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The Growers Solution

SUMMER 2022

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VOLUME 35 ISSUE 3

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PROPER FOLIAR FEEDING PRACTICE AND BENEFITS

by Zach Smith, Product and Training Specialist

Each year, we include an article in the early summer Solution with foliar feeding methodology as a reminder/teaching tool for our customers. This year, with our Research Team conducting research into foliar feeding in a lab environment, we would also like to share some information on the effect GMS has on the root zone and soil microbiology, with a potent picture worth a thousand words.

FOLIAR APPLIED GMS IN THE ROOT ZONE

Take a look at Photograph A before reading this section. The plants in the photograph were sprayed twice, four days apart, with a solution of GMS and water equivalent to 2 gallons per acre (per spray), the same solution but with a sample of GMS with no trace elements added to it, 28% nitrogen, molasses, and a 9-18-9 liquid fertilizer. They were also watered only once with pure water, then left to wilt, after which they were plucked, dried, weighed, and the soil tested with the MicroBiometer.

As you can see from the photograph, the roots of the plant sprayed with GMS are significantly heavier than all of the other competitors. Please also note that these

	Weight of above ground parts
GMS	1.08 grams
10-20-10 no/trace	1.08 grams
28% Nitrogen	1.12 grams
Molasses	.75 grams
9-18-9	.77 grams

plants were growing in dry conditions for most of their short life, meaning that even in drought conditions, fertility sprayed on the foliage is translocated into the root system. Also note Photograph B (on page 4), which shows the top growth of the plants before they were plucked and dried. The chart shows the weights of the above ground portion of the plants after they were plucked and dried, and both GMS products were only beaten by 28% nitrogen. Nitrogen causes lots of top growth, so this shouldn't be too too surprising, though I'm willing to bet that, had these plants been allowed to grow further, it wouldn't have held the lead as the plant took advantage of the balance of nutrition in GMS to build more tissue.

WASHING AND MIXING PRECAUTIONS

Since many people's sprayers are used for multiple products, including fertility and various pest and weed control products, it's important to remember to wash out your sprayer of old product before going out to spray GMS. This is for two reasons:



PHOTOGRAPH A: The root systems of each plant after being pulled and dried. Their respective weights are listed below them.

"Practice and Benefits," continued on page 2

WE'RE HIRING!

We are offering the exciting opportunity to join our growing team as our Sales Manager. We don't yet know exactly what the responsibilities of this position will be, but our goal is to expand the company and share our amazing product with as many people as possible. Our ideal candidate would even have experience with, or background knowledge about, the Growers Program! However, even if they do not have prior experience with Growers, we will make sure that they are given the necessary tools and education to succeed. We need a self-motivated individual to help our sales grow and help more customers champion the benefits of farming with the Growers Program.

Requirements:

- Must be available to work full time.
- At least 3 years prior experience in sales
- Background in agriculture or farming
- Ability to travel frequently, primarily December through April
- Location near Milan, OH

Since the Sales Manager will work so closely with all of you, we wanted to invite you to be a part of the process. Please apply, submit questions about the position and benefits, or send referrals to our Human Resources Coordinator, Marguerite Fall, at 216-468-5784 or mfal@growersmineral.com.

GROWERS WINTER MEETING IN AUGUST?

Since 1955, Growers has hosted a Winter Meeting for our hard-working District Managers and Sales Representatives who are the face of Growers to our customers. With COVID, we have had to suspend these gatherings and conduct these meetings virtually.

We are happy to announce that, after a two-year vacation, the Growers Winter Meeting is returning! The Growers Winter Meeting will take place on August 31, 2022 in beautiful Milan, Ohio. Having a winter meeting in August is unique, but then again, so are we.

As always, our Winter Meeting will be a chance for our District Managers and Sales Representatives to reconnect, find out what is new and interesting in our organization, and help reinforce that together, we are making a difference in the lives of our customers.

We will send out all the details for the meeting to our District Managers and Sales Representatives in the next few weeks. It will be great to get together again and share some of the new ideas and plans we have for the future!

New Beginnings

Honoring Our Roots—Building our Future

SOIL TESTING AND SOIL HEALTH

by Jim Halbeisen, Director of Research

In recent years, the agricultural establishment has been referring to the term "soil health" when discussing the various environmental issues that are related to fertilization in the agricultural industry. Now as fertilizer prices have increased dramatically, the biostimulant (soil microbiology) industry has received interest from many different areas of the agricultural fertilizer industry. Understanding the microbes in your soil is now considered a step toward understanding how to achieve soil fertility. Growers Mineral, Corp. has discussed the importance of soil microbes since 1955, and believed that the conventional soil test was not the best method of assessing a soil's suitability for economic crop production. In the past, the company would use conventional soil tests to appraise a soil's health; however, that discussion always included the advice of doing "strip tests" to evaluate various implemented approaches. However, now enters the microBIOMETER.

The inception of the microBIOMETER occurred when Dr. Judith Fitzpatrick saw a gap in traditional soil quality testing, which typically analyzes soil content and chemical volumes without giving special attention to microbes and their impact. Dr. Fitzpatrick, in her early career as a microbiologist and medical test developer, was running the company Serex where she created over 15 medical diagnostic tests and helped produce 3 million FDA approved tests a year. According to Laura Decker, president of Prolific Earth Science which manufactures the microBIOMETER, the microBIOMETER is changing the world of soil testing, making healthy soil a goal that a farmer can accurately measure. The producer can evaluate which methods are more effective and prove the efficiency of implemented biologic procedures.

In the past, testing soils for microbial contents has been too expensive and time consuming for many farmers. Plus, many microbes do not survive the trip to a lab, which leads to inaccurate test results. The microBIOMETER test is low cost at about \$13.50 per test, and it is done in real time, approximately 20 minutes.

The microBIOMETER has been used in various scientific studies, but Decker explains that results delivered by the test are data only. The results of the microBIOMETER is useful to users who want information rather than prescriptions. Her thought is that this is why researchers and independent farmers tend to be more interested in the test than most agribusinesses.

At Growers Mineral, Corp., we don't know if the microBIOMETER is a good replacement for the conventional soil test or if it can help improve the interpretation of a conventional soil. ■

"Practice and Benefits," continued from page 1

1) Even residual amounts of herbicides, such as that left in the lines or lining the inside of a tank, are strong enough to seriously damage or kill non-resistant crops if accidentally sprayed onto them. This is especially important with newer technologies, including glyphosate, dicamba, and 2-4D mixtures. Please follow proper tank cleaning protocols in order to avoid crop damage. 2) GMS is unpredictable in how it will react to or affect herbicides when they are mixed. Just as when mixing with some hard water, there may be precipitate that will cause efficiency and equipment problems. Also, some operators have noticed an increase in herbicide potency when mixed with GMS, causing even resistant crops some problems. It is not advisable to tank mix GMS with any other product.

FINE MIST

Foliar feeding with fertility products is most successful when as much of the plant as possible is coated in as fine a mist as possible. The pores in leaves' cuticles are very small and so will absorb small water particles much better than large ones. Spray pressures over 40 psi tends to produce the smallest particles. In addition, if spray drift is a concern, tend towards higher spray pressures for the anti-drift type of nozzle you are using. Remember, plants can absorb nutrition through their leaves and through the smooth bark/stalks, so getting as much coverage as possible is in your best interest.

SPRAY TIMING

Foliar spraying should not be done in the heat of the day or in direct sunlight. This is because foliar nutrition must be absorbed through pores in the leaf surface, which will close in high heat or sunlight to prevent water loss from the plant, thereby preventing them from absorbing anything on their surface. Furthermore, since foliar nutrition must be absorbed with water through the plant surface, we advise that you spray when there is, or will shortly be, dew on it. Taking these together, the best times to spray are early morning, late evening, on overcast or foggy days, or anytime the leaves will have dew on them. If you do spray in high heat or direct sunlight, the risks of leaf burn and bad fertilizer efficiency are high.

"Practice and Benefits," continued on page 4

WHAT LAYS AHEAD IN 2023? (OR, WHERE DID I PUT MY CRYSTAL BALL?)

by Rick Bobel, President & CEO

Jim Halbeisen asked that we discuss the pricing situation on GMS this year and where we feel it may head leading into next year. In addition, he asked that we give our thoughts about where we feel prices in agriculture are going to head. To best do that, we will need to get out our crystal ball and polish it off a bit. To be fair, we will only need the crystal ball when we want to talk about pricing in agriculture.

Let's start with agriculture prices in general. It seems that the consensus is that prices across the board will either stay where they are or go up. Inflation may become a big issue (will go up) as will supply (or lack thereof) of almost everything. Overseas transport pricing may soften a bit, but it looks like domestic transport may continue to be an even bigger problem. Situations in getting raw materials from non-US sources will continue to be an issue both in terms of supply and availability and transport.

I think we are all realizing that agriculture is not just a local or national issue, but a global issue. There are so many factors outside of our control that play a part. Our feeling was, and continues to be, to control those things that you can, be open to learning as much as you can, and realize that we are all working together to create the best world we can.

The pricing on GMS for the future may be a bit clearer, although there may be some guesswork involved in coming up with what direction we think our prices will head. Our pricing model for GMS is based on looking at the actual costs involved in making, delivering, and selling GMS. To those costs, we add a reasonable return on our investment and set our prices accordingly. We don't pay a lot of attention to supply and demand as a rationale in setting our prices. Taking that course of action this year could have given us a much higher return on our investment, but we like the idea of being consistent with our business model, especially if that supports our customers. (The price of GMS is up approximately 60% over a year ago. Many other input costs have gone up over 150% over the same time.)

The main costs involved in GMS involve the high quality raw materials that are used in making it, and the transportation costs both from our supplier to us and from us to our customer.

For the raw materials that we use in making GMS, this has been a challenging year both in terms of getting the best pricing and consistent supply. Fortunately, adequate inventory of GMS in storage throughout our sales area has allowed us to supply all our customers' orders in a timely manner. That is the advantage of having a product that will stay consistent and in-solution almost indefinitely.

We are seeing a bit of softening in the transport costs for some of these raw materials, and have found slightly lower pricing on one of the raw materials. Unfortunately, some of the pricing of the other raw materials we use looks like they are trending up. Fortunately, it also looks like there will be a consistent supply.

Our plan for this year is to have a consistent supply of GMS available. The advantage of a highly efficient product (90% utilized by the crop) that can be applied when and where it is needed was a unique benefit of our product when it was developed. Those same attributes make our product not only unique but an extraordinary value because it represents having a strong return on the investment of costs involved in plant nutrition.

Our best estimate is that the price of GMS will tend to trend up this year, but we are confident in the supply available for our customers. We will continue to provide weekly updates in terms of overall supply, and daily updates in the pricing of GMS.

"People who say that it cannot be done should not interrupt those who are doing it. —George Bernard Shaw ■

CROP NEEDS MORE FERTILIZER HELP? FOLIAR SPRAY!

by Jim Halbeisen, Director of Research

With the fertilizer mess that is clouding 2022 crop production, a producer could consider the use of foliar feeding. Whether it is from the availability of product or an exorbitant price, many farmers used significantly less fertilizer on their crops than they have used in past years.

So, as the growing season starts to shift into high gear and commodity prices are remaining relatively consistent, many producers are concerned that their crops should receive more fertility nutrition. In the past, the agricultural establishment believed that this type of problem had little to no solution.

Since 1955, Growers Mineral, Corp. encouraged producers to foliar feed mineral elements to their crops as a source of sound nutrition. The foliar feeding discussion in the past centered on supplying mineral elements directly to the plant to satisfy the plant's direct need for plant tissue growth. The plant's need for supplying mineral elements for its tissue growth is a very important part of foliar feeding plants, but as the agricultural establishment recognizes the importance of the microbiological life in the soil, another discussion opens up about foliar feeding of crops.

As the crop grows, it is fed by the symbiotic relationship between it and the microbiological life in the soil. As part of this symbiotic relationship, the plant transports sugars made by photosynthesis to the microbiological life which is present in the rhizosphere that surrounds the roots of the plants. Therefore, any mineral elements that are supplied to the plant through foliar application that the plant may not need directly for its tissue growth can then be transported with the sugars to the plant root zone and rhizosphere which, in turn, can be used directly by the soil microbiological life. This infusion of nutrition to the soil microbiological life improves their performance at feeding the crop important nutrition. The effect of feeding the crop directly and the indirect influence on the soil microbiological life could give the plant enough energy to overcome any environmental stress.

So, if a producer feels they have shortchanged a crop's fertility needs because of the fertilizer mess, foliar feeding—particularly using GMS—may offer the producer a very important option. ■

FOLIAR FEEDING CONTINUED: SOIL MICROBIOLOGY EFFECT

During the same trial explained in *Proper Foliar Feeding Practice and Benefits*, our research team tested the soil the plants had grown in with a MicroBiometer. The results are shown in the chart here.

These numbers are of total microbiological biomass, or the amount of microbiological tissue present in the sample. The soil tested at 215 before having anything planted in it. As you can see, both regular GMS and GMS with no trace elements added have significantly better results than any other product. Molasses comes the closest, which is probably because of its high sugar content which soil microbes love

to feast on. However, even that isn't enough to counter the balance of nutrients in GMS, or apparently the purity of the product, which is why even GMS with no trace elements performed so well. We believe these results are a product of both the plants excreting more sugars into the root zone as a result of being healthier, and these plants excreting some of the fertility into the root zone as well.

Of interest to note is both the 28% and the 9-18-9 actually reduced the biomass in this test. While replicating this test may not produce the same result, it is consistent with our knowledge that impure fertilizers can hurt soil microbiology. ■

Soil bio # at trial start 215	Biometer Number
GMS	286
10-20-10 no/trace	283
28% Nitrogen	174
Molasses	218
9-18-9	141

New Beginnings

Honoring Our Roots—Building our Future

FOND FAREWELLS

Over the many years that Growers has been around, we have said goodbye to many people. It is with sadness, but also fondness, that we add three more men to the list of people we've had the privilege of working with who have passed:

David Prater: Born June 23, 1949 and passed January 14, 2022. David was a longtime District Manager with Growers from Illinois, and he will be missed.

Mac Carter: Born November 19, 1937 and passed January 12, 2022. Mac was also a longtime District Manager from Pennsylvania, and will be missed.

LaVern Scherping: Born August 23, 1945 and passed February 3, 2022. LaVern drove delivery truck for Growers for many years in Minnesota, and is fondly remembered by many.

"Practice and Benefits," continued from page 2

SPRAYING GMS STRAIGHT OR DILUTED

GMS can be sprayed straight or be diluted in water. In the early days of the company, when low-volume sprayers were more commonplace, spraying GMS straight was by far the most popular choice. Since the use of foliar applied herbicides and fungicides has become widespread, higher volume sprayers have become more the norm. In such a case, GMS can be mixed with water to meet volume requirements. Spraying straight or diluted does not affect the effectiveness of GMS, barring if water of poor quality is used.

If you are going to mix GMS with water, it is best to use R.O., distilled, or rainwater because they contain little to no dissolved solids. The phosphorus in GMS can react poorly with the various elements in hard water creating a white precipitate that reduces efficiency and can plug up sprayer screens and nozzles. However, if you keep the amount of water added under the amount of GMS, this should not be a problem.

WATER QUALITY CONSIDERATIONS

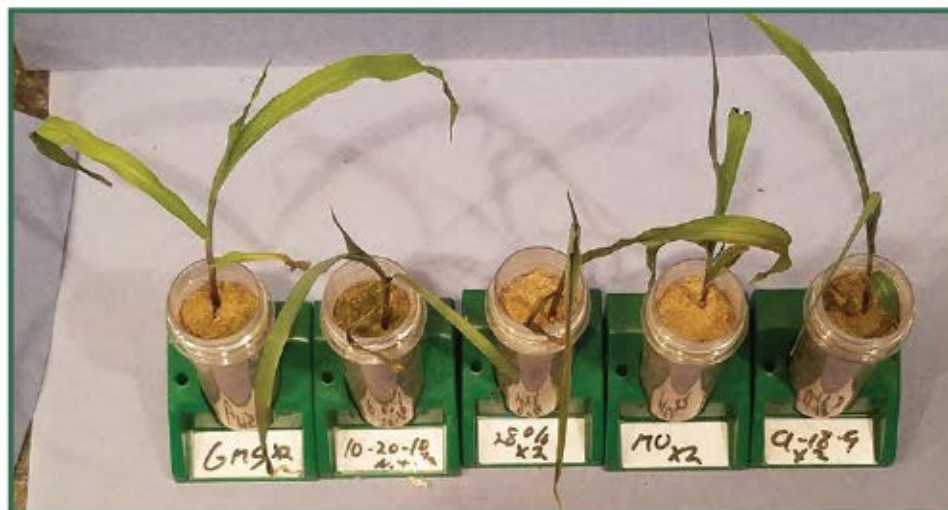
In the past, we recommended that, if you were going to mix GMS with hard water, you acidify the water first to ensure it wouldn't react with the GMS and produce a precipitate. Acidifying the water will prevent the phosphorus and various elements from bonding together and precipitating out. While this will ensure that the mixture makes it through your screens and nozzles, research done over the past year and a half has shown that even if the water and GMS don't react, there is still a detrimental effect on the leaf from using hard water. The mineral left on the leaf surface from the hard water can impair photosynthetic potential, so it is important to use clean, low dissolved solid water to ensure no harm comes to the plant and you get the most out of GMS. ■

The Growers Solution

Circulation: U.S.A. and Canada: 10,000
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PHOTOGRAPH B: The top growth of the plants before they were removed from the soil.