

AGVISE

LABORATORIES

SPRING 2014

SOUTHERN TRENDS

So, what will 2014 bring for growing season conditions? The 2012 season started early and took off fast after a warm open winter. What a great year! The 2013 season was quite different and started later than normal due to the long, snowy winter. Cool wet conditions hung on all through the planting season. This triggered a lot of “yellow-striped” corn early in 2013. Yellow-striped corn is a good indicator of low crop uptake of nitrogen and/or sulfur. Plant tissue analysis was a good tool to identify if the symptoms were caused by sulfur or nitrogen deficiency. In 2013, 55% of corn tissue samples early in the season tested by AGVISE were low or deficient in sulfur and 12% for nitrogen. Early season leaching of sulfur and nitrogen by excessive rainfall required sulfur and nitrogen to be side-dressed on many fields. As the corn progressed from V6 to VT, there were only 12% of corn tissue samples testing low in sulfur and 27% testing low in nitrogen. Hopefully 2014 won't have as much yellow striped corn as 2013!



RICHARD JENNY
AGRONOMIST/CCA

Equipment update: More grid samplers are using the Wintex1000 sampler each year. In the past, most of the Wintex samplers were mounted on ATVs (4 wheeler). Now, more Wintex units are being mounted on UTVs (side-by-sides). The UTV seems to work better because it is a slightly heavier vehicle which provides a smoother ride. The UTV's also provide more operator comfort with the option of having a cab or windshield. The Wintex sampler has proven itself as a valuable tool in grid soil sample collection. The Wintex greatly improves sample depth consistency, saves time, reduces fatigue and makes your sampling operation much more efficient. If you have any questions on the Wintex sampler please give me a call.

Have a great spring season!

iPhone & Droid Friendly (Seed Fertilizer Calculator)

Lower crop prices and high fertilizer prices are increasing the interest in banding fertilizer. Research from South Dakota State University is a great resource to help determine what rate of fertilizer will be safe when placed near the seed for many crops. This research combines data from greenhouse work with field research to provide real world information in an easy to use format.

This research has been put into a spreadsheet based “Fertilizer Seed Decision Aid” on the SDSU Plant Science web site. This program has recently been updated

Continued on page 2

Fertilizer Seed Decision Aid –SDSU 2014

Input: Fertilizer with Seed		Maximum Fertilizer with the selected seed	
Crop Selection	Fertilizer Type	Corn	
Corn	APP (10-34-0)	(lbs/a)	(gal/acre)
Seed Furrow Width (in):	1	90.1	7.77
Row Spacing (in):	30	<i>(nutrients supplied with the above rate)</i>	
Tolerated Stand Loss (%)	5	Nitrogen (N) lbs/a	Phosp. (P2O5) lbs/a
Soil Texture	Fine-Medium	9	30.6
Planting Soil Moisture	Borderline	Potassium (K2O) lbs/a	Sulfur (S) lbs/a
Info	Output	Return to Input	
Seed Furrow(in)= 1	Tol.Stand Loss(%)= 5	CropFert Coeff=-0.037	
Row Width (in)= 30	Soil Text.= Fine-Medium	Soil Molst.= Borderline	
MX= 1.5			

INSIDE

Fertilizer Seed Decision Aid iPhone and Droid Friendly	2
Fallow Syndrome (Don't Skimp on Starter P!)	2
Precision Soil Sampling Update	3
Soil Testing Pays Big in Tight Times!	3
Soil Trivia	4
Cation Ratios and CEC, Cutting Through the Hype!	5
Northern Notes	6
President's Column	6

Online Sample Submission Increases

With the switch to our web based “Agvisor” program a couple of years ago, the number of samples being submitted with the online process continues to grow. Nearly 70% of all soil samples are now submitted using the Online process instead of hand writing submission forms. Once customers use the online submission system, they realize the benefits of grower name and field information consistency from year to year with no mistakes! By using the Online system, you setup your Growers once, so all their field information is the same each time. Once their Fields are entered, then they are consistent in all their reports. Grower and Fields can easily be added or edited in the online program. Another very nice feature is the “Default Settings.” To speed up online submission you can set default settings such as: Previous Crop, 3 Crop Choices, Yield Goals, P & K Guidelines and Sample Depth. This will save you many clicks! You can also insert your company logo into Agvisor so it will print on each soil test report.

Another very nice feature is your soil test option choices. You can create a “Dealer Default” test option for both your Grid/Zone samples and for your Conventional Composite samples (just call John or Richard to get this set up). All these features add consistency and speed up your sample submission process. Using either a PC or mobile platform like the iPad or smartphone with the Agvisor system has also made sample submission and reporting very user friendly and versatile. Right now you can do Online soil sample submission for conventional composite samples, grid/zone samples and SCN (soybean cyst nematode) samples. We hope to test online tissue submission this summer.

iPhone & Droid Friendly (Seed Fertilizer Calculator), continued...

and now has information on the safe rate of fertilizer for 18 crops and 18 fertilizer materials.

An additional feature is the ability to use this decision aid with iPhone and Android devices (see example of user screens). This will make this decision-making tool even easier to use by agronomists and growers. If you haven't used this tool in the past, now is the time to fire up your hand held device and give it a look! This is a great tool!

To find this tool do a search on “Fertilizer Seed Decision Aid SDSU.”

Fallow Syndrome (Don't Skimp on Starter P!)

Several million acres went unseeded in the northern plains in 2013 due to excessive spring rainfall. One nutrient issue that comes along with unseeded acres is “fallow syndrome.” “Fallow syndrome” is primarily a phosphorus deficiency caused by a lack of mycorrhizae fungi in the soil. Mycorrhizae (Vesicular arbuscular mycorrhizae or VAM) is a beneficial fungus found in most soils and needs living plant roots to flourish. This fungus has a symbiotic relationship with plants and is especially important for grass crops like corn. VAM fungi act like an extension of the plant roots, to help them absorb more nutrients like phosphorus and zinc. If the mycorrhizae population is low, plants like corn can be stunted and have purple leaves due to a lack of phosphorus uptake. Yield loss is common with “fallow syndrome.”

The population of these fungi decreases rapidly when no plants are growing in the soil. In 2013, growers did their best to control weeds on acres that did not get seeded. If weed control was good and fields were kept black with tillage, the mycorrhizae population drops quickly and these fields are set up for “fallow syndrome.” If the unseeded acres had cover crop seeded on them later

in the summer, the VAM fungi population had some time to recover and “fallow syndrome” should not be an issue. Canola and sugarbeets do not support mycorrhizae on their roots and crops following them can also suffer “fallow syndrome.” If possible, avoid planting corn following canola or sugarbeets to avoid “fallow syndrome.”

The cure for “fallow syndrome” is a high rate of P fertilizer placed near or with the seed regardless of the P soil test level. Placing P fertilizer in a band near the seed is a common practice for corn growers. They just have to make sure the P rate with the seed is high (be sure to apply a safe rate). A rate of about 10 gallons of 10-34-0 would be the limit for seed placed fertilizer with corn seed on 30” spacing with good soil moisture. If a grower skimps and uses only 2-3 gallons of a low Phosphorus liquid fertilizer, “fallow syndrome” will likely cause yield loss. Research has shown that broadcasting P fertilizer (even a high rate) will not fix “fallow syndrome” induced P deficiency. A high rate of starter P is required. Hopefully, we will have an early dry spring in the northern region this year so we won't have to worry about acres that don't get seeded.

Precision Soil Sampling Update

Precision soil sampling (grid or zone sampling) continues to increase in the Upper Great Plains. When we consider all soil samples tested by AGVISE, 63% of soil samples were precision samples in 2013, up from 60% and 52% in 2012 and 2011. Figure A shows the trend since 2008.

If you look at the trend in precision samples tested at our Benson, MN lab, since 2000, there has been a steady increase (Figure B). Our Benson lab serves primarily southern Minnesota and South Dakota customers. Most customers in Minnesota collect topsoil grid samples, while in South Dakota most customers do zone sampling with both a topsoil and subsoil collected for nitrate analysis. In the sugarbeet area of southern Minnesota, sample depths are commonly as deep as 42-48". While the sample depth may vary from one area to another, over 80% of all samples tested in our Benson lab are now precision samples (grid or zone samples). This trend will probably increase as more growers see the benefits of precision soil testing.

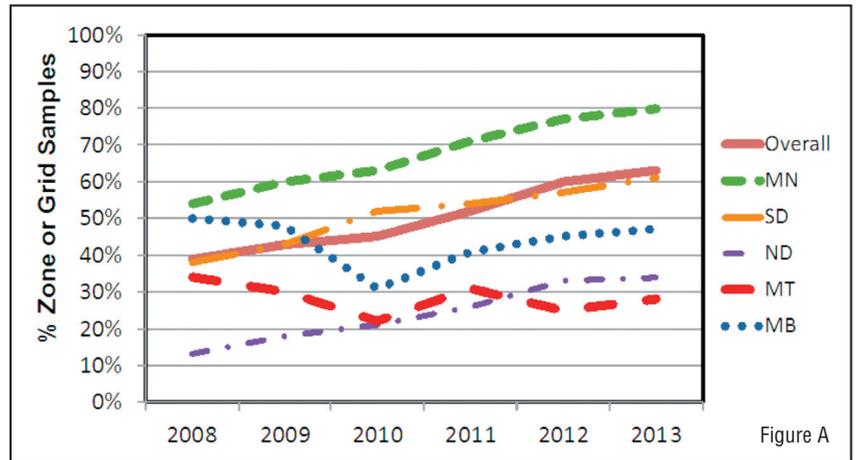


Figure A

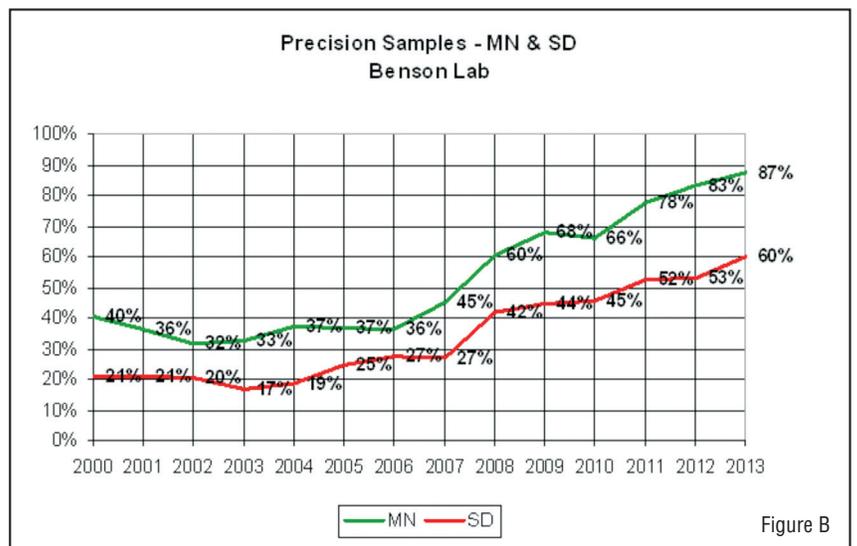


Figure B

Soil Testing Pays Big in Tight Times!

If there was ever a time for growers to do soil testing it is NOW! With grain prices on the down side for now and fertilizer, seed and fuel remaining high, soil testing is a great bargain! The cost of laboratory analysis is only up a small percentage over the past 10 years, while land, fertilizer, seed, and fuel have increased dramatically. Growers can't afford to over-fertilize or under-fertilize. Without soil testing, they're guessing. Using crop removal values instead of soil testing is the most expensive and the least effective method of making your P & K fertility decisions. With these high costs, fertilizer has to be placed where it is most needed. This can be accomplished by wiser methods of sampling and application. Soil testing fields by productivity zones or grid testing are the better methods to determine your fertilizer needs. Guessing at fertilizer rates by doing what the neighbor does, using old soil test results or by using rates you have used for years is not very wise or very profitable.

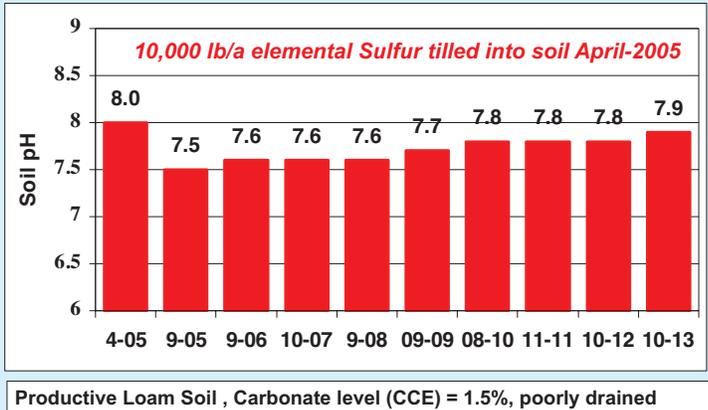
Soil Trivia

What common fertilizer material can be used to decrease the soil pH?

Answer: The most common acidifying fertilizer material is elemental sulfur. Elemental sulfur will lower the soil pH when applied at very high rates, but the decrease in pH may only be temporary. AGVISE Laboratories established a demonstration project using elemental sulfur in 2005. 10,000 lb/a of elemental sulfur was tilled into the soil in April of 2005 and soil samples have been collected each fall for the past seven years. Initially the soil pH decreased from 8.0 to 7.6 (see figure). Since that time, the soil pH has continued to increase and is almost back to where it started. The reason this happened is this soil contains carbonates which are common in soils with pH higher than 7.3. The rate of 10,000 lb/a of elemental sulfur was not high enough to neutralize the carbonates in the soil, so the change in the soil pH was only temporary. On a side note, this high rate of elemental sulfur did not lower the soluble salt level or have any effect on plant growth. High soil pH by itself does not hinder crop growth for corn, soybean or wheat. The average soil pH in the Red River Valley is 7.8 to 8.2 and these soils are some of the most productive in the world!

Does Elemental Sulfur Decrease Soil pH?

YES, But The Decrease May Not Be Permanent!



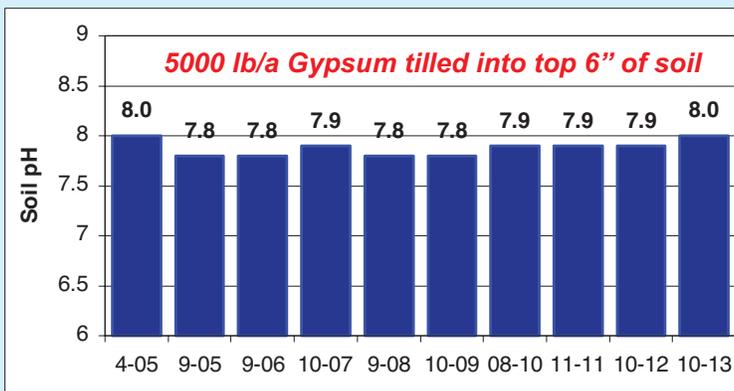
What common soil amendment will not lower the soil pH?

Answer: Our staff often receives questions about gypsum and its ability to decrease soil pH. We started another demonstration project using gypsum in April of 2005. 5000 lb/a of gypsum was tilled into the soil and soil samples have been collected each fall. The application of gypsum has had no effect on the soil pH (see figure). This is not

a surprise since gypsum (CaSO_4) is a low solubility salt and has no soil reaction that results in H^+ (acidity) being released to the soil. In addition, in the eight years since the gypsum has been applied, there has been no effect on plant growth and the soluble salt level in the soil has not changed.

Does Gypsum Decrease Soil pH?

NO! – Gypsum has no acidifying affect in soil



** If you want to learn more about soil amendments go to www.agvise.com click on "Agronomic Information" then "Soil Amendments" or "Soil Analysis". You will find several articles about soil amendments. You can also find additional information on gypsum in an NDSU publication SF 1321: "Effectiveness of Gypsum as a Soil Amendment."*

Cation Ratios and CEC Cutting Through the Hype!

In the media today everything is hyped to get your attention. Even things like “Soil Cation Balancing” and the importance of soil “CEC are being hyped to growers.

Sometimes you just need to shine a light on things like this, show people the facts and let them decide what the truth is. The people who promote cation balancing would have you believe that the potassium level in the soil needs to be a certain percentage of the total cations for crops to achieve high yields. Research has shown many times that there is no ratio of one cation to another that is important. What is important is that there is enough of each of the cations for vigorous plant growth. The other part of this issue is that soils with a pH > 7.3 that have some salts and carbonates, will have inflated test levels for calcium, magnesium and calculated CEC with routine test methods.

To make this easier to understand, we tested a soil with two different laboratory methods to determine the cations (Ca, Mg, Na, K) and the Cation Exchange Capacity (CEC). This soil has a pH of 8.2, a salt level of 0.45 mmhos/cm and 4.5% carbonates (CCE). This is a very productive soil which yields 170-190 bu/a corn in the Red River Valley of North Dakota. The first method used to test the cations and CEC of this soil was the routine ammonium acetate test method. This routine method is used by all of the major soil testing labs in the U.S. and Canada. The second method used was a special method which provides more accurate test results for Ca, Mg, and CEC on soils which contain soluble salts and carbonates.

In the table above, you can see that the calcium and magnesium test levels from the routine test method are much higher than the test values from the special method. You can also see that the potassium and sodium values are the same for both methods. The calcium and magnesium test values are inflated with the routine method because Ca and Mg from the soluble salts and carbonates are being included. The Ca and Mg from the salts and carbonates should not be included, because they are not held on the soil exchange sites. The special method provides data which is much more accurate than the routine method for Ca, Mg and CEC.

Cations Test Levels & CEC Inflated Values on High pH Soils

Test Method	Calcium	Magnesium	Sodium	Potassium	CEC
Routine Method	4740 ppm	1443 ppm	270 ppm	200 ppm	37.4
Special Method	2410 ppm	1240 ppm	260 ppm	210 ppm	23.9

Soil test values: Soluble salt .40 mmhos/cm and 4.6% carbonates (CCE)

So what does this mean in the real world? This means that the routine method for determining cations and CEC gives inflated values on soils with pH higher than 7.3. If that is the case, then how can the ratio of one cation to the other mean anything? The logical answer is that trying to balance cations using test results that are inflated by soluble salts and carbonates is one more reason the idea of balancing cation ratios makes no sense.

Here is a rule of thumb that will help you recognize which soils have inflated test values. If the CEC is higher than 35, it is inflated and the test values for Ca and Mg are inflated as well. That doesn't mean the test results are useless. If the CEC is very high (>35), you still learned that the soil texture is loam or clay loam. Soil texture is an important soil property for making decisions such as nitrogen application and timing. The table below shows the range of CEC for common soil texture classes.

Soil Texture vs. CEC

Soil Texture	CEC Meq/100g
Sand, Loamy Sands (coarse)	0-10
Sandy loams (medium)	11-20
Silt Loams (medium)	20-30
Clay loam/ Clay (fine)	20-35

Based on soil texture determined by hydrometer – USDA soil texture class

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PRESIDENT'S CORNER

In the agricultural world, winter is the time for meetings. This past winter I attended a meeting where a speaker made a comment that was just plain wrong. The speaker indicated we are getting less efficient in the use of fertilizer. To illustrate my point of view, all I need is a single graph.

This graph represents the pounds of nitrogen used in the US to produce one bushel of corn over the past 40 years. I chose corn because this crop consumes a large amount of the nitrogen fertilizer used in the US. Since a picture (in this case a graph) is said to be worth a thousand words, I rest my case. Another good lesson for all of us is:

“Just because you heard it at a meeting, does not mean it is true!”



BOB DEUTSCH
 PRESIDENT
 SOIL SCIENTIST/CCA

NORTHERN NOTES

Spring is on its way, but winter's grip can still be felt. We had a pretty cold winter with limited snow cover and deep frost in many areas. There are reports of frost beyond 7 feet in some areas with water lines taking a beating. In my lifetime I can remember several years when small grain and sugarbeets were seeded on top of frost. This could be one of those years!



JOHN LEE
 SOIL SCIENTIST/CCA

Soil testing was a real struggle in some areas last fall. Spring sampling will be a chance to catch up, but it can be a struggle if you don't have the right equipment. If you need sampling equipment of any kind, please give us a call.

Online sample submission has been a big hit. If you haven't given it a try yet, give me a call. I can help import all of your grower names and field information from last year. This will help you get started without having to enter all of your grower names and field info from scratch.

We hope you have a very smooth and safe spring season!

Lbs of Nitrogen to used to Produce 1 Bu of Corn-US

