

Who's Right & Who's Wrong?

The Many Faces of Sustainable Agriculture

by Philip Wheeler, Ph.D.

As in any field of endeavor, there are different interpretations of the paradigm we call *sustainable agriculture*. Let's discuss some of them.

We can go back to J.I. Rodale and his heavy emphasis on dolomite lime. He recommended it as a source of calcium and magnesium. Carey Reams rejected its use based on the premise that the magnesium in dolomite had bad energy patterns, tended to compact soil and promote weed growth, and was antagonistic toward nitrogen — releasing it from the soil. We know Reams's premise is true since magnesium sulfate is used in a foliar spray to lower excessive nitrate levels in crops that are growing too rapidly and failing to fruit. Also, veterinarians use Epsom salts (magnesium sulfate) to treat nitrate poisoning in livestock.

Rudolph Steiner was way ahead of the game in the 1920s, when he talked about gathering and directing/applying energy. Dr. William A. Albrecht concentrated on the application and balancing of minerals according to CEC concepts. Reams was a contemporary of Albrecht. He also applied minerals and talked about plants growing from energy. Philip Callahan added to the energy theme with his work on paramagnetism.

Albrecht used CEC (we consider this a *mining assay*) type tests, while Reams used LaMotte (available/soluble nutrient) type tests. I suspect that Steiner and Reams were clairvoyant, while Albrecht was a very good, intuitive scientist.

Bruce Tainio is a scientist who has more recently entered the picture. His thoughts on major minerals appear to be different from those of Reams. I think he is both a good scientist as well as being somewhat clairvoyant, similar to Steiner and Reams. He does promote mineralization à la Albrecht and uses CEC rather than Reams tests. This can present a problem for growers who listen to these seemingly opposing

views. They become confused and unsure, or simply follow one camp and ignore the other. I regularly get calls from such growers seeking clarification.

In fact, there is no need to take sides. Steiner, Reams and Callahan are all right about the concept of energy. Plants grow from energy (not fertilizer), as Reams taught. Albrecht and the others are right about mineralization and mineral balance as applied to most soils. Sometimes, in very high CEC soils, it is more economical to concentrate on biological activation and application of in-row or foliar nutrients rather than trying to balance the entire field. If you use both CEC and LaMotte tests, as we do at CSI, you get a broader, better picture and you can make better decisions as to how to proceed.

The biggest difference between Reams and Tainio is the handling of potassium (K). Reams taught that by emphasizing calcium and phosphorous over nitrogen and potassium in the soil, you would get higher-brix crops and better weed control. The basis for this emphasis was on soil availability. Recently, however, Tainio found that plants need large amounts of K to express all their potential, including higher brix. His emphasis is on amounts of K *in plant tissues*. He wants his growers to have CEC levels of K on the upper side of the suggested Albrecht range and to moderate their N usage. He uses the tissue ratio of N:K as his indicator of good balance. When the N ppm are higher than K, it means you won't produce high brix, manganese can become excessive to the exclusion of zinc, and you won't achieve the right pH for optimum plant health and resistance. Tainio discovered that pH is reflective of the overall frequency of the plant, with 6.4 being optimum. This is in line with Reams when he worked with soil and human health. He wanted his client's soil — and his patient's urine and saliva — pH levels to be close to 6.4.

Tainio foliar feeds K when necessary to correct problems or force a plant to do

abnormal things such as having fruit buds and set on the trunks and inside branches (rather than on the ends, as is typical). His foliar feeds can also contain other major and minor minerals.

Thus, I don't think there really is a conflict in any of the above paradigms or teachings. There *is* conflict in the world of biodynamics, however. Greg Willis and others have directly challenged the original interpretations of Steiner's work. My opinion is that Steiner's early followers did perhaps codify his teaching a bit too much and did not do enough with his charge to keep discovering *more*. What is not in question is that using the energies identified by Steiner can produce dramatic effects — I have directly observed them both in Australia and in the United States. I think that a combination of both direct spray and broadcasting of Steiner energies through field broadcasters/towers is the optimum way to take advantage of these forces.

There is also conflict over the use of colloidal clay — soft rock phosphate — versus reactive rock phosphate. Reactive rock phosphate is a geological form. Since Reams used colloidal phosphate, some followers assume that nothing else is good enough. One of the unique qualities of colloidal phosphate is that it can be layered over or under high-calcium lime and the two materials will react together electrochemically, something I observed on my own farm in the 1970s. Since calcium tends to move downward, this bonding and holding could be beneficial. Then along comes Elaine Ingham and tells us that calcium can be held in the soil by beneficial fungi — and she has photomicrographs to prove it.

Some proponents of colloidal phosphate claim that reactive rock will tie up with calcium and revert to hard rock phosphate-like orthophosphates. This is patently false! I consulted with John Slack, a well known geologist, of Agricultural Mineral Prospectors from Ontario.

He was aware of this misconception but could not find the source of the misinformation in the literature. CSI has also talked to growers whose farms had the reactive phosphate Brown Sand (the old name for Tennessee Brown) applied years ago, and they said they could still see the effects 25 years or more later.

The last point of contention seems to be about Elaine Ingham's work, which some interpret as demonstrating that microorganisms can do all the work of remineralizing soils without further mineral inputs. This seems to fly in the face of the basic premise behind all of the previous gurus and paradigms, which is that minerals are the basis of life and that plants consume minerals. Reams talked about green plants gathering minerals from the atmosphere, but he also emphasized the application of needed minerals to the soil. Albrecht and Tainio both start with minerals, and Tainio also

adds microbes and enzymes. Steiner emphasized the energies, but he loved sul-po-mag, a natural mineral source of sulfur, potassium and magnesium that is now marketed as K-Mag.

My recommendations: remineralize, bio-activate, and manipulate/stimulate with foliar sprays and energies from sprays, broadcasters/towers and Veges Sound Machines. We have seen this approach yield abundant, nutrient-dense crops again and again.

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