



CLIMB EVERY MOUNTAIN - Indulging the species' love of heights, a bearded goat takes advantage of a parked pickup truck to get the best view on a farm west of St. Nazianz. (Photo by Carole Curtis)

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Oconomowoc farmers believe in creating a soil balance

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Robert Miller was the first in his area to implement a no-till farming system on his Oconomowoc grain farm. He admits people thought he didn't know what he was doing when he adapted the system that has now become commonplace on many cash grain farms.

Now Miller's sons are farming with him. They were the first in the area to adapt a biological farming system. Like their dad, they are open to new ideas and are always looking for ways to work with nature and cut costs while increasing yields and protecting the environment.

Luke joined his father in the business after graduation from the University of Wisconsin-Madison. Nick spent five years on active duty in the Navy before coming back to the family's 3,600-acre cash grain farm. Talk farming with these two young men and what one gets back is passion. They are excited that their crop yields are on a steadily rising curve, and they are thrilled that the effort they have put into balancing their soils is paying off.

The Millers have always believed in soil testing, but the younger generation has sought more detailed reports in order to create a balance that considers all the minor nutrients as well. They know it takes time to correct imbalances, but through tissue tests and visual observation of what's happening in their fields they have seen some immediate results.

They work with cover crops to help build organic matter in the fields, something they feel is important not only from an environmental point of view, but also as a way for plants to make better use of the nutrients like nitrogen. They credit the use of gypsum, however, for loosening their soil and establishing better drainage, particularly in the heavily traveled parts of the fields.

"We did a lot of reading and recognized the advantage of gypsum. Then we found an economical source for it," says Nick. "We were looking for a way to weather-proof our crops. Last year we had, crusting and needed to use a rotary hoe to break the crust."

In 2009, after winter wheat harvest, they applied 1,000 pounds per acre with a spinner spreader. They also applied a ton



Ron Chamberlain, of Gypsoil, looks over the corn raised on the Miller farm in Oconomowoc. One of the farm operators, Nick Miller, is a firm believer in biological methods of farming including using gypsum to soften the soil and prevent crusting after heavy rain.

of high calcium lime.

While gypsum itself does not cost much since it is a byproduct, there is trucking costs involved so the price farmers pay for the product will depend on their proximity to a coal-fired power plant.

Gypsum is delivered by semi trucks and stockpiled. The Millers say they are able to spread six or seven loads a day. It comes out with a 6 to 8 percent moisture, a level they say is ideal. If it's too wet it will cake but if it's too dry it blows in the wind.

Gypsum is applied like lime, but it does not replace it since lime is used to adjust soil pH. The Millers applied it to bring the calcium-magnesium levels in the proper proportion. Detailed soil tests showed they had lower calcium, high magnesium soil and the excess sulphur pushes out magnesium and helps bring the calcium-magnesium ratio into line.

Gypsum is a material used in making wallboard, food additives and other applications. Synthetic gypsum is produced by removing sulfur from coal-fired power plants, the most pure source. When it first became available, farmers began picking up the material at the power plants, but these plants are in the business of produc-

ing electricity not serving farming needs.

Gypsum for agricultural use has been branded Gypsoil, a company founded in 2002 by Ron and Cheryl Chamberlain, who both grew up on Indiana farms. Ron has a degree in agriculture from Purdue and spent more than 35 years in the agricultural industry both in Europe and in the U.S. With his extensive experience working with crops and soils, Ron developed the belief that soil structure was a major contributor to crop success or failure.

In June 2009, Beneficial Reuse Management acquired Gypsoil and Ron became director of gypsum programs for the company. Beneficial Reuse Management is in the business of identifying opportunities to utilize byproducts of various manufacturing processes in safe and effective ways that benefit landowners and others that can use these materials.

Chamberlain comments, "We found that when we put calcium sulfate on clay soils the structure changes. It helps the soil structure 4 to 5 feet into the subsoil. Over time it provides the opportunity to reduce the amount of applied nutrients."

Gypsum has not been studied much by researchers, so farmers generally do



Luke, Nick and Robert Miller look at some corn roots on their farm to determine the success of their biological farming methods. They believe that healthy roots are where it all starts, and insects and disease do not attack healthy crops.

(Photos by Gloria Hafemeister)

not get recommendations to use it from university Extension crop specialists. Still, farmers like the Millers who have turned to biological farming methods believe it makes sense. They use tissue tests to monitor results and variable rate technology to place nutrients only where they are needed.

When Purdue University hosted a farm tour earlier this year, they wanted to show off some of Indiana's most successful cash grain farms. Even the researchers were surprised when they found the host farms were all attributing their successes to the use of gypsum to loosen their clay soils.

The producers had been grappling with water and nutrient runoff, and they found that after five

years of using the soil amendment they reduced phosphate, nitrate and sediment runoff. Chamberlain explains that's because with gypsum there is a lot more structure and stability in the soil. When they get rain it doesn't dislodge the clay. The gypsum permits oxygen into the soil allowing soil biology to mineralize nutrients as they break down soil residue.

He also points out that because it flushes out excess minerals, it creates a better environment for earthworms to do their work. He illustrates, "Between the yellow and gray soil levels is an elevation of aluminum. It's toxic to worms, but when gypsum is used, it's flushed out and they can go through that layer."

The Millers say the biggest benefit they have seen is that it expands the rooting environment for the crop. The organic material is going down deeper and earthworms are burrowing deeper into the soil. These burrows help get oxygen into the soil, something that is important for healthy plant growth.

They say that's what biological farming is all about. It allows the biological systems to work and, while there is a cost to applying gypsum, they have reduced their other input costs. They believe there are many nutrients out there but not all of them are available for the plants to use unless the soil is in proper balance.