



## Improving Your Grass With Calcium Sulfate

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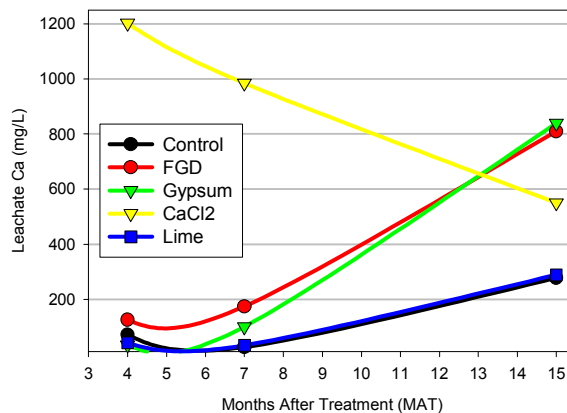
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## Benefits of Including Calcium Sulfate in Your Nutrient Management Program

Whether you grow grass for a lawn, golf course, athletic field, park, or for sod production, calcium sulfate will help improve your grass. Calcium sulfate dihydrate, commonly referred to as gypsum, contains approximately 22% calcium and 17% sulfur on a dry basis.

Calcium is an essential plant nutrient, primarily considered important for cell wall integrity, active growing points and maintaining an acid/base balance in the plant. However, it is probably most beneficial as a constituent in the soil to maintain good soil structure and to improve overall nutrient availability.

Recent research at Texas A&M has shown that calcium stimulated ammonium absorption by plants by as much as 100%. This has the benefit of improved use of nitrogen applied. If the nitrogen is absorbed before it converts to nitrate, then less nitrogen is potentially lost by leaching or runoff. Also if absorbed as ammonium nitrogen the plant will require less energy to convert it to proteins in the plant. Gypsum can greatly enhance soluble calcium as is represented in the following data from Penn. State of analyses of leachate from a soil column of clay soil.

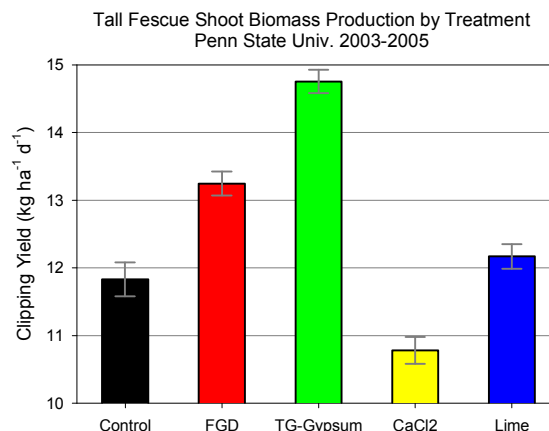


Sulfur is also an essential plant nutrient. Its primary role in plants is to increase the efficiency of nitrogen in plants by improving the production of certain amino acids, thus increasing protein content. As a result, visually, your grass will be much darker green where sulfur is used as part of the fertility program. Research has shown an average increase in green cover of nearly 10% where gypsum is used. Sulfur is needed by plants in about the same quantities as phosphorus. In addition, it also holds great value in improving availability of many other nutrients by forming complexes or through its reduction in the soil.

Most sulfur containing fertilizers cause soils to become more acidic. Calcium sulfate, however, is a neutral salt and will not cause the pH to lower unless your soil pH is greater than 8.0. This makes it a preferred source of sulfur and calcium in growing grass since liming soils in grass production is more difficult due to limestone immobility.

Research at Iowa State University where they applied calcium sulfate to silica sands revealed a 22% increase in clipping weight of Kentucky bluegrass and a 32% increase in clipping weight of creeping bentgrass in the first year. This would suggest that many athletic fields and golf greens which are constructed of silica sand would benefit from the use of calcium sulfate. In addition, nitrogen, calcium, potassium and phosphorus uptake were greatly improved in both the Kentucky bluegrass and the creeping bentgrass with the application of calcium sulfate.

The following research at Penn. State also demonstrates that the clipping yield of fescue was also greatly increased with the use of gypsum in a heavy clay soil.



## Golf Courses

Beautiful lush grass is of utmost importance to golf course superintendents. Calcium sulfate should be an essential part of the fertility program at every golf course. For the reasons previously discussed calcium sulfate will make the grass healthier, will improve the nitrogen efficiency, therefore resulting in less



environmental concerns and will allow for more playable time.

One of the proven benefits of calcium sulfate is that it improves drainage. This allows the course to dry more quickly after rain events or after irrigation so that play may resume more quickly and with less compaction concerns.

Many golf courses are constructed on soils with poor permeability due to the clay soil. The permeability is even poorer if the soil contains an appreciable amount of magnesium. Diseases become more prevalent in these soils due to the frequent watering and slow permeability. To improve infiltration and permeability of these soils calcium sulfate should be applied at least once per year. Rates will be determined using soil analysis, however, 1 ton/acre would be a general use recommendation.



This is a spreader that Soil Solutions has available for the application of PRO CAL 40.

Some golf courses use water from city lagoons for watering their course. Frequently this water contains sodium which will destroy soil structure, reduce root growth and overall growth of the grass, and decrease water infiltration. Calcium sulfate is the product of choice for these conditions. The calcium will release the sodium from the soil particles causing the sodium to react with the sulfate and be flushed from the root zone. Rates to apply should be based on soil and water analyses, but generally applications of  $\frac{1}{2}$  to 1 ton/acre applied in the spring and again in the fall are recommended.

Other golf courses use water with high bicarbonates or are in areas where the soil pH is high causing the grass to turn yellow due to iron chlorosis. Bicarbonates are toxic to plant roots causing less root growth and reduced nutrient uptake. If you have these conditions, calcium sulfate is beneficial by reacting with the bicarbonates tying them up and increasing calcium availability. If the pH is above 8.0 calcium sulfate will lower the pH (to around 7.7 or 7.8) by reducing the level of carbonates and bicarbonates. Rates to apply need to be based on a soil and water analysis, however, rates will generally be from 1 to 2 tons per acre applied in the spring with a repeated application of 1 ton/acre in the fall.

## Turf Grass/Sod Production



A commercial sod field with “yellows” from iron chlorosis.

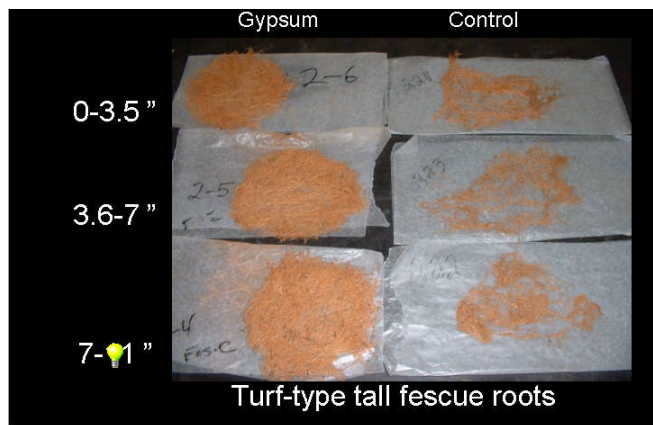
When growing grass for sod production it is imperative that the grass is healthy, thick and dark green for maximum sale value. Calcium sulfate can be an important tool in assuring that you are growing dark green sod. As the picture above shows, growing sod (especially bluegrass) on high pH soils or where irrigation water contains bicarbonates can mean reduced marketability if iron chlorosis presents itself.

Iron chlorosis, although not completely understood is caused by high levels of bicarbonates in the root zone. They can reduce availability of many nutrients including iron, manganese, zinc, phosphorus and calcium. Bicarbonates also reduce root growth in many grasses which also decreases nutrient availability and plant vigor. Calcium sulfate will supply a readily available form of calcium that will also tie up the bicarbonates and improve nutrient uptake. The sulfur in calcium sulfate also will increase uptake of iron, manganese, zinc and phosphorus. Its effectiveness is improved with use over many years. Rates to apply should be based on a soil test and water analysis. In general, calcium sulfate should be applied at a rate of 1 to 2 tons per acre in the spring followed in the fall by another 1 ton/acre.



Calcium sulfate will also help grass develop a thicker canopy more quickly through more efficient nutrient utilization, through enhanced root growth, and through improved soil conditions (all discussed earlier in this booklet). This will mean sod that is marketable sooner.

In the picture below greater root growth of fescue is evident in this study where gypsum was used.



## PRO CAL 40

PRO CAL 40 is a premium grade calcium sulfate marketed by Soil Solutions, LLC for lawns, athletic fields, golf courses or commercial sod farms. Its crystalline structure allows it to move easily into the soil and give quick responses in turf grass. Application equipment is available through Soil Solutions. It may be applied by most spinner spreaders utilized by golf courses.



For use in lawns, due to the fineness of the product, it cannot be applied through most lawn fertilizer spreaders. It is usually applied by throwing the product by hand. An over application will not cause any burning of plants such as you may see with other fertilizers.

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