

# Winter Dormancy and Desiccation

Dr. Thomas Watschke

Knowing how grasses grow is essential for all turfgrass managers. Equally important, however, is to know something about how turfgrasses 'rest' (dormancy). As the winter months approach, day length, light intensity and temperatures (both day and night) decrease, causing many physiological changes in turfgrasses.

The first effect of these changes is a reduction in growth. Higher temperatures than those occurring in late autumn are required for the optimum functioning of metabolic processes responsible for rapid growth. Nitrogen metabolism slows, resulting in decreased protein synthesis. Carbohydrates accumulate in storage tissue (rhizomes, stolons, crowns) because the metabolic demand for carbon is reduced (less growth and lower respiration). As long as chlorophyll remains in the leaf, photosynthesis will continue even after temperatures become quite cool. The majority of the carbon dioxide fixed in late autumn is translocated as carbohydrate to storage tissues.

Once temperatures are cold enough to cause leaf chlorophyll degradation, photosynthesis is drastically curtailed and new foliar growth is almost non-existent. The leaf canopy of turf areas becomes a mottled green to light brown colour and dormancy prevails.

Late autumn is also the time when root sloughage begins. As much as 80 per cent of the root system of turf grasses is lost over the winter. The crown area, however, is very much alive and at the mercy of the elements.

We are indebted to *The Keynote*, published by the Pennsylvania Turfgrass Council Inc., for allowing us to print these two timely articles from their November issue.

Mr. Frank Sirianni, superintendent of the Penn State University, has produced a useful check list of winter work, and Dr. Thomas Watschke, Assistant Professor of turfgrass science at Pennsylvania State University, writes on winter dormancy and that dangerous phenomenon—desiccation.

Because the grass is alive it transpires, respire, and at times fixes small amounts of CO<sub>2</sub> and consequently requires water. The inability of grasses to satisfy their water requirement results in a wilting phenomenon known to a turfgrass manager as 'desiccation'.

Desiccation is probably the foremost cause of winter injury from the Great Plains to the Atlantic seaboard and is not restricted to cool season grasses. Desiccation occurs when the water supply is diminished to the point where the plant is unable to absorb water to replenish that transpired. Several winter days of snow cover, low humidity and wind will enhance the possibility of desiccation. Evaporation losses from the soil coupled with

losses by transpiration place unattainable demands for water on an already crippled root system. Often much of the soil water is frozen and unavailable for absorption. This further reduces the time for severe desiccation to occur. Winters with plenty of snow cover seldom result in desiccation damage except for exposed areas where snow is blown away. Most winters however, have bare ground periods when the potential for desiccation is high.

Many techniques are used for the prevention of desiccation with varying degrees of success. Organic and inorganic mulches, burlap, polyethylene sheeting, porous plastics covers, or erection of snow fence to increase the amount of snow accumulation, have all been used to alleviate desiccation. Hauling of water to greens, if irrigation cannot be turned on, is an expensive and inconvenient solution, but necessary to save desiccating turf. The very best control is to apply water through irrigation lines if possible and drain the lines the same day.

Snow mold generally is more of a problem when snow fence is used, and preventive fungicide applications are more essential. Covers are bulky and difficult to secure to the turf and condensation often occurs on sunny, warm winter days. Temperatures under various covers occasionally are elevated high enough to induce growth of *Poa annua*. Screen materials or porous plastic covers do allow air movement and reduce temperature fluctuations and are superior to solid tarpaulins.

Although desiccation does not occur every winter, turf managers should be alert to the environment conditions conducive for its appearance. Turf professionals must cultivate the ability to recognise conditions favourable for desiccation and take the proper precautions to minimise its effect. During snow-free winter periods the crown area of turfgrasses should be periodically checked for turgidity. Desiccating turf appears very dry, is brittle to the touch, and is easily pulled from the soil. Examination of the upper 1½-2" of soil should also be made periodically, particularly during windy weather, as soil moisture can decline very rapidly during low humidity days (10-20 per cent relative humidity) which occur during the winter months.

Much continuous effort is expended for excellent turf during the growing season, and there is no reason for those efforts to go down the drain by losing grass to winter desiccation. Providing for the needs of dormant turf is every bit as important as the attention it receives during the growing season. Grass needs your attention 12 months of the year. Are you there?

## Turf Manager's Winter Check List

Frank Sirianni

November is the month Superintendents and Turf-managers in Pennsylvania are making preparations for winterising their golf courses, sod farms and equipment. The following is a list of *musts* we use at the University Golf Course.

1. Protect turf from frost damage, either by water or by keeping golfers and traffic off until conditions are favourable.