

THE RIGHT RATE

BY GREGG HILLYER



Sky-high costs are driving farmers to replace general recommendations with new approaches to trim nitrogen rates for corn.

Jay Ostrander shakes his head in disbelief when he sees nitrogen prices at \$450 per ton and rising. "My co-op won't even quote a price for spring," says the Jefferson, Iowa, farmer in early November. "Once they do, I'll probably prepay because prices are likely to get worse."

Record-high nitrogen costs coupled with weak commodity markets have corn farmers everywhere rethinking their fertilizer programs. Historically, fertilizer recommendations have been based on maximizing yield potential, points out Robert Mullen, Ohio State University soil scientist.

"Using a yield goal developed a mindset that to get high yields you need more nitrogen," he explains. "That may have worked when the

economic penalty for over application was small. But as nitrogen prices have risen over the past several years, you can't ignore the cost for applying too much nitrogen."

Ostrander certainly isn't. He's using new tactics to apply nitrogen more economically. University researchers are also studying different approaches to enhance nitrogen efficiency.

SWITCH TO SPRING. Before tinkering with their nitrogen program, Ostrander and his father, Jerry, religiously knifed in 150 to 180 pounds of anhydrous ammonia in the fall. "We suspected some nitrogen was leaving fields," says Jay, who farms in the Raccoon River watershed. "We were concerned about potential water-quality problems, so we thought it

Jay Ostrander and his father, Jerry (shown), Jefferson, Iowa, switched from a fall to a spring nitrogen program and reduced rates by about 30%. PHOTO: BOB ELBERT

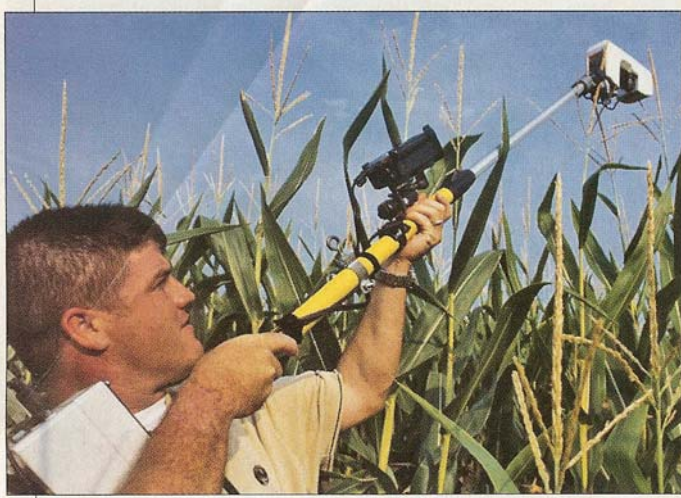
was time to do something different."

Soon after, he attended a meeting where Iowa State University agronomist Alfred Blackmer was expounding on the merits of applying nitrogen in the spring. Ostrander decided to do test strips comparing fall- and spring applied nitrogen.

Three years later they now apply all their nitrogen in the spring. "When we ran the tests, we were amazed that we could maintain our corn yields yet cut nitrogen rates to 100 to 105 pounds per acre," says Ostrander.

Their program includes applying about 30 pounds per acre of 32% nitrogen solution as part of a pre emergence herbicide treatment. That's followed by 70 pounds of 32% when corn is about 6 inches tall. A 24-row tool bar equipped

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University of Missouri scientist Kent Shannon is using remote-sensing technology to enhance nitrogen

efficiency. PHOTO: GREGG HILLIER

with coulters places the nitrogen in row middles about 2 inches deep.

"I was no different than any other farmer," says Ostrander. "I was fearful of shorting the crop, so I'd pump up rates 20 pounds or so in the fall. But I've learned nitrogen is a precious commodity. You have to use it wisely."

The Ostranders continue to fine tune their nitrogen program. They're experimenting with rates ranging from 75 to 125 pounds per acre. "The late-fall stalk test shows the low rate shorts the crop while 125 pounds is always too much," he says. This spring they also plan to try variable rate technology to apply nitrogen. "We know a field has various soil types," explains Ostrander.

"Experience tells us the high ground will need more nitrogen than the low ground. From there, we can tweak application even more by breaking the low areas into different soil types."

ISU's Blackmer isn't surprised by the Ostranders' results. He has been a longtime critic of fall-applied nitrogen and has worked tirelessly with producers across the state to tweak their fertilizer programs.

"Too many environmental factors come into play when you apply nitrogen in the fall," he says. "In many years you end up with a nitrogen-deficient crop.

Our research shows that by delaying application until spring, you can greatly reduce the amount of nitrogen per acre and still optimize yield."

Blackmer's trials show that on most fields of corn following soybeans, farmers can maximize profits with 100 pounds of nitrogen applied in the spring. Corn after corn

requires approximately 150 pounds per acre.

ECONOMIC EQUATION. As university scientists rethink fertilizer guidelines, nothing has come under more scrutiny than using yield goal (1.2 pounds of nitrogen x yield + nitrogen credits from legumes) to base application rates. Several states have stopped using it altogether, even before the recent ramp-up of fertilizer prices.

"The proven-yield method used for decades tends to set rates that are higher than the amounts needed to maximize the return to the investment in nitrogen," says Emerson Nafziger, University of Illinois crop scientist. "It basically set an amount that ensures the crop doesn't come up short on nitrogen. But the system relied on nitrogen remaining cheap and over application not being too costly."

Ohio State's Mullen agrees. "Shooting for the maximum yield isn't the best approach. The goal is to aim for the most economical rate."

Mullen along with university specialists in Iowa, Illinois, Indiana, Michigan, Minnesota and Wisconsin are spearheading efforts on a new system that bases optimum nitrogen rates on the price of fertilizer and the average price of the corn crop.

"It boils down to an exercise in risk management," says Mullen. "The old system uses a single value while

the new one provides farmers with a range. This gives them more flexibility in making nitrogen decisions.

"If farmers are more risk-averse, they can use the high side of the rate range. If they are more willing to accept risk, they can use a lower side of the rate range, increasing their potential for economic reward."

HOW IT WORKS. Say nitrogen in Illinois is 30 cents a pound and corn is selling for \$2. Under the new system, the recommended range for corn following soybeans is 122 to 162 pounds of nitrogen per acre; 137 to 174 pounds of nitrogen for corn following corn.

Nafziger points out as the cost of nitrogen or the price of corn changes, the optimum rate of nitrogen also changes. If the corn price (\$2) stays the same, the nitrogen rates for Illinois drop by about 1.5 pounds for each 1-cent increase in the cost of a pound of nitrogen. That's about 1 pound of nitrogen per acre for each \$10 increase in the cost of a ton of anhydrous ammonia. If the nitrogen price stays at 30 cents per pound, the corn price has to drop by about 33 cents per bushel to drop the recommended nitrogen rate by the same 10 pounds per acre.

Each state will have its own rate range for nitrogen. The range will be based on data collected from years of fertilizer trials. There will be separate ranges for corn following soybeans and corn following corn.

Plans call for the system to be on the Internet so calculations can be done automatically. University agronomists in Indiana, Ohio and Michigan plan to incorporate the method in their nitrogen recommendations this year. For more information, visit <http://extension.agron.iastate.edu/soilfertility/lnrate.aspx>.

PRECISION APPLICATION/TOOLS. Advances in tool bars and application equipment are also helping farmers hone their nitrogen rates. Precision agriculture in particular promises to greatly enhance the accuracy and efficiency of nitrogen.

Remote sensing shows the most near-term potential. It uses infrared and near-infrared light to determine a crop's nitrogen needs by reading a corn plant's leaves. The greener the leaves, the less nitrogen applied. Applicators equipped with the sensors use variable-rate technology to change nitrogen rates across a field.

University of Missouri scientists have tested the technology on farm plots for the past two years. They use Holland Scientific sensors mounted to a high-clearance sprayer and handheld NTech Industries units sold under the GreenSeeker brand.

Results have been mixed, according to Kent Shannon, associate director of the Missouri Precision Agriculture Center. "In some cases we've seen a huge advantage using the sensors. One site saw a nitrogen of 90 pounds plus a 3-bushel yield increase (224 bushels) over the conventional plot (180 pounds of nitrogen, 221 bushels)," Shannon says. "On average, we saved 29 pounds per acre of nitrogen and increased revenue \$2.57 per acre using the technology."

Elsewhere, in a series of field trials in 2004, the GreenSeeker unit was used on 800 acres of corn in Iowa, Illinois and Minnesota. Ted Mayfield with NTech Industries says growers had an increase in gross profit of \$18.26 per acre.

While these new technologies and approaches will help you do a better job, nitrogen by its very nature requires constant tinkering. But farmers like Ostrander say they're getting closer. "It's all about finding the right rate to optimize returns." **PF**

Get Your Best Price

New approaches to applying fertilizer or determining rates certainly go a long way to getting more from every pound of nitrogen, but so does the price you pay. Analysts in the fertilizer industry say there are keys to getting the best price in today's changing market. Here are some of their tips: ~ Watch nitrogen prices just as you would commodity prices. To keep tabs on industry trends, go to www.globex.com. This site follows new fertilizer futures and options on futures contracts. It is based on the three most-commonly used varieties of fertilizer and trades exclusively on the CME's Globex electronic trading platform. To track nitrogen prices, follow diammonium phosphate, which is 18% nitrogen; urea, which is 46% nitrogen; and urea ammonium nitrate, which is 32% nitrogen.

~ When you find a price level you like, even if it's 6 to 8 months out, consider buying a portion of your crop's needs for the upcoming season.

~ Don't buy all your fall fertilizer

in September or all your spring fertilizer in March. Stagger purchases to give the supply chain time to gear up and distribute on a better basis. Waiting to commit your nitrogen needs until February or March tells the market not to produce as much product because there are not enough contracts.

~ Follow news of New Orleans terminals. If they get their hurricane-damaged off-loading and distribution back on track, prices are more likely to remain stable/ level in the near future.

~ Keep an eye on international competitors. What growers in other countries, such as China and South America, do will affect supply and ultimately the price of fertilizer in the United States.

~ Be ready for prices to move after the USDA releases its planting intentions report. Go to www.usda.gov for details.

-Victoria G. Myers