Nitrogen Management

Specialist Offers Tools To Measure Available Nitrogen For Corn

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"Use common sense when applying nitrogen to corn. There's no substitute for that." Those are the words of Fabián Fernández, University of Illinois Extension Soil Fertility and Plant Nutrition specialist, who spoke at the Corn and Soybean Classic in Mt. Vernon recently.

Fernandez spoke on the management of nitrogen in corn production.

"Nitrogen is an expensive commodity but it is a commodity that we cannot live without," he said. "Corn really needs nitrogen to reach its potential yield and so the management of it is extremely important. You cannot over-apply because you lose money, plus there are environmental concerns. You cannot under-apply because that can result in a yield reduction and decrease in profit, so you really need to manage your nitrogen effectively."

He discussed tools that are available to improve nitrogen use efficiency, one of which is the new nitrogen rate calculator.

"That's a guideline system that takes into account the economics," Fernández said. "It's a web based calculator that was developed by collecting data over many years and sites within Illinois to produce these rates.

"You can go to the website by typing in 'nitrogen rate calculator' into a search engine like google" he advised. "The link to the calculator typically appears first in the list."

The data is provided in Iowa State University, however, the information for Illinois was collected in Illinois.

"Once you reach that page, you will have to determine whether you are in the north, central, or southern part of Illinois; decide whether you will plant corn following soybean, or continuous corn; and then the price of corn, and the price of nitrogen. You can also choose the source of nitrogen to be used," he explained. "Once you enter all these information, click the calculate button and it will calculate for you what the optimum nitrogen rate will be to maximize your profitability."

These are regional recommendations, they're not site-specific. There are some other tools available to help farmers determine how much nitrogen might be needed on their particular farm. Among them the pre-sidedress nitrate test (PSNT), canopy sensing technologies, and the corn stalk nitrate test. The PSNT can be used if you haven't applied nitrogen prior to planting, except perhaps for a small amount in a starter. The test will determine the nitrate levels in the soil, and whether more nitrogen is needed. The test works fairly well in soils with high potential for nitrogen mineralization such as fields that have received manure previously, or if you had a legume crop grown before.

"Canopy sensing technologies allow you to look in season, around V-10, to see whether the crop needs more nitrogen or not," Fernández said. "The corn stalk nitrate test can be used in a post mortem type approach. You look at how much nitrogen is in the plant at the end of the growing season and determine whether that plant had too little, enough, or too much nitrogen."

Fabián Fernández, University of Illinois Extension Soil Fertility and Plant Nutrition Specialist, explained tools to improve nitrogen efficiency. Photo by John LaRose, Jr.

Since you also know what the rate of nitrogen was and the weather conditions during the growing season, this test will allow you to determine how well plants responded to your nitrogen management in that particular field.

"Of course, every season is different, so the usefulness of this approach is enhanced when the information is collected for a few years," he explained.

With nitrogen costs rising and corn prices falling, it's very important for farmers to tune in to their crop's needs so they do not over-fertilize.

"That's exactly right, and that's one of the nice features about the calculator," Fernández said. "It allows the farmer to know what the maximum return will be, considering prices as that ratio changes. As the price of nitrogen increases and the price of corn decreases you can buy less nitrogen from the yield that you expect. You might notice, as the ratio increases, the difference between the maximum possible yield and the yield at the most profitable nitrogen rate will increase as well. That shouldn't be too much of a concern if you are interested in making the most profitable decision. You won't be winning the yield contest, but you will be making more money out of that yield."

There are many things that work against crop production and many leave the farmer with little control, such as weather conditions. This is one that really affects nitrogen availability

"That's why it is important to use the nitrogen rate calculator and couple that with good management and knowledge of nitrogen management to make the most profitable decisions," Fernández summed. Δ