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## Pay attention to management needs of fertilizer products

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## Pay attention to management needs of fertilizer products

### **Abstract**

With concerns this spring about nitrogen (N) fertilizer availability and pricing, perhaps you are considering an N product you haven't used before. What management considerations should you pay attention to? When properly managed, all N fertilizers can be effective for supplying crop N needs.

### **Keywords**

Agronomy

### **Disciplines**

Agricultural Science | Agriculture | Agronomy and Crop Sciences

# INTEGRATED CROP MANAGEMENT

## Pay attention to management needs of fertilizer products

With concerns this spring about nitrogen (N) fertilizer availability and pricing, perhaps you are considering an N product you haven't used before. What management considerations should you pay attention to? When properly managed, all N fertilizers can be effective for supplying crop N needs.

### Anhydrous Ammonia

- Anhydrous ammonia ( $\text{NH}_3$ ) must be injected into the soil to avoid losses due to volatility and can be successfully applied from preplant to sidedress.
- Because free ammonia may be toxic to seedlings, having adequate untreated soil between the band and seedling (depth and location relative to the corn row) is important with preplant applications. If applied close to planting time, consider application at an angle to the row so entire rows or sets of rows are not placed near an ammonia band. Waiting a few days between injection and planting can lower risk of ammonia damage. Lower N rates and narrower knife spacing result in lower N concentration per band.
- Sidedressing ammonia can begin immediately after planting (same for injection of other N fertilizers) as long as the corn row or small seedlings are not covered with soil. Injection between either every row or every other row works. Waiting until after the sampling period for the late spring soil nitrate test allows for rate adjustments.

### Urea

- Urea is an organic N compound. It is rapidly converted to ammonium (with concurrent pH increase) in the presence of warm temperatures, moisture, and the urease enzyme (found in soil and plant residue). Therefore, when banded in soil or broadcast on the soil surface ammonia can form. In bands, concentration of this ammonia can lead to root and seedling damage. On the soil surface, free ammonia is lost to the atmosphere (called volatile loss). Conditions that lead to greater volatilization include warm weather, moist and drying soils, high residue, high soil pH, no rainfall after application, and low soil exchange capacity. With worst-case situations, losses have been measured up to 30 percent. Rainfall of 0.25 to 0.5 inch or incorporation with tillage within 2 to 3 days after application moves urea into the soil and minimizes losses. Urea should not be placed with the seed at planting. Urea rates in starter (2 inches by 2 inches) should be limited to avoid ammonia damage. Rescue applications can be applied with broadcast equipment or flown on. Some urea granules may lodge in corn whorls, but typically cause only minor leaf damage. Cultivation can be used to incorporate the urea.

## Urea-ammonium nitrate solutions (UAN 28 or 32 percent N)

- These materials are comprised of approximately one-half urea and one-half ammonium nitrate. Because of the urea component, UAN is subject to losses due to volatility. Because only one-half of the N is in the urea form, the loss potential is lower than with straight urea. Solution UAN should be either incorporated or injected into soil for greatest efficiency and most reliable results, especially in no-till and high-residue systems. Surface dribble banding reduces volatile loss. Surface applications can work, but there must be either low soil temperatures or rainfall within 2 to 3 days to limit volatility. Also, if soils are dry and no rain occurs, the surface-applied N may be unavailable to plants.
- Solution UAN can be applied preplant, at planting, or sidedress. Solution UAN can be broadcast postemergence, but because of foliar plant burning application should occur before corn reaches the V7 growth stage (no more than 90 lb N/acre for corn smaller than the V3 stage, or 60 lb N/acre if corn is between the V3 and V7 growth stage). Check herbicide labels for any restrictions. In-season applications after that stage should be injected or dribble applied and can be between every other row.

## Other N fertilizers

- Examples include ammonium nitrate and ammonium sulfate. Both have limited volatile loss potential, thus are good candidates for surface application. Because ammonium nitrate is one-half ammonium and one-half nitrate, it is more subject to immediate N loss by leaching or denitrification.
- Products used as phosphorus sources are diammonium phosphate, monoammonium phosphate, and ammonium polyphosphate (10-34-0). The N contained in these products is not subject to volatile loss and should be accounted for when figuring the total N application.



**Corn tissue damage from foliar application of UAN solution at 100 lb N/acre.**

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With uncertainty surrounding N prices and potential supply issues, it is important to use N fertilizer products in the best manner possible. Be mindful of the unique properties and management needs of each material. Don't get in a rush and waste valuable N just to get the job done.

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