

## Nitrogen Management Practices

**Manure contains both organic and inorganic forms of nitrogen (N). The organic material is broken down (mineralized) by soil bacteria which convert it to plant available forms of inorganic N. This process involves several phases including conversion to ammonium nitrogen (NH<sub>4</sub>) and on to nitrate nitrogen (NO<sub>3</sub>). This biological oxidation is called nitrification. The speed at which the decay and reaction occurs is greatly influenced by the type of manure, soil moisture, aeration, temperature, as well as time. Warm, moist soils will have more organic N converted to available N over time than cool, dry soils. Under normal conditions, most organic materials will decay in 3-4 years. Therefore, only a portion of the total nitrogen can be utilized by a crop the first year.**

**Nitrogen movement in fields occurs in a variety of ways including leaching, surface runoff, erosion and volatilization. Nitrate nitrogen (NO<sub>3</sub>) is highly soluble and is commonly lost through leaching as water moves down through the soil. The rate of leaching is determined by soil texture and moisture. Because water flows freely through coarse textured soils, nitrates are likely to move below the root zone more rapidly in these soils than those with finer textures. Nitrate leaching can eventually threaten and contaminate shallow groundwater resources, if present. Under wet conditions, nitrates can be reduced by bacteria with nitrogen lost to the atmosphere in gaseous form. This process is called denitrification. Volatilization losses of ammonia nitrogen occurs and varies with manure storage, handling and application methods used.**

**The following practices will help reduce nitrogen losses:**

- Match manure nutrient applications to crop needs. This will minimize the potential for excessive nitrogen build-up.
- Inject or incorporate the manure into the soil preferably within 24 hours for maximum nutrient-use efficiency and to reduce odor and runoff problems. Significant volatilization losses will occur when manure is left on the surface for several days.
- Avoid surface applying manure on sloping land, frozen soil or near water bodies to minimize risk of nutrients lost to runoff.
- Apply manure as close to the time of crop utilization as possible.
- Avoid applying manure on wet soils to minimize soil compaction, runoff, nitrate leaching and denitrification.
- Delay fall manure applications until soil temperatures drop below 50°F to minimize nitrate leaching and ammonia volatilization.
- Establish and maintain buffer strips at the point where water leaves the field to trap sediment and nutrients.