

AGVISE

LABORATORIES

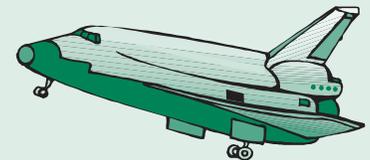
FALL/WINTER 2008

SOUTHERN TRENDS

The big question from everyone this fall is how to deal with the high cost of fertilizer, especially P & K. The time to build soil test P & K to optimum levels is when the costs are lower, not when they are at their peak. Banding P & K is getting a lot of attention right now. High fertilizer prices have resulted in more soil testing this fall, even with the “on & off” wet harvest/sampling/application season. The Benson Lab has been very busy with daily lab volumes over 50% higher than our 5-year average as of mid-November. Kudos’ to our lab staff that has maintained very fast turn around! Grid and zone soil sampling is increasing as well as a result of higher fertilizer costs. Thank you for all of your hard work through difficult soil sampling conditions. Keep up the good work. Once it freezes, we can all catch a break.



RICHARD JENNY
AGRONOMIST/CCA



“Agcam” Rides Shuttle to Space Station

The “Agcam” (Agricultural Camera) rode the Space Shuttle to the International Space Station on November 14. The Agcam will be observing the earth from about 250 miles above the surface. The Agcam has been in development since 2001 at the University of North Dakota in Grand Forks and should be operational by this coming May.

In the past, satellites such as Landsat provided images showing differences in vegetative vigor on the earth’s surface. While these images have been very useful for Precision Agriculture for the past 20 years, the Landsat satellite only provided images every 16 days for each part of the world. Issues such as cloud cover caused Landsat images to be

Continued on page 2

AGVISE Soil Fertility Seminars January 6, 7, 8

AGVISE soil fertility seminars are coming up quickly. The dates and locations for our 2009 Soil Fertility Seminars are listed below. We have confirmed all speakers and topics for these seminars. A registration letter was sent to all AGVISE customers in early November so they had the first chance to register for our seminars. Please make sure you register early for these seminars if you plan on attending because space is limited and there is usually a waiting list. An email was sent a week later to everyone on our mailing list to let them know about these seminars. If you received this newsletter, you are on our mailing list, but we may not have your current email. If you

want to receive an email in the future announcing our seminars, please call Teresa at our Northwood office (701-587-6010) and give her your current email.

CEU’s applied for are 2.5 Soil and Water and 3.5 Nutrient Management.

- January 6, 2009 - Willmar, MN
- January 7, 2009 - Watertown, SD
- January 8, 2009 – Grand Forks, ND

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Agcam continued...

unusable and another image was not available for 16 more days. With Agcam being mounted on the Space Station, there should be opportunities for many images per week and in some cases more than one image each day. One cloudy day will not be a big deal with Agcam.

The Agcam has many implications for agriculture in the Midwest. The first use of Agcam will be to get detailed pictures of North and South Dakota, Montana, Idaho and Wyoming. Consultants and agronomists have been using satellite images for many years as part of their precision Ag programs. Satellite images of vegetative vigor are an important layer of information used to break fields into management zones for soil testing.

Fall Nitrogen on Sandy Soil?

Our technical support staff has been getting a few calls lately about how much nitrogen can be safely applied in the fall on sandy soils. Because sandy soils are prone to leaching, fall N application are not a good management practice (BMP). Applying nitrogen fertilizer in the fall when soil temperatures are low reduces the risk of N leaching losses on these sandy soils, but the overall risk is still too high.

There is some confusion about the CEC (Cation Exchange Capacity) of sandy soils and how

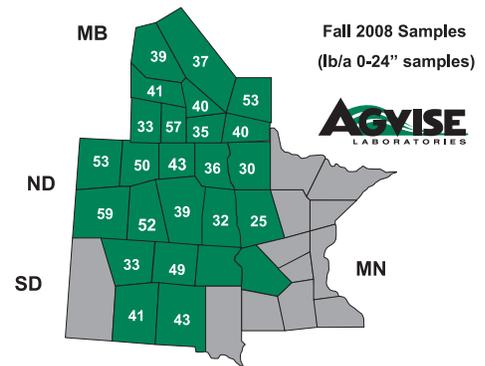
Higher Soil Nitrate Levels—Fall 2008!

While many eastern areas of the Dakotas and Manitoba had good yields, the western areas suffered with dry conditions. In areas with good crop yields, the soil nitrate levels were very similar to 2007 (see figures below). In areas where dry conditions continued for the second or third year, crop yields were poor and soil nitrate levels are much higher on average than 2007.

Two figures show the average soil nitrate level following wheat in 2007 and 2008. The third figure shows the difference between the average soil nitrate level in 2007 and 2008 in each zip code area. At this time of year we usually have compiled the regional figures for the average soil nitrate following corn, but the delayed harvest makes that impossible at the time this article was written.

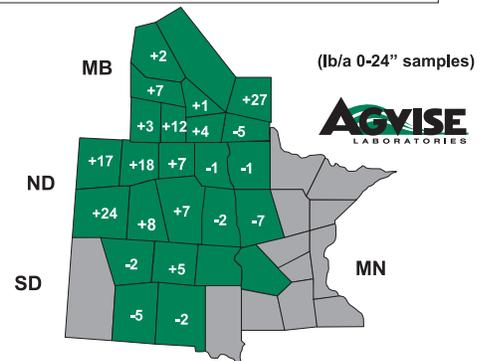
While it is interesting to look at the big picture to see general differences from year to year, it is very important to soil test each field to determine the level of soil nitrate remaining in the 0-24" soil profile in that field. High fertilizer prices are just one more reason to get a current soil test. Soil testing is not a perfect tool, but it is the best management tool available to help you determine the rate of nutrients needed for next years crop.

Average Soil Nitrate following Wheat in 2008

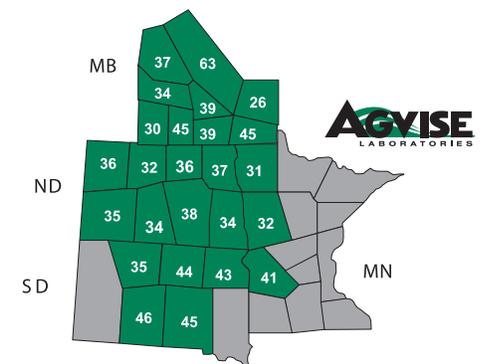


Soil Nitrate Change from 2007 to 2008

Higher Soil Nitrate in Western Areas Due to Dry Conditions



Average Soil Nitrate following Wheat in 2007



Continued on page 3

Zone Soil Testing—How Many Zones?

Dividing fields up into several management zones for soil testing is now a regular practice in many areas. It just makes sense to split fields into parts for soil testing based on different levels of production to see if soil fertility is the reason. Fields are divided into management zones from several sources of information (i.e. vegetative vigor, yield maps, salinity maps, topography, etc.) As a laboratory we do not know what information layers were used to create these management zones, but we do know the nutrient test levels of each zone. Customers often ask us how many zone samples should be taken from each field to get the best nutrient information. Common sense tells us that splitting fields into more zones will provide more detailed nutrient information.

With soil test data from thousands of zone tested fields in our database, we decided to see if the range of soil nutrients (high testing zone minus low testing zone) could tell us something about how many zone samples fields should be split into for soil testing. The table below shows the average difference from high testing zone to low testing zone for over 1000 fields. The number of samples per field ranges from 3 zone samples per field up to 8 zone samples per field. You can see, as the number of zone samples per field increases, the difference between the high testing zone and the low testing zone gets larger.

Number of Zone Samples per Field	Average Difference of Nitrogen	Average difference of Phosphorus
	(high zone - low zone)	(high zone - low zone)
3	28 lb/a	7 ppm
4	32 lb/a	14 ppm
5	43 lb/a	18 ppm
6	57 lb/a	17 ppm
7	47 lb/a	20 ppm
8	65 lb/a	21 ppm

*Nitrogen = 0-24" nitrate nitrogen * Phosphorus = Olsen P test

This data reminds us that the more zone samples tested in each field, the more we learn about the nutrient status of each field. The general nature of the soils in your area will dictate the number of zone samples you need to take per field. If you have variable soil types, rolling topography and salinity issues, you may have to take more zone samples per field (5-7) to see most of the nutrient differences in the field and take full advantage of zone sampling. If your area has fewer soil types, relatively flat terrain and no salinity issues, you can probably take fewer zone samples per field (3-5).

Once the fall soil testing season is done, we will put together a more complete analysis of the soil test data from all zone tested fields. We hope to be able to divide the data into different areas such as Glacial Till soils, Old Lake Bed Soils, etc.

Nitrogen continued...

that affects the rate of fall N that can be applied safely without risk of N leaching. All soil particles have a negative charge which gives soil the ability to hold onto cations like calcium, magnesium, potassium and sodium which all have positive charges (like a battery). While ammonium forms of nitrogen fertilizer also have a positive charge

and can be held by the negative charge of the soil, this is a temporary situation. All ammonium fertilizer is eventually converted to nitrate nitrogen. Nitrate nitrogen can easily be leached downward in a sandy soil and lost from the root zone in the fall or spring. It does not matter what the CEC of a sandy soil is once the ammonium

based nitrogen fertilizer converts to nitrate. So the next time somebody suggests that there is a safe rate of nitrogen fertilizer that can be applied in the fall on a sandy soil based on the CEC, ask him or her how much of their money they would like to give you if the N is lost due to leaching!

AGVISE Phosphorus Fertilizer Guideline Options

In this current climate of high production costs for land, seed, fertilizer, fuel and equipment, it is important for growers to examine where they could decrease their costs without decreasing yield in the short term. One area that's been written on extensively is banded phosphorus fertilizer and the importance of soil testing. Both over and under fertilization reduce grower profits. While trying to build your soil P test level may not be a good idea for 2009, you also need to make sure you are applying enough P fertilizer to achieve high yields.

AGVISE Laboratories provides four different P & K fertilizer guidelines for our customers to choose from. (See charts and tables.) Below is a short description of these guidelines and how following each guideline will affect your P soil test levels over time. Hopefully this information will help you choose which AGVISE P fertilizer guideline is best suited to your grower's equipment and management.

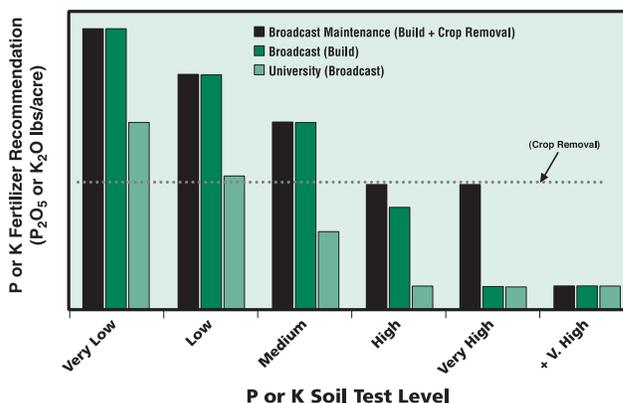
Band: The AGVISE Band guideline will build the P soil test to the medium range over 7-10 years if the initial soil test levels are in the very low or low category. If the soil test level is in the high or very high range initially, then the Band Guideline rate will be less than crop removal and the P soil test will drop to the medium range over a 7-10 year period.

Band/Maintenance: The AGVISE Band/Maintenance guideline is the same as the band guideline if the P soil test level is medium or lower. The Band Maintenance guideline will build the P soil test to the medium range over 7-10 years if the initial soil test levels are in the very low or low category. If the P soil test level is in the high or very high range initially, then the Band/Maintenance guideline rate will be calculated based on the amount of P that will be removed from the field in the harvested grain. Over time, the Band Maintenance guideline will keep the soil test level in the medium range. The soil test level will not drop because you will always be applying P at a rate equal to crop removal (to maintain the test level).

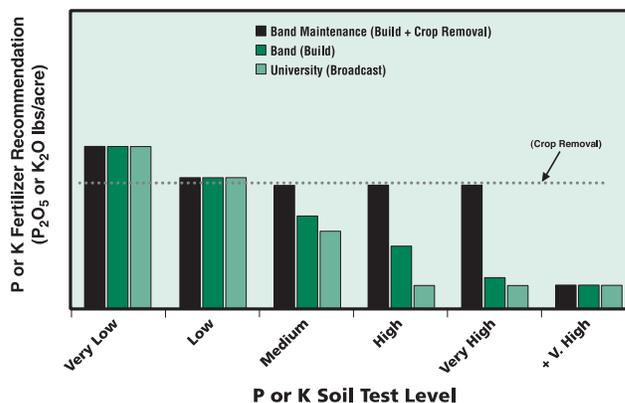
Broadcast: The Broadcast guideline is designed to build the soil test level to the high range over a 5-10 year time frame. High pH fine textured soils will take longer to build than sandy soils and it may not be economical even at lower fertilizer prices. At low soil test levels the Broadcast guideline fertilizer rate will be about two times as high as the Band guideline. If the P soil test is in the high range initially, the Broadcast fertilizer guideline rate will be less than crop removal.

Broadcast/Maintenance: The Broadcast/Maintenance guideline will build the P soil test level to the high range over a 5-10 year time frame (the same as the Broadcast guideline). At low soil test levels, the Broadcast/Maintenance guideline fertilizer rate will be about two times as high as the Band guideline. If the P soil test is in the high range

Comparison of Broadcast Guidelines



Comparison of Band Guidelines



initially, the Broadcast/Maintenance fertilizer guideline rate will be equal crop removal (Maintenance) based on the yield goal provided by the grower. The P soil test level will not drop over time if crop removal rates of phosphorus are applied.

University Broadcast: The University Broadcast guideline is based upon the Tri-State University fertilizer guidelines from ND, SD and MN. The University guideline is designed to supply enough broadcast phosphorus fertilizer to achieve your yield goal for that year. This is known as the "sufficiency" approach. If the P soil test is very low, the University Broadcast

Phosphorus continued...

guideline will increase the P soil test to the medium range over many years. The P soil test will increase slowly because the University Broadcast rate is higher than crop removal. If the P soil test level is in the high or very high range initially, then the University Broadcast guideline will be less than crop removal and the P soil test will decline over time. If the P soil test is very high, the University Broadcast guideline will drop to 0, but a P starter of 10-15 lb/acre of P₂O₅ is still recommended for small grains and corn by University specialists. If you have a high P soil test initially, the P soil test will decline to the medium range over time following the University Broadcast guideline.

University Researchers recommend reducing the “University Broadcast” guideline rate by 50% if you can apply the phosphorus fertilizer in a band with or near the seed (seed safety should always be considered). A starter rate of 10-15lb/ac P₂O₅ is always recommended for small grains and corn.

Comparison of P Fertilizer Guideline Rates Corn Yield Goal of 160 bu/a

Soil Analysis Method	Soil Test level					
	V Low P soil test	Low P soil test	Medium P soil test	High P soil test	Very high P soil test	Very high P soil test
Olsen P test method	0-3 ppm	4-7 ppm	8-11 ppm	12-15 ppm	16-19 ppm	>19 ppm
Bray 1 P test method	0-5 ppm	6-10 ppm	11-15 ppm	16-20 ppm	21-25 ppm	>25 ppm
P fertilizer Guideline choice	P ₂ O ₅ lb/acre					
University Broadcast	**100	**70	40	15	*15	*15
AGVISE Band	85	65	50	35	*15	*15
AGVISE Band/Maintenance	85	65	65	65	65	65
AGVISE Broadcast	145	120	95	75	50	*15
AGVISE Broadcast/Maintenance	145	120	95	75	65	65

* = To be applied as a starter, with or near the seed ** = can be reduced by 50% if banded near the seed

Corn Strategies

Even with the higher gross returns of corn compared to small grains, corn growers use band lower rates of P in years of high cost fertilizer and not sacrifice yield, if the P soil test in the medium or higher. Dr. George Rehm, retired U of M Extension states that University Broadcast rates can be cut in half if P fertilizer is banded with or near the seed at planting without losing yield. The band must be no more than 2 inches away from the seed to get the starter affect. Maximum N + K₂O in a band in contact with the seed at planting should not exceed 10-15 lb/acre. Rates of 7-8 gallons of 10-34-0 with the seed will not to cause emergence or stand establishment problems, unless the soil becomes dry and is a light sandy texture. If a shortage of 10-34-0 develops this spring, you should prioritize which fields get the higher rates of 10-34-0. The first priority should be corn on corn followed by corn on soybean situations. He also states that research of nutrients/acre has shown that when applied in equal amounts, liquid and dry P fertilizer products perform the same. The choice for liquid or dry is based upon the growers' planter equipment.

Small Grains Strategies

NDSU Extension Soils Specialist, Dr. Dave Franzen states in a recent article “Phosphate-To Build or Not to Build” that at current P prices (\$1/lb of P₂O₅) it would not be economical to build P soil test levels, even if wheat is \$8/bu. If P costs drop to \$0.50/lb, then it would be profitable to build the soil to 10 ppm (medium) (Olsen P test). He also states that University research shows that for wheat, banded P has a 2 to 1 efficiency over broadcast P. His recommendation is to reduce the University Broadcast recommendation 50% when banding P near the seed at planting (If the P soil test is medium or lower.). N + K₂O should not exceed 25-30 lb/acre when placed in direct contact with the seed when row spacing is 6 or 7 inches.

Comparison of P Fertilizer Guideline Rates Wheat Yield Goal of 60 bu/a

Soil Analysis Method	Soil Test level					
	V Low P soil test	Low P soil test	Medium P soil test	High P soil test	Very high P soil test	Very high P soil test
Olsen P test method	0-3 ppm	4-7 ppm	8-11 ppm	12-15 ppm	16-19 ppm	>19 ppm
Bray 1 P test method	0-5 ppm	6-10 ppm	11-15 ppm	16-20 ppm	21-25 ppm	>25 ppm
P fertilizer Guideline choice	P ₂ O ₅ lb/acre					
University Broadcast	**55	**40	25	15	*15	*15
AGVISE Band	50	40	30	25	*15	*15
AGVISE Band/Maintenance	50	40	35	35	35	35
AGVISE Broadcast	95	80	60	45	30	*15
AGVISE Broadcast/Maintenance	95	80	60	45	35	35

* = To be applied as a starter, with or near the seed ** = can be reduced by 50% if banded near the seed

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PRESIDENT'S CORNER

What a wild ride 2008 has been for farmers in the upper mid west. Record fall rains fell in large areas of our trade territory. On the 7th of November, I saw entire fields of unharvested corn, near Moorhead, MN standing in water. Muddy fields lined the interstate all the way to Iowa City. On the other extreme, wheat fields 10 miles west of my home farm in North Central ND yielded less than 10 bu/ac because two years of persistent drought. Another 30 to 40 miles west, many fields went unharvested due to the parched soil. I often wonder what the crop insurance executives when they go through claims from flood and drought in the same state less than 200 miles apart.

Not only has the weather been wild, the markets have resembled a roller coaster ride as well. Early in 2008 we saw record high prices for many of the grains. Fuel, oil, fertilizer, and other inputs hit record highs as well. Then the housing foreclosure crunch hit. This news caused the stock market to tank, taking commodities along with. As I write this article, North Dakota has 2,000,000 acres of corn still in the field, along with 450,000 acres of soybeans. I can't even guess what is in store for mid-west farmers in 2009. Hopefully we don't have as many extremes as 2008.



BOB DEUSCH
PRESIDENT
SOIL SCIENTIST/CCA

NORTHERN NOTES

Wet soil conditions have slowed harvest in many areas up north. Some areas will not be able to finish corn harvest until the soil freezes and will hold the weight of combines and grain carts. In spite of the difficult harvest, soil testing has been happening at a fast pace. With high fertilizer prices and crop prices taking a dip recently, there is a high demand for soil testing.

In the northern area, we have been seeing quite an increase in the amount of fields broken into several management zones for soil testing. Depending on the soil variability in each customer's area, most fields are being divided into 3-7 separate soil samples (see zone sampling article).

Our customers tested the capacity of the new lab in Northwood several times this fall. There were several days when our staff tested almost 3000 samples in our new facility. Our employees were equal to the challenge and did a great job! With a few changes, we now know that we can test even more samples in the future. We hope everyone has a safe harvest season and will take time to spend with their families and friends once it is finally wrapped up.



JOHN LEE
SOIL SCIENTIST/CCA