

Nitrogen Fertilization: Saving Money, Protecting Environment

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Lester Price has a relatively small dairy farm, but shares the same big problem facing farmers of all sizes: how to best fertilize his crops in a time of rising input costs.



During the off season farmers met to review and discuss field records with project staff. The Corn Stalk Nitrate Test (CSNT) was identified during these farmer meetings as a useful tool to help them manage nitrogen use. (L_R): Lester Price, Kevin Frisbee, Janice Degni, Rob Howland and Patty Ristow.

management for corn using a corn stalk nitrate test.

“The grant we are working with had been awarded through the Center for Dairy Excellence to look at nutrient management tools for small dairy farmers,” Ristow said, referring the CDE, a division of the Syracuse-based NYFVI. “We wanted to see what we had in our toolbox that could be used by small as well as large farms. We got together at the farms with their crop consultant or met in the winter time to go over data from the farm and ... one of the tools that came out of those talks was the corn stalk nitrate test.”

The test, which was developed at Iowa State University in the 1990s, involves laboratory analysis of representative portion of corn stalks collected at harvest. The samples are analyzed to see if nitrogen supply to the crop was adequate, too low, or in excess of what was needed by the plants during that growing season and can be used to determine if changes in nitrogen application rates can be made for the following growing season.

“It’s an old test,” Ristow said. “It’s been around, and a lot of labs offer it. What we’ve been doing is calibrating it here for our conditions in New York state.

“What the test does is give the farms information to base decisions on. The tool gives them the ability to measure the result of their nitrogen management over the season.”

Grant money furnished by the New York Farm Viability Institute is helping Cornell University give New York farmers a valuable tool in keeping their costs low.

“I’ve always been a proponent of this principle: The fewer acres you can farm and produce that much more per acre, the better off you are,” said Price, who grows silage on 300 acres to support a milking herd of 60 cows in Broome County.

“It’s much more efficient operating that way than going after more and more land.”

To help Price and farmers like him maximize efficiency, Patricia Ristow with Cornell’s Nutrient Management Spear Program is helping farmers fine-tune their nitrogen

Those measurements can be critical in the success of a small farm, according to one Cayuga County dairy farmer. “It’s the difference between profit and no profit, or at least enhancing your profit,” said Dale Mattoon of Genoa. “In the old days, you’d just do a certain amount of side dress on every field. It’s really not essential for every field to get it or every field to get the same amount.” “Side dressing” is a fertilization technique that generally involves nitrogen-based materials.

According to data from the U.S. Department of Agriculture, the price U.S. farmers pay for nitrogen solutions has risen dramatically over the last decade -- from \$131 per ton in 2000 to \$351 per ton in 2011, an increase of 168 percent.

“We really want to maximize the return on every field -- even, in some cases, within a field,” Mattoon said. “There may be situations where you think part of a field needs more or less (nitrogen) than other parts.”

To make the most of the land he has, Mattoon started sending out samples for the corn stalk nitrate test following the 2009 growing season. This year, he is collaborating with Ristow and Quirine Ketterings, the director of Cornell’s Nutrient Management Spear Program.

Mattoon will send his stalk samples along with data about his manure applications, fertilizer applications, rainfall and planting dates to Cornell. Researchers there will use the information to help the farm make decisions about nitrogen management and to further evaluate the impact of management decisions and weather on the corn stalk nitrate test results for New York farmers.

Whitney Point’s Price has been working with Ristow in the NYFVI-funded program for several years.

“It’s very, I guess you could say, cutting edge,” Price said of corn stalk nitrate tests. “It’s a different way of thinking about nutrients. It took a while getting used that, but once you get the hang of it, you do start to see the logic of it.

“You start to use it more and more in your management decisions, and you are able to make more accurate decisions, particularly on fertilizer use and manure use.”

Ristow said the test is part of the tools we evaluated for a long-term assessment and management program that will allow growers to track their crops’ nitrogen-usage over time and adjust strategies accordingly.

“Each growing season is a little different,” she said. “It’s not meant to be a test that leads you to change drastically your management choices after one year.

“(Farmers) might see opportunities where they could cut back on fertilizer usage. ... It’s great to have a tool that will show them information.”

And Mattoon noted there are benefits in addition to reducing input costs.

“Beyond that, there is an environmental concern,” he said. “You want to apply enough nutrients to allow plants to reach maximum productivity. Beyond that level, there is not only increased cost but the potential for leaching. “(Testing) is wise environmentally and frugal economically.”