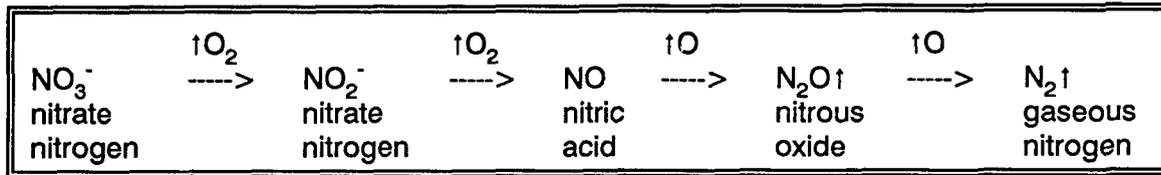
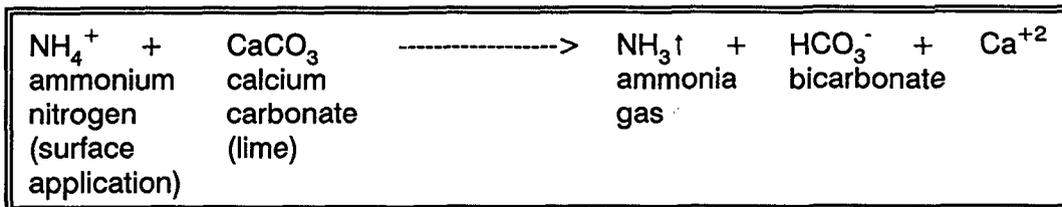


Denitrification



Volatilization is the conversion of ammonium nitrogen (NH_4^+) to ammonia gas (NH_3), which escapes to the atmosphere. If ammonium nitrogen comes in direct contact with free calcium carbonate in the soil, ammonium bicarbonate is formed. Ammonium bicarbonate, a relatively unstable compound, decomposes into ammonia, carbon dioxide, and water when exposed to the sun.

Volatilization



Usually, volatilization of ammonia nitrogen can be avoided by incorporating ammonium nitrogen fertilizer into the soil. In addition, ammonium nitrogen fertilizer can be applied to the surface of a sandy soil free of lime or calcium carbonate without volatilization of ammonia nitrogen. Further, irrigating with approximately 1/4 inch to 1/2 inch of water after applying fertilizer will eliminate the potential for nitrogen loss.

Nitrogen's Effects on Bermudagrass

Nitrogen is one of the most important elements turf managers apply to bermudagrass. In addition to affecting turf color and growth rate, nitrogen influences thatch accumulation, disease and insect incidence, cold tolerance, heat and drought stress, nematode tolerance, lime requirements and, most important to the player, putting speed. Turf managers often measure nitrogen needs based on turf color, density, and/or amount of clipping. However, it is nitrogen's effects on other aspects of turf management that often influence the success or failure of a superintendent.

Turf Color, Growth, and Density. When plants are deficient in nitrogen, initially leaf color is an overall pale yellow-green. This symptom, known as *chlorosis*, reflects decreased chlorophyll production. Because nitrogen is a component of chlorophyll, it is essential to chlorophyll manufacture. Chlorosis due to insufficient nitrogen usually appears first on the lower (older) leaves; eventually, leaf color changes to yellow as the deficiency symptoms progress to the base of the plant. In addition, growth rate and density may decrease, resulting in weak turf that has poor recuperative ability.

Other factors also may contribute to or possibly cause symptoms that, to the untrained observer, appear similar to those of nitrogen deficiency. Chlorosis also may be due to a deficiency of nutrients such as iron, sulfur, or manganese. Florida sandy soils, many of which are alkaline, often are deficient in these elements. Compounding this problem, high nematode populations and soils with poor water-holding capacity can result in reduced rooting and increased water stress. Therefore, turf managers should determine the cause of chlorosis and turf thinning before indiscriminately applying nitrogen or micronutrient fertilizer.