

By Larry Reichenberger

HANG ON TO N

*Nitrogen-loss inhibitors
get the most
from a costly input*

Yellow crops left many growers red-faced last season. Heavy rainfall kept wheat growers from timely topdressing and contributed to the loss of nitrogen from many corn fields. The costly experience has increased interest in products that inhibit nitrogen loss from urea and UAN solutions, including ESN, Agrotain, Agrotain Plus, and Nutrisphere-N.

"With nitrogen costing 70 cents or more per pound, and corn selling for this past summer \$7 a bushel, you've got to get the most from the N you apply," says Hinton, Iowa, farmer Dennis Bollmeyer, who used Nutrisphere-N on 4,000 acres of corn last year.

N losses vary. The amount of nitrogen growers lost last season depends on many factors, including soil type, fertilizer type, timing and placement, soil temperatures, and the amount of rainfall. In a sandy soil, only an inch

▶**Left:** ESN fertilizer is a polymer-coated urea that allows water to enter to dissolve nitrogen, but delays its release to match crop growth.



▶**Left:** Barney Gordon is finding that products which reduce volatilization losses of nitrogen boost irrigated corn yields by nearly 20 bushels.

20%, depending on environmental conditions," says Kansas State University agronomist Barney Gordon.

Gordon has been comparing these slow-release and urease-inhibiting products in irrigated corn. In averaged results prior to last season, he found that ESN, Nutrisphere-N, and Agrotain increased yields by 16.9, 15.5, and 14.5 bushels per acre compared to urea alone, which produced 168.1 bushels per acre. When applied in a UAN solution, Nutrisphere-N, Agrotain, and Agrotain Plus increased yields by 18, 17.7, and 15 bushels per acre respectively compared to UAN alone, which also produced 168.1 bushels. "The lower yields with urea and UAN alone indicate volatilization of N may have been a problem. However, there was no significant difference in yields among the four products," he says.

Bollmeyer says the efficiency he's seen from Nutrisphere-N has prompted him to reduce his nitrogen application rates. "We did some comparisons last year with 90 and 120 pound nitrogen rates, both with Nutrisphere-N, and saw no difference. That has convinced us to trim our N rates."

Timing benefits. Agrium agronomist Alan Blaylock explains that ESN's time-release capability is controlled by soil temperature and moisture. "At temperatures around 65 degrees, the nitrogen is released over a 60 to 80 day period. For corn, this means it can be applied at planting and the bulk of the N will become available as the crop begins rapid growth," he says.

This timing factor is proving to be valuable to wheat growers as well, according to Nelson. "ESN can be applied when soils are frozen in February and the nitrogen will become available in the spring when it's often too wet to be on the field making a split application. This was a major factor this past season as many wheat growers were unable to apply nitrogen at the optimum time because of the excessive rainfall," he says. ■

of rain will leach nitrogen (in the nitrate form) 6 to 8 inches deeper in the soil. Meanwhile, on heavier silt loam and clay loam soils, denitrification can result in the loss of up to 5% of nitrogen every day soils stay saturated.

"It's safe to say that in some areas of Missouri, 50% to 75% of the nitrogen was lost this season," says Kelly Nelson, agronomist at the University of Missouri Greeley Research Center. "It really put the pressure on nitrogen-loss inhibitors we've been testing."

Last season, Nelson was impressed with the performance of ESN (Environmentally Smart Nitrogen) from Agrium. ESN is a controlled-release product that features a polymer coating on urea fertilizer. It adds 12 to 15 cents per pound to the cost of N.

ESN also caught the eye of Iowa

State University agronomist Randy Killorn. "We've seen mixed results in the past, but this year ESN clearly looked better. We think it delayed the buildup of nitrate nitrogen for a longer period of time, so less was in solution and susceptible to loss by leaching and denitrification," he says.

Improved efficiency. The Nutrisphere-N product as well as the two Agrotain products are also applied as coatings to urea, or can be added to UAN solutions. They slow activity of the naturally occurring urease enzymes which lead to the loss of surface-applied nitrogen through volatilization. Agrotain, for example, stops urease activity for up to 14 days and costs roughly a nickel per pound of N.

"Nitrogen losses due to volatilization in no-till systems can be 10% to