



## **The Chem Gro Crop Watch, Issue #2, 3/1/10**

Lonne Fry, CCA, Sales Agronomist, [lfry@chemgroil.com](mailto:lfry@chemgroil.com), 309-221-5000

**The nitrogen dilemma.** With the extended wet conditions that we received in the fall of 2009, very little fall anhydrous ammonia was applied. Looking ahead with my crystal ball for this spring, I don't believe we are going to have a good opportunity to get an early head start for nitrogen application either. Our soils currently are very wet, if not saturated in fields that have poor drainage. Soon, the 6-12" of snow that we generally have will be melting and adding to the current wet mess that we already have. I do believe that many corn on corn acres that have not received any fall tillage will be rotated back to soybeans assuming that extra time for tillage and nitrogen application will be very limited this spring. However, we do live in an area where corn is still king, and the majority of the nitrogen still needs to be applied. I will give you my opinions/suggestions on the various nitrogen sources that we have available and let you draw your own conclusions as to what is best for your farm operation.

**Nitrogen placement.** When it comes to maximizing the yield potential of the corn hybrids you plant, *nitrogen placement and timing of application* trumps the nitrogen source. To a corn plant, nitrogen is nitrogen, regardless of the source. In a perfect world, here is how I would feed nitrogen to a corn plant in a corn/soybean and a corn/corn rotation.

- **Corn/soybean rotation.** I would surface apply 30-45 units of nitrogen from a broadcast source prior to planting. This nitrogen could come from liquid UAN (32% or 28% liquid), DAP, Ammonium Nitrate, or Urea. The remaining units of nitrogen I would apply in a banded application below the ground surface in a form of anhydrous ammonia, or liquid UAN. This can be applied pre-plant or side-dress.
- **Corn/corn rotation.** I would do the exact same process, although I would increase the rate of broadcast nitrogen prior to planting of 60-70 units of nitrogen. More nitrogen is needed early to help offset the temporary nitrogen tie-up that is taking place from the high carbon content of the previous corn residue laying on the surface. The corn on corn picture to the right shows the yellow nitrogen deficient corn in a streaking pattern. This is result of 100% anhydrous ammonia application as the corn plants in between the nitrogen bands are unable to access the nitrogen at this young early stage.



**Broadcast vs. below ground banding.** For the record, I am against applying 100% of the nitrogen source(s) as a broadcast form lying on top of the soil. If an individual were to incorporate the broadcast nitrogen in with a field cultivator, it is better than not incorporating, but I am still not a fan of this. These types of nitrogen applications rely on frequent rains to leach the nitrogen down into the root zone where the corn roots are active. Peak nitrogen uptake by a corn crop does not occur until

July through early August. In a 100% broadcast application of nitrogen, if the upper 2-3 inches of soil become extremely dry, corn roots are not active to pull in this nitrogen source. I have personally seen several fields in my agronomy history with nitrogen applications in this manner that have gone through drought conditions from the day of planting through pollination. These fields show major nitrogen deficiency in comparison to the neighboring fields whose largest % of nitrogen application was banded below ground (anhydrous ammonia.) Yield loss is substantial if the nitrogen source is not being utilized by pollination.

**Nitrogen forms:** As I mentioned earlier, a corn plant has no preference as to the source of nitrogen that it receives. As long as the nitrogen is available when the corn plant needs it, it is happy. Here are the various forms of fertilizers that only contain nitrogen that are commonly used in our area, with some of my comments about each source (good and bad).

- **Anhydrous ammonia (NH<sub>3</sub>).** This has to be the greatest love/hate relationship that I have for a source of nitrogen. I like it because it has the highest concentrated source of nitrogen (82%) by weight, and that due to its chemical properties; it must be banded deep into the soil to prevent it from escaping into the atmosphere in its gaseous form. This banded application provides great agronomic merits in corn production for the reasons that I mentioned above. Also, NH<sub>3</sub> historically is usually the cheapest source of nitrogen per unit compared to other nitrogen sources. By definition, the word anhydrous means "without water". This makes it extremely dangerous to humans/living organisms because the anhydrous ammonia will seek out water to bind/attach to (water contained in skin, eyes, nose linings, etc.) Severe caustic burns will result from this combination. Worker protection safety is a HUGE priority when dealing with anhydrous ammonia.
- **Liquid UAN (Urea-Ammonium Nitrate).** This very user friendly source of nitrogen contains 32% or 28% nitrogen by weight. Its greatest advantage is that it can be evenly applied through ground sprayer equipment, at a minimal cost. Its disadvantage is that it is too convenient; that most people who utilize this source of nitrogen apply 100% of their needs in a single surface application. The combination of surface application and side-dress liquid UAN is the best approach for a person who wants to utilize this source.
- **Urea.** This is another very safe and user friendly source of nitrogen, containing 46% of nitrogen by weight in a dry form. However, it is also too convenient of a nitrogen source in that most people who utilize this source of nitrogen apply 100% of their needs in a single surface application. This dry nitrogen source is usually broadcast by fertilizer spreaders with spinners. *When broadcasting dry forms of nitrogen, extra care should be taken to double spread this nitrogen to minimize poor application patterns.* Last year, I have personally seen 100 bushel variances in corn yield within the same field from a 100% broadcast application of urea due to a poor single application. Urea being stored in a warehouse has a strong attraction for humidity in the air which can create large "used cat litter" type clumps which can further complicate the application process. Another big disadvantage to urea is that surface applications are very vulnerable to volatilization (the conversion of urea to NH<sub>3</sub> gas that is lost to the atmosphere). Various add-in products are available to minimize this loss, or tillage incorporation needs to occur after application.
- **Ammonium Nitrate.** Again, another safe and user friendly source of nitrogen, containing 34% of nitrogen by weight in a dry form. Like urea, this dry nitrogen source needs to be double spread to minimize application patterns/errors. A big advantage that ammonium nitrate has in comparison to urea is that it is not vulnerable to volatilization, which allows for more efficient surface applications.

That's my 2 cents worth...the choice and decision is always yours.

Lonne