

WATER ITS ACTION IN THE ROOT ZONE

By DONALD A. CLEMANS
Golf Course Superintendent, Cody, Wyoming

As each day begins, water condensed as dew and fog begins to be reabsorbed into the atmosphere. Water is one of the most unusual natural resources. It expands as it cools and becomes ice, causes landslides, heaves soil and plants by frost action, causes organic matter to accumulate by eliminating aerobic bacterial action (peat bogs and thatch) and causes soil to crack open (drying of clay).

Dams and ponds are built to hold water in reserve so it will be available for irrigating turf and re-drain excess water from turf with tile drainage systems.

In the July, 1926 issue of *The National Greenskeeper*, John Morley, then president of The National

Association of Greenskeepers of America, wrote an article entitled "Is *Poa Annua* Good or Bad?" He made reference to the water-soil-air relationship: "I am of the opinion, especially during extreme hot weather, that air in the soil is more important than water. For if deprived of water in hot weather for a long period the roots of old grass will frequently survive, although the leaves and stems in a drought may turn completely brown, while if deprived of air and completely immersed in water in hot weather they will die in a few days."

Soil is basically composed of sand (large particles), silt (medium sized particles) and clay (small particles). When water is added to a

soil, three of the possible conditions produced are:

1. Saturated Soil (too much water and devoid of air)
2. Field Capacity Soil (desirable balance of soil particles, air spaces, and water)
3. Wilting Point Soil (soil with too little water which is held too tightly to the soil particles to be available to plants)

The condition of the soil that is being wetted affects this relationship. That is, granular soil has good movement of soil, water and air, while compacted or platy soil has poor movement of water and air.

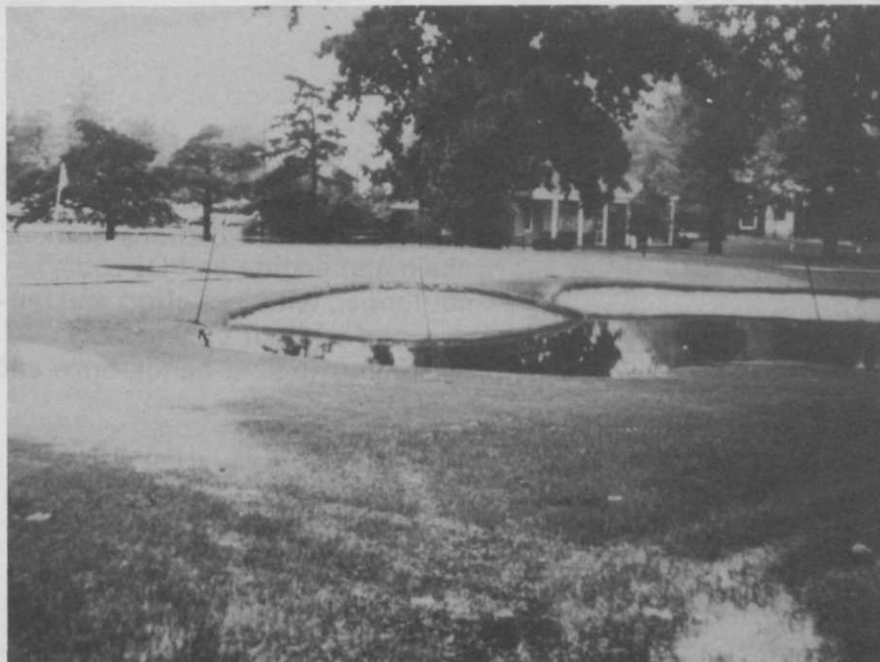
The micro-climate (the climate near the ground) is also a factor in determining whether the water that falls or runs on to a turf area is "good or bad" for that turf. Consider:

1. A hillside
2. A hilltop
3. The flat at the bottom of the hill
4. Which way does the slope face? North, South, East, or West?
5. Is the area shaded? In the morning? In the afternoon?

Relating this micro-climate phenomenon to a turf fairway, it becomes significant that the particular problem you're having in one location on your fairways is on a southwest facing slope or a southeast facing slope or at the top of a hill or at the bottom of a hill or on the side of the hill. The amount of moisture that is applied and then reabsorbed by the atmosphere due to the direction which it faces, is a significant response and reaction to the micro-climate. And thinking in terms of micro-climate the significance is maybe a key to the solution to one of your problems.

Most golf courses in the mid-west and many in other parts of the country are 40 or 50 years old. Every 5 or 6 years in the last 20 years or 30 years a way has been found to decrease the height of cut and increase the playability of the turf and still using basically the same turfgrasses originally started with. Kentucky bluegrasses, the bentgrasses and some of the hybrid bermudas used in the South are different, but basically the height of cut has drastically been reduced in the last 50 years.

(continued on page 45)



Water on a golf course can dampen a superintendent's spirit or ruin a golfer's game. Large amounts of standing water such as this can severely damage or kill turfgrass by suffocating the roots.

WATER (from page 30)

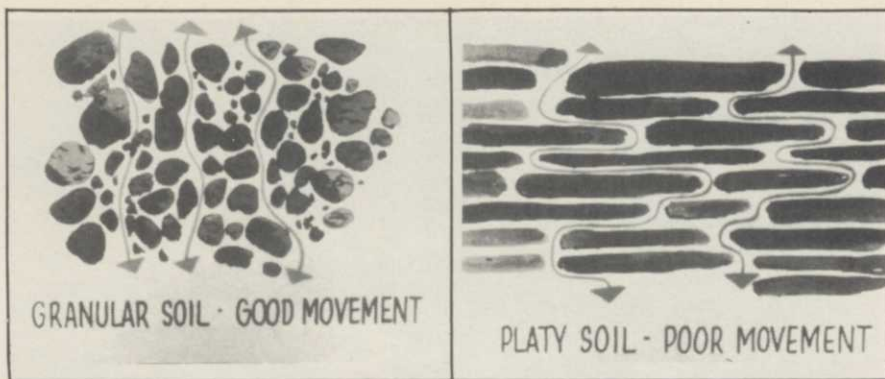
Ways have been found to add water at a moments notice to anyplace on a golf course. No longer are we completely dependent on nature's rain for the moisture that's needed.

We run 1,000 pound golf cars over the turf and the golf traffic has doubled and redoubled. Now in the '70's, we hear of "turf failure," "It's too hot or too wet to grow grass here," ". . . can't stand the traffic," "Poa annua has invaded and the turf fails every year."

We have all become product-oriented through advertising. When we see weeds invade the turf, we know from advertising that the solution is applying a selective herbicide. If disease attacks the turf, we know the solution is applying a specific or a broad spectrum fungicide. I do not suggest that turf managers do not need the herbicides and fungicides as tools and I sincerely believe that most of the herbicide and fungicide manufacturers do not promote their products as "cure-alls." But, did you ever wonder why the weeds or disease took over? Is there some agronomic practice that we might utilize to improve the health of the turf overcome some of these problems in addition to the herbicides and the fungicides?

We are accustomed to hearing about Labor Budgets, Capital Improvement Budgets and Maintenance Budgets. How many turf managers use "Water Budgets"? Do you anticipate that inch rain? Plan to have excess water run directly into surface drops and not soak into the soil. Have you left room in the root zone for a half inch rain to be absorbed and not saturate the soil?

I agree with John Morley that air in the soil is more important than water during hot weather; with Dr. Daniel, that the condition of the top inch is critical to successful turf growth; with O. J. Noer, that a mismanaged water budget causes turf failure; and with Dr. Beard, for he was looking in the right place for the answers to successful turf growth, **If you can't grow roots, you won't grow grass.** The water and air relationship in the root zone is probably the most important relationship to understand in successful turf management. I hope you have gained a renewed understanding of turf and the micro-climate and the role which water plays.



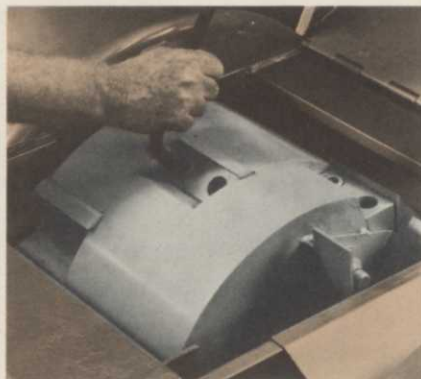
Soil condition plays an important role in the air-water-soil relationship. Granular soil has good movement of water and air, but in compacted soil, the movement is poor.

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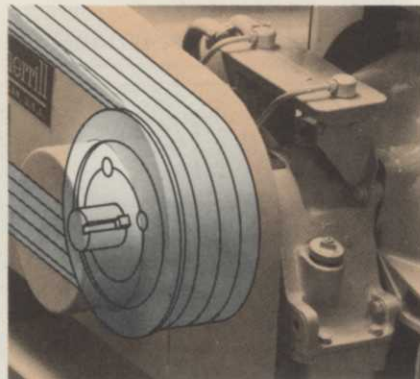


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