



## WATER RESOURCES RESEARCH GRANT PROPOSAL

**Project ID:** 2003MA9B

**Title:** Potential Movement of Pesticides Related to Dissolved Organic Matter from Organic Fertilizer Application on Turf

**Project Type:** Research

**Focus Categories:** Water Quality, Groundwater, Solute Transport

**Keywords:** dissolved organic matter, organic fertilizers, pesticides, sorption, leaching

**Start Date:** 03/01/2003

**End Date:** 02/28/2005

**Federal Funds:** \$30000.00

**Matching Funds:** \$59941.00

**Congressional District:** 1st

**Principal Investigators:** Xing, Baoshan; Torello, William

**Abstract:** Statement of Critical Water Problem

Turf grass systems, including golf courses, turf farms, parks and lawns, are the most intensively managed lands in the United States. Establishment and maintenance of high quality turf grass usually imply substantial inputs of water, nutrients, and pesticides. The impacts of these inputs to groundwater and surface water are a major concern of public and government agencies with over 17,816 golf courses in the U.S. and more than one new golf course opening every day (National Golf Foundation, 2002). Recent results from various facets of agricultural research have indicated very significant effects of dissolved organic matter (DOM) on the increased mobility of pesticides through soils to groundwater. These findings may have important ramifications to the golf turf industry in that the frequent use of certain organic fertilizers and amendments may actually enhance rather than inhibit movement of certain pesticides through highly managed greens and tee areas having a high level of sand incorporated into profiles. This is not only a regional, but also a national problem. The Northeast is more susceptible due to the coarse texture of soils in general. There is a significant amount of research devoted to the efficacy of organic fertilizers currently on the market such as NatureSafe, Milorganite, Sustain and Ringers, some

containing as much as 3.5 % DOM (water extraction). Organic fertilizers are considered slow release materials with low burn potential and are often applied at higher rates compared with soluble inorganic fertilizers. Higher application rates could easily result in higher loading of DOM into soil profiles. In addition, high density and much more root turnover in turf grass ecosystems could directly contribute to the pool of natural DOM, which could affect the behavior of pesticides in soil and water.

### Statement of Expected Results and Benefits

The proposed research will elucidate the interaction between DOM and certain pesticides used in turf grass management and the impact of DOM from organic fertilizers on pesticide movement and leaching in soils. The research will include the following steps: 1) characterize the DOM extracted from different organic fertilizers/amendments; 2) evaluate the effects of DOM on sorption of certain pesticides in soils; 3) determine the effects of DOM on pesticides leaching by using disturbed column trials, and 4) monitor and determine the concentrations of DOM and pesticides in water samples collected from the field (golf courses) under different management systems. Field results will clarify the possible DOM contribution to groundwater contamination under different turf grass management systems. The results also will provide critical information for more comprehensive studies on pesticide modeling. The results will help educate the general public about pesticide movement in soils under organic practices. Golf course superintendents will be able to use the results to identify fertilizers and amendments that promote the elevation of DOM in greens and tee profiles. This information could then be used to develop management practices to further reduce the likelihood of pesticide movement and identify compounds that were previously thought to be of no environmental consequence. The research is also expected to provide valuable information for organic fertilizer manufacturers to improve products and for superintendents to make better combinations of organic and inorganic fertilizers in their IPM practices. These benefits will in turn help protect water quality.

---

*[U.S. Department of the Interior, U.S. Geological Survey](#)*

*Maintain: [Schefter@usgs.gov](mailto:Schefter@usgs.gov)*

*Last Modified: Wed May 28, 2003 4:26 PM*

*[Privacy Statement](#) // [Disclaimer](#) // [Accessibility](#)*