Printed on Recycled Paper

The Growers Solution

SPRING 2011

VOLUME 24 ISSUE 2

Calcitic Limestone Improves Pasture Moisture Management

By Teresa Weber

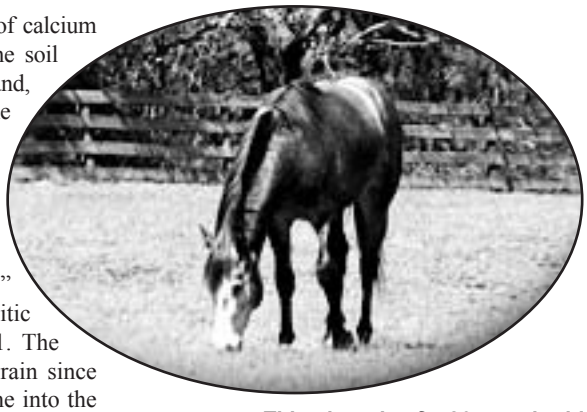
Our leased horse farm north of Gainesville, Florida was built too close to a wetland area. Whenever it rained, the farm was a mud hole, with standing water everywhere. It was a real health issue for the horses in that their hooves deteriorated to the point they couldn't hold a shoe. It was a nightmare, and, of course my daughter with her high end dressage horses and jumpers was very frustrated with what was occurring.

We considered building a complex drainage system along with drain tile, but it would have been prohibitively expensive. Pete Collins, a Growers representative, recommended we apply calcitic lime to flocculate the soil and enable it to breathe. He made recommendations and we decided to give that a try.

Pete took a soil sample for the base line record. The soil pH registered 5.9, with the calcium at 1000 #/acre, and the base saturation of calcium was extremely low. "When I took the soil samples," Pete laughed, "this is all sand, but I had extreme difficulty getting the soil probe in the ground! The sand was tight and compacted. When I finally got the sampler out of the ground, I had to use a screwdriver to get the core out. Right away that explained why the water was standing."

We applied 10 to 12 tons of calcitic lime per acre in early January 2011. The farm has received 6 to 8 inches of rain since which has helped incorporate the lime into the ground. Consequently, we had a large flood and for the first time since we leased the farm, there was no standing water. "It is beginning to do its job," said Pete. "A year from now it will be even better. Of course it will also improve the quality of the pasture grass."

In an e-mail to Jennie Henry at Growers about a month and a half later, I told her, "I have just come back inside after walking through a couple of paddocks and seeing the arena and am amazed that there is no standing water as was the case before the calcium. The gates have some standing water as is expected and only two low spots in the road, and all else is dry and not even squishy. There is some ability to compare as the yard around the house was not done with calcium and one can feel the difference under foot." ■



This photo is of a 20-month-old warmblood colt. Teresa says, "We feed all of our horses calcium carbonate and Growers Mineral Solutions in their feed."

Inside The Solution

Conference Call Features Minnesota Stock Operation

By Scott McIver

The following is from our January 2011 Growers Conference Call in which host Jim Halbeisen had Scott McIver tell us about his family's experiences with Growers.

Jim gives Scott's background saying, "His father and mother, David and Marilyn, started with Growers in the 1970s on their registered Polled Hereford and Saler cow-calf operation in west central Minnesota."

Scott begins saying, "The farm has been in the family 130 years. We run 225-250 cows and have been rotationaly grazing since the late 70's which really helps a lot with the pasture and quality of grass.

"With Growers, you just have to prove to yourself it works. Cut a field in half and go with the Growers Program on half of it and see what it does. You will convince yourself.

"We do use the product on the crops. We cut 150-200 acres of corn for silage and basically just grow the feed we need. The Growers works best if it is in the feed you are feeding,

Please turn to page 3

Penetration of Spray Nutrients into the Plant

By James L. Halbeisen

Early research showed roots and root hairs are absorbing organs characterized by easily penetrable cell walls. In contrast to the roots and root hairs, the above ground portion of the plant is covered with a protective cuticular layer. The cuticle is composed of cutin, a mixture of long-chain fatty acids. In some cases waxes, a mixture of alcohol, ketones, and esters of long-chain fatty acids, protrude from the surface of the cuticle. These two structures give the plant protection from the environment by regulating water or nutrient loss.

The pathways for plant penetration must occur at three sites, the cuticle, the cell wall, and the plasma membrane. Attention will be focused on the cuticle since the cell wall proper is relatively permeable to water and ions. The plasma membrane, or plasmalemma, selectively transports ions and molecules into the cell and a nutrient reaching this membrane would be assumed to be available to the cell.

The cells or conductive tissue of the leaves are bounded by the secondary and primary cell wall. Outside of the primary wall is the cuticular layer followed by the cuticle proper. A schematic representation of these regions of plant cells is shown in Figure 1.

In past times many researchers believed the cuticle presented such a barrier to the penetration of nutrient solutions that uptake would not occur and the only possible means of penetration would be through stomatal pores. It is now thoroughly established this is not the case. The stomatal openings may well be of relatively minor importance as an opening for foliar nutrients because the stomatal pores have a cuticle lining also. There has been, of course, a search for pores in the cuticle of leaves by electron microscopy, but there is no indication of a general occurrence of these pores except for a few species.

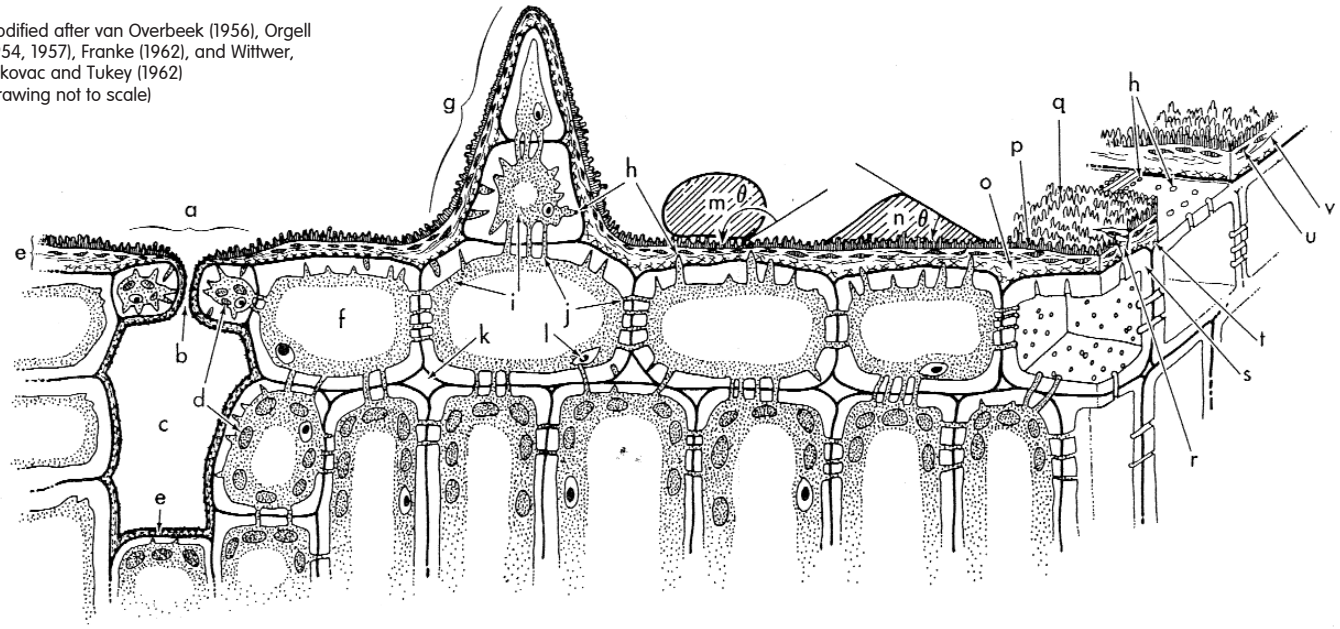
A better explanation for foliar penetration centers around cuticle structure. The cuticular layer is viewed as an aggregation of organic platelets cemented together by pectin type materials. The chemical structure of cutin in the cuticular layer is assumed to be a condensation product of fatty acids. It is believed intermolecular spaces, or holes, exist between the fatty acid chains within the cutin units as well as between the large molecules themselves. These holes allow the movement of solutions from the leaf surface to the cell wall. Cutin also contains water loving chemical radicals, thus, in a microstructural sense, cutin is more water loving than was once believed. This combination of intermolecular holes and water loving radicals assures intercuticular penetration by nutrient solutions occurs through a continuous pathway from the outside of the plant to the plant's conductive cell tissue. Recent work has shown point-like areas exist in the cuticle indicating still other pathways through the cuticle have even higher permeability.

Extremely fine structures, called ectodesmata, which may exist in the outer tissue of plant cells and extend into the cuticle from the cell wall, were once thought to be pathways facilitating the entry of nutrients into the cell. Recently researchers showed ectodesmata appear only at sites of penetration in the cuticle and, in fact, demonstrated similar structures in an artificial medium resulting from the penetration of material through an isolated cuticle. Ectodesmata, therefore, appear to be a result of penetration into the plant rather than a preexisting pathway. In summary, movement of nutrient solutions through the plant cuticle appears to occur through the intermolecular spaces that exist in that cuticle.

Finally, other conditions such as leaf age, light concentration, nutritional status of plant, and moisture conditions influence the plant's absorption of foliar applied nutrients. For example, hydration of the cuticle causes swelling, the wax platelets interspersed throughout the cuticle are spread further apart and penetration is facilitated. When the cuticle is dry, either from lack of moisture in the plant or from the absence of moisture on the leaf surface, the framework constricts and impedes entry. It is well known foliar absorption is most rapid in the presence of leaf surface moisture. ■

Diagrammatic representation of leaf epidermal cells and cuticle

Modified after van Overbeek (1956), Orgell (1954, 1957), Franke (1962), and Wittwer, Bukovac and Tukey (1962)
(Drawing not to scale)



LEGEND

a : Stoma	e : Cuticle	i : Protoplasm	m : Non-wetting Droplet	q : "Wax" Rodlet	u : "Wax" Lamella
b : Stomatal Opening	f : Vacuole	j : Plasmodesma	n : Wetting Droplet	r : Crack in Cuticle	v : Cellulose Lamella
c : Stomatal Cavity	g : Hair	k : Intercellular Space	o : Cutin	s : Cellulose Cell Wall	θ : Contact Angle
d : Chloroplasts	h : Ectodesma	l : Nucleus	p : "Wax" Layer	t : Pectic Lamella	

Minnesota Stock Operation

Continued from page 1

and in the wintertime, we put two ounces per animal in the ration.

"Growers helps the animals. Conception rates are way up, hair coats have a shine, the cows clean after they calve, and the movers and shakers out of both breeds can't believe the gains we get.

"We put 4-5 gallons of Growers on the seed at planting and come back with a 2 gallon foliar spray. Then we broadcast 30 pounds of actual N and come back with 30 pounds of 28% side dress. We chop all our corn. In 2010 yield adjusters came out and found the poorest field had 180 bushels and the best 230 bushels per acre.

"We put on about 15 tons per acre manure every year. Since the late 70's, and depending on the money situation, we usually apply 2-3 tons of high calcium limestone every four years.

"Earlage: All silage and earlage is put in silo bags. We have a snapper head on the chopper - the cob has the same food value pound for pound as shell corn—and it sure extends the feed a lot. We blend it when we feed it to last spring's calves, but do not give it to the cows.

"Pastures: A lot of that is out of bounds for a sprayer. Going in there expands your vocabulary and you get good at fixing equipment. Where we have done some spraying in previous years the cows will go back to where you foliar sprayed because they prefer the Growers grass.

"Hay: We free choice round bales. We plant roughly 10-12 pounds of alfalfa and 20 pounds of grass seed total. Normally we get two crops of hay, then in the fall, when the pastures are petering out and the calves are getting bigger, we let the cows in for the third cutting.

"We have been grazing alfalfa for many years, but don't turn them out when there is dew on it. You want the cows fairly close to being full when you put them out the first time. We notice when we turn them out to mixed forage, they will pound the dickens out of the orchard grass before they work on the alfalfa. The will go through and clean out the orchard grass just about down to the roots before they eat the alfalfa.

"With the hay, too, the previous four years we were short of hay and had to buy hay. We have these double round bale feeders and the cows would eat every single crumb of our hay before they would touch the purchased hay.

"The first crop of hay we foliar feed 2.5 to 3 gallons per acre and it's normally our biggest crop. The second and third cuttings, we'll put 2 gallons on, but we like to wait for it to green up a little bit, so we don't leave major tracks. The weather dictates when you get it done.

"We are set up with 10 gallon tips—2 gallons of Growers and 8 gallons of water.

"Last year we hosted the National Saler cattle tour. This was the sixth year for the tour and there were roughly 100 people here for supper, people from 17 states, Oregon to Florida. With some of the people having attended all the previous tours, we had five come up to say our farm was the most spectacular stop they had ever seen."

Scott didn't mention it during the Conference Call, but the McIver farm's March 2009 Saler took Reserve Champion Junior Heifer at both the Junior Salers Show and the National Salers Heifer at Denver's 2011 National Western Stock Show in January. The same heifer in the fall of 2010 also won the Grand Champion Salers Junior Futurity Champion and the Reserve Grand Champion in the Salers Open Show at the American Royal. ■

Congratulations to the McIvers & their National Western winner.

Growers Pays! It Doesn't Cost

By Ben Bechtel

We have found it doesn't cost anything to use Growers Mineral Solutions on our corn crops.

In our area around Conrath, here in north central Wisconsin, our Growers corn generally always shows higher test weights than our neighbors who are still on their regular commercial fertilizer programs. Our test weights consistently run 58 to 60 pounds per bushel while the average in the area is at least 2 pounds less. Taking corn at 2 pounds higher test weight at 150 bushels per acre equals 300 pounds more corn per acre. 300 pounds more corn means at least 5 more bushels per acre which, at today's corn price of about $7.00 per bushel, would earn our Growers users a good $30.00 more per acre.

Then looking at protein, our Growers corn carries 1.5 to 2.5 points higher protein than our neighbors'. If we take, say, 2 extra points protein times the price of soybean meal protein we do not have to buy at $ .16 per pound on our 150 bushel per acre corn we can say we are saving another $48.00 per acre in feed costs.

The Net Energy per Lactation (NEL) in our corn nearly always runs 4 to 6 points higher. Taking an additional 4 points of energy times the price of shelled corn at $ .10 per pound means there is an extra $ .40 of energy per bushel in Growers corn. $ .40 times 150 Bu/ac

equals another $60.00 per acre we have gained using Growers.

All together, the added value of the test weight, protein and energy earns our Growers user a total of $138.00 per acre over conventionally raised corn.

Meanwhile, following recommendations for row and foliar applications, we are using no more than 9 gallons of Growers per acre, which, priced at an average rate of $10.00 per gallon would cost our Growers customer $90.00.

While usually obtaining the same or more production, the cost of using GMS today most often is less than the average cost of commercially grown corn, but, regardless, giving them the benefit of doubt, we can say their costs are the same as Growers' costs. So, everything else being the same, an operator can pencil out a $48.00 per acre savings using Growers Mineral Solutions.

More interesting is seeing the potential profit to be gained for 20,000 pounds of corn silage. ■

On The Road Again

SPRING 2011

Growers Mineral Solutions is scheduled to set up and staff booths at the following upcoming farm shows and conventions this spring and summer. 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.

Mar 29-31	Wisconsin Public Service Farm Show Oshkosh, WI
July 1-2	Horse Progress Days Kinzers, PA
July 12-14	Wisconsin Farm Technology Days Waterloo, WI
July 19-21	Michigan Ag Expo Lansing, MI
Aug. 2-4	Farmfest 2011 Redwood Co, MN
Aug. 9-11	Empire Farm Days Seneca Falls, NY
Aug. 16-18	Pennsylvania Ag Progress Days Rock Springs, PA
Sept. 20-22	Ohio Farm Science Review London, OH

Hope to see you!

Growers MINERAL SOLUTIONS

SPRING 2011

Our Research is Your Profit
Milan, OH 44846 • (419) 499-2508
RETURN SERVICE REQUESTED

Inside:

Starter Fertilizer Receiving a Lot of Attention

By Jim Halbeisen

As farmers are going, or preparing to go, to their fields for the upcoming crop season, the agricultural literature is full of chatter that may have a significant influence on their 2011 profits. Events we farmers need to keep an eye on are the conflicts in the Middle East, nuclear meltdown in Japan, Chinese corn purchases, and a possible replay of the 1988 drought in the corn belt. Any one of these events could play an important part in our farming operations' game plans for this year. Another topic getting a lot of media ink in the spring of 2011 is the need for starter fertilizer.

Since 1955 Growers Chemical Corporation has repeatedly emphasized to producers they need to understand the biggest enemies of fertilization are time and distance. Dr. Tiedjens believed small amounts of clean balanced mineral nutrition placed close to the seed or plant would help the plant grow more efficiently when biological portions of the soil were not functioning well enough to properly feed the small plant roots. In using mineral ingredients containing the very lowest amounts of salts and heavy metals, Growers Mineral Solutions (GMS) serves as an excellent source of nutrition for crops when soils are under adverse conditions. GMS is meant to be placed close to or directly on the seed, root or foliage (distance) when most needed during times of stress—germination, reproduction or climatic adversity (time).

Recent articles describing the need for starter fertilizer are of great interest to Growers Chemical Corporation, because they show the agricultural establishment does, at times, see the value of Dr. Tiedjens' and the Growers approach to farming.

For example, in the March 2011 issue of *Farm Journal*, "Corn College" experts discuss "The timing and placement of fertilizer," "The need for 'quality' in miconutrient sources of starter fertilizer," and "Starter can change plant maturity by as much as seven to 10 days which most of the time will lead to higher yields and drier corn."

Another publication, *Ag Professional*, published a removable section in their March 2011 issue which exclusively discussed the importance of the use of starter fertilizer. The article says the benefits of starter fertilizer include; "An increase in early growth and crop uniformity", "Early growth can become enhanced more with 'proper' rates of trace elements (micronutrients) such as zinc and sulfur", "Improved financial returns in test plots resulted from 'improved' yields and 'lower grain moisture.'"

These discussions in today's agricultural literature give much credibility to the use of GMS as a starter fertilizer. Growers Chemical Corporation's many years of experience in the row starter business can give a farmer a lot of confidence that the use of GMS will get their crop off to a great start. Since 1955 farmers have used the same formulation, 10-20-10 with a balanced load of trace elements, to seed treat, for transplant solutions, or to start row crops. ■

The Growers Solution

Editor: Jennie Henry
Circulation, U.S.A. and Canada: 10,000

The Growers Solution is published 4 to 6 times a year by Growers Mineral Solutions, a division of Growers Chemical Corporation.

More About Growers

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, OH 44846, call 1-800-437-4769, fax 419-499-2178.

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

Conference Calls

Our on going Growers Conference Calls are always on the second Thursday of the month, and the next will be April 14th, at 9 PM EDT. To join in, dial 1-213-289-0500. You will be asked for the Participant Access Code, dial in 8262757#. Then you will press 1 to acknowledge the call is being recorded, which is for the benefit of those not able listen in at the time of the Call. Recordings of the most recent Calls and previous Calls can be accessed on the Growers website, www.GrowersMineral.com, under Calendar of Events, Conference Calls and Audio Recording. ■