

# FACTS FROM THE FIELD

## ESN PROTECTS YOUR NITROGEN INVESTMENT

There are 3 ways nitrogen can be lost to the environment by volatilization, leaching, and denitrification. Environmentally Smart Nitrogen (ESN) has a proven track record of 20 years of protecting your nitrogen investment from loss to the environment which means more of your nitrogen will be available to turf.

**VOLATILIZATION:** This happens when soluble nitrogen, urea, is applied on or near the soil surface of warm, moist soils. If precipitation or irrigation is not sufficient to move urea into the soil at least two to three inches, volatilization can occur. Studies indicate volatilization losses can be up to 40% of applied nitrogen, when applied as urea. Urease inhibitors also reduce volatilization, but ESN provides greater protection for a longer time.

**LEACHING:** This happens when water infiltration exceeds the soil's water-holding capacity and water moves down through the soil profile beyond the root zone. The soil air spaces become filled with water and gravity will cause the water to move down through the soil profile. Nitrogen in the nitrate form will be carried with it in the process called leaching. Nitrate-nitrogen is the primary form that plants take up. Soil type can determine how much nitrogen is leached. Sandy soils can't hold as much water as clay soils, so leaching can happen more readily in sandy soils. Data has shown that up to 60% of soil nitrate-nitrogen can be lost by leaching. Nitrification inhibitors slow the conversion of ammonium nitrogen to nitrate for up to 60 days and can reduce these losses, but ESN will reduce the nitrogen loss from leaching for 50-80 days and provide significantly greater protection in sandy soils.

**DENITRIFICATION:** This is the microbial process of reducing nitrate ( $\text{NO}_3$ ) and nitrite ( $\text{NO}_2$ ) to gaseous forms of nitrogen, including the potent greenhouse gas, nitrous oxide ( $\text{N}_2\text{O}$ ), or other nitrogen gases. Denitrification is a response to changes in the oxygen concentration of the microbial environment. When oxygen becomes deficient in the soil, as in saturated or ponded conditions, anaerobic bacteria strip the oxygen from nitrate or nitrite and convert these forms to nitrogen gases. Studies have shown denitrification losses can be as much as 60% of soil nitrate-nitrogen. Nitrification inhibitors slow the conversion of ammonium nitrogen to nitrate for up to 60 days and can reduce these losses, but ESN will reduce denitrification for 50-80 days.

ESN is a soluble nitrogen source within a polymer coating that controls the release of nitrogen by diffusion through the polymer. This controlled release allows for healthier, denser turf. All that is needed for ESN to perform is warm soils and some moisture, the same things turf needs to grow. ESN can reduce the number of applications needed and number of growth flushes from re-applying soluble nitrogen sources. The turf stand will stay green longer and be more competitive against weeds and other pests.

ENHANCED EFFICIENCY FERTILIZER  
A **SMARTER** SOURCE OF NITROGEN,  
A **SMARTER** WAY TO GROW.<sup>®</sup>



### How can we help?

To make ESN a part of your nitrogen management program, contact an authorized retailer or ESN representative.

For more information:  
[www.SmartNitrogen.com](http://www.SmartNitrogen.com)