Non-Confidential Description - PSU No. 2813
“Use of Solid-Phase Buffer to Improve Turfgrass Cultivation”

Keywords:
Turfgrass, Turf Systems including Golf Courses, Plant Fertilization

Links:
U.S. Patent 7,485,171
Inventor Website
Related Article

Inventors:
Jonathan Lynch, Eric Lyons, Robert Snyder

Background
Turfgrass is a multi-billion dollar industry in the United States. Annual turfgrass seed sales are second only to corn in the United States and rank above soybean and wheat combined. Turfgrass is cultivated in residences, roadsides, municipal areas, and recreational areas, notably golf courses. Golf greens are typically grown under high fertility and are irrigated. Because the turf is mowed at 2-5 mm, the primary stresses in this system are temperature and physical disturbances. Disease pressure is often minimized by the application of pesticides. In order to maintain turfgrass quality, golf courses often employ intensive irrigation and fertilization programs.

Invention Description
This invention creates a phosphorus buffering system (PBS) at specific depths in the soil, by which phosphorus concentrations in the soil solution are held at a steady level by chemical equilibrium between solid phase and solution phase phosphorus. By holding the solution-phase phosphorus at a low level, phosphorus leaching through the soil is greatly reduced, and a steady supply of phosphorus to plant roots is assured, regardless of plant growth rate. The PBS can be recharged on an as-needed basis.

Advantages/Applications
By localizing phosphorus availability at sufficient depth, it is possible to favor the growth of deeper rooted turf species such as *Agrostis stolonifera*, while discouraging the growth of shallow rooted, undesirable species such as *Poa annua* and mosses. The use of buffered P permits the creation of deeper rooting than conventional fertilization. Deeper rooting has multiple benefits including increased efficiency of soil water use, reduced nitrate leaching and increased plant tolerance to temperature and drought stress. Experimental evidence indicates that the use of the buffered material will also provide the environmental benefit of reduced P leaching and runoff into the environment. Use of the invention appears to result in reduced turfgrass shoot growth (less mowing and maintenance), enhanced turfgrass root growth, and more intense shoot coloration, all of which may be viewed as improvements in stadiums, parks, golf courses and other areas with heavy mechanical stress and high public visibility. The inventors believe that the invention will result in less irrigation (including syringing), insecticide and fungicide use as well as associated labor.