



WATER RESOURCES RESEARCH GRANT PROPOSAL

Project ID: 2003CT24B

Title: Handheld Light Meters and Anion Exchange Membranes to Reduce the Threat of Water Pollution from Turfgrass Fertilizers

Project Type: Research

Focus Categories: Nitrate Contamination, Non Point Pollution, Nutrients

Keywords: nitrogen, fertilizers, water quality monitoring, water quality management, leaching, solute transport, plant growth, turfgrass management, ion exchange

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End Date: 01/01/2005

Federal Funds: \$26690.00

Matching Funds: \$41693.00

Congressional District: 2nd

Principal Investigators: Guillard, Karl

Abstract: Turf is replacing cropland along the entire Eastern Seaboard of North America. Although these areas are not regarded as agricultural cropland, they may receive comparable or greater amounts of fertilizers than are applied to cropland. Increased lawn and garden fertilizer use was suspected as the cause for the additional sources of N in the sewered areas, thereby replacing the release of N from on-site domestic septic systems as the principal source of this constituent in ground water. Earlier studies have suggested that the fertilization of lawns has a high potential to degrade water quality in this region (Baier and Rykbost, 1976). Because a large land area devoted to fertilized turf in Connecticut and other Eastern states is located adjacent to pond, lake, river, and coastal shorelines, N losses from turf may contribute significantly to the degradation of sensitive N-limited ecosystems when the total N load over a larger geographical area is considered. Soil tests are now routinely used in agricultural crop production, and expected as part of nutrient management plans for most crops. It is time for such tests to be developed and implemented for turf. The problem is that up until now, no reliable N test has been developed for turf. Preliminary data from my laboratory suggest that handheld meters and anion exchange membranes (AEMs) have great potential in fine-tuning N management for turf. Establishment of a database utilizing

tristimulus and reflectance meter readings and desorbed nitrate-N from AEMs will allow for the development of a rapid and reliable N management program for turf that can be customized for specific sites and not based on subjective determinations. It can be reasonably expected that the results of the proposed work will provide conclusive evidence to show that AEMs and handheld meters can provide rapid, site-specific recommendations to optimize N management for various turfgrasses used for various purposes. The overall goal of the proposed research is to show that handheld tristimulus and reflectance meters and AEMs can be used as tools to guide N fertilization management of turf. Most of my preliminary work was conducted under a controlled environment in the greenhouse and now must be confirmed with field studies.

The specific objectives of the proposed research are:

- Determine the relationship between tristimulus and reflectance meter readings and turf color quality responses under field conditions.
- Determine the relationship between soil nitrate-N (desorbed from anion exchange membranes) and turf growth responses under field conditions.
- Determine the relationship between tristimulus and reflectance meter readings and soil nitrate-N (desorbed from anion exchange membranes) under field conditions.
- Determine the relationship between soil nitrate-N (desorbed from anion exchange membranes) and nitrate leaching from turf soil monolith lysimeters under controlled conditions.

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