

# From the Ground Up



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## Tile Pays on Rented Ground Also!

Research at Ohio State and Iowa State has shown yield increases of 30 to 50% from improved drainage alone. On our own operation we have seen yield increases even greater than these on a Luton soil. Yield increases are also impacted by more-timely field operations.

At \$5 corn, if you increase the corn yield by 40 bushels that means an extra \$200 per acre. At \$12 soybeans a yield increase of 20 bushels would mean an extra \$240 per acre. Depending upon how much tiling would be required, you may have the tile paid for in as little as three years and will reap the benefits for at least 20 years.

This makes tiling farm ground you own very attractive, but what about ground you rent? A recent study in Ohio revealed that ground that was tiled resulted in rental rates that were \$18-\$32 higher for soybeans and \$12-\$28 higher for corn. This is the way to sell the idea to your landlord. First you will need to have a good relationship with your

landlord and develop a long term agreement. If you install tiles, your landlord will need to allow you to rent this ground at the current rate for a set amount of years (at least 5 years).

After that time rental rates may be increased? The benefit to you is that the ground is more productive and you will be able to produce higher yields. The benefit to the landlord is that his ground is improved and made more valuable either demanding a higher market price if he decides to sell it or he can demand a higher rental rate once you have the tile paid for.

First, you must evaluate your relationship with your landlord. You may want to start on a small scale (possibly 40 acres) and gradually increase as you determine the economics for your operation.

### Benefits of Drainage Tiles

- Lower Your Water Table
- It Means More Timely Farm Operations
- Better Air/Water Exchange
- Have a Deeper Rooted Crop
- Eliminate Septic Soils/Waterlogged soils
- Improved Microbial Activity
- Less Water Runoff
- Less Loss of Nutrients
- Faster Removal of Sodium/Salts
- Reduce Magnesium Levels
- Better Soil Conditions
- Bring down high pH

Another option is to cost share with the landlord on the drainage tile. This may be a more attractive option if you are on a crop share rental agreement or a flex rent arrangement. The exact cost share arrangement can be reasoned out between the two parties. Again, it is a win-win situation for both parties with the landlord winning the most since he will own the improved asset after it is paid off. A third option would be for the landlord to pay for the tile and you would pay additional rental fee of 10% of the cost of the tile. This would more than cover the financing for the landlord and you would realize the increase in yield from the improved drainage. If you would want us included in your



conversations with your landlord give us a call.

Soil Solutions has added installing drainage tile as part of our services. If you would be interested in the potential benefits and economic return on your farm, give us a call and we can discuss it.

### **Have You Considered Irrigating Through Your Drainage Tile?**

A relative new system that is available now is the ability to not only drain your soils with drainage tile, but also add water in the drainage tile during periods of the growing season when the crop demands it. It is referred to as Irri-drain.

There are many benefits to this system. Some of the benefits include energy savings due to low pumping pressures and gravity flow. Lower water requirements with this system using about one third the water compared to that a center pivot uses. Less evaporation loss since the water remains below the soil surface. It encourages deeper rooting and more flexibility in maintaining optimum soil water levels. If you irrigate and then get a heavy rain, you can simply open the gates and drain the water away, maintaining a better rooting environment. Water is not applied on the leaves so scorching of the leaves on hot days is eliminated. If your irrigation well contains salts that may cause leaf burning during irrigation, it is eliminated with this system since water is introduced to the roots and not to the foliage. Since water is pumped out through the drainage tiles during irrigation, the tile lines potentially will have a longer life for drainage.

These Irri-drain systems can also be installed on sloping soils by installing the drainage tiles on the contour and the use of gates and valves to control water flow.

Yield responses to this system have been very good both in dry years and years with more normal moisture. As an added feature to this system effluent water can be pumped into system and nitrogen fertilizer can also be applied through the irrigation water.

If you think you might be interested in an Irri-drain system on your farm, contact Brad at Soil Solutions and he would be willing to discuss your situation. We have installed this system on several fields and would be glad to show you the system and how it works in the field.

### **How Do Gypsum Sources Differ?**

When it comes to ag lime most farmers and crop advisors understand that purity and fineness of grind are the two main criteria used to determine ag lime quality and is used to compute the Effective Calcium Carbonate Equivalent (ECCE) or Effective Neutralizing Material (ENM). In some instances a lower or higher magnesium level may be preferred in the ag lime.

But when gypsum sources are being considered there are no set standard like ECCE used. However, just like ag lime the more pure the gypsum and the greater the fineness of grind the higher the quality of the gypsum source.

Here are some standards you may want to consider. Gypsum is  $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ . If gypsum or (calcium dihydrate) is pure, it will contain approximately 21-22% calcium and 17-18% sulfur. The rest of the molecule as you can see is either oxygen or hydrogen. Impurities in the gypsum could lower the concentrations of calcium or sulfur. These impurities in mined gypsum are often other calcium compounds, magnesium compounds or compounds of iron or other minerals. Moisture content can also lower the concentration of calcium or sulfur. The gypsum could be a very high quality meaning little impurities and very fine particle size even though the concentrations are lower due to moisture. That is why it is important to get an accurate moisture test. Remember that the gypsum molecule contains two molecules of bound water so drying a gypsum sample with too high of temperatures will drive off the bound water giving an elevated moisture reading.

Mined sources of gypsum have varying degree of course particles and finely ground particles. Just like ag lime you should do a sieve analysis of your gypsum source to determine the fineness. Most synthetic gypsum sources will be of crystalline nature and will generally be greater than 95% passing a 100 mesh screen. The mined gypsum sources will vary, but generally ag gypsum will be more likely around 50% passing a 100 mesh screen. The particle size is important because it affects the dissolution rate or how “fast” the particles will break down and dissolve in soil. Indirectly this will affect the solubility of the gypsum. Even granulized gypsum due to its binder may dissolve more

slowly. This is a big advantage that PRO CAL 40 has over some other gypsum sources. It will dissolve very easily in soil due to its crystalline nature.

Solubility of gypsum is 200 to 500 times greater than ag lime. Water solubility of mined gypsum samples we have tested are usually around 65%. The water solubility of PRO CAL 40 is 90% or greater. This means that your reaction will occur faster the higher the dissolution rate and the higher the solubility. It will have a greater effect on surface sealing and surface crusting.

### **Iowa Changes Soil Test Interpretation**

Iowa State has recently made changes to their soil test guidelines. The most significant changes are due to the relatively new moist-base soil test. With these procedures soil samples are not dried, but rather analyzed using field moist samples. The largest difference between these two procedures appears to be in the optimum potassium level and what levels are found whether potassium is analyzed using the ammonium acetate test or Mehlich-3 extraction solutions. They have found that in fine texture (clay) soils with poor drainage the moist test will usually be lower than the dried soil procedure. This is especially interesting since we have noticed for years that on these soils described as fine textured soils with poor drainage, potassium applications have given us responses even though the dried soil samples have revealed levels that potassium would not have been recommended if the potassium test alone was used.

This description of these soils depicts many of the heavier soils in the Missouri river valley. There are other areas with fine textured soil that would be similar. Years ago we analyzed these soils using a K-availability test and it revealed the same results.....potassium availability was limited on these soils.

There is no correlation between the analyses of dried soil samples and moist soil samples so no set factor can be used to transform results from one procedure to the other procedure.

My suggestion would be that if you are growing a crop on a soil described as a fine textured soil with poor drainage, consider applying some potassium in your fertility program. Banded potassium would be the preferred method of application.

### **Genetically Modified Crops Have Different Nutrient Needs**

Research by the University of Illinois shows that fertility needs for corn hybrids with the Bt trait may be different. Fred Below, plant physiologist, used six hybrids ranging in relative maturity from 111 to 114 days with rootworm and European corn borer resistant traits. Their tests were conducted from 2008 through 2010 at Champaign and Dekalb, Illinois.

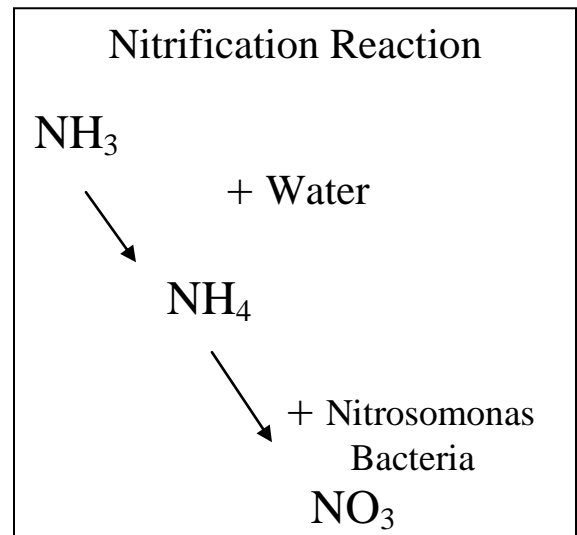
Regarding nitrogen, the study reveals that these resistant hybrids were more efficient with their nitrogen use getting more yield per unit of nitrogen than conventional hybrids. Below rationalizes that the better you protect the roots, the more likely you can access the applied nitrogen. He also noted that more nitrogen (8%) was removed in the grain directly related to a higher yield. The rootworm resistant hybrids also had greater uptake of nitrogen (31%) after flowering than the conventional hybrids.

In these studies he found more phosphorus in the grain (12%) compared to the conventional hybrids. Twenty four percent more phosphorus was taken up after flowering in the Bt hybrids vs. the conventional hybrids. This may simply be that the roots remain healthy longer and the root mass is larger so that more of this immobile nutrient is absorbed by the roots. This may also be true for potassium which had 38% more potassium after flowering than the conventional hybrids. Total potassium removal in grain was 9% greater.

Sulfur and zinc removal in the grain was also higher with Bt hybrids. This all spells the fact that fertility programs should be re-evaluated if you are planting more of these Bt hybrids. Having adequate soil test levels is more important than ever and proper placement and timing may be even more critical.

### **Should You be Using a Nitrogen Stabilizer In Fall Applied Nitrogen?**

We are now in November and soil temperatures have fallen to below 50 degrees. Some crop advisors and some regulations prohibit nitrogen applications prior to November 1. The target of 50 degrees is used because soil temperatures below this retard microbial activity associated with nitrification. This raises the question of whether a nitrification inhibitor is beneficial if nitrogen is being applied after November 1. Actually in some areas a nitrogen stabilizer is required even after November 1. Past experience has shown that nitrogen stabilizers will pay even when nitrogen is applied after soil temperatures are below 50 degrees. Microbial activity still occurs in these soils, but just at a much slower rate so some nitrification is occurring if a nitrification inhibitor is not used. We never know for certain how quickly the soils will freeze which is when microbial activity essentially stops. We also don't know how fast the soils will warm up in the spring reactivating the microbial populations. The other unknown is how much moisture we will receive in the spring after the nitrogen has converted to nitrates. Nitrogen stabilizer products will protect the nitrogen from converting to nitrate as quickly not only in the fall, but also in the spring so as soils warm up in the spring these products continue to slow the conversion of ammonium nitrogen to nitrate nitrogen.



NZONE is a nitrogen stabilizer that will not only slow nitrification, but also volatility. It can be applied to anhydrous ammonia or to liquid UAN or dry urea products or to liquid manure. It is also not corrosive like some of the other nitrogen stabilizer products. If you would like to try some NZONE with your nitrogen application, give us a call.

### **Stop by Our Booth**

The next few months we will be attending several farm shows. Below is a list of the shows we will be attending. We welcome the opportunity to visit with our customers and hear the success stories, but also discuss any crop problems you may have. Maybe we can give you suggestions on how you can improve your yields. Be sure to stop by our booth.

<b><u>Date</u></b>	<b><u>City</u></b>	<b><u>Farm Show</u></b>
Nov. 20-21	Kearney, NE	Gateway Farm Expo.
Dec. 10-12	Lincoln, NE	Nebraska Power Farming Show
Jan. 7-9	Vermillion, SD	Dakota Farm Show
Jan. 22-24	Sioux Falls, SD	Sioux Falls Farm Show
Jan. 28-30	Des Moines, IA	Iowa Power Farming Show
Feb. 4-5	Kearney, NE	Mid-America Alfalfa Expo.
Feb. 11-13	Tulare, CA	World Ag Expo.
Feb. 12-15	Lexington, KY	Louisville Farm Show
March 12-13	Omaha, NE	Triumph of Ag Expo.

### **Thank You!!!!**

With Thanksgiving just around the corner we are reminded of how much we have to be thankful for. With most of our marketing area achieving near record yields again this year, we have to give thanks for God's blessings of providing us with cool temperatures during July and early August and for ample rainfall to keep our crop going. At Soil Solutions we are very grateful for, you, the customer and the business you have done with us. As the Christmas season nears we pray that you will be able to enjoy time with family and friends and have joyful reflections on the past. We also pray that you remember the reason for the season and that through Him you have hope and reassurance.