Elaine Ingham to Keynote NOFA Summer Conference

by Nicole Belanger

Dr. Elaine Ingham is the keynote speaker for the 40th Annual NOFA Summer Conference, August 8-10th in Amherst, MA. On Friday, August 8, 2014, she will lead a preconference seminar titled “Changing Dirt into Soil: Specific Approaches for Different Soil Types and Crops.” She will also lead three workshops during the conference: “Biologically Managing Weeds”; “Compost versus Extract versus Tea”; and “Microscopic Assessment Demonstration.”

How can people repair damage done to the environment and avoid causing it in the first place? This question is in the forefront of Dr. Elaine Ingham’s work. Trained as a microbiologist, she brings a unique perspective to her work with farmers.

Her goal is to develop soils that foster thriving microbial communities. Her simple approaches to building soil biology make more robust plants, require less labor and off-farm inputs, and ultimately help save farmers money, while reducing adverse ecological effects.

Ingham believes that farmers need to rely neither on chemical fertilizers nor on costly soil amendments to build soil fertility. She maintains that by building soils teeming with the right kind of biology growers can mitigate plant pests and diseases. According to Ingham, proper soil management fosters interactions between soil bacteria and their corresponding predators, which produces plant available nutrients that would otherwise need to be brought in from elsewhere.

Instead of replanting annual cover crops and then weeding them, Ingham suggests developing regionally appropriate, perennial understory covers. She uses this strategy to preempt early succession plants that take root in bare soil. To Ingham, healthy root systems, allowed to grow over multiple seasons, are essential for fostering plant-protecting organisms in the soil.

Before consulting directly with growers, Ingham worked in academia for several decades. She did academic research on soil biology in Texas and in the pine forests of Virginia and the Carolinas, completing her doctorate at Colorado State University, where she researched the impact of grazing on the root systems and soil biology of pastureland.

In the late 1990s, after having served on the faculty at Oregon State University since 1986, Ingham took a vocal stand questioning the integrity of industry-sponsored research on GMOs. She argued that much of the research was invalid and favored self-serving conclusions.

According to Ingham, “the controls were laughable… purposely to obscure the ecological effects [of GMOs].” She also stressed the impossibility of knowing how genetic modifications will be expressed in different habitats, conditions, and environments.

After speaking publically against GMOs at the United Nations, Ingham witnessed first hand the influence of agribusiness on academia. According to Ingham, Oregon State University made a “business decision” to favor millions of dollars in research donations from Monsanto over the $2 million per year she was bringing in, making it uncomfortable for her to continue to work there. In 2001, Ingham left Oregon State University.

Though most public land grant universities are influenced heavily by agribusiness, Ingham is hopeful that young people who are now stepping into influential roles in academia will foster research and sound science independent of the demands of private funders. “It’s amazing how few people are being taught about soil biology,” says Ingham. “Soil people are not being taught about soil life, which so directly flies in the face of the toxic chemical approach that they’re taught at the university.”

After leaving Oregon State University, she started her own consulting company, Soil Foodweb. Though she spends much of her time consulting directly with growers outside of academia, she also teaches at Southern Cross University in Australia and Maharishi University of Management in Iowa.

Motivated to educate others, she travels frequently from her home in Oregon, teaching people what they need to know to be successful organic growers--such as tailoring compost and compost tea to a soil’s unique needs, identifying the color of healthy soil, and creating root systems that support beneficial bacteria and fungi.

Ingham boasts the success of simple solutions to common needs on the farm, demonstrated through her work with 300,000 people on 22 million acres. By developing strong and deep root systems on the pasture of a 300 acre dairy, the dairy was able to save $150,000-$200,000 in labor, chemical, and veterinary costs in one year. She also claims that complex root systems, populated with communities of bacteria and fungi, can build water stores in the soil, reducing water use by 70%. When implemented before its onset, such management approaches can drastically decrease the negative impact of a drought.

(continued on page A-2)
The Natural Farmer

To Readers of The Natural Farmer:

There is a movement beginning in New England and spreading across the country that aims to convince the National Organic Program to accept the 2010 NOSB recommendation to prohibit soilless hydroponic vegetable production as certified organic. We at MOFGA feel that the NOP has to take on the difficult task of writing standards that clarify what kinds of soilless crop production may meet organic standards, and what kinds simply do not. If you would like to join the movement, please go to this website and sign the petition: http://www.keepthesoilinorganic.org/

Hydroponics is the most widely used term for the production of crops without soil. Such production is most often based on providing the plant all the nutrients it needs by suspending the roots in a nutrient rich solution, or growing in a moist inert material that is bathed in a nutrient rich solution. Nutrient solutions can be made using only natural materials, including natural mineral salts and organic residuals. Some certifiers believe that this makes the production organic, other certifiers do not. MOFGA does not certify such simplistic hydroponic production as organic. The central theme and foundation of organic farming is the maintenance and management of organic matter in the soil. Neither the soil nor the organic matter are the key to this, but rather the key is the diverse population of organisms that are the foundation of the soil ecosystem. Macro and micro organisms found in abundance in a well maintained soil lie together a web of interactions that conserve and recycle the elements between all the living organisms and minerals in the system. It is the management of this ecological balance that defines organic production. The NOSB Crop Committee Recommendation of January 23, 2010 aptly pointed this out. This NOSB recommendation stresses that organic farmers are not just tillers of the soil, but stewards of the soil ecology on the farm. Organic farmers are herdsmen of the myriad organisms that fill the soil ecosystem. They are much more than farmers that open bags of nutrients to feed crops.

Actually the USDA National Organic Program recognized this as well when they wrote the Rule that is the organic standard of the country. At the heart of the regulation of organic production (7 CFR Part 205 National Organic Program; Final Rule) is the definition: Organic Production - A production system that is managed according to the Act and regulations in this part to respond to site-specific conditions by integrating cultural, biological, and mechanical practices that foster cycling of resources to enhance ecological balance, and conserve biodiversity.

Many soilless systems are close to the opposite of organic production systems defined here. Many hydroponic systems aim to reduce the complexity of the ecology of their production systems. Many aim to reduce the living organisms in the system to only the crop, and feed the crop with a simple soup of available nutrients. Such systems do not meet organic production standards. If you agree, go to the website <http://www.keepthesoilinorganic.org/> and sign the petition.

Thanks, Eric Siderman Crop Specialist, MOFGA

Hi Jack, I love all that info on crop intensification in The Natural Farmer—it was news to me, and I would love to share some of this with my readers—could I have permission to do a reprint from you? In keeping with my mission I want to emphasize that this important advancement originated from humble grassroots type people, not prestigious institutions. What a story! Thanks for putting it together.

Jan Lambert

The last issue was very best uses of my reading time.

Duncan Cox

Hi, The latest issue of The Natural Farmer in crop intensification is head-spinning to me who’s been trying to work with Jeavon’s close planting. Yes for the paper’s web of interactions that conserve and recycle the soil ecosystem. Macro and micro organisms found in abundance in a well maintained soil lie together a web of interactions that conserve and recycle the elements between all the living organisms and minerals in the system. It is the management of this ecological balance that defines organic production. The NOSB Crop Committee Recommendation of January 23, 2010 aptly pointed this out. This NOSB recommendation stresses that organic farmers are not just tillers of the soil, but stewards of the soil ecology on the farm. Organic farmers are herdsmen of the myriad organisms that fill the soil ecosystem. They are much more than farmers that open bags of nutrients to feed crops.

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Thanks, Eric Siderman Crop Specialist, MOFGA
Organic Seed Finder provides thousands of variety listings for farmers, gardeners, certifiers, and others looking for certified organic seed. Sourcing seed to meet the demands of our growing organic industry just got easier.

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(continued from cover of Section B)

runs an organic feed business, Riverside Feeds, that is processing 30 to 35 tons of soybean meal each week. And demand is growing. He says he has gotten calls from large hog operations that want non-GMO feed because the GMO stuff is causing reproductive problems in their hogs. ‘This type of problem is a big deal now,” he says.


Hawai‘i Defeats Preemption of Local Control of Agriculture

On February 4, by a close vote, a Hawaiian state legislative committee defeated a bill, SB 110, which would have stripped local control over agriculture. Earlier, on Kaua‘i, the County Council passed a law requiring large biotech companies to report and publicly disclose the pesticides and GE crops used on the island. In response, powerful interests turned to the state to preempt the right of local communities to enact such laws. That was what SB 110 was designed to do and its defeat has been hailed by GMO opponents.

source: Center for Food Safety press release, February 5, 2014

Post Foods Unveils non-GMO Grape Nuts as General Mills Takes GMOs Out of Original Cheerios

Cereals giant Post Foods has announced that Grape Nuts will be produced without GMOs, following a similar announcement by General Mills about its cereal Cheerios. Post did not announce what changes were necessary to achieve non-GMO Project Verification, but presumably the isolated soy
Study Shows Glyphosate Accumulates in Roundup Ready Soy, Refuting Substantial Equivalence

A study to be published June 15 in “Food Chemistry” describes research in which soy samples were grouped into three different categories: (i) genetically modified, glyphosate-tolerant soy (GM-soy); (ii) unmodified soy cultivated using a conventional “chemical” cultivation regime; and (iii) unmodified soy cultivated using an organic cultivation regime. Organic soybeans showed the healthiest nutritional profile with more sugars, such as glucose, fructose, sucrose and maltose, significantly more total protein, zinc and less fiber than both conventional and GM-soy. Organic soybeans also contained less total saturated fat and total omega-6 fatty acids than both conventional and GM-soy. GM-soy contained high residues of glyphosate and AMPA (mean 3.3 and 5.7 mg/kg, respectively). Conventional and organic soybean batches contained none of these agrochemicals. Using 35 different nutritional and elemental variables to characterize each soy sample, the authors were able to discriminate GM, conventional and organic soybean batches contained none of these agrochemicals. Using 35 different nutritional and elemental variables to characterize each soy sample, the authors were able to discriminate GM, conventional and organic soybeans without exception, demonstrating “substantial non-equivalence” in compositional characteristics for ‘ready-to-market’ soybeans.


Supreme Court Refuses to Hear Monsanto vs. Organic Farmer Case

The U.S. Supreme Court has issued a decision in the landmark federal lawsuit, Organic Seed Growers and Trade Association et al vs. Monsanto. Farmers were denied the right to argue their case in court and gain protection from potential abuse by the agrichemical and genetic engineering giant, Monsanto. Additionally, the high court decision dashes the hopes of family farmers who sought the opportunity to prove in court Monsanto’s genetically engineered seed patents are invalid.

“While the Supreme Court’s decision to not give organic and other non-GMO farmers the right...”
to seek preemptive protection from Monsanto’s patents at this time is disappointing, it should not be misinterpreted as meaning that Monsanto has the right to bring such suits,” said Daniel Ravicher, Executive Director of the Public Patent Foundation (PUBPAT) and lead counsel to the plaintiffs in OSGATA et al v. Monsanto. “Indeed, in light of the Court of Appeals decision, Monsanto may not sue any contaminated farmer for patent infringement if the level of contamination is less than one percent. For farmers contaminated by more than one percent, perhaps a day will come to address whether Monsanto’s patents may be asserted against them. We are confident that if the courts ever hear such a case, they will rule for the non-GMO farmers.”

Farmers had sought Court protection under the Declaratory Judgment Act that should they become the innocent victims of contamination by Monsanto’s patented gene-splice technology they could not perversely be sued for patent infringement.

source: January 13, 2014 press release by Food

Democracy Now

2,4-D Resistant Crops Clear a Regulatory Hurdle

Dow AgroScience (DOW) is one step closer to selling corn and soybean farmers a new system to fight weeds: genetically engineered crops designed to resist the herbicide 2,4-D. In January the U.S. Department of Agriculture announced that Dow’s Enlist seeds, limited only to testing so far, don’t pose a threat to agricultural crops or other plants. Federal officials proposed full deregulation of three varieties of corn and soybean, even as activists continue to warn that the resulting spread of 2,4-D would harm non-resistant plants, the environment, and human health.

The report found that Enlist crops do not themselves pose a “plant pest risk,” meaning they don’t cause injury, damage, or disease to other plants. USDA regulators don’t assess what impact increased use of 2,4-D herbicide will have on the environment and human health; that’s a job for the Environmental Protection Agency, which approves herbicides usage and is already conducting a risk-assessment set to be released in the spring. The herbicide that’s expected to spread, along with...
Dow’s genetically modified seeds, is already widely sprayed on lawns, golf courses, and agricultural lands. Its use has long been contentious because 2,4-D was an ingredient in Agent Orange, harms non-resistant crops, and can cause health problems in humans after prolonged exposure.

Still, it’s not clear that EPA officials will restrict the herbicide. The Natural Resources Defense Council filed a petition to ban 2,4-D, only to have environmental regulators deny the request and declare it safe for approved uses.

Dow’s new genetically modified seeds, meanwhile, are largely a response to Monsanto’s RoundupReady system, which included genetically engineered seeds resistant to the herbicide glyphosate. Farmers embraced RoundupReady crops when they were introduced in the 1990s because they simplified weed management and reduced costs. Overuse over the last 15 years, however, led to the development of Roundup-resistant weeds. According to Dow AgroSciences, 86 percent of corn, soybean, and cotton growers in the South have herbicide-resistant or hard-to-control weeds on their farms, along with 61 percent of their peers in the Midwest. A new system is needed, and Dow is offering its seeds plus 2,4-D as an answer. A similar scenario could play out if 2,4-D is overused, too.

source: Business Week, January 7, 2014

Organic Milk Found Healthier After 18 Month Study

Over the last century, intakes of omega-6 fatty acids in Western diets have dramatically increased, while omega-3 intakes have fallen. Resulting intake ratios have risen to nutritionally undesirable levels, with omega 6s from 10 to 15 times higher than omega 3s, compared to a possible optimal ratio near 2.3 times higher. A new report details the results of the first large-scale, nationwide study of fatty acids in U.S. organic and conventional milk. Averaged over 12 months, organic milk contained 25% less omega 6 fatty acids and 62% more omega 3 fatty acids than conventional milk, yielding a 2.5-fold higher ratio in conventional compared to organic milk.

source: http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0082429

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Bejo Seeds are available through quality-minded dealers on both a seed packet and commercial scale. Call the number below for a list of seed sources.

source: Business Week, January 7, 2014

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White Wave to buy Earthbound Farm for $600 Million
Horizon Organic’s parent company White Wave Foods announced it will acquire Earthbound Farm, the nation’s largest organic produce brand, for about $600 million in cash from shareholders Kainos Capital, a private equity firm, and founders Drew and Myra Goodman. In a statement, White Wave CEO and Chairman, Gregg Engles, said his company now provides the “two most popular gateways for consumers to enter into the organic category - produce and dairy.”
source: December 9 press release from the National Organic Caucus

GM Sweet Corn Failing in US
Monsanto’s Performance Series sweet corn, a “stacked trait” GMO seed first sold in 2011, does not appear to be doing very well. A study by Friends of the Earth tested 71 samples of fresh, frozen, and canned sweet corn from 8 areas in a nation-wide sample. Only 2 out of the 71 (2.4%) tested positive for Monsanto’s GM proteins.

Dairy Use of rBST Dropping
Over two-thirds of US dairy farmers who have ever used recombinant bovine somatotropin, the GM hormone designed to increase milk production, have discontinued using it. It’s negative effect on animal health, and the market rejection and thus segregation of processing required to sell the milk, are souring dairy producers on its use. Overall dairy usage has dropped from 16% in 2005 to less than 10% in 2010. Initial rosy projections suggested over two-thirds of dairy farmers would embrace it.

Food Safety Update
The FDA, inundated with over 25,000 comments largely focused on two of its proposed rules under the Food Safety Modernization Act, announced on December 19 that it will make significant changes to the rules. While not withdrawing the entire rule,
The beneficial results of wide spacing in grain crops are great indeed! Here in our own backyard, the Heritage Grain Conservancy conducted SARE-funded organic wheat trials at UMass and at partnering farms over four years from 2008 to 2012. Not only did we conduct and select hundreds of almost-extinct landrace wheat varieties, but we also undertook intensive agrochemical applications. The results of our trials are as follows:

**12”** - (5 lbs per acre) - Extensive tillering with large 10” long, fat seed heads, almost no disease, but also about 25% of the seedheads were short and stunted. The plant kept growing and putting out new tillers until it was mature. 12” spacing is excellent for seed-sparing and had the highest level of fusarium due to lack of air flow. Greatest lodging.

**10”** - (7.5 lbs per acre) - Less tillers, slight balancing 8” - (11 lbs per acre) - The optimal spacing for field production with evenly sized heads, minimal disease and highest yield/seed weight. 8” spacing out of the large to small seedhead proportions. About 25% of the seedheads were short and stunted. The modern wheats, bred with less leaf surface area and stubby roots, are dependent on synthetic fertilizers to survive and are powered by petroleum. Wide spacing promotes extensive roots systems for better nutrient uptake, developing roots more fully, enhancing nutrient uptake, nourishing taller plants for increased photosynthesis that imparts richer flavor. Taller plants with greater photosynthesis have richer flavor and more phytonutrients.

**Climate resilience and fertility trials of heritage vs modern wheats**

Ancient emmer and einkorn exhibited stable higher yields and robust resilience under stressed conditions, whereas the modern wheat had the lowest yields and weaker plants. The heritage wheat was more resilient than the modern but less resilient than the ancient hulled wheats. Modern wheat did not put out additional tillers at any spacing and were lower yielding at the wide 12” to 8” spacing than the heritage wheat. Under the modern spacing of 75 lbs per acre (30 seeds per square foot), the disease level was similar to the 4” spacing of heritage wheat. Seedheads were consistently the smallest. Woody stalks on short stocky modern plants prevented lodging and the root systems was the smallest of all. There is about 500% greater leaf surface area in the heritage wheats. The heritage wheats are powered by sunlight, but the modern wheats, bred with less leaf surface area and stubby roots, are dependent on synthetic fertilizers to thrive. Seedheads were the heritage wheat at 12” spacing produces over 40 tillers per plant. Each clump grows from one seed.

**Historic Research in Wide Spacing**

Fascinated by my ‘discovery’ of the value of wide spacing, I researched the matter and learned that 1800s grain research reported similar results in their trials, and promoted wide spacing of wheat. This important knowledge has been almost forgotten, as have the superior seeds. Our experiment results are confirmed by an experiment on wheat seedling rates published by the USDA in 1869 with Tappahannock (aka Red Lamas) wheat:

- **Landrace wheat at 12” spacing** produces over 40 tillers per plant. Each clump grows from one seed.
- **1.14 lbs per acre planted / 3,456 lbs harvested / highest quality ever seen**
- Drilled September 22, 1868, on rich, well-drained clay soil, at the rate of one peck (14 lbs) to the acre.
This rate yielded fifty-two bushels per acre. The grain was superior to any other wheat heretofore grown in the county. It weighed sixty-four pounds per measured bushel.

2. 54 lbs per acre planted / 2,299 lbs harvested / superior quality

Broadcast on the same date on similar soil at the rate of one bushel per acre. This yielded thirty-eight bushels per acre, weighing sixty and one half pounds per bushel. It was superior to ordinary varieties.

3. 108 lbs per acre planted / 873.75 lbs harvested / good quality

Broadcast on the same date on similar soil at the rate of two bushels per acre. It yielded at the rate of fifteen bushels per acre, each weighing fifty-eight and one fourth pounds per bushel. The grain was the same quality as the best summer varieties.

It will be noticed in this experiment that the lightest seeding rate not only produced the largest yield of grain, but also the finest quality and by far the heaviest in weight.

In 1868, Mr. J.P. Nelson sowed 11 lbs of wheat evenly on one acre. He reported, ‘The wheat grew luxuriantly beyond anything I ever saw, at least 40 stems each with good heads from one root.’ Although the seeding was excessively light compared to typical 50 lb rates of today, the yield was quite above average. A lighter seeding rate not only gave the largest yield, but the finest quality. ‘It was by far the heaviest in weight and had the least disease.’ Department of Seed. Washington DC, Frederick Watts, Commissioner of Agriculture. 1869

The recommended seeding rate in 1869 is consistent with the results of our research today. 11 lbs per acre was the heaviest in weight and had the least disease. ‘It was by far the best seeding rate not only produced the largest yield but also the finest quality and by far the heaviest in weight. One of them that served as comparison, had 180 liters of seed per hectare (2.47 acres), while others received only half, the third and the sixth seed to the first, that is to say respectively 90, 60 and 30 liters. We found at harvest, the yield of straw and grain increased as the rate was more lightly seeded. Not only the performance of the last at 30 liters was the greatest, but the grain was the best and heaviest at the same volume. Later in season, it can be sown thicker. Size or fineness of grain must also be considered. Experience is the best as a guide, but it must be informed by thinking and reasoning.’

The seeding rate of wheat sown by one farmer cannot be a practical guideline for another unless the variety, soil and the time of seeding is the about same. Since kernels of wheat vary in weight and size, the number of grains in a pound will vary. A liter measures volume, so it is difficult to know exactly Vilmorin’s weight. Each variety has a difference density. Vilmorin’s recommended seeding rate for his variety is about 15 lbs per acre.

Regarding seeding rate, Vilmorin, France’s master seedsman in the late 1800s, reports: ‘Among many experiments we have made on this subject, we will mention one that is conclusive. In a field of good soil under ordinary conditions of wheat culture, we planted a winter wheat in the month of October in four plots of equal extent. One of them that served as comparison, had 180 liters of seed per hectare (2.47 acres), while others received only half, the third and the sixth seed to the first, that is to say respectively 90, 60 and 30 liters. We found at harvest, the yield of straw and grain increased as the rate was more lightly seeded. Not only the performance of the last at 30 liters was the greatest, but the grain was the best and heaviest at the same volume. Later in season, it can be sown thicker. Size or fineness of grain must also be considered. Experience is the best as a guide, but it must be informed by thinking and reasoning.’

The Natural Farmer

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What is Heritage (Landrace) Wheat?

Landraces are pre-industrial domesticated plants or animals that have been maintained by traditional farmers in low-input, variable fields over generations so as to evolve a high level of local adaptability and survival mechanisms. In contrast modern cultivars are developed by scientific breeding with modern farming methods for conventional high-input farming. Landrace cereals, legumes and vegetables populations have been selected and saved by farmers for thousands of years since the dawn of agriculture. The popular definition of ‘heirloom’ as a variety that was grown over 50 years ago forgets the long history of our ancient landrace food crops. Landraces evolved long before industrial breeding for global markets favored uniformity, appearance and shelf-life.

Because landrace wheat was cultivated generations before the chemical soil amendments and pesticide spraying were introduced in the twentieth century, how do we grow them? What can we learn from the traditional wheat growing methods?

Good grain husbandry enhances the ecological dynamics between the interdependent soil, seed and human systems.

Living Soil enriched with compost and minerals in a rotation of vegetables and cover crops, gives wheat the balanced fertility it needs. A vital soil system...
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nourishes larger roots that reach lower to find soil moisture to avoid heat stress and stabilize the plant in heavy rain. Robust plants get less disease.

Wider Spacing for Seed-Saving and Higher Yield - Awaken the full potential of the plant: Grow landraces and mixtures in living soil at 12” space (5 lbs/acre). Select a diversity of the healthiest fat seedheads to save for seed. Plant at 8” spacing (12 lbs/acre) for field production. Broadcast clover in early spring to suppress weeds. Wide spacing nourishes deeper roots for better survival under drought, heat and rain extremes. Planting closer than 8” means fewer tillers, shorter seedheads, more disease and lower productivity. Biodiversity and Seed-Saving - Selective seed-saving has been the responsibility of farmers since the dawn of agriculture. This knowledge, however, is almost forgotten.

Landrace wheats are genetically diverse populations selected by traditional farmers over millennia to be well adapted, and were grown in mixtures of diverse genotypes. As farmers rediscover the power of seed-saving at wide spacing, new climate-resilient locally-adapted landraces for organic farms can emerge. These are the seeds that can feed us as we face unprecedented climate weather extremes!

For heritage wheat seeds adapted to New England organic conditions, see: growseed.org. copyright 2014 Eli Rogosa, Heritage Grain Conservancy

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The Farm as Ecosystem: Tapping Nature’s Reservoir – Biology, Geology, Diversity
by Jerry Brunetti
335 pages, S30. Acres, USA 2014
ISBN 978-1-60173-041-1
reviewed by Julie Rawson

This book is hot off the press. I am a person who regularly devours Jerry’s articles in Acres, USA because they are so information-packed, so positive spirited, so thoroughly researched, and always based in the practical on-farm application. Brunetti’s writing (and public speaking) is always something to be sought out by anyone who is involved with grass-based agriculture. This book goes one step further in that it is relevant for the vegetable grower, also.

Each of the 13 chapters takes a topic and discusses it at length including some deep scientific facts, some anecdotes about leaders in that particular area of science or its agricultural application, and some recipes for successful farm or garden management regarding that topic. Throughout there are recommendations for further research on any topic that piques the reader’s interest. The chapters are titled as follows – Soil as Supraorganism, The Mineral Nature of Soil, Trace Elements, The Biological Nature of Soil, Compost and Compost Tea, Foliar Nutrition, The Eternal Earthworm, Water: A Medium for Metamorphosis, System Acquired and Induced Systemic Resistance, Our Precious Pollinators and Predators, Cover Crops, The Tools of the Trade, and Back to the Future: a Permanent Agriculture.

There is way too much here to try to summarize, so let me just give you a couple of tastes.

Foliar nutrition is the subject of chapter 6. According to Brunetti, there are 5 primary advantages to foliar feeding:
1. enables rapid and efficient uptake of nutrients
2. provides nutrients in problem soils where there is limited biology, inhibiting the uptake of soil nutrients into the plant
3. minimizes the stress of weather extremes
4. incites Induced Activated Resistance – which is a grower’s way to stimulate a protective response in the plant
5. manipulates the metabolism of plants so that the growth or vegetative phase can be morphed into a reproductive phase when desired.

Cracks in the cuticle of the plant leaf, and also stomata, which are open in the cooler times of the day, are the entry points for foliar nutrition. This chapter discusses, along with leaf anatomy, timing for foliars (of the day and in the plant’s life), necessary physical characteristics of a successful mix, temperature parameters, and appropriate equipment to be used. Sticking agents and solution pH (finished tank between 5.0 and 6.0) are considerations to manage. Seaweed extracts, humic and fulvic acid, sea crop (a sea water product that has had most of the NaCl removed), blackstrap molasses and fish hydrolysates are all components favored by the author.

Mass Farm Bureau and NOFA
Take Control of Your Future – Our policy and priorities begin with you

Small Plot Farming Act – Changed the law to expand protection for farms as small as two acres
Raw Milk – With NOFA Promoting legislation to allow expanded sales of raw milk products
Food Safety – Advocating for size-appropriate, risk-based approach to food safety
School Nutrition – Helped pass state law ensuring access to healthy, locally grown food in schools
Defeated – US DOT Federal Motor Carrier Safety Admin. (CDL) requirement, harpooning farmers, their families and employees to bring their products to market
Food Policy Council – Part of the Advisory Committee to help create a stronger, healthier Massachusetts food system
Meat Processing – Working to develop stronger infrastructure for local slaughter and meat processing

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Our Mission: To protect the rights, encourage the growth, and be of service to our members, to the best interest of agriculture
I became a foliar fanatic about 4 years ago. Though I have been using mixes of commercially formulated fertility products, along with trace minerals, to good success, I have been on the search for the perfect homemade foliar spray. I think I found it here and will be using it regularly this summer. It features one of my favorite bio-accumulator plants, which I have growing all over our farm. It is comfrey.

“Comfrey tea foliar can be produced by harvesting about twenty pounds of fresh leaves per 55 gallons of water. Add 10 pounds of compost or worm castings, 4 ounces of Epsom salts, 10 lbs of molasses, one ounce of sea salt and five gallons of milk. Let this all ferment in a vented container, stirring and shaking at least every couple of days for 3 weeks. Comfrey is very high in nitrogen because it is 25 percent or more protein. It’s loaded with macro and micro-nutrients as well as polysaccharides (long chain sugars) as a source of carbon. Strain and use as a soil drench or foliar at 3 to 4 ounces per gallon of water or 2-3% dilution.”

The lowly earthworm is the subject of Chapter 7. For good reason, Jerry has incredible respect and love for these creatures which he characterizes as a kind of hybrid between a chicken and a cow which sometimes acts like a “whale in the soil.”

Already convinced of their incredible capability to improve fertility, manage soil air and water, and build organic matter, in this chapter I was most interested in how to successfully increase the number of earthworms in a shovelful of dirt. Earthworms need an aerobic, cool, moist environment with adequate organic materials to flourish. They prefer soils with a pH between 5.5 and 8.5, and that has adequate calcium levels. That element is necessary for the mucus secretions of their calciferous gland. Direct contact with ammonia fertilizers (including slurry manure), insecticides, and tillage are hazardous to earthworms. A healthy soil food web that
includes good numbers of protozoa will attract a strong earthworm population. Using alfalfa products as mulches, in compost teas, and as soil amendments will attract the protozoa that feed the worms.

An interesting fact that I learned in this chapter was that Charles Darwin studied earthworms for 39 years and published an important work on them in 1881. No scientist prior to Darwin had taken such an interest in earthworms, and many believed them to be vegetable pests that attacked plant roots as do parasitic nematodes. Jerry’s love of earthworms is summed up in his closing words in this chapter – “…earthworms may provide answers for many of our challenges associated with topsoil conservation, feeding the hungry, recycling all of our biological wastes, preserving our watersheds, decontaminating toxins, restoring damaged landscapes, and providing a low cost feed for poultry (worms are rich in quality amino acids, fats, vitamins, and minerals). And there’s even the potential for cottage industries that can sell fish worms, compost worms, worm castings, and vermitea. Long live the earthworm.”

This tome is a textbook, a storybook, a practical how-to manual, and an inspiring call to action all in one wrapper. Jerry’s love of science, nature, farming, and humankind is a constant throughout the book. That enthusiasm kept me going until the end. Even during those periods where it got too “deep” for me to understand, I could always count on a return to practicality and lessons for me to put into place on our farm in 2014.
as many critics had asked, the agency will seriously revise the sections covering water quality standards and testing, the use of raw manure and compost, certain provisions affecting mixed-use facilities (such as farms with some food processing operations), and the procedures used to withdraw qualified exemptions for some farms. Other changes may also be made by the projected new release date in the summer of 2014.

source: Organic Broadcaster, January-February 2014

DDT Linked to Third-generation Obesity
A Washington State University study of exposure to the insecticide DDT (banned in the US in 1972 but still used for malaria control in developing countries) has found it impacts multiple generations, including contributing to obesity three generations later. Researchers exposed pregnant rats to DDT, finding the first generation offspring developed severe health problems. But even two generations later, more than half of the rats had increased levels of weight gain and fat storage. The study, published in the journal *BMC Medicine*, concludes that your ancestors’ environmental exposure may influence your disease development even though you never had direct exposure.

source: Pesticides and You, Fall 2013

FARM MANAGER FOR SKYHILL EGG FARM
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Send resume, references to maherjohnson@gmail.com

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The Natural Farmer Survey
The NOFA Interstate Council publishes The Natural Farmer. Many state chapters include it with their state’s NOFA membership. Please help us better understand your use of The Natural Farmer.

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☐ Not important, The Natural Farmer has no influence on my membership with NOFA.

± 3b. If No: Would you be interested in learning more about NOFA membership?
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4c. If Yes: That is great that you usually read The Natural Farmer! Why do you read it?
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6. If we change from paper to electronic, would you continue reading it? *
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7. General Comments regarding The Natural Farmer:
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8. Which other sustainable agriculture publications or periodicals do you read? Please, tell us how The Natural Farmer compares to these publications or others you are familiar with.
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