Significantly more NH_4^+-nitrogen leached from pure sand than for 20 percent (v:v) amended mixtures. Leaching losses ranked in decreasing order: pure sand > Greenschoice = Isolite > Peat > Profile > Ecolite. The most effective amendments, Profile and Ecolite, reduced NH_4^+-nitrogen leaching compared to pure sand by 75 and 88 percent, respectively.

Further studies with Ecolite and Profile had the following results. Increasing Profile and Ecolite rates from 1 to 20 percent resulted in stepwise decreases in NH_4^+-nitrogen loss. Although 20% amendment may be the most effective rate for retaining NH_4^+, it may not be economically feasible. Amendment at 10 percent significantly reduced NH_4^+-nitrogen leaching by 63 and 79 percent compared to pure sand for Profile and Ecolite, respectively.

Ecolite and Profile (10% v:v with sand) incorporated at three rootzone depths significantly decreased NH_4^+-nitrogen losses by approximately 25 percent, compared to pure sand. Again, there was a step-wise reduction of NH_4^+-nitrogen leaching reduction with increasing amendment depth. Incorporation of 10 percent amendment through the entire 30 cm rootzone resulted in the least NH_4^+-nitrogen leaching loss, with a significant difference noted between Profile and Ecolite. Losses were decreased by 65 and 80 percent for Profile and Ecolite, respectively.

Large quantities of $N0_3^-$-nitrogen(>90%), were recovered in leachate from all treatments under all experimental conditions. Peak $N0_3^-$-nitrogen concentrations of over 70 mg L^{-1} in pure sand leachate were observed. I

Grow-in and Cultural Practice Inputs on USGA Putting Greens and Their Microbial Communities

University of Nebraska

Dr. Roch Gaussoin

Start Date: 1996
Number of Years: 5
Total Funding: $100,000 (Co-funded with the GCSAA)

Objectives:

1. *Evaluate grow-in procedure effects on putting green establishment and performance, and develop criteria and recommendations for new putting green readiness for play.*
2. *Determine grow-in procedure impacts on root zone physical and chemical properties.*
3. *Evaluate post grow-in cultural practice effects on putting green long-term performance.*
4. *Determine temporal and spatial (by depth) patterns of rhizosphere community development in golf greens during accelerated and controlled grow-in of select root zone mixes and during long-term green maintenance.*

The five year project is composed of three phases, One: Construction and Grow-in, Two: Microbial Community Assessments, and Three: Grow-in Procedure Impacts on the Long-term performance of the Putting Green. Phases I and II will span three-year periods, while Phase III will involve experiments repeated over the five years of the project.

Two separate USGA-specification root zone mixtures - one composed of sand and peat (80:20 ratio) and one a combination of sand, soil, and peat (80:5:15 ratio) - were developed in 1996. Materials used for construction complied with USGA Greens recommendations for physical characteristics and organic matter content. First year greens (1997 Greens) were constructed in late summer of 1996, allowed to settle over the winter, and were seeded with Providence creeping bentgrass (1.5 lbs/1000 ft^2) in the spring (May 30) of 1997. Second year greens (1998 Greens) were constructed in the summer of 1997, allowed to settle over the winter, and were seeded with Providence creeping bentgrass (1.5 lbs/1000 ft^2) in the spring (May 27) of 1998.

Preliminary results indicate the following trends. Microbial biomass was not affected by root-zone mix or grow-in procedure on plots established in 1997. Microbial biomass increased over 200% from spring to fall and decreased 40-60% as sampling depth increased. Water infiltration from these same plots were- not affected by root-zone mix or grow-in procedure when measured in 1998.

For two consecutive years, it was found that higher inputs would initially increase cover during grow-in. However, this increase may not translate to earlier opening for play if environmental stress conditions occur that result in damage to lush, immature turf.

The root zone mix containing soil established faster and recovered from environmental stress better than a soil-less mix. A soil-containing mix also will be harder and may result in longer ball roll distance. Addition of soil to the root zone mix did not effect water infiltration during the establishment year. I

Assessing Differential Root Zone Mixes for Putting Greens Over Time Under Two Environmental Conditions

Rutgers/Cook College

Dr. James Murphy

Start Date: 1996
Number of Years: 5
Total Funding: $100,000 (Co-funded with the GCSAA)

Objectives:

1. *Evaluate grow-in procedure effects on putting green establishment and performance, and develop criteria and recommendations for new putting green readiness for play.*
2. *Determine grow-in procedure impacts on root zone physical and chemical propeties.*