

Approximate Ammonium Volatilization Losses From Urea

Shown as % Nitrogen Applied

Basis: Silt loam soil at field capacity and air at 50% relative humidity and 100 lbs. nitrogen applied per acre.

Loss over 10 day period.

Soil Temperatures (Monthly Mean)

Soil pH	45°F (Jan.)	60°F (April) <i>Oct.</i>	75°F (May-June)	90°F (July-SJV)
7.5	16%	25%	50%	66%
7.0	13%	20%	40%	53%
6.5	8%	13%	25%	33%
6.0	6%	9%	17%	23%
5.0	3%	5%	10%	13%

Conditions that increase losses over those shown:

1. Fertilizer rate over 100 lbs. N/acre or by banding fertilizer increases losses.
2. If soil is saturated, losses could be double *compared to FC.* ~~because more water evaporation is higher.~~ When fertilizer is applied to dry (air or PWP) soil providing there is no dew or fog. *losses are lower than FC.*
3. Losses can easily double on sandy soils with low cation exchange capacity. Sands and sandy loams have CEC of 5-12, loams 15-25, and clays over 30.
4. Losses from ammonium sulfate are about 2/3 as high and from ammonium nitrate 1/3 as high.
5. Most losses occur during first 4 days after fertilizer application and most losses reach maximum after 10 days.

Losses from water run NH_3 can be very high.

Denitrification Losses of Nitrogen Fertilizers

Certain bacteria breakdown nitrate in soil to nitrogen gas that escapes to the air when soil is water saturated and oxygen deficient. The energy for this process comes from organic matter and root exudates in the soil. The bacteria need oxygen to survive and so use oxygen from nitrate.

Daily denitrification can amount to 2 to 5 lbs. of nitrogen per acre. Rates are lower in winter and higher in summer starting at 54°F and doubling with each 18°F rise in temperature. The process is slowest at pH 4-5 and highest at pH 7-8. Whenever nitrate and saturated soil exists denitrification can occur.

True sprinkler urea is good, ammonia types poorer with high losses.