

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.



THE FARMERS SOLUTION

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www.GrowersMineral.com

Your local Growers Representative is:

THE GROWERS PROGRAM CORN



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.”

Milan  Ohio

GROWERS MINERAL
THE FARMERS SOLUTION



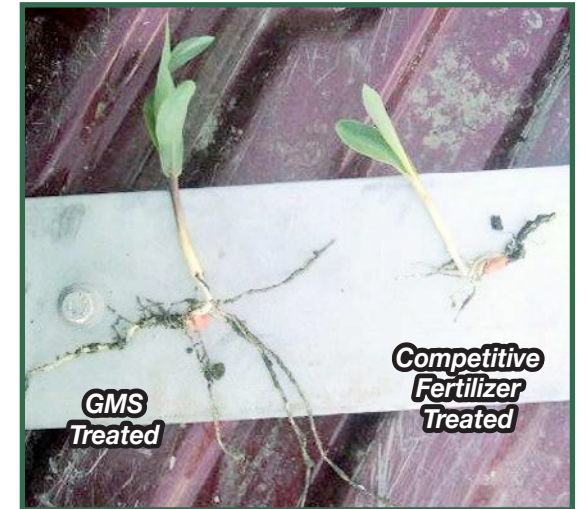
Dairyman David Kaschak and his sister, Theresa, in 2008 grew 312 bushels/acre of corn on their Waterford, PA farm, and then again in 2010, they grew 321 bushels. Each time they used only the Growers Program and Growers Mineral Solutions, some manure, but no other N, P, or K. This approach demonstrates how nutrient usage efficiency can be maximized so that nutrient loss to the environment can be minimized.

Fertilizer Regulation

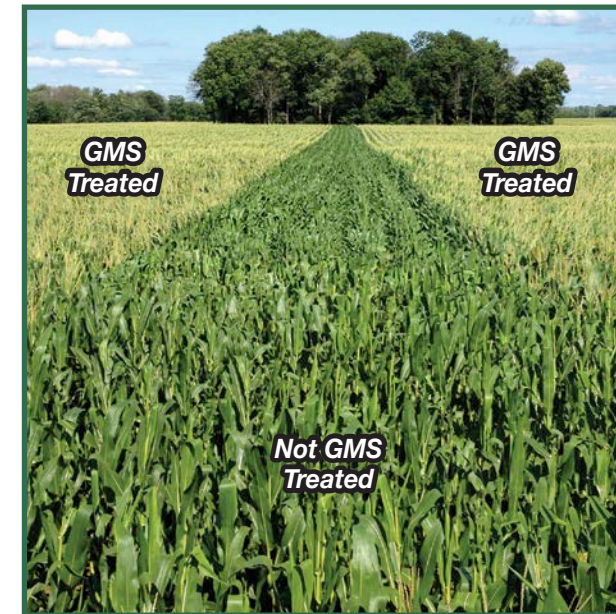
More fertilizer than necessary is being applied to North American farms, and it is leading to government regulatory agency interventions. Indicative of this are the more frequently heard terms such as: “nutrient management,” “hypoxia,” “dead zone,” “algae blooms,” “total maximum daily load (TMDL),” etc. Dealing with all these issues will affect ways farmers use nitrogen and other chemical nutrients in the future.

It is important farmers try to reduce inputs to trim per acre costs, and those interested in dealing with future regulatory guidelines examine their soil's calcium content and use competitively priced Growers Mineral Solutions to follow the 4Rs of Nutrient Stewardship which are: apply the right source of nutrient, at the right rate, at the right time, and in the right place. These 4Rs are considered very important by the agricultural establishment to deal with agricultural environmental issues.

Also, with these excessive fertility inputs, the resulting plant tissue becomes imbalanced with various elements, which in our experience, leads to profound problems for both crop and livestock farmers. Nutritional imbalances can result in various bacterial and fungal infections or adversely affect starch production in the kernel, hence lowering alcohol or feed energy potential.



Corn seedlings 21 days after planting.



	Yield (bushels/acre)	Test Weight (pounds/bushel)	Moisture (%)
GMS Treated	157.1	55	24
Not GMS Treated	137.9	52	29

Planting Corn WITH GMS

The corn plant's first stress period occurs at germination, and this can be further aggravated by cold, wet soils. By applying GMS directly on the seed, the farmer is placing a balanced load of nutrition in the seedbed; he is "Targeting Fertility."



One of several methods for In-Furrow Technology.

Besides the seed firmers, there is the rebounder or the totally tubular for In-Furrow Technology.

High quality raw materials in GMS allow it to be applied directly on the seed—targeted—and, being in a liquid form, greatly helps improve nutrient absorption. By comparison, most fertilizers are toxic and must be buffered by the soil to prevent injury to the seed or newly germinated plant. They are placed in a standard 2 by 2 (2 inches beside the seed and 2 inches below the seed) band configuration. A disadvantage of banding is that in the early

growth period, only a few side roots have access to the fertility, while the majority will grow down missing the band.

GMS flows through a drop tube located about 2" behind the seed drop into the seed trench before the soil is closed in around the seed. GMS can be supplied from tanks mounted either on the tractor or planter, and can be moved to the drop pipes by squeeze pump, piston pump, centrifugal pump, roller pump, or gravity. GMS application rates to the seed are controlled by using appropriate flow regulators sized for pressure and speed.

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.

WHEN GROWING CORN: NITROGEN & SOIL CALCIUM

Nitrogen is a necessary ingredient for crop growth and production. There are three primary sources: applied nitrogen from commercial sources, manure, and naturally occurring nitrogen from the soil. The amount of soil-generated nitrogen is related to the viability of the soil's micro-biological life. The most important and controllable factor contributing to soil life is the soil's available calcium.

Soils with a proper balance between calcium and magnesium will usually have sufficient natural nitrification to grow good crops. A good soil balance will have calcium levels of about 8½ times the level of magnesium in per cent of base saturation, or will have calcium in pounds available of about 15 times that of magnesium. Those soils with lower calcium availabilities, especially those low in organic matter and biological life, will need additional nitrogen.

Growers' representatives take topsoil and subsoil samples of customers' fields and send them to the Growers Soil Lab where they are tested for available calcium and other minerals. The GMS representative will evaluate the

RECOMMENDED RATES OF GMS

PLANT POPULATION IN 1000'S	ROW APPLICATIONS GAL. PER ACRE
14-16	2.0
16-18	2.5
18-20	3.0
20-22	3.2
22-24	3.5
24-26	4.0
26-28	4.5
28-32	5.0

As soil temperatures increase and the soil becomes drier, these recommendations can be lowered. The recommended volume of GMS to be used depends on plant population and yield potential of the soil and the environment. Some farmers may use more or less than these recommendations.

Foliar Feeding Corn WITH GMS

test results and other factors, and recommend applications of high-calcium limestone, appropriate quantities of manure or commercial nitrogen, and GMS needed to produce profitable crops.

A corn plant's second stress period occurs during its maximum growth stage, which is from the V4 stage (about 10 inches tall) until pretassel. This is another time when "Targeting Fertility" will pay and is the best time to foliar spray corn with GMS for maximum crop response. Foliar application of GMS can enhance yields, improve plant quality, hasten maturity, and reduce moisture content at harvest.

Many farmers find that foliar feeding is also a very effective tool during periods of environmental stress such as drought or excess rainfall. In these situations, plant roots often have been injured and do not take up nutrition properly. "Targeting Fertility" puts nutrients into the plant.

Foliar sprays should be applied in the early morning, late afternoon (evening), or on foggy or overcast days. Plants will not absorb minerals through foliage during the heat of the day or in bright sunlight. Foliar sprays are generally applied by ground equipment utilizing boom sprayers, mist blowers, and highboy sprayers. Some applications, however, are made by helicopters or spray planes.

The usual GMS foliar application rate for corn is two gallons per acre; however, the rate used could vary from two quarts to four gallons per acre depending on conditions. The circumstances governing the rates would be: the programmed number of applications during the season, single or multiple sprays, the size of the plant, past applications, weather, plant population, solution dilution, etc.

FOR LIVESTOCK

When corn is to be used as livestock feed, it is very important to apply foliar nutrition at least twice before tasseling. This is to further improve yield and plant tissue quality essential for animals, whether they will eventually consume the entire plant or just the grain.

FOR CASH CROP

Cash market corn should receive at least one foliar spray to help with productivity, to aid plant growth in times of stress, and to help ensure the plant is pushed along to timely maturation. Foliar feeding helps dry excess watery

growth, usually the result of too much nitrogen. In addition, foliar feeding can improve the density of grain (test weight) which helps gain higher prices.

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.

COMBINING SEED & FOLIAR FEEDING

The combination of seed and foliar applications of Growers Mineral Solutions is highly recommended over one or the other, whether each application consists of GMS alone or in combination with other commercial fertilizers. The generally recommended combined amount of GMS for seed and foliar use is as follows:

- For plant populations of 16,000 to 20,000 plants/acre, use a total of 6 gallons of GMS per acre.
- For every 4,000 plants/acre above 20,000 plants/acre, use an additional 1 gallon per acre of GMS.

For example, a farmer planting 28,000 plants per acre should use a total of at least 8 gallons per acre of GMS. For livestock, he should place 4.5 gallons per acre on the seed, and use 1.75 gallons per acre for each of two foliage sprays. For cash crop, the same approach is the best, but the farmer may be able to get by with 4.5 gallons per acre on the seed and one 3.5 gallons per acre foliar spray, or he may use one application of 8 gallons per acre on the seed.