

Nitrogen Fate in a 10-year Old Kentucky Bluegrass Stand

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Extensive research on nitrate-nitrogen ($\text{NO}_3\text{-N}$) leaching in turfgrass systems indicates that in most cases there is little risk for groundwater contamination from fertilizer applications. However, most of the research was conducted on research sites that were either recently disturbed or established. The potential for $\text{NO}_3\text{-N}$ concentrations in leachate to increase on mature turf sites has not been investigated. For this research the fate of N was examined in a mature Kentucky bluegrass stand (10-12 years old), using monolith lysimeters and microplots. From 1998 through 2002, half of the lysimeters and plot area were treated annually with urea at a high nitrogen rate of 5 lb. N/ 1000 ft^2 . The remaining lysimeters and plot area were treated annually with urea at a low nitrogen rate of 2 lb. N/ 1000 ft^2 , except in 2000 when only 1.5 lb. N/ 1000 ft^2 was applied. On October 17, 2000, ^{15}N labeled urea was applied to the microplots and lysimeters to distinguish between nitrogen already cycling in the system and the fertilizer nitrogen applied. This 'heavy' isotope labeled fertilizer is easily distinguished from other forms of nitrogen by laboratory analysis.

Beginning in 1998, $\text{NO}_3\text{-N}$ leaching from the lysimeters was measured. Between 1998 and 2001, $\text{NO}_3\text{-N}$ concentrations in leachate at the low nitrogen rate averaged 2.76 ppm. At the high nitrogen rate, $\text{NO}_3\text{-N}$ concentrations in leachate averaged 11.58 ppm, and exceeded 20 ppm on several sampling dates. Initial results indicate that total yearly applications of urea at 5 lb. N/ 1000 ft^2 over many years may be excessive and lead to high $\text{NO}_3\text{-N}$ concentrations in leachate. Data will be presented for $\text{NO}_3\text{-N}$ concentration in leachate and ^{15}N allocation in verdure, thatch, and soil.

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