

# From the Ground Up



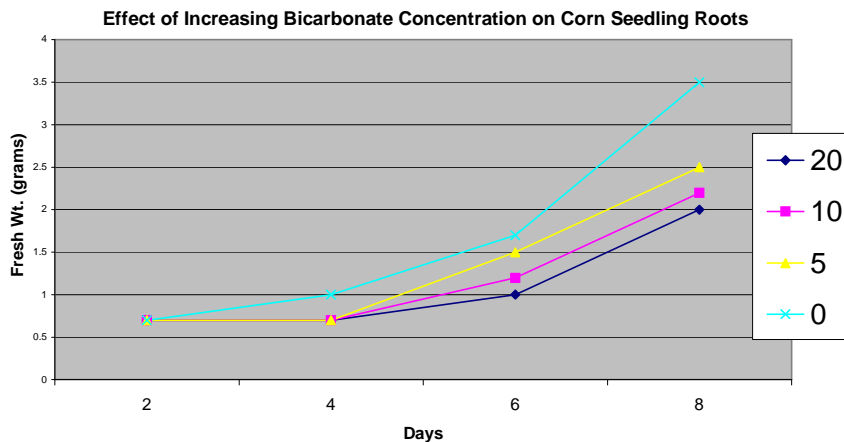
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## Using gypsum in high pH soils

Farmers often experience decreased yields of corn in high pH soils when compared to more neutral pH soils. This is usually blamed on nutrient tie up and less availability of nutrients. While nutrient availability can be a factor in these soil conditions, another factor is increased bicarbonate levels. Bicarbonates are formed when carbon dioxide reacts with water in these high pH soils to form  $\text{HCO}_3^-$ . Carbon dioxide can be produced as a result of root respiration or from the decomposition of organic matter. The greater the moisture content of the soil the greater the production of bicarbonates.

The bicarbonates are toxic to corn roots as is shown by the decreased corn root growth in the diagram below as the bicarbonate level increases from 0 to 20 meq/l. The shoot growth is likewise affected. Some research has suggested that bicarbonate will also block uptake of some nutrients.



Calcium sulfate appears to reduce the availability of bicarbonates by two modes of action. First, the calcium (positively charged) will react with the bicarbonate (negatively charged) to tie them up. Secondly, the gypsum when applied at greater than 1 ton rates will saturate

the soil solution with sulfate sulfur. Since both sulfate and bicarbonate are negatively charged, the increase in sulfur uptake will reduce the amount of bicarbonate uptake by the plant. As a result, the root growth is improved and production is enhanced.

## Offsetting the ill effects of high K in manured fields

In fields that have received high amounts of cattle manure over the years soil tests often reveal very high levels of potassium (levels >750 ppm and >10% base saturation). When levels exceed 8% base saturation potassium can have an effect similar to potassium. It will tend to cause the soils to become more dispersed and water infiltration is reduced.

Consequently, the air/water exchange in these soils is lessened. This is another reason that gypsum has given good responses in soils that have received heavy applications of manure.

### **Sulfur prices climb...PRO CAL 40 an even better buy.**

Not unlike most other fertilizers, sulfur fertilizer has taken a major rise in price in recent months. Sulfur prices can be found in the range of \$0.50 per pound of sulfur. PRO CAL 40 contains approximately 15% sulfur on an as received basis. That means that for each ton you will receive 300 pounds of sulfur. If you apply one ton of PRO CAL 40 per acre at a price of around \$35/ton (could be more or less depending upon freight), you are getting your sulfur for about 12 cents per pound. Although we promote PRO CAL 40 mostly for its soil amendment benefits, it is an excellent source of plant available sulfur and you will meet your plant's sulfur needs for at least four years in medium or heavy textured soils.

*We are questioned frequently about any ill effects of high rates of sulfur that are applied as gypsum. We have applied as high as 5 tons per acre of PRO CAL 40 in some fields and to date have not encountered any negative effects from these amounts....only positive feedback. Remember that gypsum is a neutral product and will not lower pH to a great degree unless the pH is above 7.5 and sodium is present.*

### **Gypsum: A Best Management Practice to Improve Water Quality**

In the most recent edition of the Crops and Soils Magazine published by the American Society of Agronomy there is an article entitled, "Emerging environmental concerns with manure management". In this article concern is raised over the impacts of large quantities of pharmaceutical residues present in animal wastes. These include hormones and antibiotics. Most antibiotics and hormones have a strong affinity for soil particles, thus surface runoff is considered to be the major concern of entry into surface waters.

Research conducted at the National Soil Erosion Research Laboratory in West Lafayette, Indiana, has shown that the use of gypsum will greatly reduce surface runoff from fields. Using gypsum in fields with heavy manure applications is a "best management practice" recommended by several states to reduce soil erosion and phosphorus runoff. The benefits of gypsum in manured fields not only include increased yields but also better environmental stewardship.

### **Spring of 2008—The Year for Row Banded Fertilizer**

This spring's weather conditions at this point appear to be colder and wetter than those of recent memory. Given these conditions early root growth will be reduced and the chance for a response to row placed fertilizer in corn will be high even in soils that test optimum or greater. I would recommend that you have nitrogen, phosphorus, potassium, sulfur and zinc as a minimum in this starter band. If the fertilizer is placed in the row there are two rules to follow. First, don't exceed a total of 10 pounds of nitrogen, potassium and sulfur in the band. Higher rates could cause decreased germination. Secondly, don't use ammonium thiosulfate as your sulfur source since some free ammonia could be liberated

and cause germination problems. In a band to the side of the seed you can place as high as a total of 40 pounds of nitrogen, potassium and sulfur in the band with no adverse effects. Ammonium thiosulfate would be OK to use in the band to the side of the row.

If you do not want to use a band beside the row another option is to dribble the fertilizer over the row after the seed furrow is closed but before the press wheels. Any amount of soil separation between the fertilizer and the seed should diminish the chance of germination issues. This is also a good placement for a little higher nitrogen analysis starter. This is a very efficient nitrogen placement.

**REMINDER: Scout your alfalfa fields!!**

First, don't assume just because your alfalfa was covered with snow that it survived the winter alright. Now is the time to start inspecting your alfalfa to see the condition of the crowns and early growth. Ice damage is difficult to predict. Any breaks in the ice will usually allow air exchange and alfalfa damage will be minimal.

Now is the time to scout your fields for winter annual weeds. Henbit, pennycress, mustards and dandelions can all be problems in alfalfa during the first cutting. If you find your alfalfa fields have these weeds present at significant numbers you should consider using a dormant alfalfa herbicide such as Sencor, Karmex or Sinbar before the alfalfa has much spring growth. Read labels for exact rates and timing. Normally anytime before April 1 is OK for dormancy herbicide applications. This year alfalfa development is even later.

Before long, spring temperatures will be here and that means that alfalfa insects will begin emerging once again. Alfalfa weevils will overwinter as adults and lay eggs this spring. In more mild winters some eggs that were laid in the fall have overwintered. The economic threshold is one per stem on small alfalfa and 1-2 larvae per stem for larger alfalfa.

Pea aphid may also be a problem in alfalfa early in the spring. Usually scout this insect by scouting 20 stems in five different areas of the field. If greater than 50 per stem treatment should be considered.

Potato Leaf Hopper has been a problem in recent years. This insect does not overwinter. It will migrate north on strong winds of storm fronts. It is normally more of a problem in the second cutting or later.

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