

From the Ground Up



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Back to the Basics

Most crop producers are re-evaluating their crop budgets now that most input costs have increased significantly. Historically, fertilizer has been an input that producers will trim first. However, those producers that have maintained good fertility levels are the ones that are reaping the benefit now that grain prices are high and fertility costs have increased. Those producers that have historically trimmed from their fertility budget, may find it very costly if they do so now.

At times like these it is probably good to review the fundamentals of a good fertility program. If we want to keep it simple, the best rules are “timing and placement”. If the nutrient is very mobile then timing is most critical. That is to say that you should apply the nutrient closest to when the plant will take that nutrient up. If the nutrient is immobile then you should place the nutrient in a position that will allow greatest uptake at the highest need or when the greatest yield factors are being determined. If using foliar applications you also want to time these applications to when you will get your best response.

<u>Mobile Nutrients</u>	<u>Immobile Nutrients</u>
Nitrogen	Phosphorus
Sulfur	Potassium
Boron	Magnesium
	Calcium
	Zinc
	Iron
	Manganese
	Copper

Each nutrient is important and has its specific purpose in the plant. Soil testing is still the best tool to determine if you have adequate levels in your soil. Since some nutrients are mobile and others immobile at least two sampling depths should be considered. Usually a soil sample is taken from 0-7 inches, but it may be helpful to also take a sample from the 0-4 inch depth to compare levels. Nitrate samples should be taken from 0-24” for most valuable information. Below are some guidelines to follow when interpreting your soil tests.

Nitrogen: Most labs will report your Nitrate test level in both ppm and lbs/acre. I would recommend that you only use about 60-70% of the amount reported as a nitrogen credit

in your nitrogen recommendation since there can be a wide amount of variability and this nitrogen can leach, denitrify or be used by microbes before the plant can use it.

Phosphorus: Labs differ in the specific phosphorus test that they may run. If the test is a P₁ (Weak Bray) test then I would recommend that you have a level of at least 25 ppm. If your lab also runs a P₂ (Strong Bray) and the P₂ test is greater than 75 ppm then a P₁ test of 18 ppm would be adequate. If your lab runs an Olsen Bicarbonate test then the level should be at least 15 ppm. With a Meilich II test I would suggest that your soil P level be at least 25 ppm. Given any of these P tests if you are less than 10 ppm, you should apply some phosphorus (at least 30#) in a row placed band.

Potassium: Ideal soil test levels of potassium will vary with how heavy your soil is, however, in silt loam soils or heavier the test level should be at least 185 ppm, the heavier the soil the higher the ideal level would be. On a base saturation we would prefer that the level be in the 2-4% range.

Magnesium: In sandy soils magnesium deficiencies may occur. In general, we would like to see the magnesium level at least 100 ppm or higher. On a base saturation we would prefer that the % magnesium be at least 10%. Heavier soils will have higher magnesium levels. When magnesium levels exceed 20% the soil will tend to be a tighter soil and one that is stickier. These high magnesium levels can be lowered with the use of gypsum.

Calcium: Ideal calcium levels will vary with soil texture. Usually ideal calcium levels are around 75% on a base saturation. Just because your pH is not low does not mean that you have adequate calcium. If the pH is high and the excess lime rate is medium or high the calcium availability may be limited even though the soil test indicates adequate calcium. This is because calcium can be in the calcium carbonate form which is unavailable to the plant, but is being detected by the soil test. Calcium sulfate is the preferred product to provide soluble calcium because it is neutral and will not raise the pH higher plus it is much more water soluble at these high pHs than Calcium Carbonate (lime).

Sodium: Soil test levels of sodium above 100 ppm are usually considered high and will tend to cause soil structure to deteriorate. On a base saturation the sodium level should be less than 2%.

Sulfur: Sulfur tests vary among labs. With most labs the sulfur test should be greater than 18 ppm. If sulfur tests are greater than 35 ppm this could indicate that this soil has poor internal drainage on an obstructive layer since sulfur is fairly mobile in the soil.

Zinc: On a DTPA test the level should be 2-5 ppm. For high yielding crops or soils with organic matter less than 2% it is advisable to have the zinc test above 3 ppm.

Iron: The test level should be 15-30 ppm.

Manganese: The test level should be 15-25 ppm. Since manganese and iron are antagonistic a high level of one could reduce the uptake of the other.

Copper: Usually a test level of 1.5-2 ppm is adequate

Boron: For alfalfa, a test level of 1.5-2 ppm is considered optimum. For other crops 1-1.5 ppm is adequate. Boron is mobile so it is difficult to increase levels in lighter soils. Broadcast applications or foliar applications are usually the preferred methods of application.

If you need help with interpreting your soil tests or just have some questions regarding your test levels or recommendations feel free to call us at Soil Solutions. Call Gene Kenkel at 712-579-9540 or Bob Hecht at 785-548-5271.

Better Nitrogen Efficiency With PRO CAL 40

With nitrogen prices increasing everyone is looking at ways to improve on their nitrogen efficiency. The Ohio State University recently released a study that showed that the use of gypsum improved the response from nitrogen, but also that the better yields could be attained using lower rates of nitrogen in conjunction with gypsum than using higher rates of nitrogen with no gypsum. In some soils as higher nitrogen rates are used higher rates of gypsum should be used to keep the proper nitrogen/calcium/sulfur balance.

	<u>N Rate</u>					
	<u>0#</u>	<u>60#</u>	<u>90#</u>	<u>120#</u>	<u>150#</u>	<u>180#</u>
<u>2003</u>	Corn Yield, Bu/A					
No Gypsum	126	160	161	183	182	189
200# Gypsum	148	179	180	191	191	205
<u>2004</u>						
No Gypsum	104	128	147	160	169	171
200# Gypsum	121	148	157	188	166	161
<u>2005</u>						
No Gypsum	65	66	76	89	117	98
200# Gypsum	60	89	85	131	110	84
<u>Avg. 3 years</u>						
No Gypsum	98	118	128	144	156	153
200# Gypsum	110	139	141	170	156	150

When you apply the economics to this, using PRO CAL 40, the return is huge. If you were to apply 1 ton of PRO CAL 40 per acre the cost would be \$30-\$40 per acre depending upon your location. This would last for at least 3 years. That makes the cost per year equivalent to \$12/acre or less. The cost of the additional 60# of nitrogen per year is about \$45/ acre. The yield benefit of the gypsum on average over three years was

17 bushels per acre. That is equivalent to \$90/acre at current grain prices (\$5.30/bushel). This means that this farmer in this study could have made \$123 per acre each year using gypsum and applying the lower rate of nitrogen than he would have if he had used the higher rate of nitrogen with no gypsum.

We do realize that field conditions do vary and soil responsiveness does differ among soils, however, many of our clients have found that they do get better nitrogen efficiency with the use of gypsum. With current nitrogen prices it is very tempting for farmers to consider cutting their nitrogen rates. Be careful when doing this and consider the use of PRO CAL 40.

Owners of Soil Solutions Volunteer Their Time

Bob Hecht and Kevin Heck each took separate trips with youth this summer volunteering their time and talents.

Bob Hecht, his wife, Connie and daughter, Valerie traveled to Europe with a group of forty four youth and sponsors. This trip was sponsored by EF (Education First) Tours. This trip's purpose is to educate the youth about the history of Europe as well as the current political/economic situation. They travelled through Germany, Austria, Italy, Switzerland, France and England. Bob said he thoroughly enjoyed the trip although seventeen days is a little long for teenagers to be away from friends, computers etc. He also said that since part of the youth in this group was from urban (St. Louis, MO) areas there were some differences in their opinions from what the rural youth believed. Six of the students were from northern Alaska which was educational in itself.

“Even though it wasn't an agricultural trip per se, there were many hours travelling by bus through the countryside where we got to view the various cropping systems. It was very interesting to see how the cultural practices differed from what we use. The most amazing part of the trip was being in Rome and walking on streets that date back to before the life of Christ and to know that the Apostle Paul and others walked on these same streets. It really brings history to life! If you get an opportunity to take this kind of tour I would strongly encourage you to do so.” Bob said.

Kevin Heck travelled on a four week mission trip to Tanzania sponsored by the St. Paul Lutheran Church in Holstein, Iowa and the Western Iowa Synod. Tanzania is located on the east coast of Africa and is south of Kenya and north of Mozambique. With Kevin



were 22 youth and three other adult leaders. They worked at the Ilimbilu Girls School in Chimala, Tanzania putting a roof on a classroom and laying groundwork for future classroom expansion. They also painted and did some maintenance for the school.

Until a few years ago girls in Tanzania did not have much opportunity for education. The enrollment now stands at 287 with an additional 80 students planning on attending this spring. These orphan girls also reside at the school.



“Besides our work at Ilumbilu we visited many churches and youth rallies. Although there is much work to be done in this third-world country, the Tanzania people are the most faithful, generous, upbeat people I have ever encountered.” Kevin remarked.

Did You Know?

- Current ethanol consumption represents the gasoline equivalent of displacing 600,000 barrels (25.2 million gallons) of crude oil per day.
- If the ethanol industry were a foreign oil producer, only Canada and Saudi Arabia would supply the U.S. with more fuel.
- Ethanol provides the equivalent of over twice as much oil as Iraq exports to the U.S.
- The Renewable Fuel Standards calls for 15 billion gallons of ethanol in 2015. This would displace 980,000 barrels of crude per day. That’s nearly as much as the proponents of drilling in ANWR promise will be forthcoming in a decade. That is more than either Canada or Saudi Arabia export to the U.S. now.

**Kiplinger’s Biofuels Market Alert*

Interesting Comments

At a recent Field Tour I listened to a Professor of Social Sciences from the University of Missouri make some interesting comments. I thought they were worth sharing.

- Grain prices used to be tied to livestock prices. Now grain price is tied to fuel prices.
- Profits for producers always go to zero. This is because there are others below them in the profit chain that will mandate their costs.
- The order of “Beneficiaries of High Prices” are as follows:
 1. Ethanol Producers
 2. Corn Producers
 3. Input Suppliers
 4. Land Owners
- Producers should increase their cash reserves to offset their increases in input costs (ie. Increase their current asset/current debt ratio). As the price fluctuations increase then the ratio is more variable.

A University of Missouri Agribusiness Specialist for NW Missouri estimates breakeven prices for corn and soybeans given \$200/acre rent prices:

<u>Yield</u>	<u>Corn Break Even Price</u>
150	\$4.85
175	\$4.17
200	\$3.66

<u>Yield</u>	<u>Soybean Break Even Price</u>
35	\$10.80
45	\$8.43
50	\$7.59

A useful simple marketing plan can be downloaded from the University of Missouri at http://www.fapri.missouri.edu/farmers_corner/mrkt_plan/index.asp?current_page=farmers_corner . The primary objective is to set reasonable price objectives for current market conditions and facilitate disciplined marketing rather than emotional decision based marketing.

Has your email changed?

Please notify the Soil Solutions office if your email address has changed. We will make the corrections in our database so that you won't miss any future newsletters. Also, if you are currently getting this letter by mail please send us your email address to vickie@ruralwaves.us so that we can email this letter to you instead. This all helps in holding down our costs and giving you a more economical product.