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The Growers Solution

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Sought After New Fertilizer Technology is Here

By James Halbeisen

As a fertilizer registrant, we receive an annual review publication from the University of Kentucky called *Regulatory Services News*. In their Winter 2008 edition there appeared a lengthy discussion about the fertilizer industry's need for new research. According to the International Fertilizer Development Center, about 75% of fertilizers and fertilizer technology used around the world today were developed or improved upon during the 1950s to 1970s by scientists and engineers at the Tennessee Valley Authority (TVA) in Muscle Shoals, Alabama.

Dr. Amil Roy, IFDC President says, "It's time to launch a radical initiative to develop a new generation of energy—efficient fertilizers to help avert hunger and famine. The need for increased food is escalating but new agriculture technology is not keeping pace. An effective research program to develop a new range of fertilizers should be a key element of any long-term strategy to alleviate the food crisis. Most fertilizer products used today were developed when energy seemed abundant and cheap. But with rising process we should develop a new generation of fertilizer products that use plant nutrients more efficiently."

This kind of discussion found in a land grant university publication indicates there finally is concern about the science of current popular fertilizer methods.

Prior to World War II, Dr. V. A. Tiedjens, a founder of Growers Mineral Solutions (GMS), had similar concerns about fertilizer technology. His early fertilizer research had led him to believe using proper mineral balances and purities could result in significant improvement over the inefficiencies of spreading dry fertilizer over an entire acre of soil and plants.

Dr. Tiedjens' early ideas eventually became

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Solution Review

Compiled by Jim Halbeisen

This section is meant to be quick looks into the fast paced business of North American agriculture. Copies of the

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complete articles from which these summaries were taken are available from your Growers Mineral Solutions representative.

Fertilizer Mess

Mike Rahm, vice president, market analysis and strategic planning for Mosaic speaking at the 2008 DTN/Progressive Farmer Ag Summit in Chicago.

"The perfect storm that hit the fertilizer industry this fall is causing a recalibration of crop nutrient markets...the rapid reversal of economic conditions has caused farmers everywhere to adjust and delay cropping decisions...a storage facility in Illinois had moved only about 15,000 tons of P & K this fall compared to an average year of 60,000 to 90,000 tons...Rahm expressed some concern that the lack of fall-applied anhydrous ammonia could cause problems this spring for the nation's farmers. If we get a rebound in crop prices, we may be pleasantly surprised by demand for nitrogen, which could stress the system to supply enough nitrogen."

dtmag.com, 12/9/2008

Soil Calcium

A rice producer from Sheridan, California claims to be improving crop yields by adjusting the calcium/magnesium base saturation ratio using lime and gypsum. His original magnesium percentage was 32% with a calcium percentage of 39% and now he has a magnesium level of 12% with a calcium level of 68%.

This article contains references to a USDA-ARC soil scientist from Tiffin, Georgia who claims calcium improves soil physics and crop quality. *The Furrow*, November 2008

Fertilizer Contamination

These are direct quotes from an article written by Greg D. Horstmeier for *dtmag.com*.

"Fertilizer industry officials warned their members this week about the increased chance that imported Chinese zinc fertilizers could contain high levels of cadmium.

"A memo sent by officials of The Fertilizer Institute told fertilizer manufacturers, importers and distributors that a U.S. Department of Agriculture researcher warned that zinc fertilizers containing high amounts of cadmium have

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Understanding Growers and the Growers Program

By Jim Johns

Most of our TGS readers use Growers Mineral Solutions and some have for a very long time, but other readers probably have only vaguely heard about it and would like to know more. To the later, we'd like to share some of GMS's beginnings.



Dr. V.A. Tiedjens

Dr. V. A. Tiedjens, one of the founders of Growers Chemical Corporation in 1955 at Milan, Ohio, was a pioneer in the development of fertilizer solutions.

Dr. Tiedjens had degrees from the University of Wisconsin in 1921 and 1922, and Rutgers University. He experimented with the use of fertilizers, both liquid and dry, and since 1923 was recognized as one of the leading plant nutrition specialists in the world.

In 1931 Dr. Tiedjens was an early researcher of aqua ammonia as a source of nitrogen for plants. Dr. Tiedjens was a director of the Virginia Truck Experimental Station and coordinator for the USDA research laboratories at Germantown, PA, and Charleston, SC.

Dr. Tiedjens was a past president of the American Association for the Advancement of Science. His name was in Who's Who in America, American Men of Science, Who's Who in Education, and World Who's Who in Commerce and Industry.

Early on, in a long life devoted almost entirely to studying and experimenting with soils and plants, Dr. V. A. Tiedjens discovered most granular fertilizers are very inefficient when broadcast over the ground. University studies confirm crops, during their growing season, utilize

only 10% to 20% of the dry fertilizers applied. He saw the unused nutrient materials, often carrying heavy metals and other toxicities, polluting farm land, streams and ponds, wasting natural resources and, most important, resulting in an unnecessarily heavy farm expense.

From his early pioneering work with hydroponics and from many hundreds of university and, later, on-farm research plots, Dr. Tiedjens determined practically all crops and plants perform best with a 1-2-1 ratio of N,P&K (N-P2O5-K2O) certain essential trace and minor elements to thrive and reproduce, and the nutrients should be applied in solution form directly to the plant for more efficient use. What eventually followed is now Growers Mineral Solutions, a 10-20-10 completely balanced plant food with most all beneficial trace and minor elements having up to 95% plant utilization when foliar sprayed - meaning practically no runoff or pollution - along with similar very high efficiencies when used as transplant solutions and starters on the seed. When used as recommended, non poisonous Growers is also effectively and efficiently used as a mineral supplement for farm animals.

Through his extensive experimental work with soils, Dr. Tiedjens determined adequate calcium levels were needed for healthy soil life, earthworms, etc., and, in turn, for crops and animals to produce and perform profitably. Light and heavy soils alike should have their soil test reports showing calcium (Ca) at 80% to 85% of the CEC (Base Saturation), magnesium (Mg) at about 10%, potassium (K) at 3%, with hydrogen (H) a small remainder. Dr. Tiedjens' Growers Soil Program calls for adequate low cost, high calcium liming material applications,



Dr. V.A. Tiedjens on Paul Miller farm in Ohio.

much reduced chemical and nitrogen use, and tillage methods to improve soil oxidation and aeration. For many years successful, innovative farmers and produce growers following his recommendations have consistently confirmed the Growers Program performs and is profitable on the farm.

With the goal of developing a more efficient and profitable plant food and an economical soil program for farmers, Dr. Tiedjens functioned well up at the university and extension levels for many years. Eventually, however, because he encountered so much opposition, both from fellow educators and the agricultural industry funding the universities, he was able to continue and perfect his concepts only after becoming part of a new and independent plant food company completely dedicated to helping farmers. Even though often at odds with the various state extensions and the established agricultural industry, the company, Growers Chemical Corporation, and its product, Growers Mineral Solutions, have survived over 50 years serving farmers and their families. ■

Solution Review

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fertilizers containing high amounts of cadmium have been appearing in other countries. The USDA warning said the levels recorded in other countries suggest that hazardous heavy metals may have been purposefully dumped into fertilizers as a way to dispose of them.

"The warning comes on the heels of other countries finding contaminated zinc fertilizers in shipments, and from crop contamination following the application of contaminated fertilizers.

In 2002, the U.S. Environmental Protection Agency created more stringent rules around heavy metals such as cadmium, lead, chromium and arsenic after high levels of those metals

were found in a U.S. industrial waste product, KO61, then used to create zinc oxysulfate. Zinc oxysulfate had become a low-cost zinc fertilizer product that was used in a large portion of corn and other crops needing zinc.

"According to health journals, cadmium collects in the human body, particularly in the kidneys, and can cause long term kidney damage. It also affects how calcium collects in the body, leading to bone deformities." *dnag.com*, November 26, 2008

Monsanto News Releases

New initiative focuses on water quality improvement in the Mississippi River Basin and Gulf of Mexico.

Monsanto Company launches new effort to help reduce nutrients and sediments in agricultural runoff by partnering with The Nature Conservancy, Iowa Soybean Association, Delta Wildlife and The National Audubon Society on conservation projects in the Mississippi River Basin.

Monsanto's new partners commit to sharing best conservation practices and joining in dialogue with other conservation groups, agriculture groups, government leaders as well as other parties interested in working with farmers to preserve water quality and conserve wildlife habitat along the river and its tributaries. www.monsanto.com ■

On The Road Again

WINTER — 2009

Growers Mineral Solutions is scheduled to set up and staff booths at the following upcoming farm shows and conventions this winter. It's a great time to stop in and review your plant food and animal nutrition needs, hear about new developments at Growers or just chat with the folks who make it all happen — your friends and neighbors.

Jan. 6-8	Delaware Ag. Week Harrington, DE
Jan. 6-8	Keystone Farm Show York, PA
Jan. 6-8	Ontario Landscape Congress Toronto, Ontario, Canada
Jan. 9-10	Georgia Fruit & Vegetable Show Savannah, GA
Jan. 13-14	Ohio Produce Growers Congress Sandusky, OH
Jan. 13-15	Fort Wayne Farm Show Fort Wayne, IN
Jan. 13-15	Atlantic Coast Agriculture Conf. Atlantic City, NJ
Jan. 20-22	Virginia Farm Show Fishersville, VA
Feb. 3-5	Mid Atlantic Fruit & Vegetable Hershey, PA
Feb. 3-5	Canadian International Farm Equip Toronto, Ont., Canada
Feb. 4-6	Southern Farm Show Raleigh, NC
Feb. 6	Northern Indiana Grazing Conf. Shipshewana, IN
Feb. 10-11	Alexandria Area Farm Show Alexandria, MN
Feb. 11-12	Empire State Fruit & Vegetable Expo Syracuse, NY
Feb. 11-14	National Farm Machinery Show Louisville, KY
Feb. 24-26	Central Minnesota Farm Show St. Cloud, MN
Feb. 26-28	New York State Farm Show Syracuse, NY
Mar. 4-5	East Central Farm Show Lindsay, Ont., Canada
Mar. 31 April 1-2	Wisconsin Public Service Farm Show Oshkosh, WI

Hope To See You!

New Fertilizer Technology

Continued from page 1

Dr. Tiedjens' early ideas eventually became GMS, the Growers Program and the basics of Target Fertility Technology. But the concept of using lesser quantities of higher quality mineral elements, improving fertilization timing and improved soil porosity with the use of the element calcium, for many years, fell on the deaf ears of his peers. Energy costs were relatively low and any mineral losses to fertilizer inefficiencies received little scrutiny because major water resource problems were not then recognized.

Today's world politics and energy balances have changed, making the inefficient use of fertilizer unprofitable and unacceptable. And now, a half century later, it appears there could be more acceptance of Dr. Tiedjens' ideas. Meanwhile, over 50 years experience placing higher purity nutrient elements on or near growing crops and the spraying of minerals directly on the foliage of growing plants has shown on the farm efficiencies and cost savings to be significantly better than the commonly used broadcast method of fertilizer application.

In the early 1950s Michigan State University used radioactive isotopes to prove the efficiencies of foliar spraying minerals on the above ground portion of a growing plant. In the hearings before the Subcommittee on Research and Development of the Joint Committee on Atomic Energy, one of the Michigan State University researchers said, "We have seen that materials are absorbed by the plant and move rather freely in the plant. The amounts may at first seem relatively small, but to offset this handicap, the efficiency is high. In fact, this is the most efficient method of applying fertilizer to plants that we have yet discovered. If we apply these materials to the leaves in soluble forms, as much as 95 percent of what is applied may be used by the plant. If we apply a similar amount to the soil, we find about 10 percent of it to be used."

The research said foliar applied elements were found in the plant at a rate 9.5 times higher than with soil applied elements. It should be noted the MSU research at the time assumed the soil applied elements are as soluble as the foliar applied elements, but many elements in today's soil applied fertilizers are not as soluble, and even some liquid fertilizers (cold mixes) are a weak solution and are not nearly as soluble as GMS (considered a hot mix). The more heavy metals contained in a liquid fertilizer, the less soluble are the beneficial elements included in that solution. A good indicator of an element's solubility in a solution relates to its ability to remain in solution and not separate in colder conditions and long term storage.

Doing a little arithmetic with the Michigan State University research can demonstrate some efficiency possibilities.

Say, 11.4 pounds of a nutrient material - one gallon of GMS, is applied to the foliage. That one gallon, a 10-20-10 plant food, contains 1.14

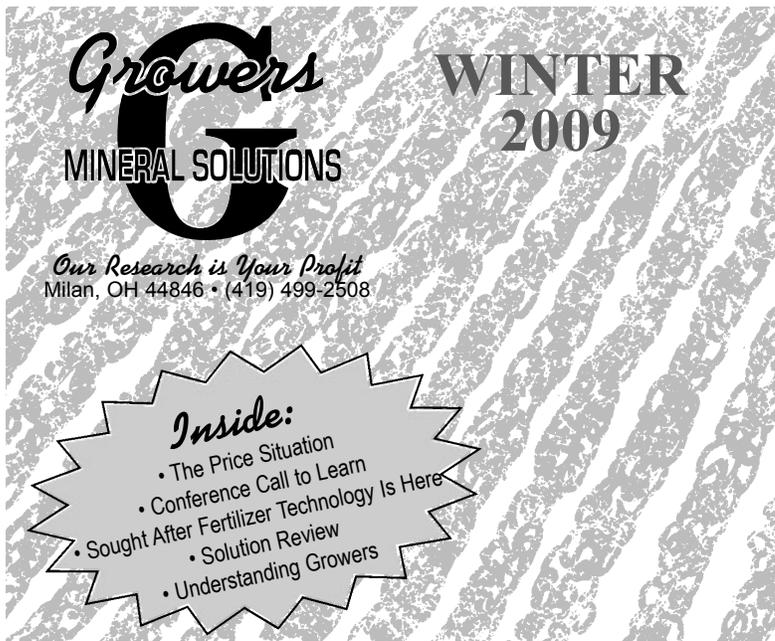
pounds of nitrogen (N), 2.28 pounds of P₂O₅ and 1.14 pounds of K₂O. Michigan State University's research is saying 95% of that material can be used by the plant, or 1.083 pounds of N, 2.166 pounds of P₂O₅, and 1.083 pounds of K₂O, making for a total of about 4 pounds of nutrients entering and being utilized by the plant.

By way of comparison, say, 100 pounds of a dry 10-20-10 product is applied to the soil. In effect 10 pounds of N, 20 pounds of P₂O₅ and 10 pounds of K₂O have been applied to the soil. But if, according to Michigan State University's research, only 10% of the soil applied nutrients are utilized by the plant, it figures just 1 pound of N, 2 pounds of P₂O₅ and 1 pound of K₂O, or, again, a total of about 4 pounds of nutrients may actually be entering the plant.

The comparison shows the nutrients used to foliar spray a crop go significantly further than do the ground applied, which, in turn, results in far less raw material waste and environmental pollution. And, if someday soon we should have to help feed starving people a half world away, the efficiency translates into much lower transportation costs.

Starting in 1955, Dr. Tiedjens and Growers Chemical Corporation have maintained 96% of a growing crop is carbon (C), hydrogen (H), and oxygen (O), mostly derived from the sun, air and water; therefore large amounts of energy intensive nutrient elements are not required to grow a cost competitive crop. Couple proper fertilizer quality, timing and placement along with good soil oxidation from the proper use of the inexpensive element calcium, can allow producers to have a long lasting scientifically sound program creating economical production with little, to no, adverse environmental consequences. (Adequate soil calcium levels release "tied up" native soil fertility, reduce weed and insect pressure and encourage soil biological life.)

The Growers Program and GMS's Target Fertility Technology could very well be the "new generation" fertilizer product Dr. Norman Borlaug, 1970 Nobel Laureate, had in mind when he was writing for the *IFDC Report* of September, 2008 Volume 33 Number 3, "I am concerned about the state of the fertilizer industry itself. With the price of energy increasing, we need to find cheaper, more effective ways to nourish food crops. The price tag for increasing productivity in Africa will be quite high. The fertilizer industry needs to do everything in its power to minimize that cost. Farmers are paying way too much for fertilizer products because we are transporting millions of tons of material that is not nutrient and because much of the nutrients in applied fertilizers are never used by the crop. Nutrient losses to the environment are high with consequences for global warming and water pollution." ■



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The Price Situation?

Naturally, we are receiving lots of questions about whether there are price changes for Growers Mineral Solutions in the offing. Of course we would like to see prices come down for every one's sake, but unfortunately we are still being notified of price increases. On top of the 2, 3, and 400% price increases we had this fall, shortly before the first of the year one supplier raised us 27%, and another had been warning their price was to increase 22% as of the first of the year, but they just recently told us it would

now only be 10% increase. Fortunately we did have one nitrogen supplier offer a price decrease, so with this latest news we are maintaining our current price. But for how long, who knows?

We did receive a nice flush of orders with checks dated December 2008 (business tax deductions), so we will shortly be delivering those orders out of our, currently, fairly adequate inventory. Our present concern is when more orders come in, it could be a sudden rush and our inventory at the time would not be able

to handle the demand, and, at the same time, we might not be able to obtain raw materials and deliver product fast enough to satisfy the rush. Our suppliers' warnings of imminent raw material shortages are still very much of a concern for us.

The bottom line, its hard to outguess the raw material suppliers, but we promise to keep you, our customers, and our Growers Sales Representatives updated as timely as we can. ■

Conference Call to Learn

You are invited to join in our Growers soil seminar conference calls. The call is designed for Growers customers and prospective customers who want to learn more about soil health.

Jim Halbeisen, Growers Director of Research will give a short introduction and then open the call to questions from the listeners.

For our customers who do not use telephones, a written summary of the conference will be available from the office or your Growers sales representative. Questions may also be submitted to the office and will be answered on the call.

The questions will lead the direction of the call. We plan to keep the conference calls to approximately one hour.

When asked for your conference security code or participant PIN, please enter 637573 # (you must enter the # after the last number).

Before you dial, make sure you know where your mute button is on your phone. Or you can enter *6 on your phone keypad. When you are not talking, it is best to mute your phone so that the conference call is less noisy. ■

The Growers Solution

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We hope you will find this newsletter helpful and interesting and we welcome your input. Please send letters-to-the-editor, comments, suggestions, etc. to: Growers, P.O. Box 1750, Milan, Ohio 44846, call 1-800-437-4769, fax 419-499-2178.

email to: growers@hmcltd.net
or visit our Web site: www.growersmineral.com

The Growers Soil Seminar Conference Call

Tuesday, February 17, 2009
at 8:00 PM EST and

Tuesday, March 24, 2009 at 8:00 PM EST

At that time, please dial:
1-712-429-0690

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redesigned Web site:
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