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UNITED STATES GOLF ASSOCIATION GREEN SECTION

Mid-Continent Turfletter

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CAUSES OF COLD INJURY IN TURFGRASS

Several types of injury may occur in plants as a result of exposure to conditions which prevail during the winter months.

(1) Suffocation - When covered for long periods with densely packed or encrusted snow, turf may suffer from a deficient oxygen supply. This particular problem was discussed in detail in the February turfletter, and the need to break up or melt the ice sheet and remove the resultant water was stressed.

(2) Desiccation - Continued high transpiration rates during a period when soil moisture is frozen or otherwise limited causes an injury called winter-killing. The need for water during critical periods may necessitate the activation and retraining of a sprinkler system or hauling water in a sprayer to areas where it is needed.

(3) Heaving - Heaving of the soil is another type of injury frequently called winter-kill. Heaving tears the roots loose from the soil, and wilting and death occur before the plant can re-establish itself.

Heaving may be reduced by covering the turf with a suitable mulch or similar cover. Polyethelyene covers are now being tested for this purpose.

(4) Freezing - Many plant tissues are killed or irreparably injured when they are exposed to temperatures which are low enough to cause ice formation to take place within the plant cells. This is a type of damage which we can do little about if we have protected the turf as much as possible against the previous types of injury.

With the hardest winter months just ahead, it will pay real dividends in the spring to keep a sharp eye out for possible causes of winter damage and protect against them.

WATER MOVEMENT IN SOILS

Knowing some of the how's and why's of water movement in soils can be a distinct advantage in the management of soils and the turf above them. Following is a review of some of the basic facts concerning the mechanics of soil water movement.

Water moves in all directions in an unsaturated soil, indicating that both gravity and soil tension are active. Soil tension is the attraction of the fine soil particles for water and is the dominant force causing water to move in medium or fine-textured soils until the soil approaches saturation, and then the forces of gravity become more prominent. In sandy soils the reverse is true, and gravity movement becomes the more important factor.

If a sandy layer occurs within a loamy soil, water will not move into this layer until the soil above is saturated. If a clay layer exists within a sand, the water will move more readily into the clay layer beneath the sand than out of the clay layer into the sand below.

The question is frequently asked--Would water move differently if the sand layer under the loam soil was moist? Actually, the water will not move into moist sand anymore readily than if the sand layer is dry. Water does enter and move through a sandy soil much faster than a clay or clay loam; but once the soil is wet, the usable water in a clay loam or clay is much greater than that in a sandy soil. This means a clay loam soil can be watered less frequently than a sandy loam, but the water must be applied at a slower rate for good absorption.

It is also important to understand the relationship of water movement to the movement of fertilizer materials in the soil. The fertilizer materials are carried in several different directions and may concentrate at an area where two wetting fronts come together. This suggests an advantage to applying water uniformly over the surface area.

Tillage and the incorporation of organic matter affect water movement in several ways. Organic matter when thoroughly incorporated in the soil tends to stabilize the soil structure and improves penetration. If incorporated into the soil in layers, it acts the same as a sand layer and restricts water movement. Channels left in the soil will also restrict water movement if not open to the free water surface above.

In summary, unsaturated flow of water in soil takes place because of attraction of fine particles for water and of water molecules for each other. How readily the water moves depends upon the nature of the pores and the particle size in the system.

COMING EVENTS

1962 December 10-11-12.....Texas Turfgrass Conference
Texas A & M College
College Station, Texas

1963 January 7-8.....Mid-Atlantic Association of
Golf Course Superintendents
Conference
Lord Baltimore Hotel
Baltimore, Maryland

January 14-18.....New Jersey Turfgrass Short Course
Rutgers University
New Brunswick, N. J.

January 25.....USGA Educational Meeting
Biltmore Hotel, New York City

January 30-31.....Virginia Turfgrass Conference
John Marshall Hotel
Richmond, Va.

February 10-15.....34th GCSAA International
Turfgrass Conference & Show
El Cortez Hotel
San Diego, Calif.

February 18-21.....Penn State Turfgrass Conference
Pennsylvania State University
University Park, Pa.

February 21-22.....Minnesota Golf Course Superintendents
Association Turf Conference
Minneapolis, Minnesota

March 4-5-6.....Midwest Regional Turf Conference
Purdue University
Lafayette, Indiana

March 7-8.....University of Massachusetts
Turfgrass Conference
University of Massachusetts
Amherst, Mass.

March 12-13-14.....Annual Turfgrass Short Course
Iowa State University
Ames, Iowa

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