Minnesota Crop eNews
Current • Practical • Convenient
www.extension.umn.edu/cropenews
University of Minnesota Extension Service

WILL INCREASING PRICES FOR FERTILIZER NITROGEN CHANGE TRADITION?

George Rehm
Department of Soil, Water, and Climate

Traditions are easy to establish, but difficult to change. In Minnesota, this is especially true for the application of fertilizer nitrogen. The current high price of fertilizer N, however, is a shock. Will these very high prices cause Minnesota farmers to change how they use fertilizer N? Will traditions be changed?

The production of anhydrous ammonia is linked directly to the price of natural gas. Natural gas has frequently been referred to as the "feedstock" for anhydrous ammonia production. So, the price of anhydrous ammonia to the fertilizer dealer, then to the farmer, will change with every change in the price of natural gas. Anhydrous ammonia is also the starting point for the production of other nitrogen fertilizers (urea, liquid N, ammonium nitrate). So, we can expect the price of these products to increase as the price of anhydrous ammonia increases.

Ammonium sulfate (21-0-0-24) and manure production are not directly linked to the production of anhydrous ammonia. So, as the price of nitrogen fertilizers increases, use of these two nitrogen sources should be given serious consideration after calculation of cost.

There is no way to look into the future and predict the price of natural gas. It is a safe assumption however, that the price will not drop to the levels that will lead to the previous nitrogen prices that we are used to. The alternative is to use best management practices that will minimize the loss of applied N. There is no logic in applying nitrogen fertilizer with practices that have a potential of leading to N loss. The losses from volatilization, leaching and denitrification are of greatest concern. Some reminders of Best Management Practices for application of N for 2006 and beyond are described in the paragraphs that follow.

Fall application of any nitrogen fertilizer is not a good option in eastern Minnesota. Leaching of nitrate in this part of the state is a major concern. The large majority of the soils in the region are well drained. Understanding this soil property, there is ample time for preplant, sidedress, or split applications of nitrogen as a substitute for fall applications. Use of a weed and feed strategy utilizing 28-0-0 in combination with sidedress N is a practice that will assure optimum yields with a minimum amount of N lost to the groundwater.

Wait, Wait, Wait Throughout Central and Western Minnesota, it's traditional for many to apply fall N soon after soybean harvest. That tradition enhances the probability of N loss. In this case there is the possibility that the N is lost to denitrification in the spring following application. A consistent soil temperature of 50°F at a depth of 4 to 6 inches is critical. With

patience, late applied ammonium-nitrogen will not convert to nitrate-nitrogen until the spring following application. Potential for spring denitrification losses is usually reduced as soils drain when spring soil temperatures rise to 50°F or more.

In the liquid sources of N (28-0-0, 32-0-0) 25% of the N is present in the form of NO_3-N. Therefore, the application of these two sources of N in the fall would not be a Best Management Practice and should be discouraged.

Depth of application in the fall is an important consideration. If fall N is applied late, think about depth of application. Losses of N due to denitrification are related to soil temperature rising as air temperatures rise. In the spring, the warmest temperatures are near the soil surface. This is not the place to put fertilizer N. Fall applied anhydrous ammonia should be at a depth of at least 6 inches. This is an actual measured depth—not a perceived depth. Any urea applied in the fall should be well incorporated as deep as practical and not remain close to the soil surface.

Split applications should be an important consideration. Consider split applications if fall application is questionable. There are several combinations that can be used. One popular split option would be to combine a "weed and feed" utilizing a preemergence herbicide with sidedress N. The N supplied in the "weed and feed" should supply adequate N to the V3 or V4 stage of corn development.

Another good option would be to apply some N in a band at planting followed by a sidedress application. The rate of N applied in the band may be less than the rate applied in the "weed and feed". Therefore, earlier sidedress applications should be planned in this N management situation.

Match time of nitrogen application to soil texture. Soils are not uniform and this characteristic offers an opportunity for better management of fertilizer N in the parts of Minnesota where fall applications are appropriate. For soils with a high clay content and associated poor drainage problems, a late fall application of N is probably the most practical choice. Other soils across the landscape have better internal drainage. Spring and sidedress applications are good choices for these soils. All fields do no to be treated the same when time of application is planned. Take soil texture into consideration. The efficiency of N applied during the growing season is usually higher than N applied in the fall.