



Best Management Practices for New York State Golf Courses

Nitrogen Management Checklist

Using the right product, at the right time, and at measured rates of application maximizes plant use of the fertilizer and minimizes the risk of nutrient leaching or runoff. However, determining these best practices requires an understanding of other important factors.

Soil Issues

- **Soil Type:** Well-drained soils with coarse textures and high percolation rates have lower water holding capacity, greater infiltration, and higher risks of leaching.
- **Organic Matter:** Soils with low amounts of organic matter have lower biological capacity to assimilate nitrogen and are more susceptible to leaching.

Plant Issues

- **Growth Phase:** Newly seeded areas pose higher risks of leaching and runoff than well-established stands of turfgrass. Once established, the increased density of root mass increases nitrogen uptake while reducing the risk of leaching. Turfgrass in early stages of growth (1 to 20 yrs or more, depending on the organic matter starting point) has increasingly greater capacity to store and release nitrogen, reducing fertilizer requirements. The lower the amount of organic matter present in turfgrass, the longer the period of storage will be. As the site matures and the amount of organic matter accumulates (20 to 50 yrs), it poses a higher risk of leaching than younger turf.

Product Characteristics and Application

- **Product:** The best strategy for use of water soluble fertilizers is light rates of 0.5 lbs n/1000 sq. ft in general; 0.4 lbs n/1000 sq. ft on sand; and no more than 0.7 lbs n/1000 sq. ft on other soils (assuming no heavy rain events) and more frequent applications. This practice more closely matches plant uptake and ensures minimal leaching past the turf root zone. Water insoluble or slow release products, including organics or stabilized products, used properly, have a lower risk of impairing water quality through leaching and runoff. Release rates of combined fertilizer sources and applications can increase or "stack" the amount of available nitrogen. The combined total nitrogen can possibly leach nitrogen even if individual products would not.
- **Fertilizer Rate:** Excessive applications of any nitrogen-based fertilizer product can create high soil nitrate levels (>1.0 ppm) susceptible to leaching.
- **Timing:** Application of any nutrient to saturated soil or prior to heavy rainfall can lead to significant off-site movement. Applications made too early in the spring or too late in the fall result in higher soil nitrate levels, posing a greater risk to groundwater quality. Similarly, applications should be reduced during summer decline when plant uptake decreases. Research has not shown an appreciable difference in turf quality using different schedules of application. Applications made

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every month compared with split schedules of spring and fall, spring only or fall only show reasonable consistency. Light-frequent applications may provide the most consistent quality and limit the susceptibility of losses to leaching and runoff. Low rates of N associated with light- frequent applications may require that applications be made using spray equipment to uniform coverage and response.