



THE OHIO STATE UNIVERSITY

COLLEGE OF FOOD, AGRICULTURAL,
AND ENVIRONMENTAL SCIENCES

Hardin County Extension News Release

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Nitrogen Management Technology

Jim Hoorman, OSU Extension Educator, Putnam County

How much nitrogen (N) does it take to produce 200 bushels of corn per acre? That question haunts farmers and researchers alike. There is no one-size-fits-all approach to N management, and not every corn crop needs the same amount of N to produce 200 plus bushels/acre. Effective N management plans need to focus on how much N a particular field and corn crop needs, as well as how to properly manage N throughout the growing season. The following information comes from Ron Lloyd, with Agronomy and Technical 360 Yield Center and Mathew Grassi who offers five steps to rethinking and maximizing nitrogen management as margins shrink and regulatory concerns grow.

1. Know and don't guess how much N is left: Guessing how much N is in a field or needed doesn't allow for the most accurate and impactful N management plans. Rain events, soil moisture, soil organic matter levels, pH, microbial activity and mineralization all play a role. The only way to know exactly much N is needed is by knowing how much N is in the soil. Farmers and researchers are experimenting with new technology (like 360 SOILSCAN and other nitrogen testing systems) in real time to determine N field levels. These portable soil testing systems can provide in-field soil nitrate results in about five minutes. It also can generate GPS-tagged, zone-specific readings with comparable accuracy to commercial labs. OSU Extension is looking at evaluating the effectiveness of this type equipment and similar nitrogen systems next year.
2. Corn demand for N varies: Corn demands nitrogen throughout the growing season and its demands fluctuates during the season. Up to 75% of N is used after V10 in corn. Too little N late in the growing season, especially when kernels form, could potentially reduce yields. Split-N application allows farmers to apply N throughout the growing season. It's about maximizing N inputs so it's available when the corn needs it and increasing N use-efficiency.

3. Outsmart Mother Nature: Even with a split-N approach, farmers might not be making the most of their N because big rain events can reduce available N but that extra moisture can also raise yield potential. New crop modeling software allows farmers to adjust N management plans based on weather events midseason. Now, farmers can anticipate the potential for big rains in June and push N application back. Nitrogen management plans should be monitored and adjusted throughout the season based on full-season, real-time data.

4. Provide the right amount of N in the right place: Nitrogen needs change not only throughout the season but also throughout fields. Different management zones in fields use N differently, so a 3.5 inch rain on a hill makes a different impact on N levels than a 3.5 inch rain on flat soil. Taking nitrate samples from different management zones allows farmers to build a variable rate N plan that provides the right amount of N to each zone in a field to maximize every pound of N.

Where N is applied within the row is also important. Traditional side-dress methods apply N in the middle of the crop row about 15 inches from the stalk base. Yet, a corn plant acquires more than 60% of its N from a horizontal radius of approximately 7 inches. Farmers are experimenting with technology to apply N within 2 to 3 inches of the stalk base so nearly 80% of the plant's root mass is within the N application zone. Due to the funneling nature of a corn plant, farmers can take advantage of stem water to move N placed at the base into the root zone and put N in the right place for uptake and minimal loss.

5. Increase the N window of application: Traditional side-dress methods tend to have a short window of N application and missing it may mean that the crop goes without the N. New technology extends the window of N application and allows for more flexibility in timing for late-season N application, so farmers can apply N when crops needs it most, whether that's at V6 or all the way up to tassel. That is more than 30 days of application time. So now farmers don't have to worry and have the control to hold some N back for a late-season application. With smarter N management, farmers can make the most of inputs by applying N when it's needed most, instead of putting it out early when it's vulnerable to loss from rain and environment.