

# From the Ground Up



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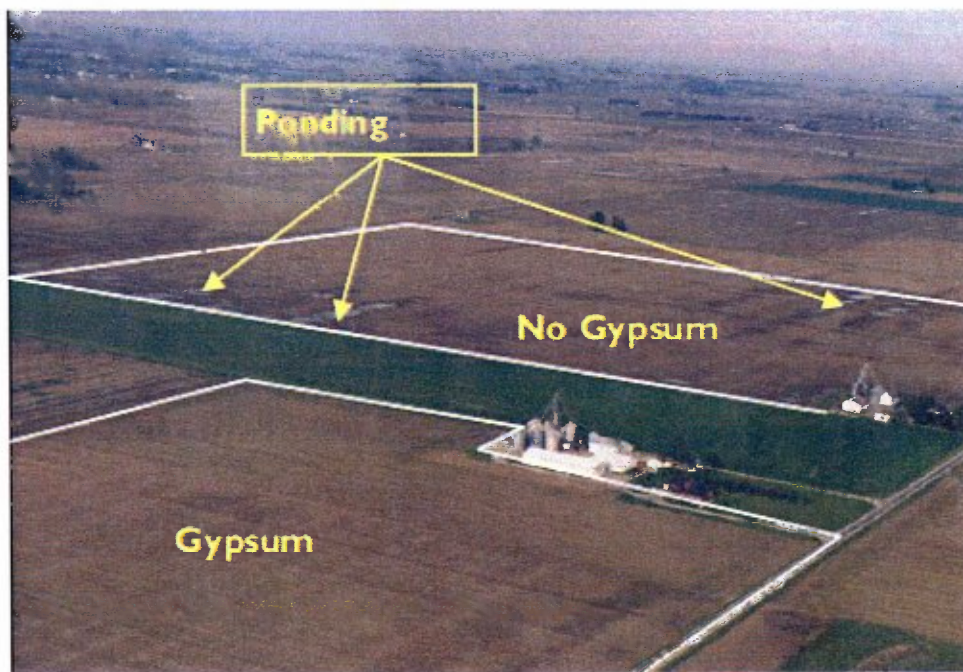
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## Using Gypsum to Improve the Performance of Drainage Tile

Many farmers across the Midwest and Eastern plains have plans to install drainage tile in their fields this fall. Drainage and pH are usually considered the two most limiting yield factors in this area. What many farmers don't realize is that drainage tile work much more efficiently if used in conjunction with applications of gypsum. In fact, we have had several clients who have found that where they have used PRO CAL 40 that their drainage tile have begun working again.

**PRO CAL 40**

If you visualize placing a thumb on a straw the water in the straw remains in the straw even though there is nothing on the bottom to keep it from leaving the straw. The same is true in many soils. The soil seals off at the soil surface keeping the water from draining down into the drainage tile. By adding gypsum to these soils you "take the thumb off" by improving the soil structure at the soil surface and allowing air and water exchange. Below is a picture from a USDA publication of two fields that both have drainage tile. The one in the front had gypsum applied to it. The one in the background did not. You can see that after a rain how quickly the water leaves the field where the gypsum was applied. The field in the background still had areas of standing water.



If you are considering tiling this fall or you already have drainage tiles in your fields, give us a call or call your local retailer and arrange to have PRO CAL 40 gypsum

applied to your fields. You will be amazed at the difference you will observe in less standing water and the resulting better stands and crop growth. After years of this program you will find that your soils have greatly changed and no longer act the same. One producer who has been on this program for at least 10 years said his soil conservationist told him that his soil would no longer be classified as the same soil type as it was before he started this program.

### Zipper Ears

This year there have been many observations of what may be referred to as “zipper ear”. This is when one or several rows of corn on one side of the ear do not have kernels as is shown in the picture to the right. This is most likely the side of the ear where the silks



were covered up or shaded by the silks above them, when they were draped to one side of the ear. As a result of the additional heat or drought stress these silks either did not receive pollen or were pollinated later than the rest of the rows on the ear. The later kernels to pollinate are the ones most vulnerable to being aborted if a stress occurs later during kernel development. Consequently, these kernels either were not pollinated, or pollinated later than the surrounding kernels and were aborted. These ears often times have a curvature to them since the kernels on the opposite side are enlarging and causing that side to elongate.

### Late Season Slump

Every year in August and early September I notice fields where areas of the crop begin to shrink and turn yellow. It occurs in corn, soybeans and alfalfa fields. It usually occurs in



the most eroded areas or the heavier clay soils. The picture to the left shows soybeans that are lighter green mostly on the hill tops or eroded hillsides in northeast Nebraska. It is prevalent

in eastern Nebraska and western Iowa. This could be due to many factors and most

“corn” producers attribute this to loss of nitrogen. In reality, it may be due to loss of oxygen. Often times these soils are the ones that seal off and don’t allow for good air exchange. Or they are too wet and sticky early to allow for good root growth. In soybeans or alfalfa the lack of air exchange means less nitrogen fixation and less root growth.

We have observed that where we have applied PRO CAL 40 to fields like these that the “late season slump” disappears and these areas yield much better. One of the benefits of PRO CAL 40 described by most of our customers is that our fields are more uniform, our stands are more uniform, our crop is more uniform in growth and our yields are more uniform at harvest. Call us if you want to improve your field uniformity. **HEALTHY SOIL.....HEALTHY PLANTS.....HEALTHY PEOPLE!!**

### **Using Gypsum in Soils After the Flood**

What about applying gypsum to flooded soils? This is a popular question lately. We have found that there are very few experts when it comes to reclaiming soils that have been flooded for as long as the Missouri river valley soils have been this year. Since there will be a large difference in how the river current affected individual fields there will be no one answer for every field. Once the water recedes we will be able to make a better evaluation.

However, gypsum has benefits that should be advantageous to many flooded soils. Below is a list of some of these:

**Improve soil structure.** Gypsum has been proven to improve soil structure by causing soil particles to form aggregates or clumps. We can anticipate that much of the flooded soils will have deteriorated soil structure due to being wet so long, due to soil being eroded and/or due to dispersed soil particles being deposited. Gypsum can definitely improve surface soil conditions and greatly improve plant emergence and uniformity of stands.

Most farmers will be doing tillage to get air back into the soils and help dry them out. Also many fields will need some leveling. This is going to cause poorer soil conditions and more risk for crusting at planting time and potential emergence problems. Gypsum helps to alleviate these problems.

**Better Drainage.** Gypsum does improve drainage especially by reducing the amount of surface sealing. These flooded soils could experience a significant amount of surface sealing since the soil’s structure could be compromised. This could mean soils remaining wetter into the spring and the possibility of delayed planting.

**Improve soil microbiology.** Gypsum has shown to improve microbiological activity by allowing for better air and water exchange. When soils are flooded for this length of time and there is a lack of plants growing in these soils many of the fungi and other soil microorganism die off. It takes some time for these to rejuvenate. One of these fungi is mycorrhizae that are needed for roots to take up phosphorus. By improving the soil

structure and providing available sulfur, many of these microorganisms will rebuild faster.

**Better nutrient availability.** Gypsum has been shown to improve the availability of most nutrients already present in the soil. In addition, it is a very good source of available calcium and sulfur. Sulfur in particular could be leached in these soils and found to be quite low. A soil test will be a valuable tool to assess your nutrient requirements.

**Better root growth.** Gypsum provides soluble calcium for root growth. Since calcium is immobile in the plant, meaning that calcium will not move back down to the roots, there must be adequate calcium at the root tip for roots to grow. This is why you will generally see greater root growth where gypsum is applied.

In summary, an application of PRO CAL 40 will be a good tool to reclaim many of the flooded soils of the Missouri River valley and get these soils productive for the 2012 growing season.

### Midwest Soil Improvement Symposium

Kevin Heck and Bob Hecht, Soil Solutions, LLC attended the Midwest Soil Improvement Symposium in near Madison, Wisconsin on August 23<sup>rd</sup>. It was a symposium highlighting the latest research and practical insights into using gypsum in crop production sponsored in part by the University of Wisconsin Extension and the Conservation Technology Information Center at Purdue University. There was a wealth of information and experience in the use of gypsum represented at the conference between the presenters and the farmer panels.

Following are some “take aways” from the conference:

Farmer panels were definitely enlightening and insightful. One farmer noted that gypsum is just part of the “total system” that makes his soils and crops more productive. This system also included the use of drainage tile, no-tilling, cover crops, grid sampling and plant analysis. He is raising higher yields with less plant food inputs. Yields are definitely better in drier years than they were before the use of gypsum and he estimated his crop inputs at \$100 less than his neighbor's. He applies gypsum to about 3000 acres.

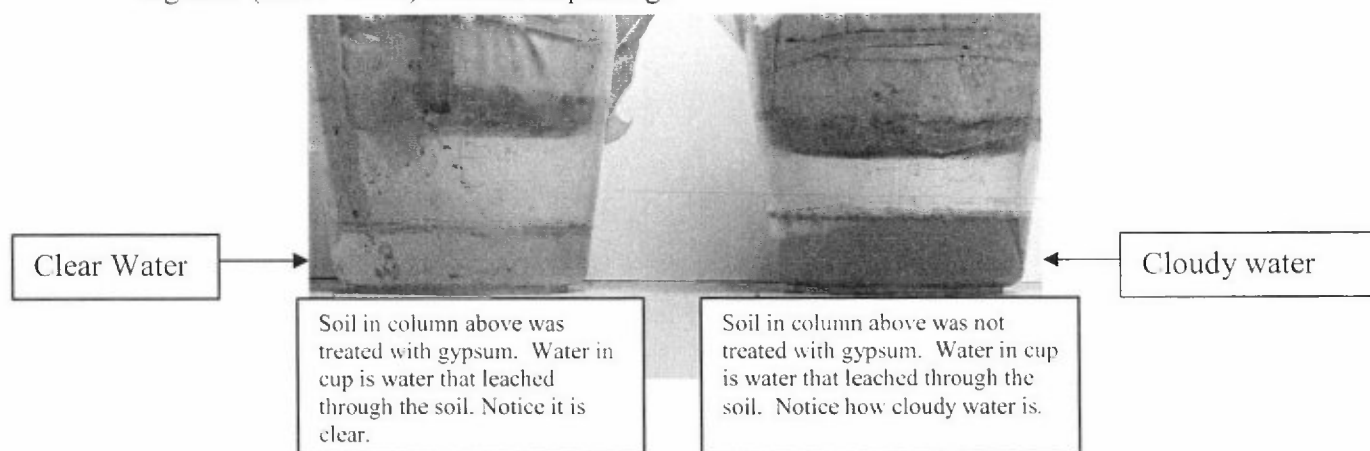
Another farmer who has been using gypsum on his farm for 10+ years said his soil has completely changed in characteristics. He applied 1 ton/acre every other year on his 2600 acres and now has changed to applying 1000# every other year since his soil conditions have improved so dramatically. His soil tests of P & K have improved over those years and his yields have greatly increased.

A farmer from Wisconsin said that gypsum plus cover crops (radishes and peas) says it is like one plus one equals three. He, like many of the farmers, shared that he sees better soil conditions, better drainage and increased nutrient availability where they have been

using gypsum. It was interesting that the comments shared by farmers at this conference were the same we hear from our customers.

One of the most interesting concepts, yet most difficult for many to grasp was that gypsum applications were able to increase the plant available phosphorus in the soil, but decrease the water soluble phosphorus and the sediment phosphorus and therefore decrease the phosphorus leaving the field by greater than 50%. Dr. Darrell Norton explained that calcium from gypsum can react with phosphorus in the soil to form a hydroxyapatite which is less soluble than water soluble phosphorus, therefore it will not leave with the water from the field, but it still can become soluble at the root tips for plant uptake.

Research conducted by Dexter Watts, USDA-ARS showed that with the use of gypsum the solubility of soil zinc and manganese in the soil was also increased significantly with even 1 ton/acre. Higher rates had an even greater affect on solubility. His work also showed that the runoff water was much clearer just as our own research has shown (see pictures below) with leachate through soils. This is due to the soil particles holding together (more stable) and not dispersing.



### **Don't Forget the Emergence Problems**

Many producers in eastern Nebraska expressed that they had uneven emergence and crusting problems this past spring. As a result these later emerging plants never developed ears or had poorer pollination. In these same areas we had customers tell us that where they applied PRO CAL 40 that their soil had never planted so well. "The soil condition was just awesome." If you have soils that have been wet and sticky at planting or where you are experiencing uneven plant emergence give us a call and improve your soil conditions with an application of PRO CAL 40 to your soils.

*Note that The National Soil Erosion Laboratory has found that soils become sealed off due to soil dispersion caused by low electrolyte rain water. This is why soils often times become hard at the soil surface especially when rain falls on tilled soils. Gypsum provides electrolytes which offsets the low level found in rain water.*

### Procidic Has Given Good Results on Control of Goss' Wilt

Goss' Wilt was a problem again this year in a large area. The leaf symptoms of Goss' Wilt usually start at the top leaves of the corn plant and progress downward. Typical symptoms are shown in the pictures to the right and below. It is important to properly diagnose the disease. It can be confused with drought stress or sun scald, but with Goss' Wilt



you will notice the water soaked appearance of the tissue prior to dessication. Also you will usually see a blackening of the tissue by the bacteria that you will not see with the other plant problems.

**PROCIDIC bacteriacide/fungicide at the 10-14 oz. rate proved to be a valuable tool in stopping Goss' Wilt.**

Although PROCIDIC works as a curative it can also work as a preventative and will give even better yield results if used in this manner. Since Goss' Wilt outbreaks are difficult to predict using PRO CIDIC as a preventative is less common, however, if you plant a hybrid that has low tolerance to Goss' Wilt you should consider using a planned preventative program in 2012.

### Getting Geared Up for Fall

Soil Solutions, LLC has been receiving many calls from existing clients and some new clients to be put on the list this fall for applications of PRO CAL 40 gypsum. We will begin spreading as soon as the fields are harvested so if you also want PRO CAL 40 applied to your ground again this year be sure to give us a call soon so we can get you on the list. We have many clients who apply PRO CAL 40 to about 1/3 of their acres each year as a planned program. This may be something you may want to consider also.

Remember also that gypsum and lime can be applied together if your soils need both. Visit with us about these benefits as well.

### **Have a Safe Harvest Season!!**

Crop yields in most of our area are going to be above average to very good. This means a very busy harvest season, but we want to remind you to take time to be safe. Be careful as you prepare for harvest and through the harvest season. Here are a few things to remember to prevent accidents.

- Always look around before moving equipment, especially if children are nearby.
- Be aware of overhead powerlines.
- Watch out for washouts in fields especially when harvesting at night.
- Be sure to shut off equipment while working on it and while working under the combine head apply the safety lock to the cylinder.
- Never step over power take offs and be sure protective shields are in place.
- Remember that ATV's can be very helpful, but can be dangerous if not operated with sufficient respect and a watchful eye for field conditions.
- This year with all of the flood damage please take care when working to reclaim these fields and working around water holes.