IPNI
Plant Nutrition TODAY
Better Crops, Better Environment...through Science

From Scientific Staff of the
International Plant Nutrition Institute (IPNI)
3500 Parkway Lane, Suite 550
Norcross, Georgia 30092-2844 USA

Phone: 770-447-0335 Fax: 770-448-0439
E-mail: info@ipni.net Website: www.ipni.net

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CROP NITROGEN USE EFFICIENCY—HOW HIGH IS YOUR HURDLE?

Past research indicates that on average, about 35 to 45% of the N applied (as fertilizer and/or manure) is recovered in the above-ground portion of the targeted crop during the year/season of application. Does that mean all the remainder is lost to the environment? No! A large portion may be retained in the soil in organic matter, on soil cation exchange sites, and also in root systems and crop residues.

With good management and available technologies, it is possible to raise the above-ground crop N recovery into the 60 to 70% range or more on most farms and fields. In the future, the hope of many agronomists is to see this range of recovery raised to an even higher level by coupling crop varieties and hybrids that have improved N recovery and physiology characteristics with skillful field N management.

What limits crop N recovery improvement in most fields? The first answer would probably be the weather. Although unpredictable weather is a big factor, there are opportunities in every field and on every farm to hedge against weather impacts and to lower the risks of N loss in retaining more in the crop and in the field.

Here are some examples of things one could do to help optimize N management:

Account for

- the supply of N released from microbial mineralization of soil organic matter,
- residual soil nitrate N when choosing a fertilizer N rate,
- any history of manure application and N released,
- crop N uptake demand and the seasonal uptake pattern.

Consider

- the balance between N applied from all sources and the crop harvest removal,
- how well the fertilizer N source is suited to your soils and crops,
- better synchronizing the timing of application to more closely match crop uptake demand,
- the risks for N loss via leaching/drainage, runoff/erosion, gaseous loss as ammonia, and gaseous loss due to denitrification during wet or waterlogged conditions.

If you have doubts or lack knowledge about any of these bulleted items, seek the advice of a Certified Crop Adviser, experienced fertilizer dealer, or Extension agent. A close evaluation of your N management plan might expose some of the hurdles present in your operation that may be limiting your crop N recovery. You might be surprised at the economic losses of N that could be occurring in your fields, and the risks the losses pose to water quality in your watershed and to the atmosphere. Fine-tuning your crop N nutrition program can enable you to clear the hurdles that may be exposed and provide improved returns on your fertilizer N investment.

What will you adjust in 2011 to get more profitability from your fertilizer N management?

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For more information, contact Dr. Clifford S. Snyder, Nitrogen Program Director, IPNI, P.O. Box 10509, Conway, AR 72034-0008. Phone (501) 336-8110. Fax (501) 329-2318. E-mail: csnyder@ipni.net.

Abbreviations: N = nitrogen.