

Sidedress and Pre-Tassel Nitrogen Application in Corn

KEY POINTS

- Sidedressing is used to provide corn with nitrogen (N) closer to when it is needed by the plant.
- Sidedress management options vary and growers should be aware of potential injury concerns as they sidedress N during the spring.
- Corn plants require the most N when nearing the reproductive growth stages.
- Applying N pre-tassel may help maximize crop yield potential, especially when early applied N has denitrified or leached.

Application Timing

If N was not applied at or before planting, sidedress N applications should be made by V3 stage of growth. At V3, seedlings have used up nutrients stored in the seed and become dependent on soil supplied nutrients.

Sidedress:

When supplementing previous N applications, sidedressing can be done through V8 stage of growth. Adequate N from growth stage V5 through V8 is critical due to the number of potential ears and that ear girth is being determined. Nitrogen uptake is greatest from V8 through silking, depending on weather conditions (**Figure 1**).¹

Split Applications:

Split applications of sidedressed N may be used to help extend N availability to corn, especially in warm, wet climates. A split application method can reduce the risk of substantial N loss before crop uptake.²

Pre-tassel N Application:

A corn plant enters the rapid growth stages at V10, which occurs about 40 days after plant emergence. Corn plants require more N during this time. Some growers have adopted the practice of applying a small portion of the total N requirement when the corn plant nears tassel (VT growth stage) and is referred to as pre-tassel N (PTN) applications. Recommended PTN application rates typically range from 15 to 25% of the total N applied to corn. The other 75 to 85% of N should be split between an application made prior to planting and at early vegetative growth stages.

Wet field conditions can significantly delay sidedress N applications. Numerous university trials have verified that late PTN can improve yield potential.³

Nitrogen Sources

Urea-ammonium nitrate (UAN) and anhydrous ammonia are good nitrogen fertilizers to use sidedressing corn, pre-tassel N applications are best with UAN solutions.

- **Urea-Ammonium nitrate.** UAN liquid solutions, such as 28% or 32% N, can be applied by soil injection or as a band on the surface with drops, on fairly large corn with high clearance applicators. When applying N, from a UAN source or other sources containing urea, rainfall or light tillage is necessary to avoid volatilization, and move the N into the soil profile. Up to 30% of the urea could be lost due to volatilization if no rainfall occurs within two weeks and temperatures are warm. The most effective way to apply UAN is to the soil by injection or pre-tassel with high clearance applicators using drops and applying the UAN in a concentrated band.

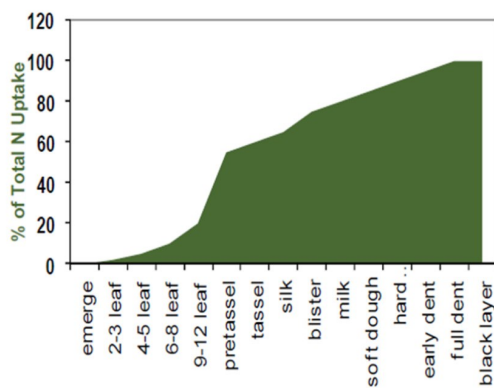


Figure 1. Percent of total nitrogen uptake for corn by growth stage. Nitrogen data adapted from "How a corn plant develops," Special Report 48, Iowa State University.

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- **Anhydrous Ammonia.** Anhydrous ammonia applications should be made in moist (not wet) soil and only if excess root pruning will not occur. Sidedressing ammonia can begin immediately after planting. Injection can either be done between every row or every other row (**Figure 2**).

Benefits vs Risk

Sidedressing is agronomically more efficient and can help reduce input costs. If over 50% of the N applied is through sidedressing, rates can be 10% less than pre-plant rates.

Based on early indications of yield potential, N rates can be adjusted with sidedress or pre-tassel applications. If the stand is good and biotech traits and fungicides are being used to protect yield potential, N rates can be increased, with poor stands, N rates can be reduced.

Some of the risk associated with sidedressing or pre-tassel applications:

- Shortage of labor.
- Adverse weather conditions.

When sidedress or pre-tassel applications are delayed and corn is deficient of N for an extended period of time, yield potential can be dramatically reduced.

- Crop injury is also a potential concern with late sidedress or pre-tassel applications.
- Broadcast UAN can cause foliar burn, leaf loss and reduced early growth (**Figure 3**).

Because of leaf burning risk:

- Recommended to not exceed 90 lbs/acre when corn is at growth stage V3 or V4.
- Recommended at V7 growth stage not to exceed 60 lbs/acre.
- After V7 through pre-tassel the use of drops (**Figure 4**) and a concentrated band application of UAN at a use rate of N that supports the yield potential.



Figure 2. Anhydrous ammonia sidedress application to V5 corn.



Figure 3. Corn leaf damage from broadcast UAN at 100 lbs. N/acre, Photo courtesy of John E. Sawyer, Agronomy Extension, Iowa State University.



Figure 4. 360 Y-drop® pre-tassel nitrogen application.

Sources:

- ¹ Russelle, M.P., Hauck, R.D., and Olson, R.A. 1983. Nitrogen accumulation rates of irrigated maize. *Agronomy Journal*. 75:593-598.
- ² Larson, E., Oldham, L., and Golden, B. 2014. Tips to improve nitrogen response for Mid-south corn. Mississippi State University Extension. www.mississippi-crops.com
- ³ Brouder, S., Joern, B., Vyn, T., and Nielsen, B. 2003. Nitrogen fertilizer management in good economic times and bad. www.agry.purdue.edu
- ⁴ Sawyer, J. 2001. Nitrogen fertilizer management options. *Integrated Crop Management*, IC-486 (2). Iowa State University. www.ipm.iastate.edu. Web resources verified 4/25/18. 140315070131

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