

Michigan State research shows insignificant amounts of fertilizer reach ground water

By MIKE KENNA

Michigan State University researchers have found the amount of nitrogen fertilizer applied to turfgrass which reaches ground water is basically nil.

Turfgrass management on golf courses is often criticized for contaminating ground water with nitrogen fertilizer. This criticism is strictly a perception on the part of the public that a turfgrass system is no different than an agricultural cropping system.

As part of the \$3 million United States Golf Association Environmental Research effort, preliminary results indicate that less than one percent of the nitrogen applied on a Kentucky bluegrass turf traveled to a depth of four feet within the sandy loam soil.

The annual nitrogen fertilization rate for the two-year study was 175 pounds of actual nitrogen per acre split into five monthly applications made during the growing season.

The effect of an early-spring versus late-fall application of nitrogen fertilizer was also compared.

However, the differences between the late-spring and early-fall nitrogen applications were negligible.

Previous research has demonstrated that late-fall applications of nitrogen extend turf color into the winter and have added benefits during green-up in the spring.

The research project was designed to monitor the movement of nitrogen fertilizers through the soil and their potential to subsequently contaminate ground water.

The study was conducted by Dr. Bruce Branham and a team of university faculty experts in nitrogen fate research. Four large, draining lysimeters (or buckets) containing an undisturbed sandy loam soil were installed at the Hancock Turfgrass Research Center on the Michigan State University campus. These lysimeters are approximately three feet in diameter and four feet deep.

Using labeled N-15 nitrogen for the first applications — made in April 1991 for the spring treatment, and November 1991 for the fall treatment — the distribution of nitrogen among Kentucky bluegrass clippings, verdure, thatch, sandy loam soil, and leaching and gaseous losses were determined.

The results provide an environmentally positive view of the turfgrass ecosystem. After continuously monitoring the water leached from the lysimeters for more than two years, recovery of labeled nitrogen amounted to 0.01 percent for the spring-applied nitrogen and 0.005 percent for the fall-applied nitrogen.

Mean nitrate concentrations over the two years averaged less than 1 part per million (PPM), with the highest recorded concentration at only 4.5 PPM. These values are well below the U.S. Environmental Protection Agency drinking water standard of 10 PPM. Less than 20 percent of the original nitrogen applications was found in the soil.

Whether the nitrogen was spring- or fall-applied, the thatch layer was found to store approximately 30 percent of the application. Another 30 percent was harvested in turf clippings and verdure. Gaseous losses accounted for 25 percent of the spring application.

The research data compiled so far at

After continuously monitoring the water leached from the lysimeters for more than two years, recovery of labeled nitrogen amounted to 0.01 percent for the spring-applied nitrogen and 0.005 percent for the fall-applied nitrogen.

Michigan State University paints a very positive picture of the fate of nitrogen applied to a Kentucky bluegrass turf.

More important, the thatch layer demonstrated a significant and positive impact on the fate of nitrogen from an environmental standpoint.

For more detailed information on the above study, contact Mike Kenna at the USGA Green Section Research Office, P.O. Box 2227, Stillwater, Okla. 74076.

OFF THE RECORD

This month marks the beginning of a new column featuring information gleaned by U.S. Golf Association Green Section agronomists around the country. We look forward to sharing research like this from universities and others expert in the field of turfgrass.



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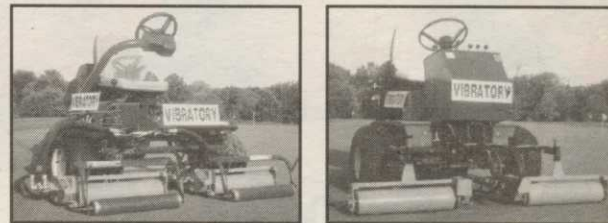
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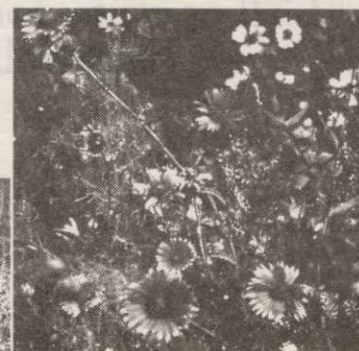
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Mike Kenna, PhD, is director of Green Section Research for the United States Golf Association. He works from the USGA office in Stillwater, Okla.