Nitrogen (N) is an essential nutrient for successful corn production and there is never a good time to be short of N. The chart below illustrates how much N is accumulated by a corn plant during the growing season.

Approximately 60% of the total amount of N needed by the plant is accumulated from V4 to pollination, making that an especially important time to be mindful of the N available in your fields. N deficiency after V6, when the plant is relying solely on soil supplied nutrients, can have severe impacts on yield. The rate of N uptake diminishes after pollination as a high percentage of the N used during grain fill is supplied via remobilization from leaf and stalk tissue.

There are various soil and tissue testing methods available to determine if supplemental N is needed after crop emergence. All these methods have their pros and cons and should be studied before using. A more recent popular method of predicting post emergence N applications is the use of internet based N modeling tools. These e-based tools use algorithms that account for current N availability, crop growth stage, weather, and soil parameters.

A simple method for determining N need is observing the plant’s growth and color. This method is best if N check strips were previously applied for comparative purposes. Regardless of method, if the crop is expressing N deficiency symptoms at any point from the V4 stage through pollination, a sidedress application of N is usually a wise investment.
Late season N uptake can differ among hybrids, but no hybrid will yield well in N deficient conditions. To ensure maximum yield, regardless of hybrid, use a N management program that supplies a readily available amount of N to the crop throughout the growing season. Rather than choosing which hybrid to sidedress for supplemental N, choose which field is more likely to respond.

The best response to sidedress will come from fields with:

- Little or no pre-plant applied N, apply N before V3
- Saturated soils in warm conditions, especially poorly drained fields
- Coarse (sandy) soils that received heavy rainfall after planting
- High pre-plant N losses due to weather
- N deficiency symptoms from the V4 growth stage through pollination
- High stand counts, uniform growth and yield expectations that are higher than the planned pre-plant N rate

**Sidedress N application methods**

**Anhydrous ammonia** – This application method provides an efficient in-season N source. Applications should be made prior to the V6 growth stage to avoid excessive root pruning. It’s important to make sure the application knife track is properly sealed to avoid N loss and crop damage.

**Broadcast urea** – This is a time efficient application method but is vulnerable to volatilization loss. To avoid N loss, applications should be made shortly before an expected rainfall. In warm conditions, as much as 30% of broadcast urea can volatilize if there is no rainfall within 10 days after application. Urea stabilizer products such as Agrotain® Plus can be used to reduce volatilization. Urea granules can cause leaf burn. To minimize leaf burn, apply granules to V4 or smaller corn when leaves are dry. If urea is applied in emergency situations to larger corn, leaf burn will be more apparent but is worth the risk if the only alternative is not having enough N available for the crop.

**Urea Ammonium-Nitrate (UAN) solutions** – This method has the widest application window and is only restricted by the height of the crop for the application equipment used. High clearance machines allow application up to tasseling. Liquid N solutions can be dribbled on the soil surface or injected using a coulter system. Avoid broadcast applications after V3 growth stage due to the potential of extreme leaf burn. Dribble applications are prone to volatilization loss if not incorporated by a rainfall. N stabilizers can be used to reduce the risk of N loss.

**Fertigation** – Applying N through sprinkler irrigation systems is a common and efficient practice. Proper equipment to avoid backflow into the water source is required when using this method. Fertigation should begin with the first irrigation and be complete by the R1 to R2 growth stages. Application rates of 20-30 lb N/acre per irrigation event are recommended. However, higher rates of up to 50 lb N/acre per irrigation are unlikely to cause crop damage because the fertilizer is diluted in water. It is important that water is applied uniformly, without runoff, to ensure even distribution of N.

**Conclusion**

There is never a good time for a corn crop to be short of nitrogen. Pre-plant N applications have an increased risk of N loss, leading many corn growers to use sidedressing as part of their nitrogen plan. For others, it’s a way to add supplemental N in fields that have sustained high N loss. In either case, there are factors to consider to ensure the best return on your investment.

**From the desk of**

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