

NITROGEN APPLICATION TIMING IN CORN PRODUCTION PART 2

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the plant does not have to cannibalize the leaves to provide N for kernel development when it can take up N from the soil during this period. This allows the plant to retain more green leaf area in late summer and early fall, which increases the duration of photosynthesis, carbohydrate production and grain yield.

Meeting Corn Needs for N

In order to meet corn needs for adequate nitrogen at V8, growers must often contend with aberrant weather patterns that impact N management goals. Excessive rainfall can threaten soil nitrogen reserves as well as hinder resupply by ground equipment. Excessively dry conditions can prevent applied N from moving from the point of application to the root zone of plants. Temperature and moisture conditions also impact the amount of N mineralized from the organic matter fraction of soils.

To help avoid weather-related pitfalls to corn N supply, **growers can spread their risk by applying N at multiple times**, or using products that help protect specific N fertilizers from rainfall-related losses. This is especially important on soils subject to N loss, such as sandy soils that are prone to N leaching, or heavier soils in high rainfall areas that may become saturated and subject to denitrification losses. This approach to N management can also increase the bottom line by decreasing the total amount of N applied.

Nitrogen may be applied by growers at several times during the year: in the fall, early spring (preplant), at planting, and in-season.

Fall-application: Fall application of N is practiced in areas where soil temperatures usually remain below 50°F from late fall to spring. These cool soil temperatures reduce the activity of nitrifying soil bacteria that convert ammonium to nitrate forms of N. However, if soil temperatures rise above 50°F, this N is at risk of loss through leaching or denitrification. Because of the extended period of time that this N is at risk of loss, fall application, if practiced, should be carefully managed. In all instances of fall application, only ammonium sources of N should be used (Murrell and Snyder, 2006). A nitrification inhibitor such as N-Serve® should also be considered to help keep N in the stable NH₄⁺ form.

Early spring (preplant) application: Preplant N application is commonly used in areas where growers are able to complete this practice without delaying planting beyond the optimum window. Because this N is applied well ahead of major crop uptake, it too is at risk of loss if warm soil temperatures and excessive rainfall occur. Application of ammonium forms of N can reduce loss potential. Depending on the time of application relative to planting, as well as expected weather conditions (determined by climate history) a nitrification inhibitor may also be advantageous.

At planting application: Though many planters are not equipped to apply fertilizer at planting, this method of application has certain advantages. When the field is fit to plant, planter N applications are sure to occur, unlike preplant or sidedress applications that may be disrupted by weather. However, there are limits on how much N can be applied at planting, due

to concerns over effects on seed germination, as well as how much material can be reasonably carried on the planter. In addition, applying fertilizer at planting slows the planting process to some degree.

Liquid forms of N, such as UAN solution, are preferred for planter application. UAN solution can be combined with liquid starter or other liquid fertilizers to supply multiple nutrients to the crop.

In-season (sidedress) application: In-season N applications allow for adjustments to planned N supply based on weather variations. If wet spring conditions result in N losses, sidedress rates can be increased. If warm temperatures and moderate rainfall result in high N mineralization and an N-sufficient crop, sidedress rates can be reduced. This process of determining crop sufficiency or need can be aided by various methods of soil testing or plant sensing.

In-season N applications can supply N to the crop near the time of maximum plant uptake. However, if wet conditions develop, sidedress applications may be delayed beyond the optimum application date. Extremely dry conditions can result in a delay in availability of sidedressed N to the plant.

Because of the risks associated with in-season N application, this practice must be carefully managed to reap its potential rewards. Soil fertility specialists often recommend that only one-third of total crop supply should be targeted for sidedress application. In addition, growers should be well-prepared to apply sidedress N as quickly as possible when the window of opportunity arises. **Finally, a backup plan should be in place for in-season application.** If weather interferes with the originally planned application, a quickly implemented backup plan can help avert significant N deficiency and yield loss.

Ammonium Forms of N More Stable

The most common nitrogen fertilizers are anhydrous ammonia, urea-ammonium nitrate (UAN) solutions, and granular urea. Other forms include ammonium nitrate and ammonium sulfate. Ammonium (NH₄⁺) forms of N bind to negatively charged soil particles and are not subject to leaching or denitrification losses. Applying N fertilizers that include more ammonium and less nitrate forms of N reduces their potential for loss in the short term. However, over time, soil bacteria convert ammonium to nitrate (NO₃⁻), a form which is readily lost when excessive rainfall leaches or saturates soils. Nitrifying bacteria have minimal activity when soil temperatures are below 50°F, so cool or cold temperatures naturally help protect ammonium forms of N from losses.

Urea-containing fertilizers have yet another mechanism of loss: they are subject to volatilization when surface applied. However, once urea is taken into the soil by rainfall, irrigation, or tillage, volatilization potential ceases.

Nitrogen Stabilizers

To help reduce N losses, nitrogen "stabilizers" or "additives" can be applied along with N fertilizers. These products must be matched with specific N fertilizers in order to be effective. Several common products include Instinct®, N-Serve®, Agrotain®, Agrotain Plus® and ESN®.



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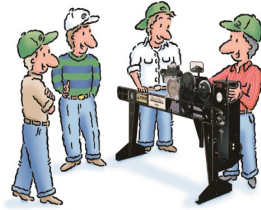
PERMIT # 14

PLANTER TEST STAND

Get your meters calibrated and repaired. We have a planter test stand for checking the accuracy of vacuum, finger pickup, and Kinze brush meter units.

This is something that we suggest should be done on a planter at least every other year. Contact Mike, Tye, or Korey for details and to schedule your test. We would really like to do these this winter instead during the spring rush.

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