variation in nitrate levels due to the UAN application, an intense four-week (28-day period) soil sampling was performed during the 2008 growing season (July 23 through Aug. 16, 2008). Soil samples were broken into 0 to 15 cm and 15 to 30 cm soil depths.

Leachate was collected three times after rainfall events from three separate fertigation cycles (28 days/cycle) once at four, 13 and 26 days into cycle — April 1, May 7 and Aug. 12, respectively. Leachate was analyzed for nitrate and nitrite being leached and compared to the EPA limits of 10 milligrams (mg)/1 and 1 mg/1 respectively. A biomass collection and several visual quality ratings were performed throughout the 2008 growing season to analyze the health of the turfgrass.

Two- and three-way analysis of variance (ANOVA) were performed on the collected data using the Statistical Analysis Software general linear model (GLM) procedure at the 0.05 probability level with the Tukey multiple-comparison test used to determine differences in means between the treatments.

There was no significant difference in fertigation frequency for any of the data collected, therefore only the rate means are shown.

Soil analysis showed large amounts of nitrate-nitrogen being retained in the soil and not being utilized by the turfgrass at rates of 48.8 and 97.7 kg N/ha/month.

During a natural rain event (Aug. 18, 2008) resulting in 8.28 cm of precipitation, this large buildup of nitrate-nitrogen in the soil was leached, causing excessive nitrate-nitrogen leachate over the EPA limits.

The first two water samples were taken early in the growing season when the applied nitrate-nitrogen was not being effectively used by the turfgrass. This led to higher nitrate-nitrogen leachate values in the lower 12.2 and 24.4 kg N/ha/month rates, which lowered significantly once the turfgrass was fully established. Leaf tissue N levels were 1.3 percent, 3.0 percent, 3.4 percent, 3.5 percent and 4.6 percent for the 0, 12, 24, 49 and 98 kg N/ha/month rates, respectively. The control was significantly lower and the 98 kg N/ha/month rate significantly higher than the other rates. However, all four rates had leaf tissue nitrogen percentages between the 3- to 5-percent sufficiency range for a fairway turfgrass (McCarty, 2001).

Visual quality ratings were highest for the 12.2, 24.4 and 48.8 kg N/ha/month rates compared with the control and 97.7 kg N/ha/month rate (data not shown). Visual quality rating for both the 48.8 and 97.7 kg N/ha/month rates were often lower due to excessive vegetative growth that led to scalping with the weekly clipping. Both these rates, however, did still produce an acceptable quality turfgrass.

When compared with the vegetative growth data, it was generally seen that as vegetative growth increased, visual quality increased as well. However, sometimes the quality of the turfgrass was affected if the growth was excessive. This would show up during the weekly clipping when some of the more vigorous turfgrass would have a scalping effect when clipped.

Results from the study indicate a fertigation rate of 12.2 kg N/ha/month produced a quality turfgrass, while minimizing nitrate-nitrogen leaching in sandy-loam soil. Optimum quality was obtained at the 24.4 and 48.8 kg N/ha/month rates. This range is currently recommended for optimum bermudagrass quality and growth. However, in this study, the 24.4 and 48.8 kg N/ha/month rates produced nitrate leachate levels that were well above EPA limits. These rates may have produced such high nitrate leaching values due to the limited root zone and soil profile of only 30 cm. If a deeper soil profile had been used, leachate values may not have been as high.

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