

**Linda Chalker-Scott, Ph.D., Extension Horticulturist and Associate Professor,  
Puyallup Research and Extension Center, Washington State University**

### **The Myth of Biodynamic Agriculture**

*“Biodynamics is a scientifically sound approach to sustainable management of plant systems”*

#### **The Myth**

Biological dynamic agriculture, a.k.a. biodynamics, is a system of agricultural management based on a series of lectures given by Rudolf Steiner in 1924. Over his lifetime, Dr. Steiner became concerned with the degradation of food produced through farming practices that increasingly relied on additions of inorganic fertilizers and pesticides. Reputed to be the first alternative approach to agriculture, biodynamics has evolved over the last century to include many organic farming practices that have demonstrable benefits on land use and crop production. In fact, biodynamic is often used synonymously with organic in both scientific and popular literature. Biodynamic agriculture has more recognition in Europe, but North American proponents of this system are increasing. Is the biodynamic approach one that should be encouraged?

#### **The Reality**

There are many non-scientific websites and writings about biodynamics, Rudolf Steiner, and the school of thought he developed (anthroposophy). [An excellent scholarly overview by Kirchmann (1994) is referenced at the end of this column.] There are fewer refereed articles on biodynamics, and a review by Reganold (1995) found many of these to be of questionable scientific quality.

Rudolf Steiner (1861-1925) was a true intellectual with interests in many academic areas; his forte, however, was philosophy and his PhD dissertation topic was Fichte's theory of knowledge. The intention of his series of agricultural lectures was to instruct farmers how “to influence organic life on earth through cosmic and terrestrial forces” (Kirchmann, 1994). This distinction is important because biodynamic agriculture, as initially conceived, consisted primarily of concocting and utilizing eight biodynamic “preparations” that would “stimulate vitalizing and harmonizing processes in the soil” (Kirchmann, 1994).

The directions for preparing the eight biodynamic compounds are complicated and can be found on a number of websites and in popular literature. Briefly, two of the compounds are prepared by packing cow manure (preparation 500) or silica (preparation 501) into cow horns, then buried for a number of months before the contents are swirled in warm water and then applied to the field. Cow horns are utilized as antennae for receiving and focusing cosmic forces, which are transferred to the materials inside. The other six compounds (preparations 502-507) are extracts of various plants either packed into the skulls or organs of animals (i.e. deer bladders, cow peritonea and intestines) or into peat or manure, where they are aged before being diluted and applied to compost. The chemical elements contained in these preparations were said to be carriers of “terrestrial and cosmic forces” and would impart these forces to crops and thus to the humans that consume them.

These processes were not developed through scientific methodology, but rather through Steiner's own self-described meditation and clairvoyance. In fact, Steiner declared that these spiritualistically-determined methods did not need to be confirmed through traditional scientific testing, but were “true and correct” unto themselves (Kirchmann, 1994). The rejection of scientific objectivity in favor of a subjective, mystical approach means that many of Steiner's biodynamic recommendations cannot be tested and validated by traditional methods. In practical terms, this means any effect attributed to biodynamic preparations is a matter of belief, not of fact.

Other non-scientific practices have become part of the post-Steiner biodynamic movement. These include use of cosmic rhythms to schedule various farm activities and nutritional quality “visualization.” This latter practice uses legitimate chemical analyses such as chromatography as ways to study the “etheric” life forces in plants through “sensitive crystallization” and “capillary dynamolysis” – techniques that are again not scientifically testable.

What has muddied the discussion of biodynamics even further is the incorporation of organic practices into Steiner’s original ideas. Many of these practices – no-till soil preparation, use of compost, polyculture – are effective alternative methods of agriculture. These practices often have demonstrated positive effects on soil structure, soil flora and fauna, and disease suppression as they add organic matter and decrease compaction. Combining beneficial organic practices with the mysticism of biodynamics lends the latter a patina of scientific credibility that is not deserved. Many of the research articles that compare biodynamic with conventional agriculture do not separate the biodynamic preparations from the organic practices – and of course obtain positive results for the reasons mentioned earlier. However, when researchers have compared biodynamic, conventional, and organic farms (where again “biodynamic” incorporates organic practices), by and large there are no differences between the biodynamic and the organic farms (though both are different from conventional farms). It would be an interesting experiment to compare conventional farms to conventional farms with biodynamic preparations without the organic practices to see if a difference exists.

Given the thinness of the scientific literature and the lack of clear data supporting biodynamic preparations, it would be wise to discontinue the use of the term “biodynamic” when referring to organic agriculture. I am guessing many academics, both theoretical and applied, have no idea where the roots of biodynamic agriculture lie: the fact that “biodynamic” is used interchangeably with “organic” in the literature seems to support this conclusion. For me and many other agricultural scientists, usage of the term is a red flag that automatically questions the validity of whatever else is being discussed.

The onus is on academia to keep pseudoscience out of otherwise legitimate scientific practices. As Robert Beyfuss (NY Cooperative Extension) and Marvin Pritts (Cornell University) state, “it is this type of bad science that has created a hostility between the scientific community and many proponents of biodynamic gardening.” All too often scientists avoid addressing the problems associated with pseudoscience. Those scientists who do challenge pseudoscientific are frequently attacked and ridiculed, thus shifting the focus from the problem (pseudoscience) to a personal level. Part of this is a cultural shift; Alan Alda is quoted as saying “we’re in a culture that increasingly holds that science is just another belief.” But more importantly, when published research is not held to an acceptable standard of scientific rigor and when junk science is not challenged, pseudoscience creeps closer towards legitimacy in the public eye.

### **The Bottom Line**

- Biodynamic agriculture originally consisted of a mystical, and therefore unscientific, alternative approach to agriculture
- Recent addition of organic methodology to biodynamics has resulted in a confused mingling of objective practices with subjective beliefs
- Scientific testing of biodynamic preparations is limited and no evidence exists that addition of these preparations improves plant or soil quality in organically managed landscapes
- Many organic practices are scientifically testable and can result in improved soil and plant health parameters

- The academic world needs to address the explosion of pseudoscientific beliefs and help non-academicians become more discerning learners

References:

Kirchmann, H. 1994. Biological dynamic farming – an occult form of alternative agriculture? *Journal of Agricultural and Environmental Ethics* 7: 173-187.

Reganold, J. 1995. Soil quality and profitability of biodynamic and conventional farming systems: a review. *American Journal of Alternative Agriculture* 10:36-45.

For more information, please visit Dr. Chalker-Scott's web page at <http://www.theinformedgardener.com>.