

Nutrient-Dense, Carbon-Negative

the future of eating is a secret of soil

David Yarrow, October 2009

Part One: Real Food Means Nutrient Dense

2010 marks 20 years since Congress created **USDA Certified Organic**. Foisting this on a reluctant, resistant USDA was a grassroots Green Revolution in its time, empowered by a wave of citizen activism unprecedented since the Vietnam War resistance.

Appropriately, 2010 will birth a new movement to go “beyond organic”—a new Green Revolution—to grow and market foods with a new standard of true quality: nutrient content. This *Biological Agriculture* is a giant step ahead to **nutrient-dense** standards of farming and food quality—the foundation for a sustainable food system.

In the 80s, when we started organic certification—reluctantly, unhappily, we restricted anyone from marketing organic food with any nutritional claim. At the time, we couldn't reliably produce, verify and authenticate such food.

Now, 20 years later, food with higher nutrient content can be reliably grown by standardized practices. We can now easily verify this nutritional quality. We can now track foods from farm to market to assure authenticity. We can now go “beyond organic.”

In early February in Barre, Massachusetts, over 100 growers attended Dr. Arden Andersen's 3-day training on **Soil Mineral Nutrition**, co-sponsored by the Real Food Campaign, Remineralize the Earth and NOFA-MA. At the end, growers gave Dr. Andersen a long, enthusiastic standing ovation. Clearly, the next revolution in farming and food quality is underway. (NOTE: This 3-day training is available on CD from NOFA-MA.)

Arden Andersen grew up on a Michigan dairy farm. He took early interest in connections between soil fertility, crop quality, nutrient content, and animal health. He left the farm for college, then medical school, but never lost his focus on agricultural roots of health and disease. Arden got a PhD in Biophysics, and began to see organisms and ecosystems as energy, not just chemistry.

AS A MEDICAL DOCTOR, ARDEN QUESTIONED patients on diet, and counseled them on food quality and nutrition. Arden saw farm families with degenerative conditions from toxic chemical exposure. Among all clients, he saw increasing allergies and reactive illness. After years of medical practice, he realized modern agriculture can't grow food with adequate, healthy nutrition.

Thus, Arden began a journey back into agriculture, working with farmers to grow crops with higher nutrient content. Along the way, Arden studied under Carey

Reams, Dan Skow, William Albrecht, and other pioneers in soil fertility and crop quality.

In two decades as a farm consultant on three continents, Dr. Andersen taught growers how to successfully increase their soil minerals and biology, and boost crop quality. Arden insists he simply applies to soil the same principles of science he learned in medicine apply to a human body. Fertility, like our blood, begins as a complete mineral menu—major, minor, trace elements, and even the least of all—the nano- and pico-elements.

Once these elements are in proper proportion in liquid solution, then biology gets organized for optimum function. When the **Soil Food Web** is resident in stable, functional communities, micro-organisms manage soil for the farmer—adjust pH, digest organic carbon, maintain calcium & phosphorus, capture & release nitrogen, water storage, and more. This new Green Revolution moves agriculture from a 20th century chemical mindset to a biology paradigm that recognizes the soil is a community, beginning with the least and smallest life.

THIS NEW MOVEMENT SPROUTED last December in St. Louis at the Acres USA conference. After months of plans and preparation, no press conference or flashy publicity trumpeted this sprout. Just a new booth in the trade show staffed by one young man: **Daniel Kittredge**—an earnest farmer from Concord, Massachusetts—historic site in America's Revolution. A farmer who went to India to work with Dr. Vandana Shiva to resist GMO seeds muscled into markets by Monsanto. A farmer who herded sheep on Navajo Reservation in the Southwest. A farmer who decided to spark a new, true green revolution.

Since Dr. Andersen's February training, Daniel has taught “nutrient-dense” all over the Northeast. Many more

growers signed up to learn how to grow crops with higher nutrient content. Daniel created **The Real Food Campaign** website, and opened a warehouse to distribute equipment and supplies for nutrient-dense production. He is raising money from memberships and sales to finance the complex organization required to deliver a certified and authentic product to the market.

All while he bought a farm of his own, rehabbed the old farmhouse, and managed another farm nearby. His family moved in this April.

The emerging biological paradigm for farming requires a more rigorous discipline than organic. Growing nutrient-dense food begins by boosting and balancing the soil's major minerals and



trace elements. This simple, elemental soil science starts with careful soil tests and direct mineral applications, supplemented by soil drenches and foliar sprays of trace elements and inoculants.

Once minerals are restored and in balance, microbes are introduced by various strategies and substances. This begins the shift from chemical to biological agriculture. The goal of a nutrient-dense grower is to create optimum living conditions for the Soil Food Web. Since chemically drenched soils are largely sterile, new growers must import these micro-organisms, or culture them on their farms.

Once healthy, stable communities exist in soil, the microbes feed the plants in exchange for some solar sweetness, and insect and disease troubles evaporate.

To monitor plant health and nutrient density, growers measure their crops' "**Brix**"—named for a French scientist who developed a device to assay sugar in wine grapes. **Brix** measures the solids dissolved in plant sap, which is mostly sugar—carbon fixed into carbohydrates by photosynthesis. This sunshine sweetness in solution is liquid energy to power cells and organisms.

A routine practice of nutrient-dense growers is to daily collect leaves from plants in the field. A drop of sap is squeezed from a leaf petiole onto a prism in a *refractometer*, a simple hand-held device to measure the angle light is bent (refracted) passing through the plant sap. Plants with Brix levels above a minimum have adequate energy and nutrients, and will thrive without pests or disease to yield nutrient-dense crops. But if Brix is low, plants are starving for energy, short on nutrients stressed, not metabolizing properly.

The goal of a nutrient-dense grower is to grow crops with consistently high Brix level. The foundation is soil with balanced, full spectrum minerals, and microbes to digest and feed the plants. With steady supply of sugar, minerals and bionutrients, plants are strong and vigorous, and don't need rescue with toxic chemicals.

Consumers can measure Brix in markets to evaluate nutrient content, and thus nutritional quality.

TRAINING GROWERS IN NUTRIENT-DENSE is Dan's immediate challenge. Unless farmers decide to change their methods, and embrace newer higher standards, nothing will change. And many quality conscious and earth aware farmers and gardeners are signing up for the training. Each needs perhaps two years to apply materials, master methods, improve soil fertility, and upgrade production practices. This new green revolution needs a few growing seasons to get started.

But the Organic Revolution wasn't won by farmers. Many facets of the food system united to force federal adoption of "unscientific" and "anti-chemical" food quality standards. Farmers joined by consumers, processors, retailers, gardeners, environmentalists, artists, actors, even some scientists. This unprecedented activist army made "organic" the fastest growing sector in the food economy.

In the 21st century, a similar alliance—this time with science—must empower a new transformation in markets.

This year Daniel will launch an online directory of



nutrient-dense growers and a library of literature—especially scientific research reports—on nutrient density. He is recruiting a panel of experts to draft Production Standards to identify and certify nutrient-dense growers. Another

lengthy process is needed to establish credible third party certification. These complex processes of deliberation will evolve in the next two years.

This new Green Revolution underway in the Northeast is sprouting elsewhere in North America, and also in Canada, Britain, Australia, and New Zealand. A minimum of education and promotion should make **Nutrient-Dense** food quite visible and popular among conscious consumers, provoking steady, strong market demand, and premium prices for farmers who grow these foods.

Every day every human must eat. "You are what you eat" applies to personal biology, but also to our collective economy. In any community, food is the fundamental, universal commodity and service that generates true wealth, and circulates to create an economy. If this ceaseless daily appetite of humans is harnessed to social change, technological revolution and ecological restoration, this transformation to a sustainable society can happen.

Soon, consumers can choose to go "beyond organic" for their appetite and money and buy food with verifiable higher nutrient content. Then we can literally "eat our way to the future."

www.nutrient-dense.info

www.realfoodcampaign.org

Part 2:

Carbon-Negative for Soil & Climate Stability

