



PHOTO: DARRELL SMITH

# Zone In On Nitrogen

Master efficiency with all the tools **BY MARGY FISCHER**

**N**arrowing in on maximum nitrogen (N) efficiency for top yields is like hitting a moving target, especially during a challenging weather year. Using all available tools for N management can help you set your sights on the bull's-eye.

In 2007, the Farm Journal Test Plots, with help from AgriGold Hybrids, harvested its second year of data to predict when hybrids prefer their N treatments. The plot was designed with six hybrids and three N applications.

"The first year we did the study, we had very little trouble with N loss due to environmental conditions," says Ken Ferrie, Farm Journal Field Agronomist. "We found that AgriGold could pick out when their hybrids wanted the N."

However, in the 2007 growing season, Mother Nature threw a wrinkle into the study.

"This field received substantial heavy spring rains," Ferrie says. "This was a different farm than the first year's plot, and some parts were poorly drained while other parts were well-drained. In the poorly drained areas, we experienced substantial N denitrification. And there was leaching of N in the well-drained areas."

Despite the environmental challenges, in the well-drained areas of the field the hybrids responded similar to the previous year in regard to N timing. On the flip side, the consequences of denitrification in the poorly drained areas were apparent.

The test plot crew used nitrate sam-

ples to pinpoint the problem as denitrification or leaching.

"The nitrate samples told us we lost that N," Ferrie explains.

In the well-drained areas where the crew applied 160 lb. N up front, the nitrate readings were 21 parts per million (ppm) in the top foot and 53 ppm in the second foot, which indicates downward movement of N—and leaching N.

In the poorly drained areas, the nitrates were 20 ppm in the top foot and 16 ppm in the second-foot samples. Those readings indicate N loss due to denitrification.

The plot had three N programs: 160 lb. N up front; 100 lb. N up front and 60 lb. N sidedressed at V5/V6; and 100 lb. up front, 30 lb. at V5/V6 and 30 lb. at tassel initiation. ▶



## Web Extra

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"The 100 lb. N applied up front had high N losses in the spring," Ferrie says. "That led to N deficiencies in the poorly drained areas."

Ferrie says you can never let corn have a bad day. In this plot, the nitrates indicated the denitrified areas might not have the staying power through the season without additional N.

**Timely application.** "Typically, you'd say that the more times you split N applications, the better off," Ferrie says. "But when we split the 60 lb. of N between sidedress at V6 and tasselling that 30 lb. at V6 wasn't enough to feed the plant until pollination for some hybrids in the poorly drained areas. We kept the corn hungry, which came at a penalty."

Because this plot was for studying hybrid's responsiveness to N, the plot protocol was maintained despite the N loss and its challenges.

"If this weren't a plot, we would have altered and increased our N rates in those poorly drained areas," Ferrie says. "When N was the limiting factor, all hybrids responded to the sidedress."

Ferrie advocates a three-pronged approach to N applications: a fall application, a preplant or at-planting application, and then sidedressing the rest of the N allocation.

"The keys are timing and placement," he says. "It's not all dependent on the amount."

In this plot's poorly drained areas, due to the high N loss when the entire N amount was supplied up front, the corn yielded the worst. The areas with 60 lb. applied at sidedress performed the best, and when the sidedress allocation was split at V5/V6 and tassel initiation, yields were not as high.

"Those who only apply fall ammonia need to know the risks," Ferrie says. "The least expensive form of N can become the most expensive N if it isn't placed and timed correctly. When the growing season goes against your N program, pull nitrate samples so you can make the call to go back in and fix the fields or areas that are high-risk."

Consider all the tools to manage N: hybrid selection, the Illinois Soil Nitrogen Test (ISNT), nitrate sampling, re-

mote sensing, sidedress equipment, late-season application, tillage practices and crop rotation.

ISNT revealed that this particular plot field doesn't have a high enough N-giving power if weather turns against it. Weather stations recorded rainfall so the crew knew when soils were saturated, and nitrate sampling provided the time frame for when N was lost. Aerial images provided Normalized Difference Vegetation Index (NDVI) values for midseason affirmation of plant health. Finally, a yield map, which matched NDVI, confirmed the areas where N limited yields.

Ferrie sees the information in

hybrid preference as a valuable tool in the N management puzzle.

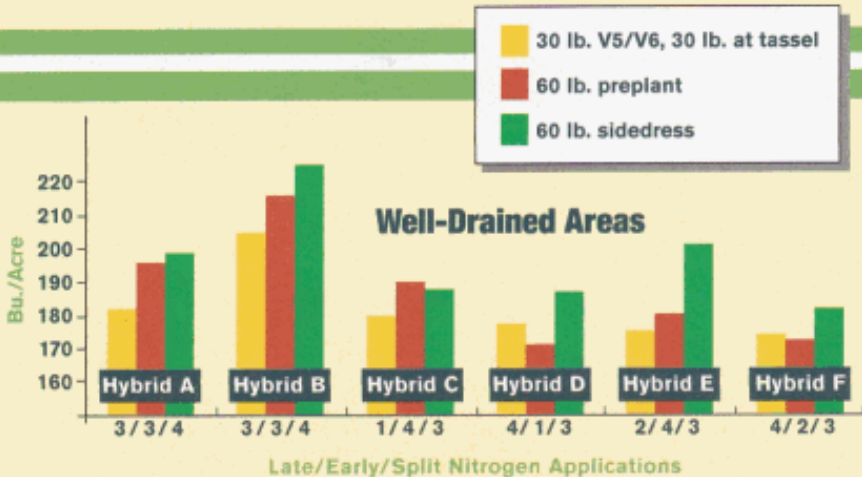
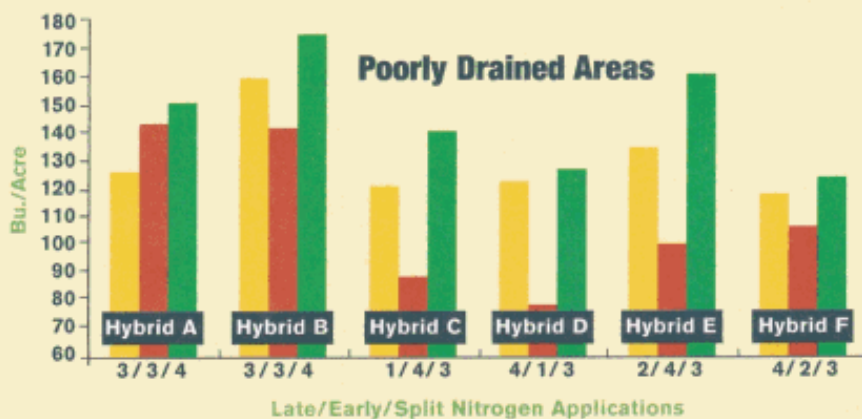
"When you know how a hybrid likes N, then you can use that information to plan timing and placement of N applications," he says.

AgriGold has studied their hybrids' N preferences for seven years, and they group hybrids by family accordingly.

"This information is another tool for farmers to use to pick the right genetics that fit their farms and their environment," explains Mike Kavanaugh, AgriGold agronomy manager. "This helps farmers look at their N application practices and geography and make a hybrid decision."

## When Hybrids Prefer Nitrogen

These charts show how AgriGold Hybrids responded to timed N applications. The lower the number, the less a hybrid should respond, and the higher the number, the more likely for response. In the top chart, the hybrids didn't respond as predicted because preplant N was lost to denitrification in the poorly drained areas of the field. The bottom graph parallels our first year of data, in that in the well-drained areas, the hybrids responded similar to predictions.



### Web Extra

Go to [www.farmjournal.com](http://www.farmjournal.com) for tools to calculate N needs and loss.