More Fertility Trials

Dennis and Eve Abbas, Hampton, asked a question pertinent to their organic farming operation. Like the previous trials it relates to nitrogen, although at first glance it may appear to be a population study. On the Abbas farm, the system supplies the nitrogen; in other words, N generally comes from green manures, other crop N contributions, and the farm livestock, not from off-farm purchases. Wanting to match crop needs with the ability of the farm system to supply N, Dennis hypothesized that a lower corn population would need less N than a high population, so he compared 21,000 and 28,000 plants per acre. This makes sense in an intuitive way, but it runs counter to tools like the late spring soil nitrate test, which does not differentiate recommendations based on population.

Cultivation at the Olson's farm

We'll have to wait another year for the answer. First the field suffered severe green-snap in one of the summer's wind storms. Then harvest took Dennis away at a time when the stalk nitrate test would have provided an important piece of the puzzle. Midsummer leaf nitrogen was significantly higher in the lower population corn, suggesting that individual plants were closer to N sufficiency in the lower population. Yields, however, were very similar (Table 5). Yield-per-acre, of course, is a function of both yield-per-plant and plants-per-acre. Another year might show the same results - but only time will tell.

Two other cooperators evaluated products intended to improve the efficiency of crop nitrogen utilization. **Jeff and Gayle** Olson, Winfield, surface-applied 72 lbs N per acre as urea-ammonium nitrate solution - with and without a urease inhibitor - to corn following soybeans (Table 5). The inhibitor is designed to slow the breakdown of urea to volatile ammonia nitrogen. The product did not improve crop yields in this trial. It may be that the urea was incorporated into the soil by the 0.2-inches rain that fell the day after application. Additionally, the 80 lbs N later sidedressed over the whole trial may have obscured any loss of nitrogen.

Dave and Becky Struthers evaluated the product called ACA (ammonium zinc acetate), which is said to improve crop nitrogen utilization. There was no effect on corn yield (Table 5), but the late spring soil nitrate test of 32 indicates that nitrogen was not limiting to begin with. Dave includes in the cost of the practice part of the price of the electric pump he had to buy in order to furrow-apply the ACA with the planter.

Deep-banding of nutrients has been a continuing interest for PFI's no-till and ridge-till cooperators. ISU agronomist Antonio Mallarino, working both on farms and ISU experiment stations, has found that corn in these reduced tillage situations sometimes responds to deep-banded potassium - even though the soil already tests adequate in that nutrient. (See The Practical Farmer, vol. 13, #3, Fall, 1998.) Paul and Karen Mugge repeated part of a 1996 trial, comparing broadcast to deep-banded NPK fertilizer. In 1996 the yield difference was not significant; in 1998 the difference was also not statistically significant at the 95 percent confidence level, but it was very close to being so. If you consider the 3.8-bushel difference to be a real treatment effect, then the $2.20 greater cost of deep banding is offset by a yield benefit of about $9.40. Just as Paul Mugge saw no carryover effect in soybeans following his 1996 trial, Jeff and Gayle Olson found no benefit to 1998 corn from deep banding for the 1996 crop (Table 5).