ENVIRONMENTAL FACTORS INVOLVED IN EFFECTIVE CONTROLLER PROGRAMMING

Knowing how much water to apply to the various turf zones on the golf course is an important aspect of e every Superintendents job. The amount of water to be applied by the irrigation system is dependent on the following environmental factors:

*How much water the turf needs to survive.
*How quickly does the applied water infiltrate the soil, or move through the soil and beyond the turf root zone.
*How much water is currently available within the turf root zone.
*How much of that available water is expected to be lost through evaporation or used by the turf between irrigation periods.
*How much water is expected to be supplied by natural rainfall between irrigation periods.

Since the formulas used for calculation sprinkler precipitation rates, rainfall data, root zone depths, and moisture capacities for various soil types each use "inches" as a basis for measurement, the Superintendent should try to determine each of these environmental factors using "inches" as a basis for evaluation.

The amount of water needed by turfgrass for survival and healthy growth will vary depending on the type of turf being used, its current stage of growth or development, and other seasonal or environmental considerations. A great deal of research has been published regarding water requirements for cool season and warm season turfgrass species in California., Several publications regarding this subject are currently available from the University of California through ANR Publications, (510) 642-2431. Publication #21491 "Turfgrass Evapotranspiration Map for the Central Coast of California" ($2.00) and Publication #21492 "Turfgrass Irrigation Scheduling" ($2.50) may be of assistance in the determination of typical evapotranspiration rates and water requirements for turf in a specific regional climatic zone. If possible, the turf water requirement should be estimated as an "inches per day" quantity for each month of the year.

Available water within the turf root zone is often difficult to quantify and is dependent on root zone depth, as well as soil type and texture. Active root zone depth can usually be approximated by using a soil probe to pull soil samples at various locations around the golf course. The soil samples can also be used to evaluate typical soil types an layering (soil profiles) around the course. This data will provide an indication of which areas of the course will require more (or less) frequent irrigation cycles in order to provide available water to the root zone (based on the turf requirement). In general, sandy soils will hold less available water than clay soils. Therefore, longer or more frequent irrigation cycles may be needed in sandy soils than in clay soils to maintain a healthy and active root zone. Available water held within the root zone is usually measured as "inches of water held per inch of soil" under field water capacity conditions.

Applied water that is not fully absorbed into the soil may be lost due to evaporation or run-off before it reaches the turf root zone. Water within the root zone is drawn into the plant by osmotic pressure and is used by the turf for nutrient transfer, structural support, and temperature control. This temperature control mechanism involves the "transpiration" of water from the plant to the atmosphere. The combination of "evaporation" and "transpiration" creates a water loss that is replaced by natural rainfall and supplementary irrigations. "Evapotranspiration" rates run in cycles that are closely associated with seasonal weather patterns. In cool winter months the rate that water is lost due to evapotranspiration is much slower than during the peak summer season. Conversely, in Northern California the cool winter season generally produces more rainfall than the hot, dry summer months. Because of these opposing factors, it is necessary to reduce irrigation applications during the winter and apply water on a regular basis throughout the peak summer season. Evapotranspiration rates are expressed in terms of "inches of water lost per day" and effective rainfall is expressed in terms of "inches of water applied to the root zone per day".

To summarize, the following environmental factors at the golf course should be determined for effective irrigation program scheduling:

*Turf water requirement (average inches per day for each month).

*Active turf root zone depth (inches).
*Water holding capacity of soil within the root zone (inches of water held per inch of soil at field capacity).
*Evapotranspiration rate for turf on-site (average inches per day for each month).
*Site rainfall (average inches per day for each month)

These environmental factors will help determine the amount of water needed by the turf and will set the groundwork for developing an effective irrigation system program. The actual time required by an irrigation system to apply effective water to the turf is dependent on the physical properties and operation of the system itself.

Next Month: Physical Properties Involved in Irrigation System Programming.

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MEMBERSHIP

New Members

Class A
Bill Kissick, Salinas Golf & CC, Salinas

Associate

Todd Cook, The Olympic Club, San Francisco
Christopher Gose, Sunnyvale Municipal GC, Sunnyvale
(pending Class B exam)
Thomas Langbein, Wikiup GC, Santa Rosa
(pending Class A exam)

Affiliate

Don Grivina, Dow Elanco, Penryn
Michael Haile, Turf Tech, Concord

Class B Retired

Edward Munnelly, Concord

New Applications Subject to 30 Day Wait

Micael Landsdale, Cambridge Systems, La Selva
James Niskanen, City of Modesto Golf Program, Modesto

A LOOK AHEAD

March 26	USGA/NCGA
April 27	Palo Alto Hills CC
May 4,5	CGCSA Annual Meeting Ojai Valley Inn
May 13	Sonoma G & CC
June 19	U.S. Open-Pebble Beach
July 13	Lake MercedCC-Supt/Pro
August 14	Marin CC
September 14	Pasitiempo CC
October 9	Sierra Nevada Chapter joint meeting
November 11,12	GCSANC /UC CooperativeExtension Golf Course Institute
December 4	Christmas Party

EQUIPMENT FOR SALE

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