

TITLE: The Effect of Salinity on Nitrate Leaching from
Turfgrass

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USGA REGION: Western

00061

Executive Summary for USGA Sponsored Research Project:

The Effect of Salinity on Nitrate Leaching from Turfgrass

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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, and nitrogen uptake by turfgrasses.

Las Vegas: The irrigation system and sampling hardware (lysimeters, tensiometers, neutron probe access tubes, ceramic extraction cups, associated plumbing) 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 50 and 400 kg/ha, respectively. Each turf is being established under typical fairway management conditions. Bermudagrass plots were overseeded with Palmer/Prelude perennial ryegrass in October. We intend to initiate the line source treatments 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 (15 cm diameter by 60 cm deep) were equipped with ceramic extraction cups embedded in diatomaceous earth and backfilled with a loamy sand. Each extraction cup is connected by tubing to individual collection bottles, which are in turn connected to a common vacuum line. Thirty-six columns were then seeded with either 'NuMex Sahara' bermudagrass or 'Monarch' tall fescue at the rates above. Establishment and growth has been rapid in the greenhouse for both species, and a dense sward has developed. Columns are fertilized once each month with NH_4NO_3 at a rate of 50 kg N/ha. Supplemental iron as Fe-EDDHA has been added regularly to correct some incipient chlorosis in the young bermudagrasses. It is planned to start the salinity X leaching fraction treatments in January, following which drainage will be collected weekly and analyzed for nitrate and ammonium.

In addition to setting up the column experiment, an experiment was conducted in nutrient solution culture to examine the effects of salinity on N uptake. Briefly, two cultivars of tall fescue were grown in solution culture for four months. 'Monarch' was chosen as a relatively salt tolerant and 'Finelawn' as a salt sensitive cultivar. Nitrogen treatments were imposed to produce N-replete turf (no N stress) and moderately N-deficient turf (daily additions of NO_3 at suboptimal rates to mimic the more typical turf condition). Rootzone salinity was imposed incrementally over four weeks to final salt concentrations of 0, 40, 80 and 120 mM using a combination of NaCl and CaCl_2 at a molar ratio of 8:1. Nitrogen uptake was measured for either $\text{NO}_3\text{-N}$ and $\text{NH}_4\text{-N}$ over a 24 hr period as previously described (Bowman et al., 1989, J. Amer. Soc. Hort. Sci. 114:229-233). Data is currently being analyzed.

