



United States Department of Agriculture

Agronomy Technical Note #8 NITROGEN MANAGEMENT IN A NO-TILL CORN SYSTEM

Natural Resources Conservation Service - Indiana - October 2016

AGRONOMY TECHNICAL NOTE – Quality No-Till Series

The *Quality No-Till Series* provides management techniques for the successful adoption of *Quality No-till Cropping Systems*. This information is applicable to most Indiana soils and cropping conditions and covers broad application.

Understanding the Nitrogen Cycle during the Transition to No-Till

During the first 3-4 years of a no-till system, the soil biology and chemistry undergoes significant changes. Soil microbial populations increase rapidly as soil disturbance decreases and the organic matter stabilizes. These microbes can tie up (immobilize) most of the available soil nitrogen early in the growing season. This nitrogen immobilization will be greater in fine-textured soils and may result in nitrogen deficiency during the early corn growth stages. Corn plants determine ear size and thus yield potential from emergence through the 5th leaf stage. A corn plant which is stressed during these growth stages can set smaller ears and thus have a lower yield potential. Supplying available nitrogen during this time period will preserve yield potential. The nitrogen which is tied up early by the soil microbes will be made available later in the growing season or stored in the soil organic matter. The total amount of applied nitrogen will not necessarily need to be increased, but rather the timing and/or formulation of nitrogen may need to change.

Management Strategies

1. Start your No-till system with soybeans which are less affected by nitrogen immobilization.
2. Use starter fertilizer at planting, which delivers 20-60 pounds of nitrogen per acre. Use the lower range after soybean and upper range after corn, wheat or after a grass cover crop. Using UAN (Urea Ammonium Nitrate) solutions alone or in a blend to achieve desirable N rates can be a good choice. For the higher rates, place the N in a 2x2 fashion to minimize loss.
3. Consider adding ammonium thiosulfate to UAN solutions at a 5 to 10% volume-to-volume ratio as a sulfur source and a stable ammonium source.
4. At least 35 lbs. of **nitrate** nitrogen must be available during the first 40 days of corn growth to provide for full yield potential.
5. Inject at least half of the nitrogen below surface residues.
6. Side dressing of N should be completed as early as possible (emergence-V-4). Use knives that seal well, yet cause as little surface disturbance as possible.
7. If soil test shows that phosphorus is needed, consider using DAP or MAP for a stable, early dose of N, if applying phosphorus ahead of corn.
8. Consider using 15+/- gallons of 28% UAN, with a urease inhibitor, as part of the carrier with pre-plant soil applied, residual herbicides (not with glyphosate products).
9. Utilize multiple forms of soil and tissue tests to continually analyze and adapt your N management for in season as well as future planning.
10. Plan to provide nitrogen in multiple applications, forms and pathways to reduce losses from leaching, run-off, or denitrification, and increase uptake through more timely availability for the crop.

An increase in soil organic matter improves soil health and overall productivity. Increases in total soil nitrogen becomes a valuable part of your total nutrient bank. Managing these changes in the nitrogen cycle when entering into a no-till system can preserve and potentially improve corn yield potential.