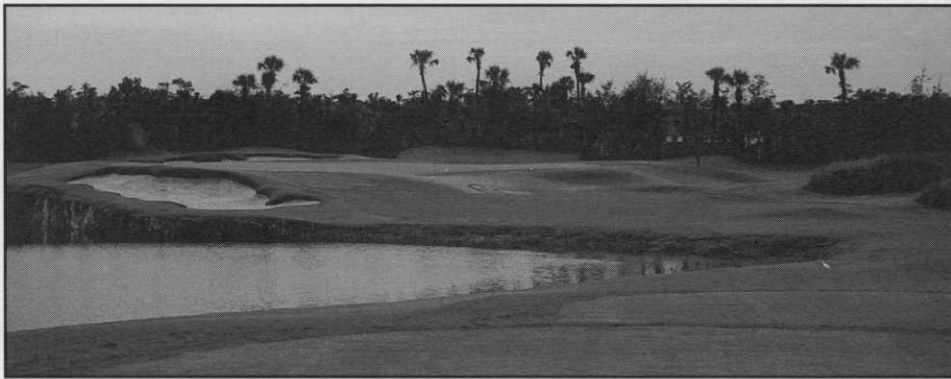


# Soil Amendments Reduce Nitrate Leaching

By Cale A. Bigelow, D. Keith Cassel and Daniel C. Bowman



*Greens mix amendments can reduce nitrogen leaching and runoff.*

The public continues to perceive golf courses as careless polluters of water supplies. It is thus important to examine any and all cultural practices as they affect offsite nutrient movement. The greatest concern is with nitrate transport into surface and groundwater. Nitrate is very mobile in soils, and is prone to leaching in sand-based rootzones, especially during turf establishment.

A study of the nitrogen-holding ability of sand-based rootzone mixes was recently conducted at North Carolina State University in Raleigh. The goal was to compare the nutrient holding capacity of conventional sand-based rootzones to those amended with sphagnum peat moss or with one of several inorganic soil amendments (porous ceramic, diatomaceous earth product and clinoptilolite zeolite).

Quartz sand was mixed with four different inorganic amendments, including Profile® (Applied Industrial Materials Corp.), Isolite® (Sundire Enterprises), Greenschoice® (Premier Environmental Products), and Ecolite® (Western Organics), and sphagnum peat moss. Cylinders were filled with uniform mixtures of sand and amendment to a depth of 30 cm. Ammonium

nitrate ( $\text{NH}_3\text{NO}_3$ ) was applied to the soil mixes and irrigation was initiated immediately using distilled water. Leachate was collected and analyzed for  $\text{NH}_4\text{-N}$  and  $\text{NO}_3\text{-N}$ . Results are summarized below:

- Nitrogen leached rapidly from the unamended sand, with approximately 95 percent of applied nitrogen passing through the rootzone. Amendments generally reduced the amount of  $\text{NH}_4$  leached, but had little effect on  $\text{NO}_3$  leaching.
- Increasing the incorporation rate of Profile and Ecolite progressively decreased  $\text{NH}_4\text{-N}$  loss. Using either amendment at 10% by volume reduced ammonium losses nearly as well as at 20%.
- Deeper incorporation of the amendment reduced N leaching more than shallow incorporation.
- It might be possible to reduce N leaching during putting green establishment by amending sand-based rootzones with a specific inorganic material, with or without peat moss and using ammonium based fertilizers.

*Cale Bigelow is completing a Ph.D. at North Carolina State University. Drs. Cassel and Bowman are NCSU faculty involved in turfgrass soils research.*