

Nitrogen: corn's “must-have” nutrient

Nitrogen is one of corn's most important nutrients and an essential component for generating high corn yields. It's a critical part of the building blocks for a healthy corn crop—amino acids, proteins and, perhaps most importantly, chlorophyll production. Reduced chlorophyll means poorer photosynthesis and the risk of reduced yield potential. Nitrogen is important to the health of every part of the corn plant.

Nitrogen can be found in soil, where microbes break it down into ammonium and then convert it to nitrate in a process called mineralization. Corn can access nitrogen as either ammonium (NH_4^+) or nitrate (NO_3^-). The ammonium form is more efficient for plants to use and less susceptible to nitrogen loss, but any form of nitrogen is susceptible to loss through **leaching**—when excess rainwater carries nitrate down through the soil, away from where the corn plant can access it—or **denitrification**—the result of bacteria in saturated soil using the oxygen from nitrite in place of oxygen from the air, leaving the nitrogen to be converted to nitrogen gases that are not useable by plants. Loss of nitrogen through either process causes corn to cannibalize its own nitrogen by absorbing it from its leaves and stalk. That's why it's important for nitrogen to remain in the soil, close to plant roots, to be accessible throughout corn's critical growth periods.

Nitrogen is corn's most important nutrient in terms of yield, and almost certainly one of your customers' largest input cost. A 200-bushel corn crop requires about 200 to 250 pounds of nitrogen per acre throughout the growth cycle, or at least a pound of nitrogen per bushel of corn harvested.

Nitrogen demand isn't high during corn's early growth stages, but its availability is important. This is when yield potential is determined, so growers should apply nitrogen as close to the plants as possible to reach their small root systems. From V10 through tasseling, nitrogen uptake increases, but the root system is now larger, so precise nitrogen placement becomes less important. After tasseling, demand decreases, and even some cannibalization of lower plant leaves is desirable, as it shows that a grower hasn't over-applied nitrogen. Soil nitrate tests and plant tissue tests can tell you whether corn is in danger of becoming nitrogen deficient.

Soil and weather can both impact the amount of nitrogen available to corn throughout its growing cycle. Corn may not display signs of nitrogen deficiency in early growth stages, but as the plants mature, growers may see “firing” of the leaves, where they turn pale greenish-yellow and eventually develop dry brown tips and edges, along with spindly stalks. Unfortunately, once the signs of nitrogen deficiency become apparent, it's unlikely they can completely salvage the crop's yield potential.

Fertilizers can add nitrogen to the soil. Common nitrogen fertilizers include urea, ammonium sulfate, ammonium nitrate and anhydrous ammonia, and each converts nitrogen at a different rate. Another approach is to avoid nitrogen deficiency in the first place. A nitrogen stabilizer can keep bacteria from converting ammonium to nitrite, keeping nitrogen more accessible to plant and protecting their yield potential. Nitrogen stabilizers have been shown to increase yield by 5.2 percent when applied in the spring and up to 7 percent when applied in the fall.

Without nitrogen, corn can't reach its fullest yield potential, so it's important for your customers to ensure their crop is getting enough. To help optimize nitrogen use consider using N-Serve® nitrogen stabilizer with fall or spring applications of anhydrous ammonia or Instinct NXTGEN® nitrogen stabilizer with urea, UAN and liquid manure applications. Both N-Serve and Instinct NXTGEN include exclusive Optinyte® technology which reduces denitrification, reducing the escape of greenhouse gases into the atmosphere, as well as leaching of nitrates into groundwater.



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