

However, it has been proved by a number of experiments that oxygen must be present at the surface of the plant roots before water can be taken into a plant. When oxygen is lacking, root cell membranes are impermeable to water. Therefore, under certain conditions it is possible for a plant to wilt while the roots are standing in water. Almost every greenkeeper has observed this condition on a putting green and has supposed that the green was suffering from "scald." While this may seem impossible, the green actually was suffering from drought because air was lacking and the grass roots were impermeable to the abundant soil moisture.

The plant also requires oxygen for the process of respiration. Respiration provides energy, and the plant requires energy for the intake of nutrients. The salt solution in grass roots (sap) is much more concentrated than is the soil solution. Ordinarily under such conditions

the nutrients would move out of the plant roots and into the soil. The energy produced by the process of respiration enables the plant to absorb nutrients against the gradient. Thus it is shown that in the absence of oxygen, the grass plants cannot provide the energy necessary for food intake. In the absence of good aeration, grasses may be poorly nourished even though there may be a plentiful supply of available nutrients in the soil.

The practical turf grower need not remember all the details of the complicated relationships which exist between the plant and its environment. He should remember, however, that it is important to maintain a proper balance between air and moisture in the soil. He should also remember that surface compaction and poor drainage are the two greatest hindrances that are encountered in the maintenance of proper soil-moisture and soil-air conditions.

TURF PICTURE AT BELTSVILLE

Bluegrass

Spring got off to a slow start. March and the greater part of April were cold and dry. The rains came in May—21 days of rain, along with cool weather. As a result of these weather conditions, the soil became saturated and common bluegrass, where grown alone, was severely damaged. Large areas of the bluegrass turf that surround the Plant Industry Station have rotted out. This has occurred on the high spots as well as on the flats. Merion (B-27) came through with flying colors.

Bents

Disease was severe on bentgrass. *Helminthosporium* leafspot (no known chemical control) was most severe on our creeping bent plots. These plots, consisting of bent selections which are being evaluated for disease susceptibility, were also damaged by dollarspot. No chemical control is being used. However, two strains, Arlington (C-1) bent and experimental strain (C-115) from

Dahlgren, Va., came through this trying period relatively free of disease. All others (more than 100 under test) were damaged with varying degrees of severity.

Tall Fescues

Our 17-acre front lawn of Alta fescue has been outstanding all spring. Justice fescue, a strain developed by Dr. E. N. Fergus, of the University of Kentucky, was superior to all other tall fescues under $\frac{1}{2}$ -inch mowing test. Common Alta, mowed continuously for the past three years at $\frac{1}{2}$ -inch, is being allowed to seed for future breeding work and selection.

Zoysia Japonica

Zoysia japonica was a full 10 days earlier than U-3 Bermuda in greening-up this spring. It is now growing actively and presents an ideal turf. *Zoysia* looks more and more like our lawn and fairway grass of the future. Outstanding selections were increased in the greenhouse last winter for planting this June.