



## **The Chem Gro Crop Watch, Issue #8, 10/15/18**

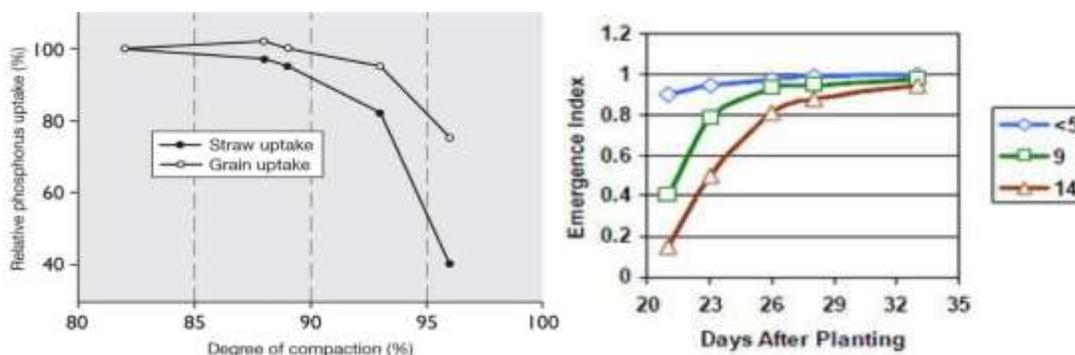
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### **Considerations for this Fall**

Now that our fields seem to have transformed themselves into ponds it might be an appropriate time to start thinking about plans for this fall and get prepared for next year's crop. Realizing that not all of this year's crop is out of the field yet it might be helpful to start this off with a discussion on compaction before moving on to fertilizer related topics.

### **Compaction**

We have all heard the term "compaction" before and most people know that in general, compaction is the pressing of soil particles together. There are many man made and natural causes of compaction but the one we would be most concerned with is equipment compaction in the field. This compaction varies depending on the weight of the equipment used and the moisture of the soil in the field. When a soil has been compacted it loses the pore spaces which are vital to the movement of water and air. Compaction layers in the soil often restrict root movement, hindering our crops ability to search the soil profile for both nutrients and water. This leads to lower uptake of key nutrients like Phosphorus in the chart below on the left. In severe cases, this restriction of movement could ultimately lead to the death of a plant. In the spring, compacted soils make it difficult for crop emergence to occur. This concept can be seen below on the right in this emergence study done in Pennsylvania where the soils that were subjected to less compaction weight demonstrated a higher percent of emergence in the first few days after planting compared to the soils with heavier compaction.



This subtle difference in emergence could lead to plants that struggle to keep up with neighboring plants. This is in addition to the fact that compacted fields are more prone to drought, disease, and nutrient stress.

There are several ways to reduce the amount of compaction in a field that when combined, can help prevent serious impact on your yields. The first way is to avoid soils that are too wet to move across. Now I know our fields are wet and there is still corn and soybeans to be harvested but it is still too early to think about making ruts and packing our soils because we just couldn't stand to look at an unharvested field anymore. If your equipment is sinking into the soil past the treads that might be a good sign that the field you are in is too wet. For tillage, do a soil ribbon test by balling up a little bit of soil from the depth you are tilling at and press with your thumb to make a ribbon. If the soil breaks around  $\frac{1}{2}$  an inch than it is good for tillage. Another thing to check is that your tires are properly inflated to the manufacture recommended pressure as a tire that is over inflated can cause unnecessary compaction and underinflated tires will shorten the life of any tire. Deep or shallow tillage could be utilized in order to break up compacted layers. Do not use tillage on an annual basis to eliminate compaction as tillage has been shown to have an inconsistent benefit to crop yields in compacted fields and too much tillage could shatter soil structure and leave you worse off than what you currently are. One last method of reducing soil compaction's impact on your fields is to increase soil organic matter in your fields. It sounds silly but that organic matter is the key to a strong soil structure and soil biologic life which can help to maintain your soils. A healthier soil will always be able to withstand more stresses than one that is not.

### **Fertilizer Considerations for this Fall**

It is that time where we must consider what we will need to apply to our soils this year, in order to get the crops we want next year. Not only that, but we also need to think about how we are going to get that nutrient on our field. So, let's start this out by looking at the nutrients we should be considering this fall and what techniques we can utilize to put them on our fields.

### **Nitrogen**

Easily the most important nutrient to our crops, making a Nitrogen plan is crucial to the success of any crop which does not utilize its own Nitrogen. Whether you are using Anhydrous Ammonia, UAN, or Urea in the fall it pays to plan ahead to ensure that your investment this fall will make it into the spring. This is where Nitrogen stabilizers come into play and they can help to not only prevent the Nitrogen you put down in the fall from disappearing from your field, but they can also help to provide more Nitrogen to translate into yield. Among the most popular and economic of these Nitrogen sources is Anhydrous Ammonia. With a fertilizer analysis of 82-0-0, Anhydrous Ammonia can't be beat as far as cheap and highly effective fertilizers goes.

This year we have 2 EPA registered Nitrogen stabilizers to choose from for your operation. The first one is N-Serve which has been our go-to stabilizer for years and has proven itself time and time again. The newest product on the market is Centuro, this product provides all the same benefits as N-Serve but in a much more equipment friendly product to work with.



Along with stabilizers in the fall, an additional pass of Nitrogen as a sidedress or through Y-drops in season may be considered to guarantee that you have all the Nitrogen in the field that you will need and without the risk of losing it all through the tile lines.

## Phosphorus

The second most studied nutrient in agriculture behind Nitrogen, Phosphorus fertilizer has become a big topic of discussion in the row crop sector of agriculture. Our primary sources of Phosphorus fertilizer will be from Monoammonium Phosphate (MAP 11-52-0) and Diammonium Phosphate (DAP 18-46-0) and normally there are very few instances where one might have an advantage over the other; so which one is better than the other usually becomes a matter of preference. It is important to remember crop removal rates when putting fertilizer on in the fall for next year's crops as these numbers represent what we are actually taking away from the field. In corn, this number comes out to roughly 0.38lbs of Phosphorus per bushel and in soybeans that is about 0.85lbs of Phosphorus per bushel. Think of your soils like a bank, fertilizer is the money you deposit to your account and the bushels you take is the money you withdrawal when you spend money. Now normally it wouldn't hurt you too much to take some money out without putting anything back into your account. And like that bank account, if you take out too much without depositing anything to your account you run into penalties. In the case of our row crops, that penalty is a yield loss and the cost of rebuilding the nutrient levels in your soil could be much higher than the cost of simply replacing what you put in.

## **Potassium**

Like Phosphorus, Potassium is another nutrient that we must carefully monitor through soil tests to ensure that we are not taking from the system more than we are putting in. The main source of Potassium fertilizer is Muriate of Potash (0-0-60). In Corn, removal rates for Potassium are 0.27lbs of Potassium per bushel and for soybean 1.3lbs of Potassium per bushel. For those of you who raise alfalfa, you might be shocked at just how much nutrient each cutting can remove as most of the Potassium in a plant resides within the stalk of the plant. That being said, a 6 ton per acre clipping of pure alfalfa hay will take off the equivalent of 490lbs of Potash per acre. It is for this reason that alfalfa is very responsive to applications of Potash in between clippings because we have taken off so much nutrient that any amount we put back will almost certainly create a positive response in plant growth and overall yield.

## **Sulfur**

Traditionally, our fertilizers come stamped with a fertilizer analysis that has become all too familiar to all of us. Those 3 numbers associated with any bag of fertilizer represent that percent of Nitrogen, Phosphorus, and Potassium in the mix. Recently, there has been discussion as to whether a 4<sup>th</sup> number should be added to this label. This 4<sup>th</sup> number would be a sulfur percentage and the thought of adding sulfur fertilizer to our soils is becoming more and more common as we hit higher yields. Just like the bank comparison I used earlier, every year we have been spending that sulfur credit in our soil account and without fertilizer source to replace it, we have been facing more frequent signs of sulfur shortages and deficiencies throughout the growing year. The most frequent question I am asked when talking about Sulfur is "I have never had to worry about Sulfur in the past, what makes this year any different?" Well the answer to that comes from the simple fact that we are now raising much higher yielding crops than we use to. To put it into perspective a 150-bushel corn crop will take off 12lbs of Sulfur but now we are raising corn that has the potential to raise 250 bushels and takes off 20lbs of Sulfur. Give it a few years with no replacement and a higher yielding plant that demands more from the soils it is in and our Sulfur reserves have had it. Luckily there are 2 easy and affordable fertilizers a grower can utilize to boost sulfur levels in the soil. The first, is elemental Sulfur which requires microbial breakdown to become available to the plants for use. This makes it ideal for fall application as it will become available by spring when it is needed. The second, is Thiosulfate whether it is Potassium Thiosulfate or Ammonia Thiosulfate, you would be working with a liquid product that has half of its source readily available and the other half requires microbial breakdown. This makes it suited for application with our first pass chemicals or on a sidedress operation with UAN.

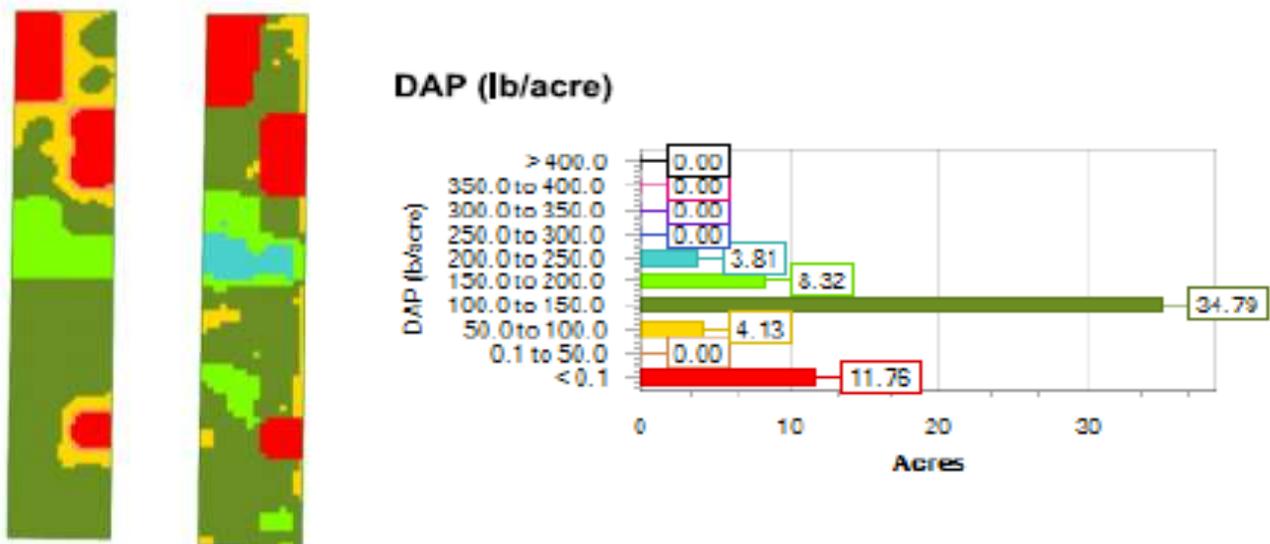
## **Zinc**

Micronutrients are the talk of the town amongst fertilizer experts and now it is our turn to start talking about how to address at least one of these nutrients in the soil. In the soil, Zinc is pretty stable and unwilling to move so management is just a matter of getting a source of Zinc in the soil. Like Sulfur, Zinc deficiencies have been showing up more often due to higher yields and higher removal rates. In fields that have been subjected to repeated manure applications or fields with a history of heavy Phosphorus application, Zinc can be a limiting nutrient as Phosphorus acts to antagonize Zinc availability. Supplementing Zinc to your soils is

easy and can be accomplished with fertilizers such as MicroEssentials SZ or Wolf Trax dry dispersible powder. The later of the 2 options, Wolf Trax, allows for a Zinc coating to be applied to whatever fertilizer source you are already spreading in the field. MicroEssentials SZ on the other hand, already comes loaded with not only Zinc but Phosphorus, Nitrogen, and Sulfur in a uniform pellet. If neither of these methods work, there is always the fall back of using a fully chelated Zinc in a starter application or broadcasted on with the first pass or in a sidedress application.

### Application Considerations

When making a fertilizer program for your fields, it is not only important to know what you will be applying to the field, but how you are going to go about applying it. This whole process starts out with a simple soil test of your fields. From a Chem Gro standpoint there are 2 types of soil tests that a grower can utilize on their farm. Both grid sampling and random sampling can be used to make fertilizer recommendations on a field. Random sampling takes samples throughout a 10-acre area with no coordinates associated with each point. This will give you a rough idea of what the nutrient levels look like in the field. Grid sampling on the other hand, utilizes 2.5-acre gridded areas that have specific GPS points attached to them to make recommendations. Using grid sampled soil tests, a grower can more accurately address the needs of their field through variable rate applications. Taking the idea even further, yield monitor data from the field can be utilized over the top of these soil test maps to make fine-tuned recommendations that not only account for variability in the soil but also the variability in our yield. You can see the difference this makes in the variable rate plan below. Looking at the difference between the variable rate plan without yield data on the left versus the map with yield data on the right you will notice the yield data map has a light blue layer which calls for a 200 to 250-pound rate of DAP according to the key on the side of the maps. This portion of the field produced higher yields and therefore required more fertilizer. Without yield data, this area might not have been adequately fertilized to keep up soil test levels.



The addition of Sulfur or Zinc fertilizers in the field plans means that one of your fertilizers might have to be spread at an even, flat rate spread. This means when making a variable rate spread plan that also has Zinc or Sulfur added into the plan only 1 nutrient can be variable rate spread per year with the other being mixed in with the Zinc or Sulfur. This is simply because when applying micronutrients or Sulfur to the field, the variable rate spread plan we use for Phosphorus or Potassium might not adequately cover our need for our micronutrients or Sulfur that is being carried by it.

### **Final Thoughts**

There is an acronym that I would like to share that might be relevant to this time of the year, it is the 6P's, that is Prior Proper Planning Prevents Poor Performance. So, whether it is preparing to go back out in the field and hopefully prevent any unnecessary compaction, or preparing a fertilizer plan for next year's crop it is always a good thing to make plans and be sure to follow through with them. You are only as strong as your weakest link, whether that is a nutrient in the field that we haven't adequately fertilized for or packed down soils which hold your crops back from being the best they can be. Like always, my job is to give you the best advice possible, what you do with it is up to you.