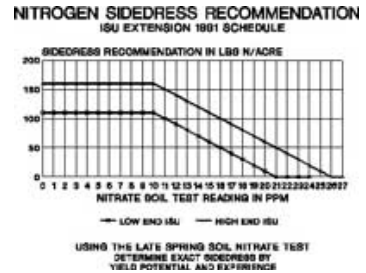


Nitrogen

1991 was the fourth year PFI has used the late spring soil nitrate test for corn. The test has been a good indicator of nitrogen sidedress needs in both dry years and wet. PFI cooperators continue to work with ISU soil scientist Alfred Blackmer to improve the test.

Using the late spring soil nitrate test determine exact sidedress by yield potential and experience



The late spring test recommends a range of sidedress rates. (See the chart on right) Through experience, growers find where in this "window" their nitrogen rates need to be. For most situations, the recommendations appear to be conservative. For example, [the table of nitrogen trials](#) shows that several cooperators ran trials in which it was the high nitrogen rate that was based on the test, with the low rate sometimes considerably below the test recommendation. Of these, only Doug Alert's trial and Lynn Stock's trial produced yield reductions from rates below the recommended range.

Tom and Irene Frantzen took the late spring test in corn following alfalfa. The test value of only 9 ppm (parts per million) nitrate N translated to a sidedress recommendation of 110-to-160 lbs nitrogen. In a replicated trial, Tom sidedressed three rates - 0, 50, and 110 pounds N. To no one's surprise, all three treatments yielded the same. The late spring test just came too early in the season to reflect the nitrate nitrogen that was going to be released from that plow-down green manure. Studies have shown corn following alfalfa responds to a maximum nitrogen application of about 25 pounds per acre.

Don and Sharon Davidson used three application rates to compare two methods for making nitrogen recommendations: 98 lbs N (48 sidedress); 140 lbs N (90 sidedress); and 165 lbs N (115 sidedress). The middle nitrogen rate was based on the formula:

$$\text{Yield Goal} \times 1.2 \text{ lbs N/bushel.}$$

The high rate was based on the late spring soil nitrate test, which recommended a sidedress of 110-160 lbs N from the soil test value of 10 ppm. The lowest rate was also based on the late spring test, using a formula given to PFI cooperators during the early stages of research on the test:

$$(21 \text{ ppm} - \text{test result}) \times 7 \text{ lbs N/ppm.}$$

The yields of the two lowest rate treatments were statistically the same. Unexpectedly, the highest rate of N was associated with a significantly greater yield. This four-to-five bushel increase did not necessarily pay for itself, however. Balancing the yield increase against the greater fertilizer cost, the high-rate treatment came out slightly less profitable than the lowest rate, at least with this year's data. Don plans to repeat the trial.

Ted and Donna Bauer contributed an interesting observation to the nitrogen discussion. They calculated the additional cost of handling and hauling from town the additional nitrogen fertilizer used in the higher rate of their trials. The additional cost, shown in the nitrogen table, comes to the better part of a dollar per acre. That is a cost most people probably don't recognize.