

## SOILS

### Summer Nitrogen Sources – Which Is Best?

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**Now that** ammonium nitrate (34-0-0) has become so expensive and all but impossible to get, anyone who needs to apply nitrogen (N) during hot weather

should evaluate the alternatives. If you are in an area where ammonium nitrate is still available, it is still an excellent source of N, but it is prudent to compare its price against other sources.

For the comparison to be fair, evaluate each type of fertilizer on a cost per pound of actual N basis. Calculate the cost per pound of N with the following formula: fertilizer cost per ton ÷ pounds actual N per ton = cost per pound of N. Calculate pounds of N in a ton of material by multiplying the percentage of N in the product x 2,000. (For example, urea (46-0-0) is 46 percent N. The calculation is  $0.46 \times 2,000 = 920$  pounds of N in a ton of urea). As an example, urea at \$625 per ton ÷ 920 pounds actual N per ton costs 68 cents per pound actual N. Ammonium nitrate (34-0-0), in comparison, at \$525 per ton ÷ 680 pounds actual N per ton costs 77 cents per pound actual nitrogen. In our example, the urea appears to cost 19 percent more when priced by the ton, but actually costs 12 percent less



*Ammonium nitrate has become difficult to obtain and expensive. Alternatives exist, but producers must understand how to evaluate and use them.*

when priced by pound of actual N.

If ammonium nitrate is chosen because the agronomic advantages outweigh the higher price (for example, application during hot weather in midsummer), make sure the fertilizer is actually ammonium nitrate and not something blended to make a 34-0-0 fertilizer. Several reports have surfaced of producers purchasing 34-0-0 thinking it was ammonium

nitrate, only to find out it was actually urea blended with ammonium sulfate or another material. There is nothing wrong with these blends as long as the producer understands that the urea in these blends is as equally prone to volatilization (evaporation to the atmosphere) in hot weather as straight urea. Make certain that you get what you pay for.

There are several available alter- ►

natives to ammonium nitrate, but this article only addresses the most common choices: urea (46-0-0), UAN liquid (32-0-0 or 28-0-0) and ammonium sulfate (21-0-0-24S).

Urea is a dry nitrogen source that has long been used for fall, winter and spring application, but is quickly becoming the primary choice for summer use. Summer applications of surface-applied urea are typically avoided due to the risk of loss to the atmosphere. Incorporation of urea by at least 0.25 inches of rainfall or sprinkler irrigation, or tillage within three to four days of application will keep volatilization losses to a minimum. If none of these occurs and temperatures are high, up to 40 percent loss can occur. See Eddie Funderburg's article *Nitrogen Losses From Urea*, *Ag News and Views*, May 2009 ([www.noble.org/ag/soils/nitrogenlosses](http://www.noble.org/ag/soils/nitrogenlosses)) for more information.

So, if urea is the only choice for pastures or no-till, what can be done to avoid these losses? The ideal choice is to apply the urea when rainfall is im-

minent, although we all know that can be very difficult. One can also apply a nitrogen additive to keep the urea from converting to ammonia. The only additive we conditionally recommend contains NBPT as the active ingredient. It is marketed under the trade name Agrotain®. This product dramatically reduces volatilization losses for up to three weeks. In considering this additive, be sure to include the cost of the product in addition to the cost of the fertilizer alone.

UAN, or liquid urea-ammonium nitrate, is a nitrogen source produced by combining urea and ammonium nitrate. The ammonium nitrate portion retains all the advantages of its granular form. Unfortunately, the urea portion has an equal, if not greater, risk of volatilization than its granular form. All of the procedures to limit volatilization losses from the granular form of urea also apply to the liquid form in UAN. Other disadvantages of liquid UAN include the potential for leaf burning and difficulty in blending with phosphorus and potassium.

Ammonium sulfate is a dry nitrogen source that has excellent agronomic properties, much like ammonium nitrate. It is non-volatile, the nitrogen is readily plant-available, and it is a good source of sulfur. The primary drawback of ammonium sulfate is the high cost per pound of actual N. Due to its high cost, ammonium sulfate is used primarily in high value horticultural crops or ornamental settings. Ammonium sulfate has a higher capacity to acidify soils, so if it is used, pay close attention to soil pH, and lime as needed.

Although ammonium nitrate is no longer generally available, summer fertilization is still necessary to maintain full productivity. Other fertilizer sources are available and each has advantages and disadvantages. By knowing what these are, the best source can be chosen and used appropriately. When applied correctly – and with some cooperation from Mother Nature – the loss of ammonium nitrate does not have to hurt potential summer yield. ■