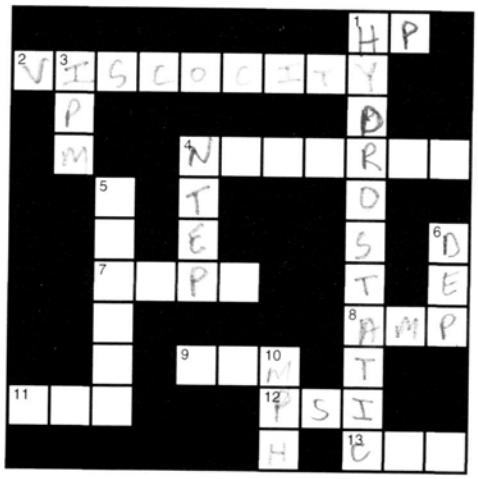

Puzzle Contest: Win one free admission to Spring Field Day on April 20th. Fill in the puzzle, be the first to fax the correct answers to 908-730-7770. Attached your name, address and phone.

Across

1. A measure of engine strength
2. Resistance of a fluid to sheer force, ie oil weight
4. A form of engine aspiration
7. A structure which protects an equipment operator
8. Unit of electrical current used to quantify the capacity of an alternator
9. Measure of hydraulic pump capacity
11. The organization which develops standards
12. Measurement of pressure
13. Measurement of a battery's starting power

Down

1. A transmission with infinite speed control
3. Method of pest control that attempts to minimize yet not eliminates the use of pesticides.
4. Abbreviation for the program responsible for evaluating and reporting new turf seed varieties.
5. The strength of an engine measured in foot pounds
6. State department concerned with pesticide regulations.
10. Measure of speed travel

Movement of Nitrogen: Fertilizer in a Turfgrass System

From the January 1999 issue of Sportsturf — *by University of California-Riverside Research Team

Nitrogen (N) aids many plant processes and components. It's necessary for growth and development, appearance, and recuperative ability of all turfgrasses. However, its mobility makes N a potential environmental hazard. In nitrate form, N won't bind with soil or organic colloids. It can move from the application site to ground/surface water or the atmosphere by leaching and runoff, or by volatilization. Our study monitored N movement below the root system of cool-season turfgrasses. We looked at situations where N was applied at high rates and frequent intervals.

Methods

Turfgrass Research Project at the Agricultural Experiment Station of the University of California (U.C.) - Riverside provided study plots of mixed Kentucky bluegrass and perennial ryegrass.

We applied N at 2.5 lbs. per 1000 sq.ft. to Hanford fine sandy loam soil, and reapplied every eight weeks. We sampled the experimental plots through two consecutive application periods, and performed nitrate analyses with a Technicon Autoanalyzer II.

We used a randomized, complete block of 4-ft. by 6-ft. plots, and performed three replications. Weekly mowing maintained a 2-in. height of cut, and clippings were collected to limit thatch. Sprinkler irrigation replaced soil moisture according to estimates of natural evapotranspiration.

Our nitrogen sources included granular urea (46-0-0), sulfur-coated urea (SCU: 37-0-0), and blood meal (13-0-0). These sources are classified as soluble, slow-release, and natural organic, respectively. They represent a range of nitrate-leaching potential. An untreated control balanced the study.

We collected two samples from each plot every week using Irrometer lysimeters. Samples of tap water from the irrigation source and deionized water accompanied each batch of leachate samples.

Results

Granular urea provided the highest concentration of nitrate sampled. The concentration peaked 10 to 14 days after application. At no time did nitrate leachate exceed federal safety limits.

Sulfur-coated urea treatments demonstrated significantly less leaching of nitrate than urea during peak leaching times. SCU regularly showed more evidence of leaching than blood meal and the untreated control, but there was no significant difference among the three treatments at any rating date during the study.

Even at very high N fertilization rates, there was little probability of significant nitrate leaching from any of the tested sources. Only urea gave levels that were above tap water content, but these readings still fell below federal guidelines.

Discussion

Other studies found similarly low levels of N leaching. A Michigan State University researcher recovered less than 0.2% of applied N below the turfgrass root system. The N he detected was well below the drinking water standard.

A Nevada study reported a total leachate loss of 1.0% or less for tall fescue and bermudagrass turf, and another study at Cornell University found minimal N leaching.

In contrast, a Washington State University study found that nitrates could leach from newly constructed sand putting greens in golf course applications. In this creeping bentgrass study, leaching was strongly tied to N application rate, and was strongly modified by rooting medium and application frequency. N leached more from pure sand than from a sand-peat medium.

Leaching was much greater in the first year of the study than in the second, possibly due to more extensive rooting in the second season. Modified-sand rooting medium, moderate levels of total annual N, and frequent applications produced the lowest leaching loss (3-5% annually).

Studies show further that gaseous loss of N can be minimized by applying water immediately after application. This ionizes ammonia that can be produced

by rapid mineralization, and prevents it from escaping into the air.

Gaseous N loss can also result when microorganisms chemically reduce nitrate. This produces elemental nitrogen and nitrous oxide gasses. Further research is necessary to explore this phenomenon.

Fertilizer nitrogen applied to a dense, mature, well-maintained turf is normally used rapidly by the turfgrass plant and soil microorganisms. There appears to be little chance of downward movement of nitrogen other than on pure sand with immature turf present. The following cultural practices help minimize potential leaching:

- Water-in fertilizer immediately following application.
- Do not over-apply N.
- Use low application rates or slow-release sources on sands.
- Avoid over-irrigation directly after application.

*University of California Researchers Victor Gibeault, Marylynn Yates, Jewell Meyer, and Mathew Leonard contributed to the study. Their complete report is published by the University's Cooperative Extension in California Turfgrass Culture Vol. 48, Nos. 1 and 2. ◆

Ask the CSFM

Jim Hermann, CSFM is a Certified Sports Field Manager.
Ask Jim questions concerning your baseball/softball fields. E-mail him at hq@sfmanj.org

Question: We just acquired a deep tine aerator last fall. We purchased both ¾" hollow and ½" solid tines. The problem is that the field is so hard and compacted we were not able to aerate below about 3". What should I do?

Answer: In the short term I would suggest deep solid tine aerating as early in the spring and as deeply as possible. In doing so you will be taking advantage of the natural compaction relief provided by the heaving action of the deep frost we have maintained this winter. This will allow for the most effective deep tine aeration possible given your situation. You may have to acquire larger diameter solid tines to achieve maximum depth without bending. Be sure to wait until proper soil conditions persist before attempting your aeration program. Use your soil test probe to pull core samples to confirm proper soil conditions. The soil should be moist but not so moist so as to ribbon when rolled between the thumb and forefinger. It should have the ability to crumble or separate into individual aggregates when pressure is applied.

If timing and usage permit, I would recommend follow-up core aeration in late May. By then, game play will have recompacted much of the playing area. Depending on the depth of your topsoil, I wouldn't recommend core aeration much below 3" or 4". Pulling cores from below this depth will typically bring inferior soil to the surface. Compaction from foot traffic normally does not impact on soil below this depth.

In the long term, I would begin to develop a proactive aeration strategy, which anticipates the affects of traffic and seasonal weather patterns. ◆

Field Tip

Have any necessary infield mix delivered and placed on the infield while the ground is frozen. This will minimize unnecessary handling of material and also minimize the potential for unnecessary damage to surrounding turf areas caused by heavy trucks.

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