# Use Nitrogen More Efficiently To Get Maximum Results

**OWENSBORO, KY.**

With the high cost of nitrogen fertilizer, farmers need to get optimum use of the product. Reviewing their management plan and making needed changes can potentially save money without compromising yield.

Most recent research shows it takes about three quarters of a pound of nitrogen per bushel to reach corn's maximum yield potential, but some producers use much higher rates, said John Grove, University of Kentucky College of Agriculture soil and crop management specialist. With today's high cost of nitrogen, using it more efficiently, and thereby lowering rates, can have a major impact on profitability.

UK has been using corn-nitrogen trial data for more than 50 years to determine rates to recommend to Kentucky growers. As a result of these long term trials, Grove said UK researchers know that tillage, soil drainage, previous crop, winter field cover and timing of nitrogen applications make a difference in nitrogen need. There are other factors in individual fields that can affect a crop's ability to take up nitrogen, including stand problems, root development problems and water availability. Understanding these factors in their fields will help farmers determine their nitrogen needs.

Grove said, in his experience, 10 to 25 percent of farmers in any given area are using more nitrogen than necessary. That represents a serious opportunity for efficiency improvement, he said.

"I've actually heard producers say, 'I know that field has a problem so I'm going to give it an extra 25 units of nitrogen and snap it out of it.' Well, you're not," he said. "That nitrogen is not going to be able to snap that crop out of a compaction or soil structure problem. It's not going to help you when you're not in an optimal crop rotation. It's not going to make up for genetics or the fact that your plant population is above or below what that soil will support."

If drainage is a problem or there is substantial residue from a previous crop, then the farmer will want to look at ways to reduce loss of nitrogen into the air through denitrification or volatilization.

Placing nitrogen in the soil beside the rows can reduce the likelihood of both volatilization and immobilization, therefore reducing the need to use higher nitrogen rates. Timing of the application also plays a role. The optimal timing depends on when the crop is planted, expected crop development and soil wetness.

Well drained soils offer the greatest flexibility but give the least response to delayed application or split applications, Grove said. Therefore, nitrogen can be applied prior to planting or via side dressing (placing it beside the row when corn is 4 to 8 inches tall) with little effect on yield.

Poorly and somewhat poorly drained soils offer the least flexibility because they give the most response to delayed and split applications. The nitrogen loss problem with these soils is denitrification, so applications prior to planting and at planting offer the greatest potential for this loss. Delaying application until the crop is growing offers the best chance of getting the nitrogen to the plant when it needs it. With pre-plant and at-plant applications, it is also important to consider using a product containing a nitrification inhibitor as these reduce denitrification loss potential on the wettest soils if side dressing is not possible, he said.

"If you've got some wet fields you should be side dressing at least two-thirds of your nitrogen on these," Grove said. "If you do that you can reduce your total nitrogen rate by 35 pounds per acre. So, on your wettest 1,000 acres of corn ground, with a nitrogen cost of $0.40 per pound, you'll save about $14,000."

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