

# GROWERS Program AND SOYBEANS

Legumes are considered a very important plant group because of their symbiotic nitrogen fixation abilities. To thrive, legumes need calcium present in the soil profile. This is to facilitate porosity for air exchange necessary for the survival of soil bacteria, which are also heavy consumers of the element calcium, but it is also required in the root environment to neutralize toxicities having direct negative effects on nitrogen fixation.

Many recommend significant applications of potassium to legume crops. This, however, only serves to release available soil calcium to the plant, or else the plant uses it as a substitute for soil calcium not present or available. Calcium, not potassium, is the real key to ensuring a successful legume crop.



Always use limestone sources high in calcium and low in magnesium.

## Growers Target Fertility

*"The placement of elements close to the plant to take advantage of the efficiencies of reduced time and distance."*



### The 3 Main Points of the Program

1. Provide a good growing medium by ensuring adequate calcium in the soil.
2. Supply necessary nutrients to the plant by applying balanced high quality soluble plant nutrients at the correct time.
3. Put in comparison plots and yield check to verify profitable results.



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*Our Research is Your Profit*

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# THE GROWERS PROGRAM SOYBEANS



Joe Henry, President and Founder of Growers Mineral Solutions, holds a bean plant supporting 200 pods.

Since 1955, Growers Mineral Solutions has helped farmers increase their profit by raising high quality crops with lower overall costs. This is accomplished by creating a superior rooting media, and stimulating plants with smaller amounts of balanced nutrition (GMS) at stress points during the plant's life. This is a farming philosophy known as "The Growers Program."

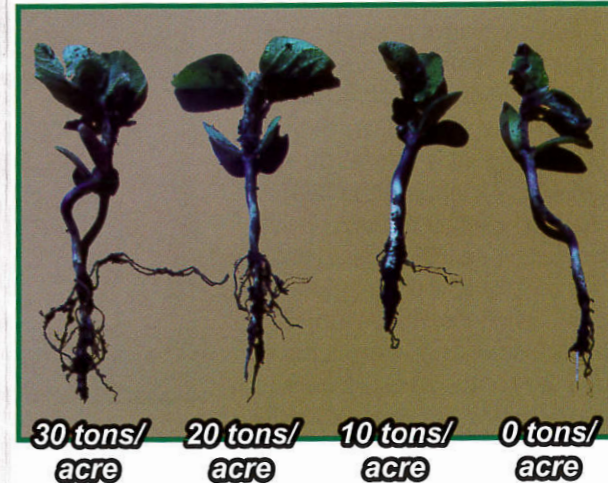


## Calcium Use

Unlike a grass crop which can be grown by using large amounts of nitrogen, a legume doesn't necessarily respond to a high rate of any N, P, or K fertility element. Calcium, however, is a critical factor in soybean growth, and ensuring there are adequate levels in the soil:

- correct injurious acidity
- improve the structure of the soil
- overcome the harmful or toxic effects of excessive amounts of magnesium, sodium, or potassium
- promotes proper conditions for bacterial growth

Calcium is also needed for plant nutrition and the regulation of other nutrient absorption. Legumes are heavy feeders on the element calcium, so GMS feels it is very important to examine the soil's calcium content when planning to grow soybeans. The lack of calcium in the root zone can cause rooting problems and reduce the potential response to foliar feeding accordingly. GMS can, and does, work on plants grown in calcium deficient soils, but the expectations will be greater when calcium needs of the soil are satisfied.



North Dakota: Higher calcium volume yields more roots. Original soil pH was 8.2.

# Planting Soybeans

## WITH GMS

Early planting of soybeans in cold, wet soils puts the bean seed in an unfavorable germination environment.

Applying nutrition at planting can give the seed the extra energy it needs for germination and initial growth.

GMS, being in liquid form, is an excellent source of nutrition for the immediate use of the germinating seed. Because it is made of highly refined food-grade or feed-grade raw materials, GMS can be applied directly on the seed, although in warm, sandy soils it is best to place it near the soybean seed.

Many fertilizers are toxic and must be buffered by the soil to prevent injury to the seed or newly germinated plant, so they are placed in a standard 2 by 2 (2 inches to the side and 2 inches below the seed) band configuration. A disadvantage of banding is that, in the first ten days, only a few side roots will have access to fertility while the majority grows down, missing the band.

GMS is applied through various approaches behind the seed-drop on either a planter or a drill. This allows GMS to enter the seed trench before the soil is closed in around the seed. GMS can be supplied from tanks mounted on either the tractor or planter, and can be moved to the drop pipes by a squeeze pump, piston pump, centrifugal pump, roller pump, 12 volt electric pump, or gravity planter kit. GMS application rates to the seed are controlled by using appropriate flow regulators sized for pressure and speed.

Soybean seeds are very sensitive, especially in light, warm, and dry soils, so when placing GMS directly on the seed in these conditions, use 1/2 gallon per acre, and never exceed the recommended one gallon per acre rate. This rate may be changed to two gallons per acre as the soil organic matter and clay content increases, or when a grain drill is used rather than a row planter.

### WATER CONSIDERATIONS

Anytime GMS is placed directly on the seed, any water added to the solution in equal volumes to the GMS helps to lessen the osmotic influence of the GMS. If the volume of GMS used for the soil moisture content, soil temperature, soil texture, soil organic matter volume, and added water is still too high, the producer may need to put the GMS in the 2 by 2 position. This situation may occur in Southern soils below the Mason Dixon line. In this case, consult with the GMS sales representative.

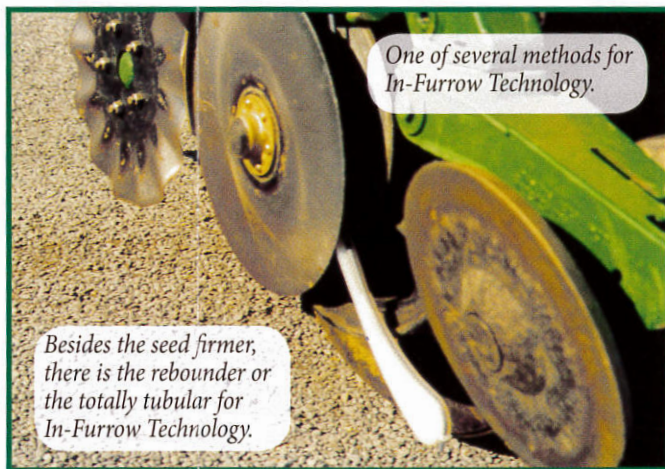
### SEED TREATING

Soybeans can be seed-treated with GMS at the rate of 4 ounces per 60 pounds (1 gallon per 30 bushels) of seed. It is important to be sure that the treated seed has dried before placing it

in the planter or grain drill, so allow about 12 hours of drying time before seeding. Mixing the GMS-treated seeds with powdered high-calcium limestone will speed drying. Also, soybean seed can be

treated in the field by applying a small amount of GMS as a fine mist to slightly dampen the seed when it is in the planter or drill box.

The seed-treating can be very effective because seeds of all grain crops will absorb approximately 30% of their dry weight in water. If nutrient salts (GMS) are added to the water, they become a part of the seed and will be ready for use by the seedling after germination.



# Foliar Feeding Soybeans

## WITH GMS

The soybean's second stress period in its growth cycle occurs when the plant is in pre-blossom and blossom. This is the best time to foliar spray, as the plant will show the maximum yield response. Foliar application of GMS at this time can:

- enhance yield by maximizing the number of pods set
- improve the rooting system
- increase vegetative growth
- increase plant vitality

Some mainstream agronomists contend that the best chance for increased yield gains in soybeans will come from increased pods per plant. They say one of the challenges standing in the way of accomplishing increased pods per plant is the problem of flower and pod abortion. Soybeans abort between 60 and 75% of all flowers each season, and that flower loss cannot contribute to yield. The agronomists contend half the abortion occurs before the flowers develop into young pods, while the other half occurs as a result of pod abortion. Once soybeans reach flowering, agronomists believe stress must be minimized to prevent yield loss.

Many farmers find that foliar feeding is a very effective tool to help the plant along during periods of stress such as drought, excessive rainfall, or following herbicide applications. In these situations, it often happens that the plants' roots have been injured and do not take up nutrition properly. Putting nutrition into the plant through foliar absorption can help overcome stress problems. Stress relief may lessen flower abortion.

Foliar sprays should be applied in early mornings, late in the afternoon (evening), or on foggy, overcast days. Plants will not effectively absorb minerals through the foliage during the heat of the day or in bright sunlight.

Foliar applications are generally made by ground equipment using boom sprayers, mist blowers, and high-boy sprayers. However, some are made by helicopters and spray planes. The rate of GMS foliar sprayed at one time is usually at two gallons per acre, but will be governed by conditions at the time and those expected.

The use of Genetically Modified Organisms (GMOs) offers a very critical opportunity to foliar spray soybeans. Also agricultural scientific literature suggests that foliar sprays can help replace fertility nutrition to GMO crops critical to accomplishing their yield goals. Growers Chemical Corporation does not recommend mixing GMS with other chemicals; however, many producers use this approach under their own advisement after several years of experimentation.

### WATER CONSIDERATIONS

Anytime GMS is foliar sprayed, if water is used for dilution its quality has a very big impact in the effectiveness of GMS. When diluting GMS with water, consult with the GMS sales representative.



### SEED & FOLIAR TOTALS

The total amount of GMS applied to soybeans on the seed and foliar sprays can vary from 1/2 gallon to up to 8 gallons per acre. The environment at planting, the row spacing, the number of foliar spray applications, etc., all determine the total used. Some farmers foliar feed early to take advantage of herbicide applications, some foliar feed later in the season after assessing environmental conditions, and others do both.