

AGVISE

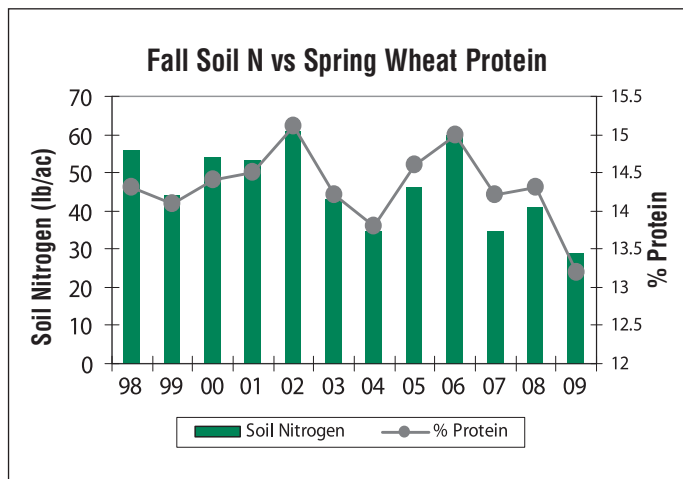
LABORATORIES

SPRING 2010

Fall Soil Nitrate vs. Wheat Protein? **NORTHERN NOTES**

2009 was a low protein year for spring wheat and resulted in many questions from farmers. As the fall soil testing season progressed, we got many calls asking if our lab instruments were giving correct test values. The soil nitrate values following spring were lower than anybody had seen before. When the fall season was done, we summarized the soil nitrate data from all fields where spring wheat was grown in 2009. Bob Deutsch then created a graph of the average soil nitrate level for the past 12 years following spring wheat vs. the average protein for spring wheat (U.S. Wheat Associates). In the graph, you will see the very good relationship between soil nitrate left in the soil following spring wheat and the average protein for that year. For example in 2002, the average soil nitrate following wheat was almost 60 lb/a on the average and the average protein level was high at almost 15%. On the flip side, the average soil nitrate following wheat in 2009 was less than 30 lb/a and the average protein was a little over 13%, the lowest in those 12 years.

This relationship shown between low soil nitrates and low wheat protein could be a useful rule of thumb. If you work with a grower who has a history of soil nitrate levels less than 30 lb/a following wheat, then he needs to generally apply a higher rate of N fertilizer. On the other side, if you work with a grower that has a history of soil nitrate levels testing more than 50 lb/a following wheat, then his N fertilizer rates are generally higher than they need to be. Who knew a simple soil nitrate test could tell us so much!



Spring is coming and I can't wait. Spring soil testing will be a challenge again this year as planting will probably be later than normal. That means spring soil testing will be a mad rush to beat the growers into the field.



JOHN LEE
SOIL SCIENTIST/CCA

Having sampling equipment for wet soil conditions will help. AGVISE has two different options for sampling wet sticky soil. The first option is the wet tip for our 1" stainless steel probe body. This tip has a flattened end with a rolled edge. Using WD-40 will reduce plugging under wet conditions. The second option we have is a "Giddings" wet probe. This probe has a larger 1 1/4" tube and a tip that has both a cutting edge and an inside lip that reduces plugging. This probe is made of Chromoly steel and is good for both wet and frozen conditions. If you need any equipment for spring sampling, please give us a call.

Please be safe during the busy spring planting season!

**in
this
Issue**

N-Calculators - Consider Fertilizer and Crop Prices	2
Estimating Soil Texture	2
Ag Detectives	3
Soil Trivia	3
Surface Applied Urea at Risk When It is Very Cool?	4
Producing High Corn Yields	5
President's Corner	6
Northern Notes	6

N- Calculators - Consider Fertilizer and Crop Prices

In the past couple years we have experienced wide swings in fertilizer and grain prices. As a result of these swings, several universities now offer “Nitrogen Calculators” to help you figure out what rate of N fertilizer will provide the best economic return when fertilizer and grain prices spike up or down. AGVISE now has links to four N calculators on our web site. Just go to www.agvise.com and click on “N Guidelines – Regional Economic Information.” The list of N calculators linked to our site is shown below:

North Dakota: Spring Wheat and Durum N Calculator

Manitoba: N Calculator for Spring Wheat, Barley and Canola

Minnesota: Corn N Rate Calculator

Montana: Small Grains N Economic Calculator

These sites are very useful when helping your growers decide the rate of N fertilizer to apply on each field or on each zone area in a field based on a soil test.

Where’s the K?

High priced potassium fertilizer caused many growers to cut potash applications in 08 and 09. While cutting potash rates have not caused large yield losses in the short term, under applying potash will cause yield loss over the long-term. This is especially true on medium and light textured soils testing low or medium in potassium.

For soils testing low to medium in Potassium, it is important to apply enough potassium to keep up with crop removal. The amount of potassium crops remove from the soil can be considerable. The table shows the

Crop	Yield	K20 removed
Alfalfa	6 ton/a	300 lb/
Corn	160 bu/a	43 lb/a
Corn silage	10 ton/a	80 lb/a
Soybeans	50 bu/a	70 lb/a
Wheat	60 bu/a	22 lb/a

Estimating Soil Texture

Last fall many of you may have noticed a new comment on the bottom of your soil test report referring to soil texture. AGVISE started printing an estimated soil texture on the report based on the Cation Exchange Capacity (CEC) results. We have always known there is a strong relationship between CEC and texture.

Last fall we decided to report an estimated soil texture based on the CEC for all soil samples with a pH less than 7.6

Example 1: A soil with a pH of 7.2 and a CEC reading of 35 meq would have an “Estimated Texture = Clays/Clay Loams (CEC range = 30+) (Fine).” (see table)

For soils with a pH higher than 7.6 we cannot estimate the soil texture based on the CEC. These soils can have elevated levels of calcium carbonate and salinity which will give inflated CEC values.

Soils that have a pH less than or equal to 7.6 will have an estimated texture based on the CEC values shown in the table.

CEC Reading	Organic Matter	Estimated Texture	Category
0 to 10	< 20	Sands	Coarse
10 to 20	< 20	Coarse Loams	Medium
20 to 30	< 20	Fine Loams	Medium
30+	< 20	Clays/Clay Loams	Fine
	>20	Peat/Muck	Organic

amount of potassium removed by several crops (harvested portion).

Now that potassium prices have come down somewhat, it is important to apply adequate potassium. Soybeans are usually the first crop to show symptoms when potassium is limited. This is because many growers only apply K fertilizer ahead of corn and don’t apply any potassium in the year of soybeans. With soybeans requiring so much potassium, they often will show potassium deficiency symptoms first if the potassium fertilizer rates have been cut.

ASSP - Go There or Be Square!

Ever have a problem with VR controller? Frustrated by a recent software upgrade? Have issues with creating VR maps, Want to know how to make green talk to red and yellow? Go to <http://www.allsitespecific.org/> and get some answers!

Ag Detectives – Plant Tissue and Soil Testing

There has been increasing interest in plant tissue testing for this upcoming growing season. As an additional agronomic tool, tissue testing is used for: 1) monitoring nutrient status in irrigated crops (potatoes and corn), 2) determining if a crop has any non-visual nutrient shortage and 3) to help diagnose visual crop symptoms in problem areas of fields.

In the situation of investigating visual crop symptoms within a field, plant tissue testing along with soil testing gives you powerful tools to diagnose the situation.

Collecting soil and tissue samples from “Good” and “Poor” areas helps diagnose the cause of the problem. The soil tests will tell you if the nutrient levels in the “Good”

and “Poor” areas are deficient or adequate and the tissue samples will tell you if there are issues with low nutrient levels in plant tissue as well. So, what’s the best time to sample problem areas? As soon as symptoms appear, soil and tissue testing should be done. As time progresses, the symptoms may get worse and many times the nutrient levels in the “Poor” growing plants will be confounded. It is best to do the testing within 10 days of symptoms becoming visible. Diagnosing the problem right away with soil and tissue analysis also provides more time for corrective action if nutrients are confirmed as the problem. You

can become an “Ag Detective” the next time you encounter a problem that appears to be nutrient related in your grower’s fields. Collect tissue and soil samples and help your growers understand what the issue is and how you can help them solve the problem.



Magic Products

It’s that time of year again when growers get bombarded with magical fertilizer products. While the products do have to be labeled for the % nutrient they contain, there is little else that is required.

Some of the promotions sound pretty good to farmers. Many of these companies tell growers they can use less of their fertilizer product and get the same yields as applying higher rates of conventional fertilizer products. In the short term, this may be true (especially if the growers soil test levels are high), but in the long term, nutrients are removed by crops and must be replaced for the soil to stay productive (see article on page 5).

Some of these magic product companies will have growers to apply a normal rate of their conventional fertilizer products, and also apply some of their new magic fertilizer material. The company will find one field where the addition of the magic product appears to out yield the conventional side of the field. Since there is no replication, there is no way to know if the response is real or if it was just a random event. That does not matter to these companies, because they now have data for a marketing program for the next few years, or until a new magic product is formulated by their company that is even better!

Growers are getting pretty saavy when it comes to new fertilizer products. Most growers will try some of the product on a few acres before they apply it to the whole farm. Many farmers also have yield monitors to measure any differences due to different fertilizer treatments. Replicated fertilizer treatments using new products are a lot easier for growers to do now with VR equipment becoming common. In the end, the market place will decide which new fertilizer products will survive and which one will be sent back to the drawing board.

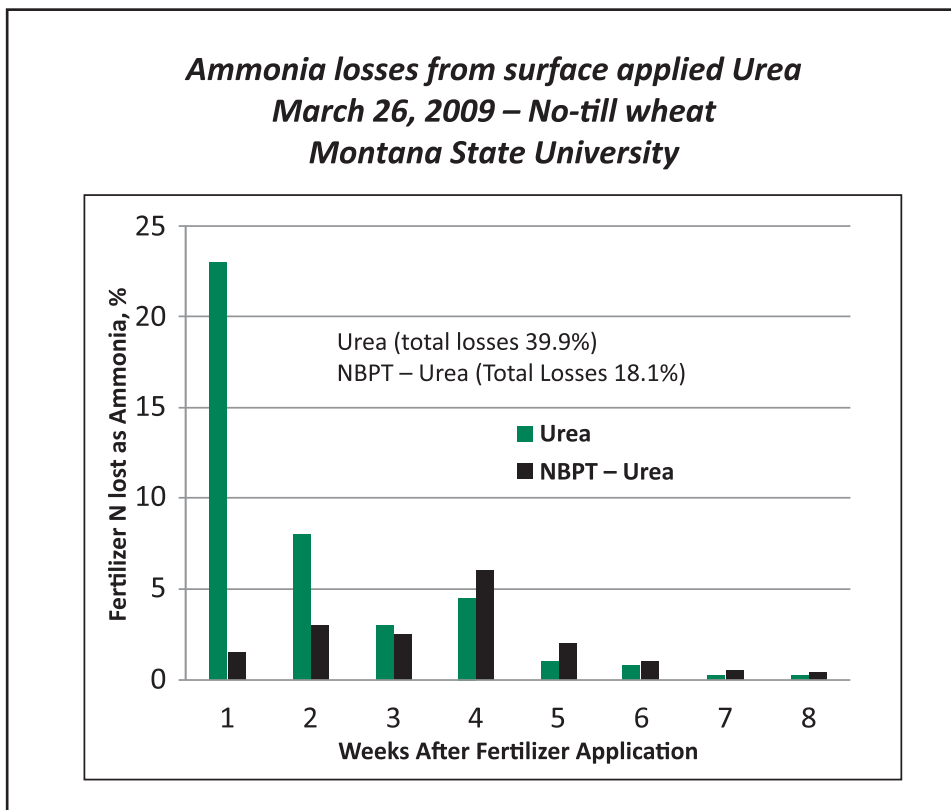
Surface Applied Urea at Risk When it is Very Cool?

Surface application of urea is a common practice in many wheat growing areas. In the past, most scientists would have told you there was a low risk of ammonia N loss if the urea was applied to the soil surface when temperatures were cool. That information is changing with recent research from Rick Engel at Montana State University, Bozeman, MT. New ammonia measuring equipment for infield testing enabled him to capture the ammonia as it was being lost from surface applied urea, even at temperatures near 32 degrees F. In this study, urea and urea treated with NBPT (Agrotain) was applied on the surface in no-till winter wheat fields. These studies were run over an eight week time period starting at different times. The environmental conditions where the highest N losses occurred were a moist soil surface and temperatures that averaged around 33-35 degrees F, with no significant rainfall for several weeks to move the dissolved urea into the soil.

The highest N losses occurred from a treatment made March 26 of 2009. This was a no-till winter wheat field and an application of 89 lbs N/acre. As you can see in the figure, 39.9% of the urea was lost from the untreated urea and 18.1% from the Agrotain treated urea. In this situation, the soil surface was moist enough to dissolve the urea prills, but there was no rainfall to move the dissolved urea into the soil where ammonia losses would be minimized. In the first two weeks, almost 30% of the untreated urea was lost. You can also see that the Agrotain treatment lasted two weeks. After two weeks, the untreated urea and the Agrotain treated urea acted the same.

This is an ongoing research project and more years of data will be collected for evidence on how much N can be lost from surface applied urea under very cool conditions. Now that we know nitrogen losses from surface applied urea can be substantial, even under temperatures near freezing, what should we do?

Timing a urea application with a rainfall event within 2-3 days will minimize losses, but that is hard to do. Treating urea with a product like Agrotain will reduce ammonia losses from surface applied urea for about two weeks. If a rainfall event of $\frac{1}{8}$ " to $\frac{1}{2}$ " occurs during that two week period, losses will be minimal.



If you apply urea and the soil surface is moist enough to dissolve the prills, but not enough to wash the urea into the soil, losses could be >25% in two weeks. Losses like that will be much more than the cost of the Agrotain or the lost income from not having enough N for good yield. The most important result would be a very unhappy grower who wants to know where his nitrogen went.

While this is only one year of data, it does confirm some past situations we have all experienced when urea was surface applied under very cool conditions and losses were obviously more than we expected. To review all of the data from this research project, go to <http://landresources.montana.edu/ureavolutilization/>. We will keep you updated as more years of data come from this research.

Producing High Corn Yields on Low vs. High P – Testing Soil (Gyles Randall – U of M, Waseca)

Gyles Randall recently presented research from the U of M Waseca at the annual fluid fertilizer meeting. The research evaluated growing high yield corn on low and high P testing soils. In this project, the P fertilizer was applied at rates of 0, 20, and 40 lb/a P₂O₅. The fertilizer was placed as a pop-up (with the seed), 6-7” below the soil surface under the seed (strip-till) and also as a broadcast application. The U of M currently would recommend 40 lb/a band applied and 75 lb/a broadcast for the low testing site.

In Table 1, you will see the three year average corn yields on the high testing site, yielded from 185 to 196 bu/a. Table 2 shows the corn yields from the low P testing site were 158 to 172 for the fertilizer treatments over the three year period. At a corn price of \$3.50/bu, the economic return for corn was reduced by \$88.00 on the low P testing site. This data shows that having a low P soil test limits the yield potential for corn, even when applying the U of M recommended rate of P fertilizer.

Gyles suggested a need for University research to determine the critical soil test levels needed for very high yield levels. One example of this is research that is already happening at the University of Nebraska. They recently changed their long time Soil Test P critical level from 15 ppm to 25 ppm for high yield corn after corn situations based on recent data. Getting research like this funded at our land grant universities is very important. We all need to make sure that dollars from the fertilizer check off are used to support research such as this in the future.

Phosphorus Fertilizer Placement - Corn High and Very High P testing Soil U of M - Waseca 2005-2007

Table 1

P Fertilizer Treatment	Rate lb/a P ₂ O ₅	Grain Yield
None	0	193
Pop-up starter	20	192
Deep Band	20	196
Broadcast	20	196
Deep Band + Pop-up	20 + 20	189
Pop-up starter	40	194
Deep Band	40	186
Broadcast	40	190
LSD (0.05)		NS

Phosphorus Fertilizer Placement – Corn Low P Testing Soil U of M - Waseca 2005-2007

Table 2

P Fertilizer Treatment	Rate lb/a P ₂ O ₅	Grain Yield
None	0	148
Pop-up starter	25	158
Deep Band	25	158
Broadcast	25	166
Deep Band + Pop-up	25 + 25	172
Pop-up starter	50	166
Deep Band	50	166
Broadcast	50	167
LSD (0.05)		10.5

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PRESIDENT'S CORNER

In the past few months I have had the opportunity to listen to a number of speakers discuss the outlook for agriculture in upcoming years. Two themes were repeated by numerous speakers:

1. We need to increase yields of major commodities by 50 to 100% in the next 20 years.
2. We need to apply the right nutrient to the right area at the right time and at the right rate.

Several speakers said we need to increase production by 50 to 100 percent over the next 20 years for wheat, corn, rice and cotton. As the standard of living rises in countries like India and China, the demand for meat increases as well. It takes anywhere from 2 to 10 pounds of grain fed to an animal to create one pound of meat. An increase in the standard living along with the call for greater use of renewable resources for fuel production will drive demand for farm products.

Applying the right nutrient at the right rate at the right time is also popular with many speakers. AGVISE can confirm that this trend is becoming more popular in our region. The number of fields that are now being soil tested in management zones or grids has increased greatly in the past few years. By zoning or gridding a field, we are doing our part to apply the correct amount of each nutrient to the right area. Growers are realizing the benefits of applying the correct nutrients in each area of the field. Yields are increasing in the most productive areas of fields with modest increases in nutrient application. In areas of the field where production is limited by other factors (salinity, drainage, dry soil), fertilizer application has decreased while maintaining the productivity. The result is increased yield for the entire field, with modest increase in fertilizer inputs.



BOB DEUTSCH
PRESIDENT
SOIL SCIENTIST/CCA

SOUTHERN TRENDS

2009 had plenty of crop production challenges, but all in all the season ended well. I am hopeful for the upcoming 2010 year.

I have attended some very good agronomy conferences over the past few years and there is definitely more emphasis on variable rate (VR) planting, VR fertilizer application and grid and zone soil sampling. The use of GPS technology on the farm for collecting yield data and also for auto steer technology are also hot topics for many producers. For example, I've attended the Precision Ag Conference in Aberdeen, SD for quite a few years now and attendance increases each year. This year over 200 producers attended the Precision Ag meeting. From this group of producers, they found 55% used VR planting, 77% used VR fertilizer application, 83% used auto-steer, 26% used RTK and 71% used GPS corrected yield monitors.

On the soil sampling side, precision sampling has steadily grown as well, with 68% of the samples tested in our Benson lab being either zone or grid samples in 2009. This is up from 60% in 2008, 45% in 2007 and 36% in 2006. In areas to the west, where 24" sampling dominates, many customers have adopted zone sampling. In South Dakota, 45% of all soil samples were considered precision samples, with the majority being zone samples. The trends are clear. Advances in technology make it easier to change the way we do things as we climb the ladder of higher yields and profits for growers.



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