KANSAS STATE UNIVERSITY | Extension
Meadowlark District

October 30, 2026

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Nitrogen Losses

Most of our crops require Nitrogen (N) in some form. Some (legumes) produce their own. Some use it more efficiently than others (native grasses don't respond nearly as well to N as do brome/fescue). For those requiring N sometimes at high levels), managing to make applications as efficient (and economical) as possible are important.

Increasing efficiency starts with a knowledge of where nitrogen might be 'lost' in our application systems. Examples include:

- Runoff – movement of N off the surface in soil or water
- Leaching – downward movement of N in the nitrate form
- Denitrification – gaseous loss of N from nitrate
- Volatilization – gaseous loss of ammonia from surface applied urea
- Immobilization – utilization of N by biomass

All have different management factors affecting loss levels. Most involve water or are impacted by soil properties and temperature since microbial processes are at the center of why losses may or may not occur. For example, leaching tends to be worse in sandy, highly permeable soils while denitrification is a problem in heavier soil types. Volatilization is an issue with urea but isn't a concern with ammonium nitrate.

In an ideal world, we'd eliminate N losses altogether – but that's impossible, so we control the things we can to reduce losses as well as we can. We'll touch on a few options in the coming weeks, but one good starter idea to keep in mind is the 4Rs of Nutrient Stewardship: Right Source + Right Time + Right Rate + Right Place. Whether you're thinking about fall anhydrous applications or fertilizer on brome next spring, evaluating applications through the lens of these 4R principles can be a great start towards reaching those efficiency goals.

Learn more about them at: https://4rplus.org/nutrient-management/ .