



April 1, 2005

## **STRETCHING THAT NITROGEN DOLLAR**

Research at the University of Nebraska and other land grant colleges has clearly demonstrated that producers can safely reduce their nitrogen input for corn following a legume crop such as soybeans. This soybean nitrogen credit is not due to increased nitrate nitrogen supplied or fixed by the soybean plant. In fact, soybean production results in a net removal of nitrogen from the soil system.

The primary mechanism for the nitrogen credit from soybeans is reduced immobilization of soil-derived nitrogen relative to decomposing corn residue. Because of the low carbon to nitrogen ratio, soybean crop residues will decompose faster than cereal crops such as corn or wheat stubble. This faster decomposition will release more nitrogen to the soil, which consequently will be available to the new crop in the next year. This saves many producers in our county a lot of nitrogen each year in a crop rotation system.

University of Nebraska recommendations for corn following soybeans indicates that there can be a credit of 45 pounds of nitrogen per acre unless the soybean yield was less than 30 bushels per acre. For yields less than this, one pound of nitrogen per bushel harvested can be credited to that field.

Nitrogen recommendations for corn following alfalfa can be reduced 120-150 lb on fine textured soils and 70-100 lb on sandy soils, depending on the alfalfa stand. Use the higher end of the range when there are more than four alfalfa plants per square foot and the lower end of the range when there are fewer than 1.5 plants per square foot.

If you do not have a deep soil sample, UNL assumes 3 ppm soil Nitrate-N and thus a credit for corn or milo after soybeans of 45 lbs/ac of nitrogen. From 1988 to 1991, UNL soils specialists studied irrigated corn following soybeans in South Central Nebraska. In total, the research covered 19 site/years. Across all site/years, a significant yield increase due to nitrogen was found only with the first 40 pounds of nitrogen applied per acre on corn following soybeans. The yields averaged 172 bushels per acre with a range of 97 bushels to 221 bushels per acre.

In 2003 and 2004, under irrigated cropping systems, UNL Cooperative Extension Educators and producers in York, Hamilton and Seward counties compared production using University of Nebraska nitrogen recommendations (assuming 3.0 ppm nitrogen carryover), using a soil N credit if applicable and a 45 pound credit and crediting soil N with a 75 pound legume credit.

Results from these nine replicated research plots over the two years demonstrated that the UNL recommendations (assuming 3.0 ppm nitrate nitrogen carryover and 45 pounds soybean nitrogen credit on irrigated fields) are more than adequate to meet the yield goal demand for nitrogen. There appears to be room to give greater credit to the soybean residue with little risk of yield reduction and good potential for nitrogen savings. All three recommendations exceeded producer yield goals of 205 bushels per acre. Following the previous soybean crop, residual soil nitrate



levels in the nine plots varied from 5.3 to 9.0 ppm and averaged 6.4 ppm, well above the 3.0 ppm assumed in the UNL formula.

For more information, go to the online newsletter, [cropwatch.unl.edu](http://cropwatch.unl.edu).

Randy Pryor, Extension Educator  
University of Nebraska-Lincoln Extension in Saline County  
306 West 3<sup>rd</sup> Street, Wilber, NE 68465  
Phone (402) 821-2151 • Fax (402) 821-3398 • e-mail: [randy.pryor@unl.edu](mailto:randy.pryor@unl.edu)