Nitrogen

The PFI on-farm research program has seen a resurgence of nitrogen trials with the addition of cooperators associated with the Iowa Farm Bureau. Not that we got nitrogen all figured out with the first 70 replicated trials! Yes, the late spring soil nitrate test saved people over $6 per acre, and the fall stalk test now provides a good end-of-season snapshot of nitrogen status. But what do you do in a year like 1999, where for most producers (stop gloating, northwest Iowa) it stopped raining just long enough to get the corn planted?

In 1999, **John and Joan Lubke**, of Ridgeway, worked with IFB rep Ron Fairchild to compare nitrogen rates for corn following soybeans. The late spring soil nitrate test was 15 ppm. The critical level of 25 ppm left John 10 ppm, or about 80 lbs fertilizer N short. He compared late-June sidedressings of 32 and 64 lbs of N as 28% UAN, so both rates fell short of what the late spring soil test suggested. As it turned out, 1999 was not the year to underestimate corn N requirements, at least not in northeast Iowa. In July Lubke recorded 9.8 inches of rain, and it is likely that additional nitrogen was leached out of the root zone. Even though yields were respectable, at the end of the growing season, stalk nitrate-N levels in both treatments were far below the 700-2,000 ppm optimum range (Table 3, click to view). John now wishes he had tried a higher nitrogen rate, and he hopes to do so in 2000.

Dave Struthers compared two nitrogen rates in 1998, three in 1999.

At the other end of the sufficiency spectrum, **Brad and Chris Harvey**, Akron, fall-applied what he calculates as 120 lbs N in 5,000 gallons of liquid manure in the fall of 1998, then came back in 1999 and sidedressed an additional 80 lbs of N as 28% UAN in strips (Table 3). The fall stalk test showed both the low and high rate treatments to be well over the target range of 700-2,000 parts-per-million (ppm) nitrate -N. In fact the high N treatment measured nearly 4,800 ppm. This was a demonstration of "what not to do," and Brad hopes that his northwest Iowa neighbors will get the point and use their manure to best advantage.

Bryan and Lisa Sievers, New Liberty, sidedressed an additional 50 lbs of N as anhydrous ammonia on top of 154 lbs N from preplant and planting operations (Table 3). This was another demo of what not to do when your late spring soil nitrate test says 42 ppm (25 ppm is sufficient). The two-and-a-half bushel yield difference wasn't close to being statistically significant, but even if it were real, it wouldn't pay for the fertilizer and application.

Dave and Becky Struthers, Collins, bit the bullet and included a zero-N treatment in their 1999 nitrogen rate trial. Table 7, click to view, shows that there was no yield difference between 100 and 140 lbs N, which isn't surprising given the late-spring soil nitrate test of 27 ppm. The zero-N rate did average significantly lower than the 100-lb and the 140-lb rates. But consider these yields from replications of the zero-N treatment: 80.0, 130.4, 147.4, 144.9, 108.5, 65.9. As you can see, the zero-N treatment did fine in the middle of the field. This is not revealed in the overall averages. Is this an argument for precision agriculture? Is there a more location-specific way to take the late spring soil nitrate test? Would it be economical? The truth is out there.