Gaseous Losses and Long-Term Fate of Nitrogen Applied to Kentucky Bluegrass Turf

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This joint project with the University of Illinois is sponsored by the United States golf Association. Our primary objective is to examine the fate of fertilizer nitrogen applied to Kentucky bluegrass (Poa pratensis) turf. Between 1989 and 1990, four monolith lysimeters were constructed using intact soil profiles at the HTRC. Previous studies indicated that approximately 0.2% was lost in leachate from the lysimeters. One aspect of the current study is to determine whether or not nitrate leaching will increase after several years on intensively managed turf.

Two rates of urea (2 and 5 lbs N/1000 ft2/ year) were applied to the lysimeter area beginning in June, 1998. Leachate has been collected and analyzed for total volume, [NO3-], and [NH4+]. Results show an increase in nitrate concentration in the leachate from areas receiving higher nitrogen fertilizer application. Leachate will continue to be collected over the next several years in order to better characterize long term fate of nitrogen.

Another aspect of this project is to determine the amount of nitrogen lost as gas through denitrification in a turfgrass environment. Denitrification is an important mechanism in the fate of nitrogen applied to turfgrass and can be simply defined as a gaseous loss of fertilizer nitrogen, with reported losses of up to 20%. Denitrification occurs biologically and chemically under elevated soil temperatures, soil acidity, and moist soil environments. A separate site is being used for denitrification studies.

This project will help establish a mass balance of fertilizer nitrogen in the turf environment and effectively assist turfgrass managers in establishing a more efficient fertilizer budget.