

Iowa farmers using precision when applying fertilizer

By spreading out applications and using the latest technology, farmers are becoming far more precise in how they apply fertilizer. That's good for crops and the environment.

BY TOM BLOCK

Iowa farmers are taking a more detailed approach to fertilizer management that balances crop needs, economics and environmental risks.

Growmark FS started introducing nitrogen management systems to its customers several years ago, says Nate Pierce, western region agronomy marketing manager for Growmark co-ops.

Instead of applying a pre-determined amount of fertilizer in a single application before planting, Growmark and other farm co-ops across Iowa are working with farmers to spread applications throughout the growing season, based on soil and plant tests that tell how much fertilizer is needed to optimize yields.

"Nitrogen management revolves around multiple applications of nitrogen to a farmer's field, different forms of nitrogen," Pierce says. "Really, it's based around the 4 R's concept, which is right rate, right source, right time and right place for the application."

Growmark further breaks its recommendations into a three-pronged approach aimed at minimizing environmental impact, optimizing yield and maximizing input utilization, Pierce says.

"If we hit all three of those, everybody wins," he says.



PIERCE



Farmers are adopting fertilizer programs that include multiple applications, which are often better for the crop and help protect against nutrient loss. FILE PHOTO

Multiple applications

Many farmers begin with a fall or spring application of anhydrous ammonia, which remains a lower-cost nitrogen source, but are using a reduced rate compared to previous years.

"What we're observing is guys are putting on fall anhydrous, but at a lower rate," he said. "We're trying to manage the nutrients so they're in the field when it's more utilized by the plant."

Spring and early summer side-dressing applications have increased significantly in recent years as growers try to sync nitrogen applications with plant needs, Pierce reports. The post-emergence side-dress applications of UAN or urea allow growers to adjust rates depending on crop needs and reduce the risk of leaching from spring rainfall before crops are growing.

"It seems like that's a more common-sense way," says Charles City farmer Dennis Brinkman, who splits his nitrogen applications into three increments. "There's a better chance of having that nitrogen there when the plant needs it. Ideally, you would be able to put it on right when the plant needs it, but you're kind of at the mercy of the weather."

While using split applications and nitrification inhibitors incurs additional costs, the practices reduce the risk of nitrogen loss and often allow farmers to reduce their overall fertilizer use — which saves money and benefits the environment, Pierce says. Timing nitrogen applications according to plant needs can also increase yields, he adds.

The use of nitrification inhibitors, which keep nitrogen in the soil longer, has also dramatically increased in the past five

years, Pierce added.

A 2013 study by Beck's Hybrids evaluated the performance of four nitrogen stabilizers: Nutrisphere-N, Instinct, Agrotain Plus and Factor. The products on average increased yields by 5.9 bushels per acre with an average positive return on investment of nearly \$16 per acre. Four-year data evaluating Nutrisphere-N and Agrotain Plus provides an average yield increase of 10.4 bushels per acre with net returns of more than \$32, according to Beck's research.

The increased farmer demand for stabilizers has prompted ag companies to develop new products, promising even better results.

BASF says its new Limus nitrogen management product can reduce ammonia losses by more than 90 percent and increase crop yields an average of 6 percent. Limus can be blended with urea and UAN fertilizers to protect against volatilization and nitrogen loss, enhancing nitrogen availability for an additional three weeks.

"Growers can lose over 40 percent of surface-applied urea due to volatilization within weeks of application," said Nick Fassler, BASF product manager. "From a grower's standpoint, when you make that application, you want to ensure it's there and it stays on its intended target. The nitrogen loss prevented by Limus nitrogen management protects plant nutrition, allowing crops to reach their maximum yield potential."

Technology at work

Farmers are also using technology to improve fertilizer management, says Ron Woeste, operations manager for Linn Co-op Oil Co. Some 80 percent of the co-op's customers are utilizing variable rate technology to optimize fertilizer use, according to Woeste.

PRECISION

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Grid sampling provides a map showing applicators where fertilizer rates need to be increased or decreased, instead of applying a flat rate across an entire field.

"In the 20 years we've been doing this, our phosphate (application rate) is probably down 30 percent from where we were," he says.

Crop sensors can also be used to optimize nitrogen applications during the season, according to Mike Olson, sales manager for Ag Leader. A study using Ag Leader's OptRx crop sensors to vary nitrogen rates showed potential profits of more

than \$20 per acre compared to using a flat rate, Olson says. The sensors are attached to a sprayer to read plant health and adjust nitrogen rates in real time, applying higher rates to nitrogen-deficient plants and cutting back rates where crop nutrition is sufficient.

"Nitrogen is a nutrient that moves on us a lot. It's not 100 percent dependable," Olson says. "In wet years, we tend to underestimate the amount of nitrogen loss."

Tracking N movement

Growers can also track nitrogen availability with regular soil sampling like Growmark's N-Watch program. Samples are taken every two weeks to see how

nitrogen changes form and moves through the soil profile.

"It's a way to bring the nitrogen cycle to life," says John Grandin, Growmark western region senior field sales agronomist. "We're able to show (growers) where the nitrogen is at and what the impacts of an application or rainfall have been on (nitrogen) availability. We're able to take that and make better management decisions."

Ultimately, nitrogen management strategies will change from farm to farm, or even field to field, to achieve each farmer's yield and environmental goals, Pierce says.

"There's multiple right ways to (manage nitrogen)," he says. "It's based on the way the farmer farms."

Always looking ahead

Moving forward, the Russells are thinking about putting in an anaerobic digester as part of a pilot project for an engineering firm next year. The anaerobic digester would be used to turn the hog manure into energy. In the process, micro-organisms break down the waste to produce biogas, which can be used for electricity and heat.

"We're excited to put another leg on the stool as far as renewable energy goes," said Russell. "The biggest things we're going to continue to do is minimize tillage and maximize yield without added unnecessary nutrients."

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