimum of hand watering, and avoiding water where it was not needed. Note the five types.

- a typical perimeter system to cover the greensite
- a misting system to cover green
- a collar misting line
- a line for banks and bunkers
- a line to water the apron independently of green and fairway.

Another Kind of Water Pressure

Al Rathjens, Golf Superintendent
Raritan Valley Golf Course

Interestingly, Al spent many hours of his youth with his father watering fairways with hose and movable sprinklers. His father changed over annual bluegrass fairways to bentgrass which eased the watering program somewhat.

Al has a new fairway watering system at Raritan Valley. He worries about (1) lacking willpower on overwatering and (2) giving in to the membership's pressure for more water.

Several summers ago, I was with him in later afternoon when Al was checking the turf by looking into the sun to help recognize the potential for the next day's wilt.

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Prompt Watering and Stress
Paul Latshaw, Wilmington Country Club

Paul has grown bentgrass in the diverse climates of western Pennsylvania (Oakmont), and Georgia (Augusta) prior to Wilmington. He commented that watering bentgrass is not as different between these locations as might be expected. Of course, temperature makes a lot of difference and Georgia has the long, hot season. Paul emphasized how critical it is to recognize water stress promptly and water as needed. He also believes in snap-in connections that enable watering for those spots

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that develop serious stress. This localized watering seems to be saying, "Avoid water on spots where it is not needed."

Watch and Handwater — Does Not Syringe

Bruce Peeples
Spring Lake Golf Club

Bruce is a believer in keeping a close watch and promptly watering only when the need arises. He uses a moderate amount of syringing. He says he is "a big believer in hand watering but not hand syringing."

Some Closing Comments

On the subject of misting, no one raised a question about its effects on disease. It seems certain that misting could be used in ways that enhance disease, but nothing insurmountable has been noted yet.

I was "mystified" by the lack of violent remarks against the misting procedure. The suggestion of an increase in equipment and the added dimension of misting might have started a storm of argument 40 years ago with the most temperate superintendents. Are they too polite to argue or are they pleased with a misting approach?

I expect misting will help us avoid some needless wetness on bentgrass and save some water. Use care to avoid overuse of misting. Temporary check of wilt and misting to start rewetting of hydrophobic turf without runoff seem the two best uses.

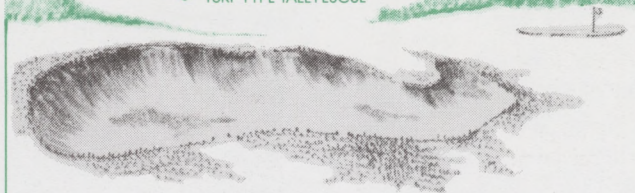
The meeting would have pleased valve manufacturers. While valves are

a pain in the neck during the years of operation, no one, from Jim Barrett through the group, seemed to object on use of "enough" valves. This appears to say there are places and times when water is not needed everywhere.

The need for precise bentgrass watering is receiving increased recognition.

• REE

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