Air Movement and Turf Disease

The expansion of cool-season grass use in the southern US, especially creeping bentgrass putting greens, faces adaptation challenges as a result of environmental conditions such as prolonged periods of high temperature and humidity. In addition, many northern golf courses have mature vegetation, such as trees, that inhibit air movement and create microenvironments that extend periods of leaf wetness and lead to disease problems. The superintendent's ability to manipulate the environment to improve air movement is made difficult as a result of: 1) golfers' demand for bentgrass surfaces in regions where bentgrass is poorly adapted, and 2) golfers not willing to remove trees.

The advent of fans to provide airflow across a putting surface has received considerable attention from golf superintendents, who accept them as management tools. In addition, anti-golf advocates cite fan use as yet another excessive use of energy to overcome the lack of plant adaptation and meet golfer demand. Nevertheless, questions remain regarding the benefits of increased air movement, how much movement is needed, among others.

Researchers at North Carolina State University conducted a three-year experiment on Penncross creeping bentgrass turf grown on a sandy soil. Three 375-watt, 14 inch diameter non-oscillating fans created various wind velocities for 4 months (June-September). Monitoring instruments were placed 14 and 38 feet from the fans to measure ambient air and soil temperature, dew point and relative humidity. In addition, turf quality and duration of leaf wetness were monitored.

Results revealed that as wind velocity increased to 3 miles per hour and above, canopy temperature decreased, turf quality increased, and incidence of brown patch and algae decreased. Separate studies have suggested different results for dollar spot which slightly increased at high velocities and low soil moisture, creating an environment conducive to desiccation. Therefore, while increased air movement is a benefit in some cases, this study suggests the importance of monitoring the microenvironmental conditions to determine actual benefits.

(From: Lyford, P.R., C.H. Peacock and J.E. Bailey. 1999. Effects of air movement on disease management programs on bentgrass. N.C. Turfgrass News, Dec/Jan. 1999. Pp. 38-40.)

Turfgrass Fertility and Water Use

Turfgrass nutrition remains one of the last aspects of a management program that appears to rely on "art" or "feel" as much as science. Simply, there is a paucity of information available on precise nutrient requirements for various uses, species, cultivars, soil types, mowing heights, etc. In addition, there are numerous interactive links among the factors stated above and between various individual nutrients. Therefore, much of the science that needs to be conducted is still exploratory in nature.

Research conducted here at Cornell by Dr. Scott Ebdon (now a Turfgrass Scientist at the Univ. of Massachusetts) and Cornell Turfgrass Team Members Petrovic and White investigated the relationship among N, P and K regarding shoot growth and water use. An improved cultivar of Kentucky bluegrass was seeded into a sandy loam soil, pH 6.5, with inadequate levels of P and K so that a response from applying these nutrients could be measured. Monthly fertilizer applications were made to simulate 1, 3, 6, 9, or 12 lbs. of N per 1000 square feet with urea, triple superphosphate and muriate of potash.

Unless the 12 lb. N rate was applied, N had no effect on water use in the absence of P and K. Of course, as has been shown in many studies, there was no measurable shoot growth or water use response to P or K applied alone, suggesting the intimate link between N rate and nutrient demand. However, the interactive effect of N, P and K relative to water use is the significant, if not surprising aspect of this research. Specifically, when N and P levels were applied in a typical fashion to this turf and soil type, as K levels were increased, water use rates decreased. This reduced water use seems well correlated with reduced shoot growth at increased K levels. This may be related to the impact of K salts on plant water relations and subsequently on growth.

By no means does this one experiment rise to the level of altering fertility programs, however, it is wise for turf managers to view their fertility programs more completely. Clearly, N levels determine demand for other nutrients and when the plant is supplied with adequate N and P, serious consideration must be given to K rates relative to water use.

(From: Ebdon, J.S., A.M. Petrovic and R.A. White. 1999. Interaction of nitrogen, phosphorus and potassium on evapotranspiration rate and growth of Kentucky bluegrass. Crop Sci. 39:209-218.)

Scanning the Journals

A review of current journal articles

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