Turfgrass research review

by Dr. James B. Beard

Winter fertilization: a new concept

Effect of Nitrogen on Winter Root Growth of Bentgrass.
A. J. Powell, R. E. Blaser and R. E. Schmidt. Agronomy Journal. 59(6):529-530. 1967. (from the Department of Agronomy, Virginia Polytechnic Institute, Blackburg, Va. 24061).

The objective of this investigation was to study the effect of fall and winter nitrogen fertilizations on root growth of bentgrass maintained under putting green conditions. Root growth during the winter was ascertained by the placement of Penncross bentgrass cores in aluminum cans four inches in diameter and seven inches in depth. These containers were placed in holes in a Penncross putting green and were removed at periodic intervals throughout the winter and spring periods to ascertain the amount of root growth achieved.

One pound of nitrogen per 1,000 square feet was applied in the following monthly treatments: (a) October, (b) October-December, (c) October-December-February, (d) October-December-February-April. In addition there was (e) a check treatment receiving no fertilization during the winter period and (f) a two pound per 1,000 square feet rate applied in the months of October, December, February and April.

In these experiments conducted in Virginia latitudes the root growth was greatest during the fall and spring and minimal during the winter period. Regardless of what month the nitrogen application was made, there was an immediate affect in reducing root growth of the bentgrass maintained under putting green conditions, but root growth was actually enhanced on a long term basis. The best root growth throughout the winter and spring period was achieved with an initial nitrogen application in October or with one or two additional bimonthly applications made following the October fertilization. Monthly applications of nitrogen at one pound per 1,000 square feet throughout the winter period retarded root growth. Bentgrass which received no fall or winter nitrogen fertilization had substantial fall root growth but resulted in minimal root growth during the spring period.

The authors concluded that bimonthly applications made during the fall and winter period in Virginia latitudes resulted in improved winter color, turfgrass quality and root growth of cool season turfgrasses. These responses were evident throughout the early spring growing season and resulted in a reduction in the amount of nitrogen which must be required during the spring period. This in turn decreased the problem of excessive top growth during the spring period.

Comments: The concept of late fall or winter fertilization to maintain better winter color and root growth is relatively new. As a result the spring fertilization requirement is reduced or eliminated. By avoiding the need for spring fertilization, the increased mowing resulting from the stimulated top growth during the optimum moisture and temperature periods of spring and early summer are avoided. This response is now documented by several universities and confirms the reports from Virginia. This concept of late fall and winter fertilization may prove to be one of the most striking changes in turfgrass fertilization principles developed in several decades.

The question arises as to how wide a range of latitudes and winter climates this concept can be applied. Observations in regions where severe winters occur and low soil temperatures are common are that it has not been possible to maintain a green color through the winter period. Also, it has been shown that excessive late fall fertilizations applied during the period when the grass is still making some vegetative growth can result in decreased low temperature tolerance. More studies comparable to the Virginia studies need to be conducted throughout the climatic zones of the cool-humid region in order to ascertain how widely the concept of fall and winter fertilization can be employed.