Milan Ohio
ESTD GROWERS MINERAL 1955
THE FARMERS SOLUTION

Printed On Recycled Paper

The Growers Solution

SUMMER 2023

VOLUME 36 ISSUE 3

# "AGRITAINMENT:" NOT JUST FUN ON THE FARM

**by Chris Kohls**

A new trend in the American agriculture industry is to include entertainment endeavors on the farm, or, in other words, "Agritainment."

Agritainment is becoming extremely popular among farmers in the United States and Canada. It is not just fun and something to do after harvest, but a profitable new farm business model. Last fall, Jim Halbeisen, John Sensenig, and I visited one of John's most dynamic Growers Mineral customers in Mexico, New York. Randy Granger owns and operates the Granger Tree Farm. He primarily grows pumpkins, blueberries, and Christmas trees, but also has a farm playground.

Every weekend in the fall, Randy opens his farm up to the public of all ages for fun and activities. He has all sorts of activities: Pick-your-pumpkin, a haunted corn maze, feed the sheep, choose your Christmas tree, and a wonderful playground along with great food and beverages. He sells over 10,000 pumpkins, hundreds of Christmas trees, and countless food and drinks. He has turned his tree farm into a weekend destination.

*Randy Granger in front of the "Pick-Your-Pumpkin" patch and Haunted Corn Maze (right).*

Randy has been a successful Growers Mineral customer for several years. He starts his Christmas trees in containers for two years prior to transplanting to the field, utilizing Growers Mineral throughout the process. His Christmas trees—the best in the county—are full and picture perfect, and an integral part of his core farm business. Randy's agritainment venue provides an additional opportunity to sell his trees at a premium.

Along with the core Christmas tree business, Randy grows exceptional pumpkins: large, with thick stems, and all the rage at the pick-your-pumpkin field. He lines up the 10,000+ picked pumpkins in a large mowed field alongside the haunted corn maze and playground. What a scene it is to see hundreds of kids trying to find their perfect pumpkin!

Turning a profit in farming has become increasingly difficult with input, equipment, seed, fuel, and labor costs skyrocketing the last few years. Farmers are looking for other ways to generate a positive return on investment (ROI). Agritainment has opened the door for many farmers to increase farm revenues and profits along with having fun!

So, if you are in upstate New York in the fall, stop by the Granger Tree Farm for a warm beverage and your Halloween pumpkin, and do not forget to choose your Christmas tree and wander the haunted corn maze. Enjoy! ■

*Granger Christmas trees ready for transplanting into the field.*

# ON THE ROAD AGAIN

*Hope to see you soon!*

This summer, Growers Mineral, Corp. is scheduled to set up and staff booths at the following upcoming farm shows. It's a great time to stop in and review your plant food and mineral supplement program, hear about new developments at Growers, or just chat with the folks who make it all happen—your friends and neighbors.

| | |
|---|---|
| **July 18-20** Tues-Thurs | WI Farm Technology Days Clark County, WI |
| **Aug. 1-3** Tues-Thurs | Minnesota Farm Fest Redwood County, MN |
| **Aug. 8-10** Tues-Thurs | Penn State Ag Progress Days State College, PA |
| **Sept. 19-21** Tues-Thurs | Farm Science Review London, Ohio |
| **Oct. 17-19** Tues-Thurs | Sunbelt Ag Expo Moultrie, GA |

# REMEMBER: MONTHLY CONFERENCE CALL

On the second Thursday of the month at 9:00 PM Eastern for the months of September through April, we hold a conference call usually featuring a picture from the Growers Calendar along with other important agricultural events. There is no participation charge for the call. For the call, dial 1-646-558-8656 (US) or 1-438-809-7799 (CAN). The Meeting ID is 359 647 7278.

# LIVESTOCK WASTE AND SOIL MICROBES

**by Jim Halbeisen, Director of Research**

The USDA's Agricultural Research Service (ARS), in the February 13, 2006 issue of *Feedstuffs,* stated "unmetabolized antibiotics' were part of livestock waste. Also, the Environmental Defense Study claimed about 50% of fed antibiotics are excreted by the consuming animals. With knowledge of these facts, it is easy to see how livestock waste could have a serious influence on soil microbiological life.

However, in recent times, certain protein companies are suggesting that antibiotics are no longer used as a part of their feeding operations. This suggestion comes into question when an April 7, 2022 article was published in *www.drovers.com* referring to research work done at George Washington University that was published in *Science Magazine*. This work found that current "raised without antibiotics" (RWA) labels lack integrity.

Their research suggests that even livestock manure from animals being "raised without antibiotics" can be a significant source of antibiotics (or ionophores) being applied to soil through that livestock waste, which is in addition to the traditional volume of antibiotics (or ionophores) that are known to be fed to livestock and end up being applied to soil. It has been known since the early 2000's that up to 50% by volume of fed antibiotics (or ionophores) end up on the livestock waste.

The suggestion that "raised without antibiotics" (RWA) labels lack integrity has forced the beef industry to give high priority to finding antimicrobial alternatives. Also, in recent years environmental groups have petitioned the US Food and Drug Administration (FDA) to ban the use of antibiotics in livestock and poultry in the absence of illness. Such a discussion appeared on January 25, 2023 on *www.dtnpf.com* "Groups: End Livestock Antibiotic Shield."

With the knowledge of antibiotics in livestock waste, a study was published on September 8, 2021 and appeared in *www.sciencedaily.com* investigating livestock antibiotic effects on soil microbes. This research was conducted at Cary Institute of Ecosystem Studies. These studies found with rising heat and antibiotic conditions, soil bacteria collapsed, allowing fungi to dominate the environment resulting in fewer total microbes and less microbial diversity overall. Antibiotics alone increased bioavailable carbon in the environment and reduced microbial efficiency. It is suggested that these changes to the soil microbes could diminish soils' resilience to future stress.

These types of studies suggest that initial livestock manure applications which showed beneficial results may possibly create a soil microbial imbalance which causes less beneficial plant growth in the future. Any problems with future plant growth will occur at different time intervals and display different quantities of problems depending on the type of antibiotic, volume of antibiotic, and critical soil properties. ■

# INTRODUCTION TO GMS

*Marty Whitsitt, who is a Growers Mineral, Corp. District Manager located in southwestern Indiana, was asked to write a brief summary of Growers Mineral Solution and the Growers program for an agricultural publication. The following is that summary.*

Growers Mineral Solutions (GMS) has been in business since 1955 and is still the same product following the same simple guidelines laid out by Dr. V.A. Tiedjens all those years ago. Those guidelines are to use a high quality liquid fertilizer for the plants that stimulates the biological life instead of injuring it, and provide the best growing environment in the soil by adding high calcium limestone.

Calcium in the soil is a cornerstone of the Growers program. Contrary to "mainstream" agriculture, pH is not a direct indicator of calcium. All minerals have a pH of their own, and the number that pops out on a soil test is just the average of all those pH's blended together. We all know that adding limestone can raise the pH of acidic soil, but did you know it can also lower the pH if it is high? The pH of calcium is about 7, so it will always push the soil pH toward 7. When we consider that magnesium is just over 8 pH and potassium is almost 9 pH, and soil is pulverized into powder and baked dry, killing all biological life, before testing, the soil test begins to look quite meaningless.

Calcium is a natural flocculant that pulls clay molecules into balls providing needed soil pore space for air and water to move as it should, creating the ideal environment for the all important biological life. If soil is sticky and slimy when wet and bakes hard as a rock when dry, change it with limestone. If soil doesn't want to drain, with or without tile, change it with limestone. How much lime do you need? Only your farm can answer that question by putting in test strips of high calcium lime ranging from 5 to 20 tons per acre, and watch what happens. Some of our customers call limestone "white gold." It is viewed as part of the fertilizer program and not just a pH adjuster.

Talking about calcium is the first thing that sets us apart from other fertilizer programs. Second is GMS itself, a unique product that is a 10-20-10 analysis with trace minerals included in a hot mixed true solution. This means the trace minerals will not settle out over time. Much effort is put into making sure GMS has a significantly lower level of toxic heavy metals such as cadmium and uranium. Since the toxicity is much lower, when GMS is placed near the seed it is consumed by the biological life and held in their tissue in the soil as they multiply rapidly and then present the minerals to the plant as needed without being leached away by rain. When applied as foliar spray to the growing leaf, GMS is quickly absorbed, spreading throughout the plant, even the roots, helping again to feed the biological life near the root. GMS is about 95% utilized by the crop where most dry fertilizer is only about 10% utilized. A little goes a long way!

With a low level of toxicity, GMS is the only fertilizer that is FDA approved to be used as livestock mineral. Dry livestock minerals are just ground up rock and a very small portion is absorbed and utilized by the animal. The rest goes out in the manure pit. GMS is easily absorbed by the animal and can reduce phosphorous levels in the manure pit while maintaining phosphorous levels in the animal. The trace minerals also feed the biologicals in the animals to aid digestion and feed utilization. With adequate calcium and GMS on forages, we are able to produce nutrient dense feed that tends to reduce health issues. Lower vet bills and less volume of feed for the same production, whether it is meat or milk, helps to improve the bottom line.

Our job is to teach you what you need to know so you can make your own decisions as to what your land and animals need. No paid "expert" can look at a piece of paper (soil test) and know your farm better than you, or read a report (forage analysis) and tell your animals what is best for them.

This introduction letter has just scratched the surface of the vast information gathered from our network of farmers over our 68 years of experience. Let us teach you what we have learned! ■

# PROPER FOLIAR FEEDING AND WATER CONSIDERATIONS

**by Zach Smith, Product and Training Specialist**

Welcome to our annual foliar feeding methodology article! This year we would like to share with you some of our own research results that speak to the importance of foliar feeding and using proper water.

### ARE ALL WATERS EQUAL WHEN IT COMES TO FOLIAR FEEDING?

In the Summer 2022 *Growers Solution*, we looked at the effect of foliar feeding on top and root mass. This year we would like to highlight the observed difference in 4 kinds of water used to spay GMS on a cucumber leaf. In this experiment, Matt placed a drop of solution (10% GMS) on four different spots of the same cucumber leaf. The types of water used were city water (treated by the municipality of Tiffin, Ohio); his own well water (untreated in any way); softened well water; and rainwater. Four hours after the application, once the water had been absorbed/dried, there was residue left where each drop had been. He re-moistened the leaf surface to simulate dew, and then took the photo shown in **Photograph A** *(see page 4)* three days later. Please note that the 4 close-up pictures in Photograph A were taken through a microscope. You can see that the only drop that has largely not resolubilized is the drop with city water. However, if you look closely, you will see that there is either some material or damage left where the softened water was. Interestingly, the well water seems to have been resolubilized and absorbed almost as well as the rainwater drop.

We are showing this experiment because we have mostly compared the differences between hard water (untreated) and either R.O. or rainwater. However, there are many people who will treat their water with a softener or, especially in gardens and if they are on municipal water, will use city water. We will go into more depth with this experiment in a future Solution, but for now, let Photograph A provide you with some food for thought!

### DOES FOLIAR FEEDING EFFECT SOIL MICROBES?

We often talk about the benefits of foliar feeding to the plant, but only recently have we started considering the effects of it on microbes in the soil. In the foliar experiment highlighted in the Summer 2022 foliar feeding methodology article, Matt also took microBIOMETER readings of the soil supporting the plants he was spraying. Remember that these plants were sprayed once or twice (two experiments were done) with a 2 gallon per acre equivalent of GMS mixed in pure water. You can see the microBIOMETER results in **Table 1** and **Table 2**.

A few things to note:

1. It is clear that foliar feeding does have an effect on the soil microbe biomass (amount of living material).

2. Regular GMS (with trace elements) provided the best results in both experiments, including doing better vs. GMS without trace elements.

3. There is a discrepancy between the single and double spray experiments where the GMS without trace elements did better than other treatments in the single, but was outclassed by both molasses and the check vial in the double.

4. In both experiments, both 28% and 9-18-9 appeared to have a detrimental effect on the biomass.

***TABLE 1:*** *The biomass readings for the single spray trial gathered using the microBIOMETER*

| TREATMENT | microBIOMETER READING *(215 at start of trial)* |
|---|---|
| GMS | 286 |
| GMS without trace elements | 283 |
| 28% UAN | 174 |
| Molasses | 218 |
| 9-18-9 | 141 |

***TABLE 2:*** *The biomass readings for the double spray trial gathered using the microBIOMETER*

| TREATMENT | microBIOMETER READING *(215 at start of trial)* |
|---|---|
| GMS | 201 |
| GMS without trace elements | 120 |
| Check (no treatment) | 162 |
| Molasses | 152 |
| 9-18-9 | 112 |
| 28% UAN | 94 |

### WASHING AND MIXING PRECAUTIONS

Since many people's sprayers are used for multiple products—including fertility and various pest and weed control products—it is important to remember to wash out your sprayer of old product before going out to spray GMS. This is for two reasons: 1. Even residual amounts of herbicides, such as that left in the lines or lining the inside of the 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 glyphosphate, dicamba, and 2-4D mixtures. Please follow proper 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 a 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 tend 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 smooth bark/stalks, so getting as much coverage as possible is in your best interest.

*"Proper Foliar Feeding," continued on page 4*

# GROWERS NUTRITIONAL ADDITIVE (GNA) AND PLANT GROWTH REGULATOR (PGR)

**by Jim Halbeisen, Director of Research**

The article "A Kick-Start for Corn" was published on *www.agweb.com* on April 21, 2023. This article discussed the use of plant growth regulators (PGR) on crops as a way to help the crop deal with environmental plant stress. This literature lists the 3 main PGR ingredients as auxin, gibberellic, and cytokinin.

Growers Mineral, Corp. has used the PGR of gibberellic acid since the early 1960's. Growers Nutritional Additive (GNA) has been foliar sprayed with GMS on pre-blooming plants to help the plant overcome the stress of blossom set. For example, *Farm Journal* agronomist MIssy Bauer contends that soybeans can abort up to 85% of the plant's seed set due to environmental stress. The discussion in the "A Kick-Start for Corn" article is very similar to Growers Mineral, Corp. suggesting to producers that GNA may help the plant better deal with environmental stress while the plant goes through the physiological stress of blooming.

Since the early 1960's, various GMS row-crop and vegetable customers have had success with the use of GNA in conjunction with the foliar application of GMS. For more information, contact your local GMS sales representative or Growers Mineral, Corp. in Milan, Ohio. ■

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SUMMER 2023

CHANGE SERVICE REQUESTED

## New Beginnings
**Honoring Our Roots—Building our Future**



*"Proper Foliar Feeding," continued from page 3*

### 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 surfaces 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.

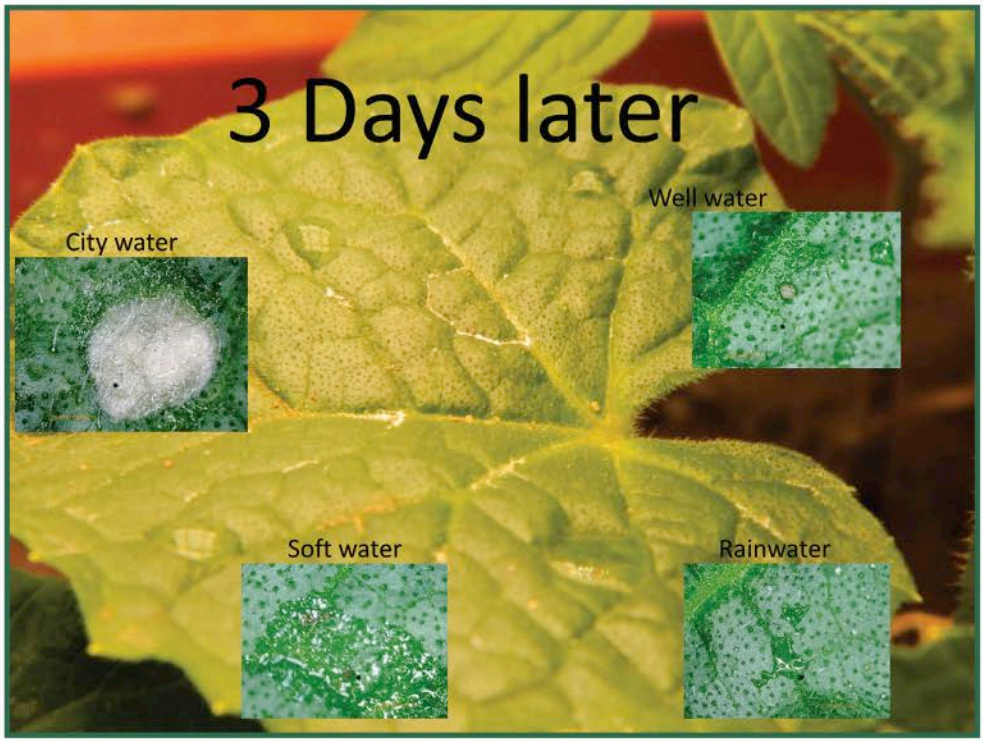
### SPRAYING GMS STRAIGHT OR DILUTED

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. We are finding that even water sources that have been treated either by a municipality or in a water softener and other in-home treatment equipment (excluding an R.O. system) may have detrimental effects on the leaf surface. This is for the same reason hard water can harm leaf surfaces: Whatever mineral is in the water that is not absorbed by the plant will remain on the leaf surface. ■




***PHOTOGRAPH A:*** *A cucumber leaf treated with 4 drops of different water sources and GMS at a 10% mix rate. This photo was taken after the initial drops had been absorbed/dried after which Matt sprayed the leaf with water to simulate dew, three days after which the photo was taken.*