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Things to Consider When Making Spring Nitrogen Decisions

It's the beginning of April and there are still plenty of fields in the area which don't have any source of Nitrogen applied to them as of yet. Now before I get any further, I would first like to make this disclaimer. This article will not give you step by step instructions on what needs to be done to your fields this spring in order for a successful 2019 crop year. Instead, I would like to communicate the various options that are available to you the grower which may fit into your operation. And remember, agriculture isn't a one size fits all industry, what works for your neighbor might not work for you so consider your options and see what fits for you. As far as Nitrogen considerations goes, it might be helpful to go over the source of Nitrogen and the timing of application.

Sources of Nitrogen

Not all sources of Nitrogen are available everywhere you go in the US and their availability might be subject to where the nearest manufacturing facility for that source is. With that being said there are 3 main sources of Nitrogen available to growers in this area: Anhydrous Ammonia, UAN, and Urea.

Anhydrous Ammonia:

Anhydrous Ammonia is by far the most utilized source of Nitrogen due to its high fertilizer rating of 82-0-0 and its relative inexpensiveness compared to other Nitrogen containing products. In the springtime however, there is a problem, because Anhydrous Ammonia contains no water (Hence the term "Anhydrous" Ammonia) this fertilizer will do whatever it can to obtain that moisture in the soil as demonstrated in the equation below.



Even if that means the Anhydrous Ammonia has to borrow moisture from a young corn plant that might be growing nearby. Knifing in Anhydrous Ammonia is the safest method of application for the crops and the person doing the application work.

UAN:

Whether you call it 32%, 28%, or liquid Nitrogen when you are referring to a Nitrogen product in this manner you are referring to UAN or Urea Ammonium Nitrate and it does come in 2 grades of either 28-0-0 or 32-0-0 depending on the ratio of Urea, Ammonium Nitrate and

water that is in the solution. Like Anhydrous Ammonia, UAN can be harmful to plant growth if present in high concentrations especially if applied directly to a seed or applied over the top of emerged corn. UAN contains 50% Urea, 25% Ammonium, and 25% Nitrate, this last form of Nitrogen is highly water soluble and is in the form which can be lost due to tile drainage in a field. Like Anhydrous ammonia, UAN can be knifed in the soil to ensure it is already in the crops root zone. What makes UAN more attractive for Spring use is its ability to be mixed with a majority of our pesticides for use during burndown application. For those with 2 inches below and 2 inches to the side (2x2) starter units, that placement is far enough away where a fraction of the Nitrogen needed to make it through the year can be applied. Last but not least, UAN has found a place when being used with Y-drop applications, which place fertilizer on the surface next to the corn stalks like the picture below so that the Nitrogen is in the rootzone of the corn plant.



Urea:

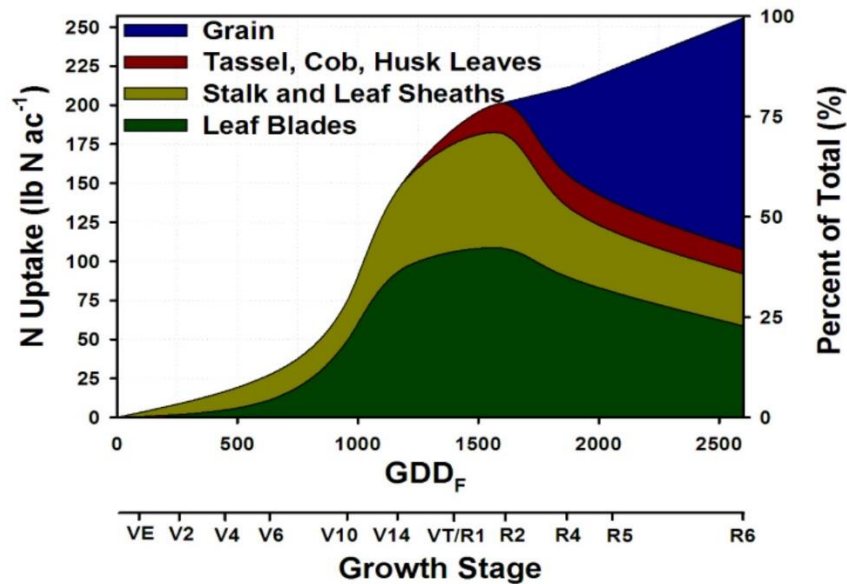
The only dry form of fertilizer on this list, Urea contains a higher fertilizer rating of 46-0-0 compared to UAN. What makes Urea special is the fact that plants don't take up Nitrogen in the form of Urea. Enzymes in the soil are necessary to convert Urea into the Ammonium form in order for Urea to be utilized by a plant. This process occurs quickly as our soils are loaded with Urease enzymes which can make Urea readily available to the plant. Urea can be spread with other dry fertilizers over a field or can be topdressed over standing corn to split up applications of Nitrogen.

You might be asking yourself at this point why I haven't mentioned other fertilizers with Nitrogen ratings such as DAP (18-46-0), Ammonium Thiosulfate (12-0-0-26S), or Manure. Simply put, these fertilizers are either used primarily for the other nutrients they contain, such as the 46% Phosphorus in Dap or the 26% Sulfur in Ammonium Thiosulfate. In the case of manure, the availability of it as a fertilizer source is purely based off of location and how much needs to be removed from the lot or the pits depending upon where you are receiving it from.

Timing of Application

Timing the application of Nitrogen to your crop is critical as this could lead to crop injury or deficiencies if not timed right. Remember that the goal of any Nitrogen management plan is to ensure that the crop has enough Nitrogen to make it through the various stages of growth. This becomes even more apparent when you look at the uptake chart for Nitrogen in corn throughout the growing season. At V10 or right around the later half of June, the demand

for Nitrogen in the plant grows immensely and reaches a rate of 11lbs of Nitrogen a day. Any shortage of Nitrogen at this point in the crop's life could lead to yield loss.



The same could be said for earlier in crop development when the demand for Nitrogen is lower and yield factors such as rows around and ear length are being determined.

If you are like many and you didn't get any Nitrogen on in the Fall, now is the time to make those plans for this Spring. Our first application window is available before a crop has even been planted. This is where Anhydrous Ammonia can be knifed into the soil right below where the seed is intended to go. The downside to this is the need to wait for that Ammonia gas to find moisture to become crop safe, usually 7-10 days after application has occurred. But this means we have all of our Nitrogen on the field in the Ammonium form which will stick to the soil.

The next window of application occurs when applying your burndown and residual herbicide to your fields. This is where UAN can be used to get Nitrogen to the crop before the crop has emerged. The downside to applying Nitrogen in this manner is all of it is lying on top of the soil and vulnerable to runoff after a heavy rain. Even after incorporation by rain or light tillage, the Nitrogen in UAN is still susceptible to loss as it has been broadcasted onto the soil and broadcasted Nitrogen will convert to the more leachable Nitrate form more rapidly than if it were in a concentrated band. Remember, the goal is for our Nitrogen to remain at a soil depth where our corn crop can utilize it during its later stages of growth.

For those with a starter system, planting time presents a unique opportunity to get a fraction of the total season's Nitrogen to the plant. In furrow applications of Nitrogen must be done with either low salt starters or Ammonium Polyphosphate (APP) so as not to damage seed germination. A second placement method is in the 2x2 method which allows for more Nitrogen to be applied as the distance the Nitrogen is from the seed is greater.

Another application window occurs between crop emergence up until the corn is about 1 foot tall during the Sidedressing stage. This can be done with either Anhydrous Ammonia or

UAN. In this case, Anhydrous Ammonia can be knifed down into the root zone of the growing corn crop because the amount of Nitrogen being applied should be smaller during a Sidedress operation and with more distance between the majority of the corn roots and the Anhydrous band, there is more opportunity for the Anhydrous Ammonia to collect moisture from other sources. A good rule of thumb for splitting up Nitrogen applications is to break it down into 2/3 of your total Nitrogen up front in a preplant application and the other 1/3 as a Sidedress application. This ensures you have enough Nitrogen in the root zone when the corn plant is young and to give the plant enough Nitrogen to reach that additional band of Nitrogen being put down with the Sidedress application.

After Sidedress, Urea can be topdressed to standing corn with a row crop spreader. This can take place the same time as Sidedress but is usually delayed until the corn crop is exhibiting 5 to 6 leaf collars or the V5-6 stage of development like below.



In some instances, the Urea pellet can get tossed into the leaf whorl of a corn plant and cause some leaf damage as the Urea breaks down into the more harmful Ammonia form.

The last application window for Nitrogen occurs with Y-Drops application of UAN. Like I mentioned earlier, the purpose of this application is to get Nitrogen close to the corn stalk and right in the root system of the plant. Ideally, Y-Drop application is to take place from 6 to 8 leaf collar which gives that Nitrogen time to work its way down to the root of the plants before that V10 stage which it really needs it. This is yet another disadvantage of Y-Drop and even topdressing as both are applying Nitrogen to the surface of the soil with hopes that rainfall will get the nitrogen where it needs to be. On a dry year, this might not happen and could limit your yield. The advantage both these application methods gives is it widens our window of application and allows for Nitrogen to be spoon fed to our crop in multiple applications instead of one.

Final Thoughts

This year has been one of those rare years that people will look back and say “hey at least It’s not as bad as it was back in 2019”. Now that may be a little bit dramatic but the idea is all the same, that this will be quite a memorable year for everybody involved. As things start to dry out make sure to review your field plans and don’t forget to communicate any changes or last-minute decisions with us here at Chem Gro. Like always, my job is to give you the best advice possible, what you do with it is up to you.