

AGVISE

LABORATORIES

WINTER 2012

NORTHERN NOTES

While severe drought affected much of the Midwest, the northern region was able to produce good yields in spite of the hot dry conditions. Subsoil moisture came to the rescue and resulted in very good yields that we did not think were possible.

With the early harvest, soil samples arrived at AGVISE in record numbers this fall. Little or no rain through September and October allowed sampling to continue at warp speed all through the fall. The additional space, equipment and personnel we added to our Benson and Northwood labs enabled us to provide fast turn around again this fall.

The online AGVISOR Lite program performed great and customers tell us they really like using it. We continue to add features to the AGVISOR Lite program, so keep emailing suggestions to us.

Online sample submission has also been a hit with customers. It saves so much time by not having to write up paper forms for each sample each year, and the misspelled grower names and field information are eliminated. If you haven't tried online submission, please give me a call and I will help you get started. I can import all of your grower names and field information from a recent year which makes getting started

with the online submission much easier.

The winter meeting season is already underway. We hope to see you at our upcoming seminars. We have a great line up of topics and speakers again this year (see seminar article). As the holidays approach, make sure you spend time with your friends and family. The most important thing in our lives are the people we care about. Make sure they know how important they are to you! Have a great holiday season.



JOHN LEE
SOIL SCIENTIST/CCA

AGVISE Soil Fertility Seminars January 8, 9, 10

AGVISE Soil Fertility Seminar dates and locations are set. The dates and locations for our 2013 Soil Fertility Seminars are listed below and a registration letter was sent to all AGVISE customers in early November. Please make sure you register early for these seminars if you plan on attending. Space is limited and there is usually a waiting list. An email was also sent to everyone on our mailing list in mid-November to let people know about these seminars. If you received this newsletter, you are on our mailing list, but you may not be on our email list. If you want to receive future emails on our seminars, newsletters and technical information, please call Teresa at our 701-587-6010 and give her your current email. To register for our Soil Fertility Seminars, call 701-587-6010 and ask for Shelly or Patti.

SEMINAR LOCATIONS

CEU CREDITS APPLIED FOR

- January 8, Granite Falls, MN 1.5 - SW, 4.0 NM, 0.5 CM
- January 9, Watertown, SD 1.5 - SW, 4.0 NM, 0.5 CM
- January 10, Grand Forks, ND 1.5 - SW, 4.0 NM, 0.5 CM
- March 19, Portage LaPrairie, MB To be determined

INSIDE

Where did all the soil N come from?.....	2
Tile Drainage Reduces Salinity	3
Drought Effects on N.....	4
Soil Testing Trends.....	5
AGVISE Giant Pumpkin Winners 2012.....	5
President's Corner.....	6
Southern Trends.....	6

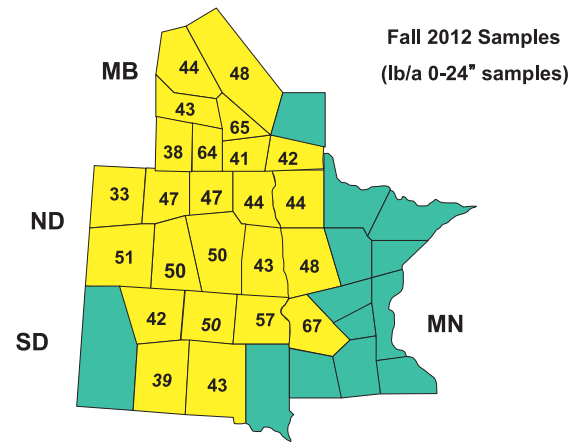
Where did all the soil N come from?

The drought of 2012 left its mark in many areas of the Midwest. In the southern areas of the Midwest, the heat and lack of rain greatly reduced corn and soybean yields. In many northern areas like ND, MB, parts of SD and most of Minnesota, crop yields were good, in spite of the extreme heat and the lack of rainfall. Most areas that came through with good yields had good subsoil moisture down 8-10 feet at planting time due to excessive rainfall in previous years.

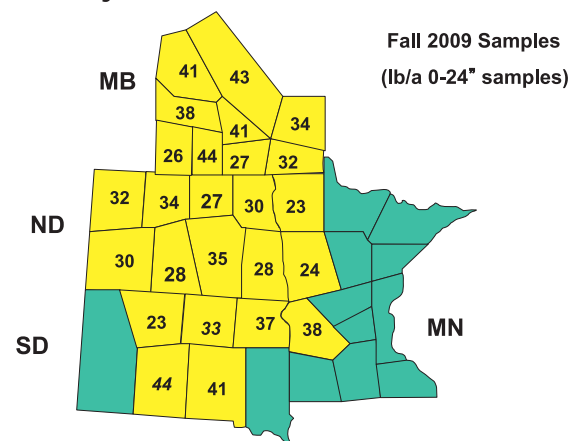
As soil testing got started after small grain harvest, it became obvious that there was more nitrate left in the soil profile than most agronomists expected following good crop yields. Instead of averaging 20-40 lb/a nitrate-N in the 0-24" soil profile, many fields had soil nitrate levels testing over 100 lb/a. Our staff received many questions about the higher than normal soil nitrate levels and how this was possible after such a good crop. Many fields were retested, just to confirm the high N levels in the soil. Each field situation is different, but there are several reasons why we should not be surprised by the higher than normal soil nitrate-N levels this fall, even after very good crop yields.

Seeding started early and expectations were high for crops like wheat and corn. With early seeding and high yield expectations, growers did not skimp on nitrogen fertilizer and applied high rates of N. The growing season started off great with warm temperatures early and plenty of soil moisture. Crops progressed well ahead of schedule and everything looked great. Then hot temperatures settled in and the rain stopped in most areas. The topsoil dried out quickly and by mid-June, crops were forced to root deeper to find moisture and mobile nutrients like nitrogen. By about July 1, the topsoil in many areas was so dry that there was little root activity in the top 6". Plants responded by continuing to root deeper into the soil profile. Since most subsoils were full of

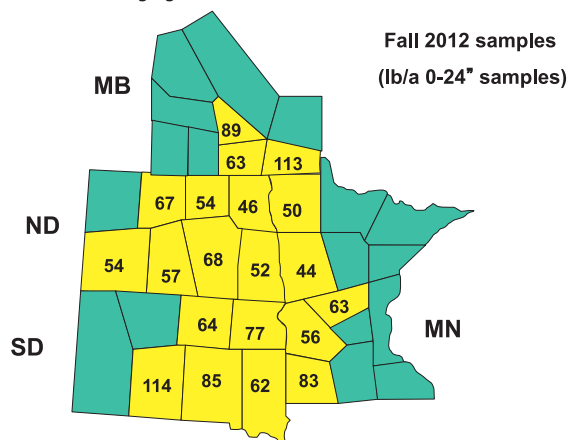
2012 - Average Soil Nitrate following Wheat in a hot and dry year



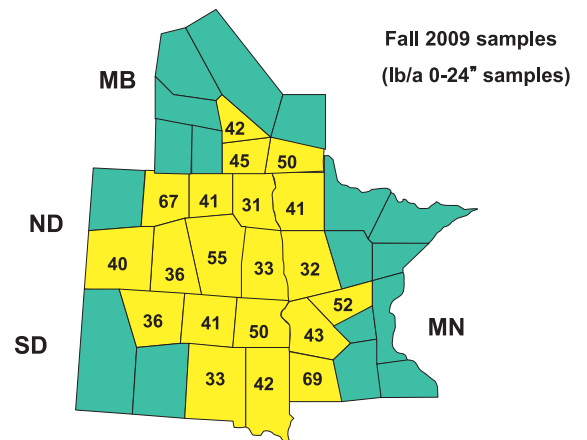
2009 - Average Soil Nitrate following Wheat in a normal year



2012 - Average Soil Nitrate following Corn in a hot and dry year



2009 - Average Soil Nitrate following Corn in a normal year



water when the season started, crops were able to keep growing and produce very good yields. Rooting depths for crops like wheat were probably 4-5 feet and corn probably rooted as deep as 6-7 feet. Both crops were able to get the water and nitrogen they needed from these deep depths to produce good yields and quality.

Many soil samples this fall tested higher than normal for nitrogen and much of the nitrogen was located in the topsoil. The average amount of N in the topsoil this fall is much higher when compared to a normal moisture year like 2009 (see table). This is probably due to N that got stranded when the topsoil got so dry plants could not take up nutrients from that part of the soil profile. Some of the N remaining in the topsoil was probably from fertilizer N the crop had not taken up before the topsoil got very dry. Some of the N remaining in the topsoil may also

be from nitrogen mineralization by microbes breaking down soil organic matter during a very hot summer. With higher than normal temperatures this summer, the nitrogen mineralization rates were probably higher than normal as well. Another reason we have more N left in the topsoil may be because we did not lose any N from the soil due to excessive rainfall. In past wet years, we always had some losses of N to leaching or denitrification, so we kind of got used to losing some N each year.

All of these things contributed to the higher amount of nitrate-N left in the 0- 6" profile as well as the total

Topsoil Nitrate-N Comparison Hot and Dry year vs. Normal Year 2012 vs. S 2009

Crop Year	Crop Grown	Crop Grown
	Wheat	Corn
	Ave. 0-6" Soil Nitrate	Ave. 0-6" Soil Nitrate
2009 (normal)	12 lb/a	13 lb/a
2012 (hot and dry)	22 lb/a	25 lb/a

0-24" soil profile this fall. The regional maps show the average nitrogen left in the 0-24" soil profile in different areas following wheat or corn production in 2012 compared to 2009. As you can see, many areas had higher soil N levels in 2012 compared to 2009, which was a year the region had good yields and received ample moisture.

Tile Drainage Reduces Salinity

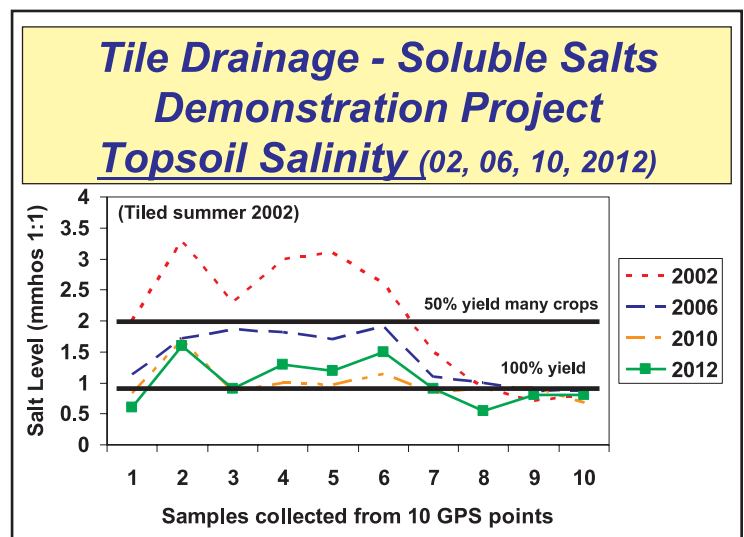
Increasing salinity (salts) has become a bigger problem in many areas the past 10-15 years. Excessive rainfall and poorly drained soils are a bad combination and the cause of salinity issues in our region. As the water table gets closer to the surface in wet years, water is wicked to the surface. Once the water evaporates, only the salt is left behind on the soil surface. Excessive salts reduce yields for many crops.

Surface drainage along with tile drainage and continuous cropping are the only way to reduce the salt level in soils over time. There are no magical soil amendments that will reduce the salt level in soil. When tile drainage is installed, the water table is lowered, which stops water from being wicked to the soil surface.

AGVISE has been monitoring the salinity (salts) of a tile drained field for a local grower since 2002. The grower was interested in seeing what happened to the salt levels in his field through the years. We established 10 points across the field and have collected 0-6" and 6-24" soil samples at each point after harvest each year.

In the figure you can see that over the past 10 years, the topsoil salinity has decreased significantly. The salinity was reduced, because the tile lowered the water table and excessive rainfall leached some of the salts down in the profile. The grower can now grow many different crops without losing yield to salinity.

In the past two years, this field has not received enough rainfall to leach any more salts from the soil. As you can see, the salt levels have actually gone up a little in the last year. In the future, we expect the salt levels in the soil will continue to decrease in years when rainfall is above average and water is drained from the field by the tile drainage system.



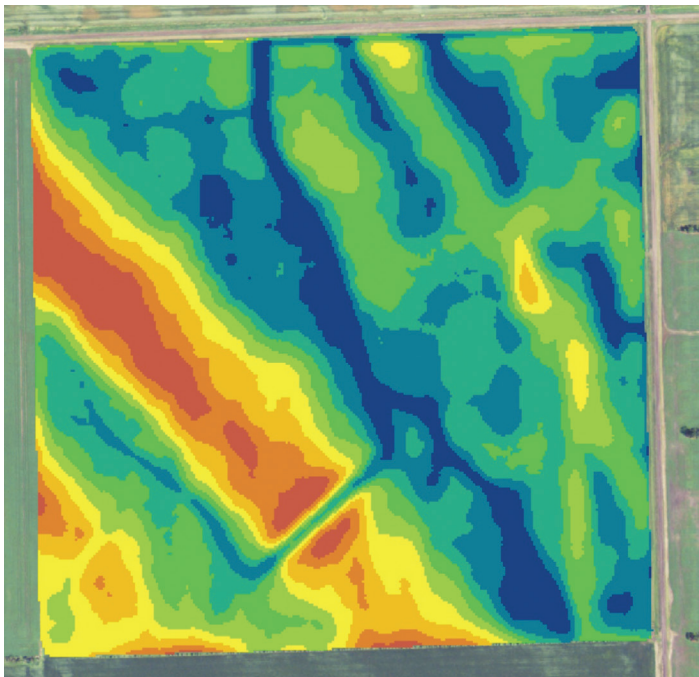
Drought Effects on N—Zone Sampling

Drought conditions this season have affected the amount of soil nitrate left in the soil profile. We can see this in regional summaries, with higher soil nitrate carry over this fall. When fields are split into productivity zones for soil sampling, the drought effects on soil N become even more apparent. In a dry year, soil water holding capacity (soil texture) and topography are two key factors in explaining yield differences in different areas of fields.

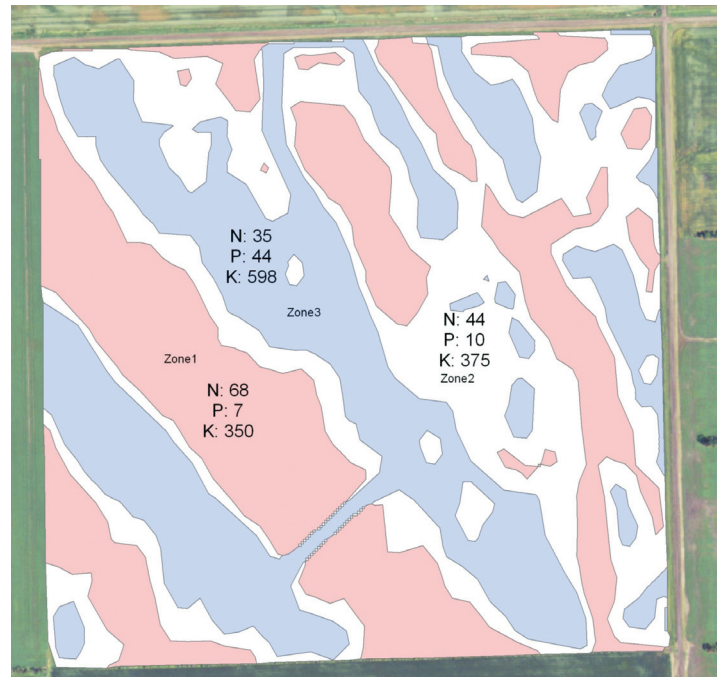
Here is an example of a zone sampled field from eastern North Dakota. In the zone map, you can see the differences of over 30 lb/a in the N levels between the three zone

samples. You will also notice from the topography map, that the highest ground (red) is the zone with the highest N level in this field. In a drought year like 2012, the high ground probably ran out of water, limiting yield and leaving more nitrogen in the soil profile. We have received many comments from zone sampling customers about the wider range in soil N levels between zones this fall compared to years with normal rainfall. Zone sampling is one way to pick up the large swings in the soil N levels following normal years and drought years as well. (Thanks to Shawn Kasprick from Simplot Grower Solutions for the zone field example).

Topography Map



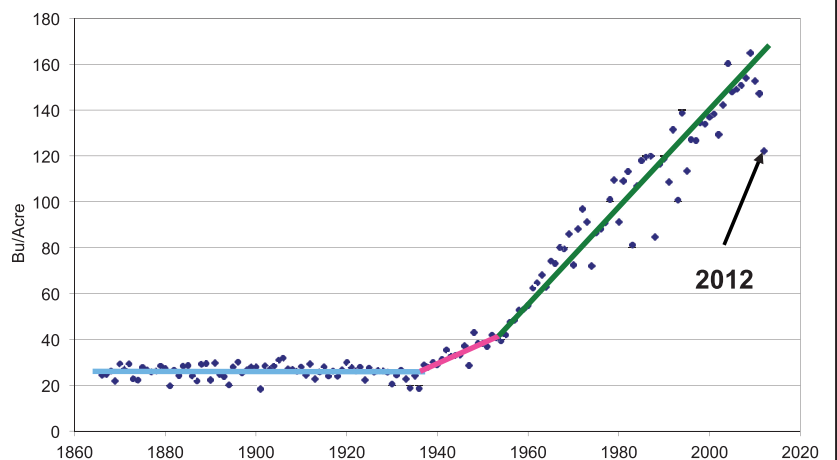
Productivity Zone - N, P, K Soil Test Levels



President's Corner *Continued from page 6*

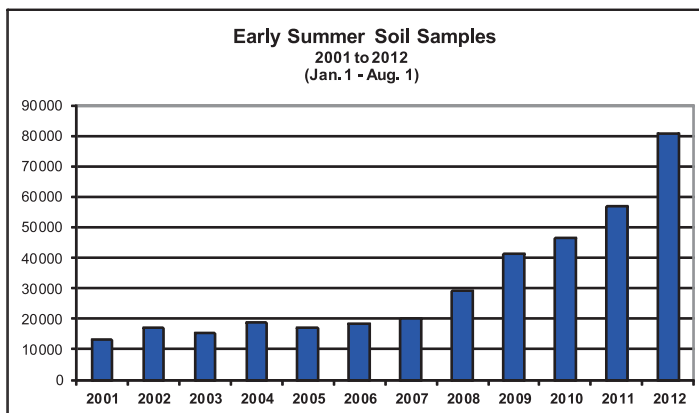
breeders are constantly releasing hybrids that are better than their previous lines. New genetics that are drought tolerant will be coming out in just a few years. In many areas, the fertilizer application rates are now tailored to the variability of the soil nutrient content and productivity of the soils across a field. My feeling is the past three years have just been a bump in the road to larger corn crops. The modern technology that brought corn yields to where they are today will continue due to dedicated scientists in our industry.

U.S. Historic Corn Yield Trend



Soil Testing Trends—Grid and Zone Samples are new “Normal”

The scales tipped in 2011, when more than half of all samples tested by AGVISE laboratories (Northwood, ND and Benson, MN) combined, were grid or zone samples. Then in 2012, that increased to 60% (see table). The table also shows the state/province breakout by year back to 2008, with a steady increase in grid/zone samples in MN, SD and ND. Most of the ND, SD and MB precision samples are 2-depth (topsoil + subsoil) “management” zone samples. Most of the MN precision samples are 1-depth (topsoil only) grid samples, with some 3-depth (topsoil + subsoil + deep subsoil) in the sugarbeet growing areas.



Percent of samples tested that are grid or zone samples (Northwood and Benson samples combined)

	Overall	MN	SD	ND	MT	MB
2008	39%	54%	38%	13%	34%	50%
2009	43%	60%	43%	18%	30%	48%
2010	45%	63%	52%	21%	22%	31%
2011	52%	71%	54%	26%	31%	41%
2012	60%	77%	57%	33%	25%	45%

Much of the MN topsoil grid sampling is moving to the early summer (end of May through early July) time frame, as shown in the chart above. The amount of early summer sampling has tripled since 2007 in the Benson lab, with many growers, agronomists and retailers seeing the advantages of getting this done early instead of waiting until after harvest to sample.

AGVISE Giant Pumpkin Winners 2012

The AGVISE giant pumpkin contest was a success again this year. The weather in the Midwest was hot and dry, but there were still some monster pumpkins grown this year! The world record was broken again this summer by Ron Wallace from Greene, Rhode Island. Ron set the new world record with a 2009 lb pumpkin (Wow, over a ton!!).

Some participants in the 2012 AGVISE Giant pumpkin contest also had good success this year. Thanks to each of them for the work they put in and the great pictures they sent. The winner of our contest this year is Adam Johnson. Adam has won the AGVISE giant pumpkin contest four years in a row now. He does a great job each year and has given me some pointers along the way. I hope the \$100.00 prize money Adam has won each year has been enough to cover a nice dinner with his wife, to make up for all the time he spends with his pumpkins!

Here are the winners of the 2012 AGVISE Giant Pumpkin Contest!

Adam Johnson, Santiago, MN	1409 lbs	1st prize \$100.00
Shawn Kasprick, Grafton, ND	600 pounds	2nd Prize \$75.00
Rick Swenson, Fergus Falls, MN	587 lbs	3rd prize \$50.00

Thanks to everyone who participated but did not get a giant this year. I know how much work it is to try and grow a giant pumpkin. There are many things that can and do go wrong at times. Sometimes you just have to be lucky. This year was a lost year in my giant pumpkin growing career. My pumpkin patch has become increasingly salty the past few years due to the poorly drained site and evaporation bringing the salts to the surface (sound familiar?). In August I decided it was easier to tile drain my pumpkin patch than to move it. I am in the process of leaching the salts from the pumpkin patch. I will let you know how it works out next year!



Adam Johnson 1409 lb
Wife Holly, daughter Hannah and son Zack



Shawn Kasprick - 600 lbs (personal best) daughter Mia and son Maison



Rick Swenson - 587 lbs (far right)
Tyler Anderson, Kris Tedrow and Heather Wallner

AGVISE

LABORATORIES

604 Highway 15 West
P.O. Box 510
Northwood, North Dakota 58267
701-587-6010 / FAX: 701-587-6013
Home Page: www.agvise.com

PRESIDENT'S CORNER

A few days ago I was looking up information on the long term trend line for corn yields in the U.S. I wanted to see how far below trend line the 2012 corn crop would fall. What I found was something that amazed me more than the drop in this year's corn yield below the trend line.

The yield trend line for corn from 1865 until 1937 was a flat line. The average yield of corn for this 72-year period was 26 bushels per acre. Yields during this time period would rise or fall a few bu/ac each year, based on weather events. It was not until 1937 that an upward trend in corn yields started.

From 1937 until about 1955, the national average corn yields started to increase about 0.8 bushel annually. By 1955 the national average corn yield had increased to about 41 bushels per acre. The adoption of hybrid corn during this time frame is credited for this increase in yield.

In the mid 1950's a second significant shift occurred in the trend line yield of corn. This shift occurred due to the availability of fertilizer, use of pesticides, and improving genetics. Since 1955, the typical trend line yield increase of the preceding year has been 1.9 bu/acre. By the year 2009, the average corn yield in the US was 161 bu/acre.

The past three corn crops have been below trend line yields, each worse than the past year. Based on preliminary numbers, it appears the 2012 corn crop will average 122 bushels per acre. Have we reached a plateau in corn yields? I do not think so. I think the disappointing yields the last 3 years are the results of acts by Mother Nature. Our plant

Continued on page 4



BOB DEUTSCH
PRESIDENT
SOIL SCIENTIST/CCA

SOUTHERN TRENDS

Even though much of the Midwestern Corn Belt was hit with severe drought, some in the northern areas hit the jackpot in corn, soybeans, wheat and sugarbeets. It's been surprising how high the yields were this year based on how little moisture the crop received. Let's hope for a big 2013 and be thankful for 2012.

Early summer topsoil grid sampling continues to greatly increase. Sample core quality is usually much better at this time due to better moisture conditions. This is especially true compared to the past two fall sampling seasons when the ground was as hard as rock. Sample collection in the field is the greatest source of variation in the whole soil testing process, so getting the best quality cores is extremely important. Poor samples = poor results and good samples = good results.

Fall two depth (0-6" + 6-24") zone sampling is steadily increasing for fertility management and is a major driver in variable rate corn and soybean plant populations. For corn, high productivity zones means higher plant populations and low productivity zones means lower plant populations. For soybeans the opposite seems to be the case, where high productivity areas need normal populations and low productivity areas need higher plant populations to maximize yields.

There has been a huge increase in both soil and plant tissue testing this season, which follows the trend of the past 5 years. Our lab expansion in Benson has been a success and our daily fall turn-around times were greatly improved by increasing daily laboratory capacity by 25%. In addition, this fall we now test the soluble salts on two sample depths at the Benson Laboratory. Having this information is important for areas with increasing salinity issues. We do our best to provide you high quality, fast turn-around times for both soil and tissue samples. Thank you, we certainly appreciate your business and will continue to strive to meet your needs.



RICHARD JENNY
AGRONOMIST/CCA