

UNITED STATES GOLF ASSOCIATION GREEN SECTION

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MORE ABOUT WATER

In 1953, water and water management was the main topic at many turf conferences throughout the West and Southwest. Water management was discussed from every conceivable viewpoint. Some of the people who attended several of these conferences came to feel that all had been said about watering that could be said. It was generally believed that watering practices would be improved in 1954. For the most part, this assumption has proven to be true. Many of those golf course superintendents who attended the turf conferences in 1953 went home to put their newly gained knowledge into practice. During the summer of 1954 the improvement in water management has been evident on golf courses throughout the Southwest.

On the other hand, there are still a great many golf courses where water management continues to be a problem. The fact remains that no one can tell you just how to water your greens. Greens vary on the same golf course; one requiring a different kind of management than another. There may be spots on the same green that require different amounts of water. Water management is a matter that you must study on your own greens, and when you have come to the point where you know just how your greens must be watered, then you must impart that knowledge to your water man. In many cases the superintendent himself may have an excellent knowledge of the principles of water management and yet he may have trouble on his greens as a result of the mismanagement of water, because he has not been able to tell his crew what he knows in terms that they can understand.

The principle of water management is rather simple to state: There must be adequate moisture in the soil to replenish that which is transpired by the leaves of grass. There must also be sufficient air in the soil to supply the roots with oxygen necessary for respiration; otherwise those roots cease to function. They will not take up water even though the soil is saturated. The pore space in the soil, therefore, must contain water and air at the same time. Usually we feel that the small, or capillary pores, should contain the moisture, and the large, non-capillary pores, should contain the air.

DON'T FORGET THE TURF CONFERENCES!

How does the superintendent arrive at this proper balance? He must look at his soil. This can be accomplished by a soil probe or a soil tube so that he can examine the soil at various depths in his greens. Moisture should be replenished often enough and in sufficient amounts so that the soil never becomes completely dry. It should be moist throughout the soil profile. On the other hand, the soil must not be saturated. Usually this balance of air and moisture is best accomplished by infrequent, heavy irrigations. When water is applied in large amounts, the excess water will move through the green rather rapidly and be drained away, if drainage is adequate. As it does so it will draw air into the pores that are vacated as the water drains out.

This principle of infrequent, heavy irrigations may need to be altered somewhat, however, in the growing of bentgrass. In the Southwest, bent suffers rather severely from intense heat and low humidity. This combination of circumstances causes a very rapid loss of moisture from the leaves of the bentgrass. It is not fitted, as are the native grasses, to adapt itself for the prevention of moisture loss. Native grasses, by their chemical make-up and leaf mechanisms, are able to retard the loss of moisture through transpiration. Bentgrass is native to cooler and more humid regions and these mechanisms are not developed to the same extent that they are in grasses native to hot dry regions. Bentgrass roots ordinarily grow best in a cool soil. During the summer months when the soils in the Southwest become very hot, the bentgrass roots do not function so well as they do during cooler weather. They become shallow. The fact that leaves are losing water very rapidly and roots are shallow and cannot replenish water as rapidly as it is lost, accounts for the tendency of bent to wilt if it is not watered frequently. It is simply a matter of roots not being able to furnish water to the tops as fast as it is being transpired.

It, therefore, becomes necessary to shower, or syringe greens, sometimes during the day in order to cool the surface and raise the humidity immediately around the leaves of the grass. This slows down the transpiration of water from the leaves and enables the roots to catch up with the job of supplying water to the leaves. It may be necessary to water bentgrass daily in cases where rapid evaporation and transpiration cause a heavy water loss. When greens are watered daily, they probably need less water at a time than if they were watered less frequently. The greens should never become so wet that there is not enough room in the soil for some air.

The principle of maintaining a balance of moisture and air in the soil is quite simple. The achievement of this principle seems to be exceedingly difficult. Improvement of soil texture and structure will help to some extent but the job still is primarily in the hands of the superintendent. His watering crew must apply the water in sufficient amounts and yet he must guard continuously against putting on so much water that it excludes the air from the soil. Watering bentgrass greens in the Southwest is a task which requires a thorough understanding of the needs of the plant and continuous vigilance to see that those needs are fulfilled. The golf course superintendents who continue to keep excellent turf under such adverse circumstances deserve special commendation for their achievement.

PERMEABILITY - CAN GYPSUM HELP YOU?

Soil permeability is one of the matters that concerns golf course superintendents rather generally. As long as your soil is open and takes water well, you have little to worry about. When it begins to shed water off the surface so that you do not have adequate infiltration into the soil, then it is time to start looking for the trouble. In some cases, putting greens will shed water because of the formation of a thatch. At other times the soil surface has become compacted through constant traffic and a breakdown of soil structure. In any case, an impermeable soil is characterized by localized dry spots and by the formation of black scum or algae on the surface. When you find water standing on the surface of the soil and dry soil immediately below the surface you can be fairly certain that your soil is not taking water as it should. You can be equally certain that the loss of your turf is about to occur.

Many devices have been conceived which help this situation. Cultivation or spiking of putting green soils will help the water to enter the soil. Soil conditioners have been developed which will help to granulate some soils, thereby allowing water to infiltrate the soil more readily.

Throughout the Southwest, gypsum may be a tool that has been overlooked. Gypsum may be thought of as a sort of soil conditioner. It adds lime and sulfur to the soil and tends to neutralize extremely alkaline soils. A great many areas in the Southwest have soils in which the sodium content is quite high. Even where soil is naturally comparatively free of sodium, the use of irrigation water containing sodium salts may result in the build-up of sodium in the soil. This accumulation of sodium causes soil to run together and to become impermeable. Many golf courses in West Texas and New Mexico appear to be suffering from just this condition. In such cases it is believed that gypsum will help to improve the permeability of the soil. Gypsum provides calcium in such a form that it tends to replace some of the sodium in the clay. Calcium tends to granulate soil whereas sodium tends to disperse the clay particles. Granulation of the soil enables water to move more freely and to leach the sodium salts out of the soil.

How? When? How much? Gypsum should be broadcast on the surface of the soil in conjunction with cultivation. It does most of its improvement near the surface. Don't work it in too deeply. It can be applied at any time but it will not work immediately. Late fall or winter applications are suggested. Apply 150 to 250 pounds of high grade gypsum per 1000 square feet.

How do you know whether gypsum will help you? Soil tests will give an indication. Rate of water infiltration may show you whether your soil is impermeable. The best indicator, however, will be a small test plot. This will show you definitely whether gypsum will help your golf course. Further details concerning the use of gypsum can be furnished upon request.

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