Washington State University

Quantification and Fate of Nitrogen from Amended Sand Putting Green Profiles

The Pacific Northwest has a history of constructing sand greens from pure sand, some with coarse particle sizes and without amendment in order to reduce the cost of construction. A major concern is whether nitrate nitrogen in the leachate from putting green profiles constructed of sand alone, or peat/soil amended sand, can be prevented through efficient irrigation practices, efficient nitrogen fertilizer application, reduction in total nitrogen fertilization rate, or use of deeper sand profiles. This research project will evaluate the susceptibility of these systems to nitrate nitrogen leaching and provide guidance for its correction, reduction or elimination. Lighter, more frequent applications of fertilizers from slow-release sources may be helpful. In addition, frequent, light, liquid application of ammonium sulfate, from a portion of the nitrogen supplied, may improve nitrogen uptake efficiency and improve turf quality and playability without promoting excessive thatch development.

Lysimeters were constructed during 1991 from local funds and labor. Thirty-six of the lysimeters were seeded in early October to 'Putter' creeping bentgrass (*Agrostis palustris* Huds.) and will be overseeded to local ecotypes of annual bluegrass (*Poa annua* L.) in the spring of 1992. The turf is managed as a putting green and traffic will be applied with a Brinkman traffic simulator equipped with golf cleats.

With these lysimeters, an amended sand by nitrogen rate by nitrogen application timing study was established. The field lysimeters, built similarly to USGA green specifications, are 4 ft. x 8 ft. and were constructed with a plastic reinforced liner, and each was fitted with perforated drain tube. The drain tubes are overlaid by 3 inches of pea gravel and 3 inches of coarse sand. Lysimeters are fitted with PVC suction water samplers placed at 8 to 11 inches in the profile. Irrigation timing and quantity is computer logged in each group of 12 lysimeters. The irrigation system is controlled by computer monitoring of moisture sensors located at 3 to 4 and 10 to 12 inches below the putting surface to provide optimum water management.

The growing medium consists of 12 inches of USGA specification sand, either alone or amended with ten percent sphagnum peat and two percent fine sandy loam soil. Nitrogen applications consist of three nitrogen rates (38.7, 58.1 and 77.4 g N m^{-2} annually) and two application methods (granular slow release/soluble N fertilizer in four-week applications and biweekly granular slow release N with liquid ammonium sulfate).

Leachate data collection was begun the last week of October with the beginning of fall rains on the weekend of October 20, 1991. Soil-water percolate from each lysimeter is monitored and quantified on 24-h intervals during leachate production periods. Leachate samples are analyzed by nitrate and ammonium ion sensitive electrodes and ion analyzer.

Dr. Stanton Brauen
Dr. Gwen K. Stahnke

University of Nevada, Reno

The Effect of Salinity on Nitrate Leaching from Turfgrass

This project was initiated in March of 1991, and consists of both a field component (Las Vegas) and a greenhouse component (Reno) to examine the effects of saline irrigation water on nitrate leaching from a soil root zone and on nitrogen uptake by turfgrasses.

Las Vegas: The irrigation system and sampling hardware (lysimeters, tensiometers, neutron probe access tubes, ceramic extraction cups, associated plumbing, etc.) were installed at Horseman's Park in southeast Las Vegas during the spring and summer. Plots were then seeded with either 'NuMex Sahara' bermudagrass or 'Monarch' tall fescue at rates of 45 and 357 lbs./acre, respectively. Each turf was established under typical fairway management conditions. Bermudagrass plots were overseeded with Palmer/Prelude perennial ryegrass in October. The saline irrigation treatments will be initiated in January of 1992, after which time data collection will begin. It is anticipated that the first full season's data will be available by November 1992.

Reno: Seventy-two soil columns (6 inches diameter by 24 inches deep) were equipped with