

# AGVISE LABORATORIES

FALL 2015

## NORTHERN NOTES

In the northern area we have had a roller coaster ride this year! The spring broke very early, with dry conditions and had people worried about a drought. Talk of drought went away in May when we received a lot of rain and went through a very cold couple weeks. Multiple freezes through May resulted in reseeded of canola in many areas and some marginal corn stands. Unlike areas to the south, we had a lot of yellow corn again this year with sulfur being the primary cause. Iron chlorosis in soybeans was also a bigger issue this year than previous years. Warmer weather in June and July, along with ample rainfall has resulted in pretty good crops across the region at this time.

Fall soil testing has begun in many areas as the small grain harvest is in full swing. We are well stocked with soil sampling equipment for the fall season. We are again offering a \$200 discount on the first 25 electric/hydraulic sampling systems sold this fall. When you purchase a sampling system for \$2,850, we will credit your account \$200 to be used for soil analysis.

Most customers have now tried submitting samples online and really like it (saves time and mistakes). All you need is an inexpensive laser printer and you are good to go. I can help you import all of your grower and field information from 2014 to make it easier to get started with submitting samples online. Give me a call if you want me to show you how the online submission works and help you get started! I hope you have a safe and smooth harvest season.



**JOHN LEE**  
SOIL SCIENTIST/CCA

## AGVISOR – Updating Crop info made easier!

We are always working to make online sample submission easier. This fall we are introducing a new feature called “Update Crop Info.” This new feature is under “Manage growers and fields.” The new feature allows you to update the previous crop and three crop choices a lot easier. With this feature you can view and edit the crop information for all of the samples for each grower on one page. This feature also allows you to copy and paste crop information from one field to another which will save a lot of time. You will want to check this out!



## Corn—Tissue Nutrient Trends

With the high volume of plant tissue samples tested over the past 4-years, we’ve found some interesting trends when we summarized this data at our Benson, MN laboratory. The trends are much more evident from corn samples in the V5 – V8 growth stages which is presented in this article. When comparing corn tissue data from southern MN and SD back to 2012, we can see there are some differences in “yellow corn syndrome” (yellowish, yellow-stripped leaves or pale green looking corn plants) early in the growing season. In 2012 and 2015 our southern area had far less yellow corn than in 2013 and 2014. This is

reflected in the tissue test comparison for nitrogen and sulfur between these years (see figure). The graph shows 2013 and 2014 having a higher percentage of samples below the sufficiency range for N and S, whereas 2012 and 2015 had a much smaller percentage of samples below the sufficiency range for N and S. This correlates to the growing season weather conditions we had in this area each year. In 2013 and 2014 we had wet, cool weather, late-planting and water-logged soils causing the “yellow corn” to be widespread in this region. In 2012 and 2015 there were far fewer fields with yellow corn due to dryer warmer soils and better

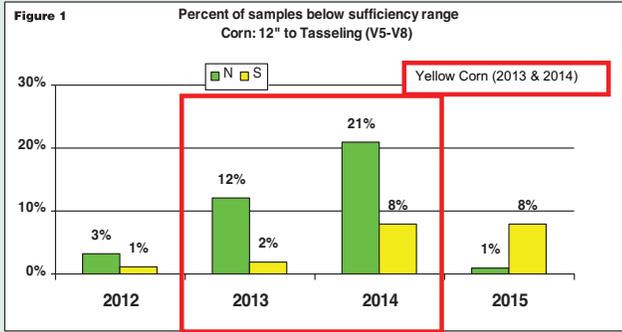
planting conditions. If you are located in northern MN and North Dakota you probably more yellow corn this spring due to very cool wet conditions in May.

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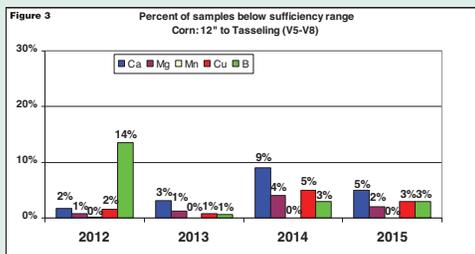
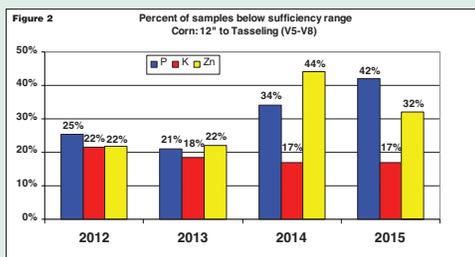
## Corn—Tissue Nutrient Trends Cont...



Over this same four year period, we do not see the % of tissue sample testing deficient in phosphorus, potassium and zinc affected by weather conditions like we saw for nitrogen and sulfur (see figure). This brings up some questions:

1. Is there a larger percentage of growers under-fertilizing their corn for P and Zn now compared to 4 years ago (samples deficient in K have actually decreased)?
2. Are the nutrient sufficiency ranges we are currently using for tissue samples correct for evaluating the hybrids we grow now? (much of the research was done in the 60's and 70's)
3. Do we need new university research to confirm the tissue sufficiency ranges we use for each nutrient are appropriate?
4. Would more intensive soil sampling provide better information for making fertility recommendations for P, K and Zn?

If you look at the % corn tissue samples testing deficient in Ca, Mg, Mn, Cu and B, there is a small percentage of samples each year (see figure). This is not surprising since our soil test summaries would tell us that the great majority of soil samples test high in these nutrients in this region.

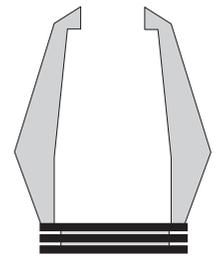


## HD (Heavy Duty) Probe and Tip – Customer Choice!

AGVISE has offered our HD (Heavy Duty) probe and tip for our hydraulic sampling systems for about 4 years now. We designed this probe body and tip to handle very wet heavy soil conditions and even frozen soil. What we have learned from our customers is that the HD probe and tip actually is the best probe and tip combination for most soil conditions. The HD body is made from chromoly steel which makes it harder to bend than a stainless steel probe body. The HD probe body also has a larger diameter which reduces the chance of plugging by having more room for the soil core. The HD tip has a cutting edge, but it also has a lip of relief just inside the end (see figure). This relief allows wet soils to expand after they pass through the tip and not touch the probe wall due to the larger diameter of the HD body.



**Heavy Duty Wet Tip Design**



If you haven't had a chance to try one of the HD probes, you really need to give it a try. It will save you a lot of time and frustration and result in better quality soil samples. If you have any questions on the HD probe and tip please give us a call.

## Wireless Remote for Hydraulic Sampling System!

We are always looking for ways to make soil sampling easier for our customers. Using our electric/hydraulic sampling system continuously can lead to fatigue of your hands and arms. We have been asked if there was a way to add a wireless remote to our system, to reduce the wear and tear on your hands. We currently use a two button control switch which requires you to depress and hold a button down to move the soil probe into and out of the soil profile. We did a search and found one wireless remote control system we can add to our electric/hydraulic sampling system (see picture). The control box for the wireless system is connected to the power unit and small wireless switch has a range of about 25 feet. The wireless remote system can be added to our system without removing the existing two button switch. The cost to add on this wireless remote control is \$200. If you have any questions on this new switch, please give us a call.



# Beet lime for low pH soil in North Dakota?

Liming is not a routine practice in North Dakota, like many areas of the eastern Corn Belt. Most soils in North Dakota have a pH higher than 6.0. Soils with a pH higher than 6.0 do not need to be limed unless you are growing alfalfa. Grid and Zone soil sampling is becoming the norm, even in dryland areas like North Dakota. As fields are divided in smaller parts, the soil test results are revealing areas with very low pH, even in North Dakota.

We recently were soil testing local fields in search of a soil with certain properties to use as a quality control sample in our day to day lab operations. (AGVISE uses about 2000 pounds of check soil each year). In this process we discovered a local field with a very low pH just a few miles from our laboratory in Northwood, ND. We were shocked to find a large part of this field had a topsoil pH of 4.7-5.0 and a subsoil pH less than 6.0. We decided this would be a good field to use for a demonstration project using beet lime from the area sugarbeet processing plant.

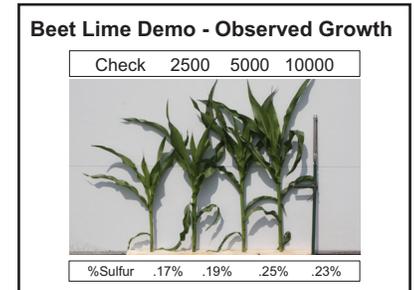
We applied three rates of lime and incorporated it into the soil on May 22, 2014. We applied rates of 2,500, 5,000, and 10,000 lb/a ENP using beet lime.

Soybeans were grown on this field in 2014 and we did not observe any differences in

Beet Lime Rate (ENP)	Soil pH 5-22-14	Soil pH 7-15-14	Soil pH 9-27-14	Soil pH 6-22-15	Soil pH 7-28-15
Check	4.8	4.8	4.8	5.1	4.7
2500 lb/a	4.9	5.3	5.5	5.3	5.2
5000 lb/a	4.8	5.7	5.6	5.6	5.7
10000 lb/a	4.8	6.6	7.4	7.0	7.0

growth. When you apply lime to an acid soil, it takes time for the lime to react with the soil acidity, so the May application apparently did not leave enough time for the lime to fully react. We have been testing the soil pH in the treatment areas since lime was applied (see table). As you can see, the check site still has a very low pH of 4.7. Test results from July 28 show that the high rate of lime has increased the soil pH to 7.0, with the lower rates of lime increasing the soil pH to a lesser extent. This year we did observe differences in the growth of the check vs the three treatment areas (see picture).

Corn does not usually give a large response to low soil pH, but in this situation, a pH of 4.7 was obviously restricting the corn growth. Tissue analysis showed that the check had a lower sulfur concentration compared to all of the treatments. We are speculating that the beet lime had some sulfur in it that increased corn growth on this sandy soil. Next year this field will be planted to soybeans. Soybeans are much more sensitive to very low pH because the bacteria will have problems fixing nitrogen. We expect to see obvious differences in plant growth in the soybean crop next year. This lime demonstration project will be a long term project as we measure the effects of the lime application on the soil pH and on the growth of the crops for several years.



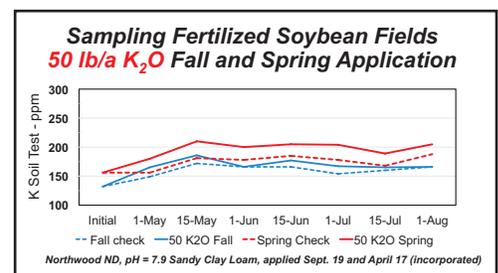
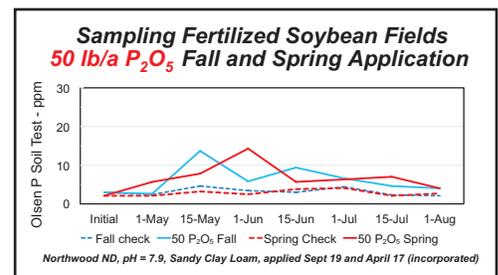
# Grid Sampling Fertilized Soybean Fields in the Spring/Summer

Spring/summer topsoil grid sampling has expanded greatly in areas with a corn/soybean rotation. Most of this sampling is done in growing soybean fields early in the spring/summer. These soybean fields have not had P & K fertilizer applied to them. In most situations, a high rate of P & K was applied to the preceding corn crop and the soybeans crop is not fertilizer with P & K. Grid sampling these soybean fields in the spring/summer provides very good quality samples and the soil test data is ready to be used for variable rate P & K application immediately after soybean harvest.

We have received questions about sampling soybean fields which have been fertilized with P & K in the fall or early in the spring. Agronomists wanted to know if a moderate amount of P & K (50 lb/a P<sub>2</sub>O<sub>5</sub> and 50 lb/a K<sub>2</sub>O) would affect the soil test values if they did sample the field that spring.

The figures below show how the P & K soil test levels were affected by a moderate application of fertilizer in the fall or in the spring. The dashed line is the check soil test level without any fertilizer and the solid lines are the soil test levels when the fertilizer was applied in the fall or spring.

This demonstration project confirms that you should not soil test soybean fields in the spring/summer that have had P & K fertilizer applied to them. The only exception would be if the P & K fertilizer was placed in a band or strip. If this is the case, the soil cores can be collected in the area away from the band and the soil test data will be not be affected.



# Online Soil Sample Submission (FSA Maps on Soil Reports!)

Most AGVISE customers have been submitting samples online for a few years now and others will give it a try for the first time this fall. When you submit your first soil samples online and realize that is the last time you have to enter that grower and field information (no more writing on forms) you will wonder why you waited so long.

One recent new feature of the online system is the ability to add the FSA map to the grower and field information (A subscription to Surety Mapping is required to have the FSA map on your soil reports).

With the FSA map linked to the field ID, every time you submit the sample online, the FSA map with the field outlined will be printed on the AGVISOR soil report. Field maps can now be displayed on soil reports for Canadian customers as well.

If you haven't started using the Online sample system yet and have questions please call John Lee in the Northwood, ND lab (701-587-6010) or Richard Jenny in the Benson, MN lab (320-843-4109). We can show you how it works and help you start doing online sample submission and make your job a lot easier with less mistakes!

## Southern Trends continued from pg 6...

soybean fields. To answer this question we setup a demonstration project at multiple locations. We'll go into the details on this demonstration project at our Fall Update Meetings and at our Winter Fertility Seminars, but the short answer is....No... It's not a good idea to soil sample in soybean fields that were fertilized the fall before or in the spring before planting. The P & K soil test values are affected by the P & K fertilizer and will not give the most accurate test results so soon after fertilizer application. We suspect that would be true for a manure application as well.

This spring, our Benson lab got a new Wintex 1000, automated hydraulic topsoil soil sampler, mounted to a new Polaris Ranger UTV. In the past 5 years, over 40 of these Wintex units have been purchased by our clients and over 600 across the US. We'll have it at our Fall Dealer Updates and Winter Trade Shows for you to take a look at. If you want a field demonstration, we can make arrangements for you to test it out for yourself, just give me (Richard Jenny) a call at our Benson, MN lab (320-843-4109). You can also checkout some setups online on our website at: <http://www.agvise.com/wintex-1000/>.

# Soil Testing Right Behind the Combine

It is more the rule than the exception that soil sampling begins in mid-September instead of immediately following small grain harvest. However many growers miss an excellent window for soil testing by waiting too long. The reason for waiting is the fear that additional nitrogen will be made available through mineralization (decomposition of crop residue and organic matter). A review of research has shown that following small grain harvest, soil nitrate level changes very little and no sampling date adjustment should be made. Soil sampling right after small grain harvest is recommended and has numerous advantages:

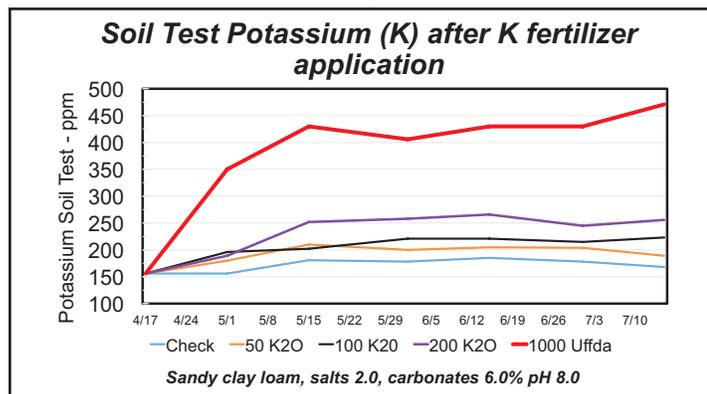


DAVE FRANZEN

1. Growers are more likely to actually use the test results to determine fall N rates if the soil test results are in their hands soon enough to consider before fall fieldwork begins.
2. Soil testing prior to fall tillage will result in a more consistent 0-6" sample core, which provides the best sample for testing phosphorus, potassium, %OM, zinc and other nutrient tested on the topsoil.
3. Regrowth of volunteer grain will not hide available nitrogen. Early sampling will show the nitrate that will be available for next years crop.
4. Sampling right after harvest guarantees that fields will get tested and not missed due to weather problems that could happen later in the fall.

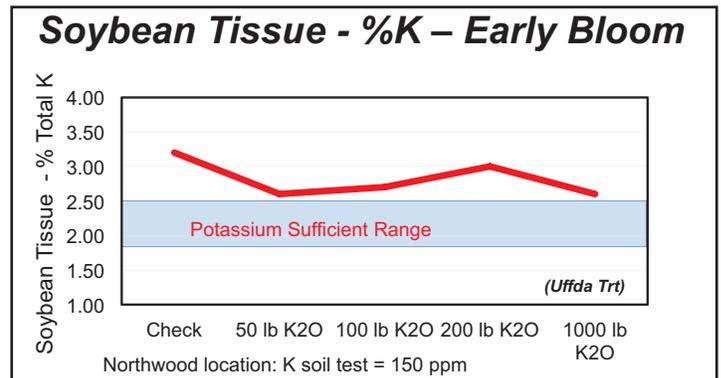
# Can you change %K on the Base saturation of a soil? Should you worry about the %K of your soil?

The past few years our staff has been getting questions about base saturation and cation ratios from farmers across the region. The farmers that called had attended meetings where they were told that a soil must have a certain %K, of the base saturation to achieve high yields. At some of these meetings, farmers were told they needed to apply high amounts of potassium fertilizer to increase the %K of their soils to achieve higher yields. Some farmers were convinced and went ahead with large applications of potassium fertilizer. (Even if though there K soil test level was very high).



Even though we know all of the research from the 1970's to today does not support the concept of ideal ranges for each cation, we decided to do a demonstration project to test the notion that you can increase the %K of a soil by applying high amounts of potassium fertilizer. We chose a field near Northwood, ND that has a K soil test level of about 150 ppm and 0.6% K on the base saturation as calculated by the routine soil testing method. The field is in soybean production this year. This spring we applied potassium chloride at rates of 50, 100, 200 and 1,000 lb/a K<sub>2</sub>O and tilled the fertilizer into the soil before seeding. The 1000 lb/a rate is so high it really gets your attention. We figured we needed this high rate to have any chance on increasing the %K in this soil. This high rate of potash has been dubbed the "Uffda" treatment. I gave it this name because I am sure my Norwegian grandfather, who farmed in southern MN, would have looked at this high rate and said "Uffda" that's a lot of potash!

We have soil tested these treatment sites periodically through the growing season. As you can see in the graph, the K soil test level did increase as the rate of K fertilizer increased. The Uffda treatment (1,000 lb/a K<sub>2</sub>O) increased the K soil test about 280 ppm. Another part of this demonstration project was to see if the potassium level in the plant tissue of the soybean crop was affected by these higher rates of added potassium fertilizer. As you can see, the K tissue level on all of the treatments is in the sufficient range. This means that even the check, which had a K soil test of 150 ppm and no potassium fertilizer, supplied enough potassium to the soybean

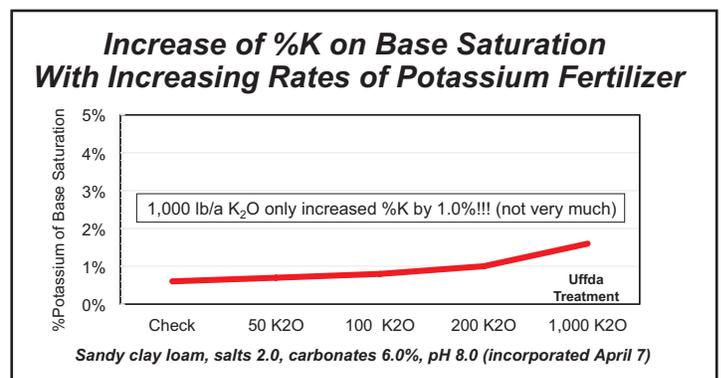


crop to keep the K tissue level in the sufficient range. Even with 1,000 lb/a K<sub>2</sub>O applied, the tissue K levels did not increase. There are no visible differences in soybean growth with any treatment. You can also see that the %K, as part of the base saturation only increased from 0.6% to 1.6% (see figure). This small increase in %K was not nearly enough to get the %K into the magical range suggested to the farmers at these meetings (I guess we should have had rates higher than 1,000 lb/a K<sub>2</sub>O - Ha Ha!)

While this is just a demonstration project, there are some basic facts you can tell your growers:

1. Increasing the %K as calculated in the base saturation on a routine soil test requires extremely high rates of potash fertilizer (1,000 lb/a only increased the %K by 1.0%)
2. Soils with a K soil test level over 150 ppm, generally supply plenty of potassium to a soybean crop to get the K tissue level into the sufficient range (Use tissue test to confirm)
3. If the K tissue level of a crop is in the sufficient range, it does not matter what %K of the soil base saturation is!
4. They should not worry about the %K in their soil, they should be concerned about their K soil test and if the K tissue levels of their crops are in the sufficient range.

This demonstration project was done in multiple locations in ND, MN and MB. All of the data will be compiled and shared at our seminars this winter.



# AGVISE

## LABORATORIES

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## PRESIDENT'S CORNER

Many of our news articles often deal with the major crops grown in our trade such as corn, wheat, and soybeans. However, AGVISE serves a wide geographic area, thus the crops our clients raise are very diverse. This summer we added 7 more crops to our AGVISE fertilizer guideline programs. Some of you may already have noticed the new crop choices when you were making crop or yield goal changes in AGVISOR. We added cabbage, broccoli and cauliflower for our commercial vegetable growers. For our clients out west, we added alfalfa/small grains (alfalfa underseeded with a small grain that will be used for hay), small grain hay, small grain silage, and sainfoin. For anybody wondering what sainfoin is, this crop is a perennial legume that is used in place of alfalfa. It does better under dry conditions and risk of bloating is less when grazed.

Adding the cole crops to AGVISOR was relatively easy because the University of Minnesota has published fertilizer recommendations for vegetable crops based on soil test. Adding the other minor crops to our guideline system was more difficult because fertility research and guidelines for a crop such as sainfoin is scarce or non-existent. In the case of the small grain hay, the nitrogen guidelines have to take into account applying enough nitrogen to obtain the desired yield goal without having the crop accumulate excess nitrates. We do our best to base our fertilizer guidelines for crops on current research from our region.

Adding more crop choices to the AGVISOR program is another example of our ability to meet our customers needs, whether its one acre of cabbage or 10,000 acres of soybeans. Have a great harvest and fall sampling season.



**BOB DEUTSCH**  
PRESIDENT  
SOIL SCIENTIST/CCA

## SOUTHERN TRENDS

What a difference a year makes! Early planting and timely rainfall makes a world of difference compared to 2013 and 2014 in much of the Benson lab trade area of South Dakota and southern Minnesota. Crop condition reports as of the first part of August were generally very good, with expectations of an early harvest and above average yields. Let's hope for good harvest conditions, high yields and increasing crop prices.

This year, there was a lot of interest in improving nitrogen management in corn production. Many new products and services aimed at improving N management in corn were introduced. Some of the information used by these services included local weather data, historical weather data, crop staging, estimated N release from the soil, predicted N uptake by the crop, N soil testing (PSNT: Pre-sidedress nitrate soil testing) and in-field soil nitrate testing equipment. AGVISE lab did some side-by-side comparisons this summer to get a handle on the accuracy and precision of some of the in-field soil nitrate measuring equipment. Sometimes the test values were pretty close and other times the in-field testing equipment was not very accurate. In the future, we'll probably see better testing equipment in the field and better nutrient modeling systems. We hope with the introduction of all of these new services, we are getting one step closer to better nitrogen use efficiency and increasing profits for growers.

June was a huge soil testing month for our Benson lab, with lots of "Early Summer" topsoil grid sampling. Early summer grid sampling has increased greatly because field conditions allow for high quality soil cores and samples and ease of sampling at that time of year. We've been asked many times if you can soil test soybean fields in June that had been fertilized without affecting the P & K soil test levels as compared to sampling unfertilized



**RICHARD JENNY**  
AGRONOMIST/CCA

*Continued on page 4*