

# From the Ground Up



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## Yellow Hillides

Each year in July and early August both corn and soybeans on many hillsides turn yellow or light green. This could be caused by many factors, but the soil conditions are largely the cause. It could be that root development in these clayey soils was reduced. It could be that the conditions at planting created sidewall compaction. It may be simply that the eroded soils have less organic matter, therefore less nutrient releasing capacity. Or it may be that the soil conditions do not allow for good air/water exchange.



Given any of these reasons the use of calcium sulfate in these soils has shown tremendous benefits. More and more producers are realizing the value of PRO CAL 40 to improve problem soils. If you have fields that look like these shown, give us a call and let us discuss your soil tests and how we can help you improve these areas.



## Water is not just Water

Water quantity has drawn much attention recently and everyone understands the importance of having sufficient water supplies. However, water quality is also important and can have a large impact on crop yields and water efficiency.

Soil Solutions conducted an irrigation water quality survey this summer to determine how much variability is found in irrigation water in Eastern Nebraska, the Missouri River Valley and SE South Dakota. Some of the wells tested were from fields of current clients while others were picked at random. If you are interested to know if we tested any of your wells you may send an email to [b\\_hecht@bbwi.net](mailto:b_hecht@bbwi.net). Some observations from this survey will follow.

- Most wells in the Missouri River valley are high in bicarbonates and high in iron.
- Wells within a small area can differ significantly.
- Many wells in SE South Dakota have high levels of sodium.
- Those wells in SE Nebraska that are pumping from the Dakota aquifer contain medium levels of sodium.
- Water that was being pumped from the Big Blue River contained appreciable levels of sodium.
- All water quality issues were manageable with soil amendments.
- Nitrate levels were undetectable or negligible in over 80% of water wells tested. Only select wells in Central and Eastern Nebraska had appreciable levels of nitrate nitrogen.
- The highest sodium level reported was from a well in SE Nebraska (318 ppm Na and an SAR of 10). This was taken from a field that we had previously treated with PRO CAL 40 and have seen a tremendous response. Subsequent applications will be necessary to manage this condition as long as this irrigation water is being used.

A complete water analysis is the starting point to determine if your irrigation water has limitations. If you have not taken a water analysis recently you may want to take one yet this season so that you may plan for next year.

Understanding an irrigation water analysis will be discussed in this article and will be continued in the next newsletter. Terminology of irrigation water analysis is sometimes confusing and used incorrectly. Two terms that I often find used incorrectly is salinity and sodicity of the water. These two terms should not be used interchangeably. The salinity is measured using electrical conductivity. The greater the salt level the greater the conductivity. The salts are both positively charged ions such as calcium, magnesium, potassium and sodium and negatively charged ions such as bicarbonate, carbonate, chloride and sulfate. Sodicity is a measure of the sodium content of the water.

Sodium causes soils to become dispersed or lose soil structure. As soil structure deteriorates soil compaction or tightness will increase and water infiltration, percolation and root growth will all decrease. If irrigation water contains greater than 50 ppm sodium, it may begin to adversely affect soil structure. If the soil contains 2% sodium or greater or magnesium levels greater than 20%, any additional sodium from irrigation water will compound the soil condition.

Soil amendments are needed to offset the ill effects of sodium in irrigation water. Amendments include gypsum, elemental sulfur or sulfuric acid. The rate of soil amendment to apply will depend upon the sodium level in the water and the amount of

water that will be pumped each growing season. Soil Solutions has developed guidelines for use to reclaim soils based on the soil test level and the water analyses. If you are interested in these guidelines please contact us.

Sodium adsorption ratio (SAR) is also used to measure the severity of water quality. As the SAR increases above 1, water quality becomes a greater concern. An SAR greater than 2.5 will likely cause water permeability problems. The best amendment for water with high SARs is to treat the water or the soil with frequent applications of gypsum.

Other factors that affect water quality are Electrical Conductivity, Bicarbonates, Chlorides, Boron and Iron. These will be discussed in detail in our next newsletter.

### **Crop & Soils Seminars Provides Valuable Information**



Soil Solutions once again this year sponsored seminars for our clients. Guest speakers were Mr. Dick Goff and Mr. Bill Darrington. Of special interest were the root pits that were dug for the Hornick meeting. A special thank you goes to Randy Rogers who dug two root pits on his farm to evaluate the effects of zone building and calcium sulfate and to Todd Sulsberger which allowed us to dig a root pit on his farm.

Some of the points that were discussed at these seminars were:

- Most soils have a natural soil compaction layer at 18" depth.
- Good soil calcium is critical to get a good response to foliar nutrient applications.
- Yellow Flash in Roundup Ready varieties has been eliminated with 1 pt./acre of Manganese EDTA chelate plus 1# sugar when applying Roundup. It is best to make a separate application of the micronutrient if you are applying the Roundup in the heat of the day.
- Dry weather can decrease nitrogen mobility and biological activity creating a greater need for foliar applications and other supplemental applications.
- Soil Structure has been destroyed over many years. It cannot be restored in one year. Patience is needed. Calcium sulfate is effective in speeding up this restoration.
- Having adequate early nitrogen is essential for corn. Corn varieties do differ in their response to early nitrogen. Soybeans are good scavengers of nitrate nitrogen and can deplete soil of available nitrogen for early corn crop growth. Research

shows that 30-40# of nitrogen banded or dribbled over the row at or soon after corn planting has a large impact on yield.

- The peak period of nitrogen uptake in corn is during the rapid growth stage and is as high as 7.5# per acre per day.
- A soil with balanced nutrition is critical for proper biological activity.
- Soybean yields are highest when the potassium and calcium release tests were the highest.
- Zone building (subsoil knifing of slots) doesn't disturb soil as much as ripping, therefore not destroying soil structure as much. This also allows soil to sustain heavy loads better after this operation. In most soils the depth of knives should be at least 18" to be certain you are below the natural compaction layer that is at 16-18" deep.
- In heavy gumbo, increasing the width between slots from 30" to 40" may also help sustain heavy loads in the spring.
- Past experience has shown that in year 2 slots are knifed in half way between slots that were placed in year 1. No additional slots should be needed to be placed for many years, if ever.
- Strip till is an effective way to place or concentrate nutrients in or near the row (8" below the soil surface) so that residue tie up is minimized, soil fixation is reduced and the work load is spread out. The maximum rate of nitrogen to apply in the strip is 100# per acre. The maximum rate of nitrogen to apply in the row with the seed in corn is 10# per acre.
- Many producers adopt just one part of a high yield program and then are critical when they find they don't get the response that was being reported. It takes a total management system to reach high yields.
- Earthworm activity is critical for high producing soils. Earthworms need air in the soil and are a good indicator of the soil's health. Earthworms feed on decaying roots and crop residue. Their excrement when analyzed for nutrient value was a 7-11-13. Their secretion from their skin is a highly soluble calcium. This is another reason calcium sulfate improves earthworm activity.

This is just a small taste of some of the subject matter that was covered in the meetings. If this information interests you then you may want to consider attending our seminars that we schedule again next year.

### **Order today**

We have had more clients ordering their product earlier this year than in past years. This is greatly appreciated so that we can be more efficient in our operations and get product properly placed. This is also a testament to the favorable responses our clients have seen. Some of our clients have soils that we applied product on four years ago. If you are one of those, you should consider a second application on those soils to continue keeping the soil's productivity going in the right direction.

### **Please give us your email address**

The cost of printing these newsletters and mailing them continues to increase. We would appreciate it very much if you are currently getting this letter by mail to send your email address to [Vickie@ruralwaves.us](mailto:Vickie@ruralwaves.us) so that we can email this letter to you instead.

