

## Nitrogen and Seed Treatment Trials

Weather affected field research in many ways in 2000; for example, the two nitrogen management trials shown in [Table 1](#). Northeast Iowa farmers **John and Joan Lubke**, Ridgeway, are part of PFI's collaboration with the Iowa Farm Bureau. They expected a yield response to the 66 lbs N sidedressing they applied to corn. After all, the 9 ppm (parts per million) nitrate-N that they got from the late spring soil nitrate test suggested the crop was definitely in need of additional nitrogen. But the weather stepped in, in the form of a hail storm. The damaged crop could not make full use of additional nutrients, and yields barely broke 100 bushels.

At the other end of the state,

Heading out to view the trial - and the hail damage - at the Lubke field day.

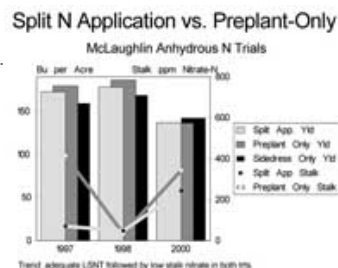


**Darwin McGhee** carried out an N rate comparison with his students at River Valley High School, in Correctionville ([Table 1](#)). The river bottom field they chose yielded better crops than many in the area, but moisture was the limiting factor for production. Additionally, the sidedressing was carried out late, with high-clearance equipment, and in the dry soil, the added nitrogen may not have made its way to the roots in time to benefit the crop.

Several cooperators in the PFI network have taken part in a project co-sponsored by the Michael Fields Agricultural Institute that examines the effects of small grains in the crop rotation. **Wayne and Ruth Fredericks**, Osage, carried out a trial in 1999, comparing oats with a berseem clover underseeding to oats alone. In 2000, Wayne grew corn on those plots ([Table 2](#)). The late spring soil nitrate test showed no greater available soil N where berseem had grown, and so Wayne did not take stalk nitrate tests at the end of the season. However, corn after berseem yielded 4.5 bushels better than corn following oats alone. Was this because of a late-season release of nitrogen from the clover residue? Maybe, but it also could have been that undefined "rotation effect." Michael Fields Institute researchers have observed healthier corn roots with longer crop rotations, and they hope to work with PFI producers to better understand these rotation effects. **The Dordt College Agricultural Stewardship Center**, Sioux Center, set the stage for a rotation effect study in 2001. The red clover they seeded with oats did nothing to hold back the excellent small grain harvest ([Table 2](#), page 20). While the clover seed cost makes the practice look like a loser in 2000, the tilth and fertility benefits will be enjoyed by future crops.

Here is a

Trend: adequate LANT followed by low stalk nitrate in both trts.  
Fig.2 Yields and fall stalk nitrate with three kinds of anhydrous management.



riddle. The late spring soil nitrate test (LSNT) moves away from the idea of an "average field" benchmark for corn nitrogen management. More than 70 replicated PFI trials have successfully used the LSNT to manage N more profitably. But what if your field doesn't fit with the average of those PFI fields? Then you have to get your own answers, and it can be a lonely business. **Dennis and Kate McLaughlin**, Cumming, have carried out three years of trials to find the best way to use anhydrous ammonia nitrogen in their system ([Table 2](#) and Figure 2). Unlike most other research cooperators, they have not had convincing success with the LSNT. Dennis writes:

"I started out wanting to know if all-sidedress could compete with preplant-only or split applications of anhydrous ammonia. Two of three years all-preplant gave me a 10-bushel yield advantage. That was a surprise. But I also learned that the late spring nitrate test following spring-applied anhydrous does not work for me."

For three years, McLaughlin compared a 140-lb preplant application to a split application of 70-70. Without access to a high-tech anhydrous regulator, adjusting rates has been a challenge, but by now Dennis feels he has the procedures mastered. Then in 2000, the "rock in the fan" was "green snap in July followed by severe stalk rot. . . I'm not surprised that there was no significant yield difference."

Figure 2 shows yields for the three years of the trial. (The sidedress-only treatment was not fully replicated but was included as a demonstration.) Preplant-only anhydrous applications haven't hurt yields; in fact that treatment yielded significantly more in 1997 and 1998. Does that mean it's a better

treatment? Dennis thinks so. He has considered many theories why the split application may not be working right. (Yes, the knives were sealing. No, there weren't more weeds to steal the sidedressed N.)

The other issue in Dennis' mind is the use of the late spring soil nitrate test after anhydrous applications. In his trials, the LSNT has indicated adequate nitrogen after preplant-only applications and nearly-adequate N in split-application plots even before sidedressing. Yet, as the figure shows, fall stalk nitrate levels have been in the marginal (less than 700 ppm) and low (less than 250 ppm) ranges. This suggests that yields for both treatments may have been limited by N shortfalls. Whether or not Dennis changes his fertilization practices in the future, he feels that, in his system at least, the LSNT has not provided information to help him adjust anhydrous ammonia nitrogen management.

**Dave and Becky Struthers**, Collins, tried out a microbial seed treatment called T-22. This "biological fungicide" is a planter box treatment that is said to colonize plant roots, providing protection from soil pathogens like Fusarium. [Table 2](#) shows there was no difference in yield of corn between treatments in the Struthers' trial, but Dave wonders if results would have been different under cool, wet conditions. In northwest Iowa, **Gary and Venita Wilcox**, Correctionville, carried out a three-way trial, comparing T-22 to a starter fertilizer treatment and to a control treatment that received neither ([Table 3](#), page 6). The yield of the T-22 corn was actually significantly less than that of both the starter and control treatment corn. The starter fertilizer did not increase yield compared to the control. Overall yields reflect the near-drought conditions. Possibly results would have been different in a year with adequate moisture, suggests Gary.