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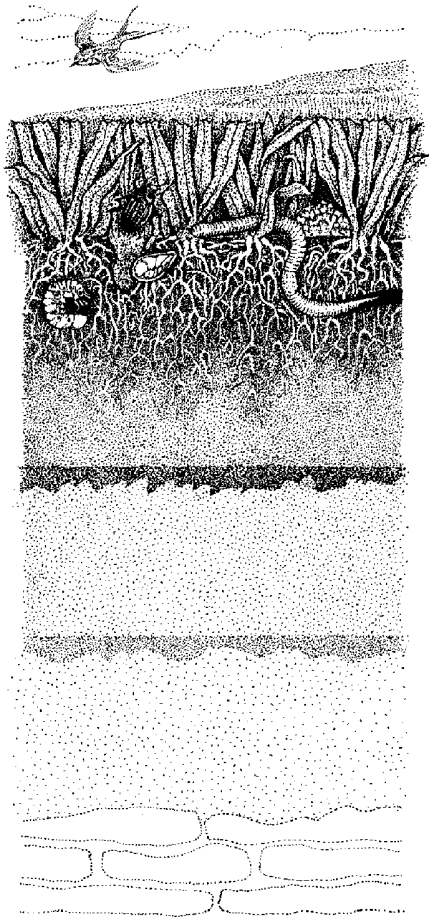

The Science and Management of Turfgrass Winter Injury

Each year acres of turfgrass across the northern regions are affected by winter injury. In some cases the injury can be severe and lead to "winterkill:" turf death resulting from singular or combined effects of freezing stress, ice encasement, traffic, desiccation, soil frost heaving, and low temperature fungi. Many of these factors, such as ice encasement or species susceptibility to freezing stress, are not easily managed.

Extensive turf loss can have significant environmental and economic consequences on the functional and aesthetic quality of recreational turf areas. Turf loss from winter injury, most evident in the spring, results in increased weed encroachment, greater soil erosion, and often requires energy intensive reestablishment procedures to restore the environmental benefits of a contiguous and healthy turf cover. ■

Low Temperature Acclimation

Survival of perennial vegetation such as turfgrasses, trees and other species that persist in northern climates requires adjustments in growth in response to day length and temperature changes. These adjustments (acclimation mechanisms) that are required for winter hardiness can begin to occur in mid to late summer. This fact is easily proved when bentgrass plants are taken from the field in June, they are easily killed at about 32 °F, while plants taken at peak hardiness in early January can survive down to -35 ° F.

Maximizing energy production from photosynthesis is essential for winter hardiness. The plant produces energy from photosynthesis and utilizes a portion for additional biomass (leaves, roots, etc.) then begins to store energy for the winter.

Energy storage is vital for winter survival for several reasons. The first and most important reason is that while the plant is dormant, it continues to respire (burn) energy. It is similar to when we sleep: we continue to breathe, we just breathe differently (deeper, more slowly). Therefore the plant must have the necessary energy to respire or it will be more susceptible to diseases and other stress.

continued on page 4

This Times