

From the Ground Up



Soil Solutions, LLC · 303 Lamp Kastner Drive · Holstein, IA 51025

Manganese for soybeans

Recent research from Kansas State, Purdue University, Ohio State, and Arkansas would all suggest that applying manganese to Roundup Ready soybeans can give a yield boost. Manganese ties up quite easily if broadcast onto soils so broadcast applications are not recommended. Research has shown responses from both band applications at planting time and foliar applications. Still other universities and some producers have not experienced this yield boost from manganese applications. Why is this? There is probably still much to be learned here. It appears that low fertility levels, high soil pH, tillage and even crop sequence may all affect how much glyphosate will decrease manganese uptake and assimilation.

One method that seems to be quite consistent is banding manganese at planting time or before planting. A 10 bushel per acre response was realized at Kansas State University. The rate that was applied is 5 to 7.5 lbs/A of actual manganese as manganese sulfate (20-30# of product) in the Kansas State Study. A manganese chelate (EDTA) could also be used. With a chelated material one could assume that 2-4 quarts/acre would be equivalent. The manganese EDTA chelate is the only source that would be recommended for a foliar application. It probably would not be recommended to apply manganese sulfate with a phosphorus fertilizer since phosphorus and manganese are antagonistic and will decrease the availability of each. Before planting your soybeans this year you may want to try banding some manganese close to the seed.

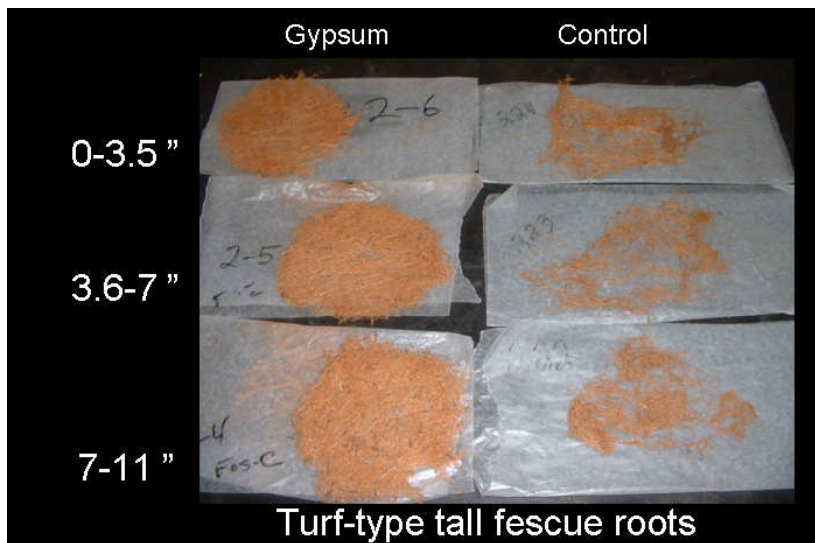
Other research has shown that when high rates of sulfur is applied and this sulfur is reduced from SO_4 to S, that manganese availability is increased and uptake is enhanced. We have experienced this where we have applied PRO CAL 40 at 1 ton per acre or greater rates. This, in combination, could enhance the response from a manganese application.

Alfalfa—Just Git'er done!

With the frequent rains of the past month and the sub-freezing temperatures, it was difficult to get some of the alfalfa fields spread. Don't be disappointed, though. We can apply PRO CAL 40 between the first and second cuttings and still get a great response yet this year. *Give us a call.* We probably already have some alfalfa fields scheduled to do in your area and can do yours while we are there.

Remember, not only does PRO CAL 40 improve the yield, but also increases protein and quality. Availability of other nutrients is also improved and alfalfa stands last longer. Applications on older stands of alfalfa have shown marked yield increases as well. Just git'er done!!

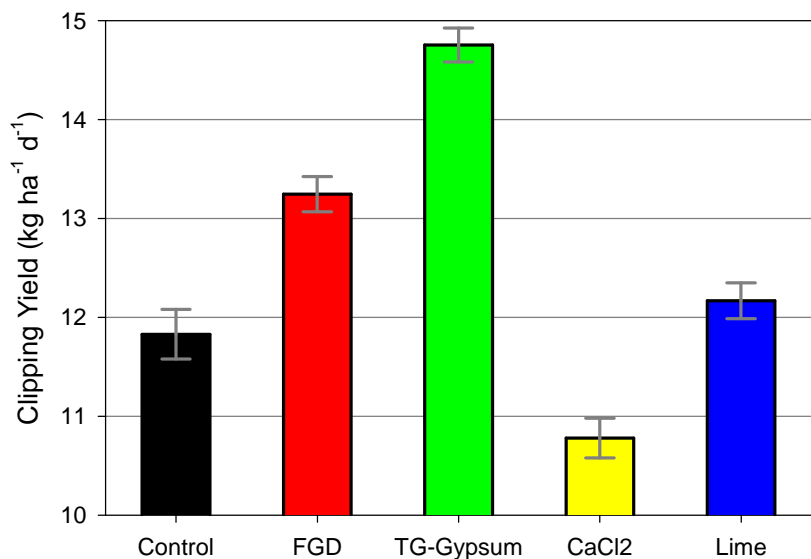
Gypsum Enhances Root Growth in Tall Fescue Study



A study at Penn State has shown that both Tall Fescue and Bermuda grass root growth was greatly increased in a clay soil with the addition of gypsum. The picture to the left shows roots that were delicately removed from the soil at the various depths. You can easily observe that there is significantly greater

root growth at each depth. This equates to greater nutrient availability and better moisture use. As you would expect foliage growth as measured by clipping weight was also affected as is shown in the graph to the right. Although this is a clay soil the gypsum movement was tracked down to 20 inches by measuring greater calcium and sulfur levels at these levels in just two years.

Tall Fescue Shoot Biomass Production by Treatment Penn State Univ. 2003-2005



Rootless Corn Syndrome can be Anticipated

With the frequent rains this spring soil conditions at planting have been a little wetter than most producers would consider optimum, especially under no-till. As a result, the planter slot has been smeared and the heavier soils especially could result in some sidewall compaction. Some of these soils have become very hard. When these sidewalls are compacted the roots have a very difficult time penetrating them and will tend to follow the path of least resistance growing only down the seed furrow. This will mean

that in the early development the root system will have a difficult time anchoring the plant. If soils dry out and the wind blows these plants fall over and could even die if the mesocotyl (stem above the seed and below the crown) breaks.



The picture to the left shows roots that were not able to penetrate the sidewalls even on a large plant.

PRO CAL 40 does improve the soil tilth and reduces the soil's smear potential or plasticity. This will help in decreasing the sidewall compaction potential.

Nutritional Interactions Influence Potato Diseases

Potato producers try to optimize financial return by reaching a high yield without sacrificing tuber quality. These management decisions involve amount, source and timing of fertilizer, soil pH, varietal differences, irrigation timing, soil characteristics, etc. and how these factors all affect the risk of disease.

Common Scab is a disease that is caused by *Streptomyces* bacteria. The best control of this disease is soil pH. It will not grow much below a pH of 5.0. These pHs however, can mean limited calcium availability. If you apply lime for a calcium source you increase your chance of common scab. A good alternative is applying gypsum. Research has shown that gypsum will increase calcium availability without affecting the pH and will decrease the incidence of scab by over 100%. Gypsum has also been beneficial in decreasing scab in soils with pH greater than 8.0 where calcium availability can also be reduced.

Bacterial Soft Rot is caused by *Erwinia carotovora* and *Erwinia chrysanthemi* bacteria. Soft Rot can be suppressed with calcium fertilization. Cell walls with higher calcium are more resistant to pectin degrading enzymes produced by these bacteria. Gypsum studies have decreased the volume of soft rot by 28% compared with lime which only reduced soft rot by only 8%.

Gypsum has also shown to decrease internal brown spot and hollow heart diseases. Shallow calcium is usually most beneficial since the calcium that goes into the potato is taken up by the stolon and tuber roots and not the main root of the potato plant. Verticillium Wilt seems to be reduced with higher nitrogen and phosphorus applications. Ammonium nitrogen decreases disease severity more than nitrate nitrogen. Low soil pH also reduces the incidence of Verticillium Wilt.

Late Blight seems to increase with excessive nitrogen rates while phosphorus seems to decrease tuber infection possibly due to producing a thicker skin. Fungicides are still a

useful tool with many of these diseases and should be used in conjunction with the other management practices.

Lime + Gypsum = ↑ Yield.

This spring we applied several fields with a mix of gypsum and lime. There are several studies that show the complimentary benefits of applying both. Another benefit is that by mixing it with PRO CAL 40 we reduce the dustiness of the very fine lime. This eliminates most of the lime from going airborne and blowing in the wind to a neighbor's field. This means you will get the "good stuff" on your field plus a faster response by using this premium grade limestone and a quicker return on your investment. If this is something that would interest you for this coming fall, be sure to let us know so that we can get you on the list.

Thank you

We will soon be finishing up our winter season of spreading PRO CAL 40 and NutraBio. We will continue to spread on alfalfa during the summer months as well, but we would like to thank all of our customers again this past year. For those of you that we were not able to get product applied for the spring planted crops we will put you at the head of the list for a fall application.