A PRACTICAL RESEARCH DIGEST FOR TURF MANAGERS

TURFGRASS TRENDS

Volume 10, Issue 2 • February 2001

AGRONOMY

Runoff of phosphorus from simulated golf fairways

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Phosphorus is not an element that most turfgrass managers would associate with water quality problems. Certainly, pesticides and nitrates easily come to mind when considering possible contamination of surface water. However, recognizing water quality problems and the awareness that there are extremely high maintenance levels for golf courses, sports fields and areas led to concern about phosphorus contamination of surface waters.

Today the media bombard the public with environmental hazard information, and phosphorus has recently been highlighted as a problem, especially related to manure and wastewater applications to grassed fields. This includes concerns about fertilizer phosphorus placed on high maintenance golf courses and other areas. The number of golf courses is escalating, and they often are next to rivers or have streams running through the course. Many have ponds, which can become contaminated by nutrients.

Adding phosphorus at low amounts more often throughout the year is better than putting on a one or two year supply at one time.

In Atlanta, the U.S. Geological Survey has monitored phosphorus in watersheds that impinge on the metropolitan area. Findings show that phosphorus concentrations decreased after phosphate detergents were banned. However, now the phosphorus that is found is thought to come mostly from agricultural and urban fertilizers.

Finding phosphorus sources

The need for determining the sources of this contamination is growing, so that it can be addressed. Especially important is alleviating public concern about commercial operations including golf courses, professional lawn maintenance companies and commercial areas causing surface water pollution through fertilizer applications.

Surface water can be considered phosphorus contaminated with concentrations as little as 50 to 100 µg P /kg (parts per billion). Although algae require both nitrate and phosphorus to live and proliferate, nitrogen is not usually the limiting element.

Phosphorus runoff research has been concentrated in the area of row crop agriculture. There, much of the phosphorus that is carried from the field by rainwater is in the form of "particulate" phosphorus. That is, the phosphorus is physically or chemically bound to soil particles, which are carried off in the form of sediment. Only a portion of this phosphorus is available to algae, and it may require some time before it does become available through desorption or solubility processes. Of course, some of the phosphorus (even from cropland) is carried by the runoff water in the soluble form, which is immediately available to algae.

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