2003 Conference a Success Despite Threatening Weather

Despite ominous looking skies that persisted throughout the weekend, rain and thunder did not significantly affect the daytime events of the 2003 NOFA Summer Conference, and participants seemed to have a wonderful time, whether they were figuring out how to change their diet, listening to impassioned speeches, or eating blueberry pies or watching others eat them. As the rain poured down on Sunday afternoon August 10 about an hour and a half after the conference's last workshop ended, I looked out the windows of the Crown Center (my headquarters for the weekend) and saw registration coordinator Dennis Cronin hustling around and getting soaked, and I realized that humid and hazy as the weather was before that time, it did not follow through on its grave threats—save a couple of nighttime deluges—and we had a great conference.

Of course, in its 29th year, it’s not as if a bit of torrential rain would shut down the NOFA Summer Conference or dampen the will of its participants. Like Dennis, whose shirt was completely wet within seconds of being outside in the rain, NOFA people endure.

Judging by the turnout for Sally Fallon’s keynote address on Friday night, it seems NOFA’s ranks might be swelling, too. There weren’t enough chairs for all the derrieres in the gym that night as they listened to Fallon rail against “Vulture Capitalism,” tell the stories of Sam, Dave, and Mike and their respective experiences with different ‘white agricultural products,’ and preach about the virtues of raw milk and raw milk products. Although there were certainly some in the audience who did not appreciate all of Fallon’s message— including the man seated next to me who wondered “why not?” when it was said that the point of Sally answering questions was not to raise a debate—many people were more than happy to hear Fallon’s outline of “raw milk economics,” and indeed I heard them talking about the benefits of raw milk the rest of the weekend.

Although conference coordinator Julie Rawson is hesitant to put anyone above 1998 keynote Wendell Berry in terms of giving an inspirational keynote, in her mind Fallon came very close. “She gave a great speech,” Rawson said. “It was easy to follow, she had plenty of facts, and even if it was a bit of a fairy tale, I think she knew that, but it was really fun to watch her create this alternative vision for society.”

Peter Rothenberg, President of NOFA Connecticut, thought Fallon elucidated issues very well. “It was very helpful when she was talking about the politics and economics that she showed why they—and by they I mean the food industry—would tell you to eat what they do,” he said. For example, according to Fallon, beef production doesn’t fit into the corporate-government paradigm because it takes up too much acreage; therefore, it is not promoted.

Rothenberg also thought Fallon connected her message very directly to the concerns of farmers. “She showed how raw milk is a possible solution to the farm crisis we are in.”

Friday’s keynote program also featured a moving tribute to the recently deceased NOFA/ Mass board member Rich Williams, written by Jonathan Von Ranson and read by Julie Rawson. NOFA’s Person of the Year was Camilla Roberts, a longtime executive committee member of the Vermont chapter, and someone who was instrumental in kickstarting the Interstate Council Retreat. We all wish her much luck and joy in her endeavors in art therapy.

In the second year of the preconference program, more than 145 people attended Fallon’s intensive workshop presentation on nourishing traditional diets, and their praise for her was effusive: “She’s so good, I would have stayed hours longer to hear her answer questions,” said one woman who was, uh, very tardy in picking up her child. “She does such a good job of telling about the ills of the food system, but also in proposing something new,” said another. Rawson was very pleased with Fallon’s preconference, saying it even outshone last year’s by Joel Salatin. “When I went in there, what I saw and felt was just wild enthusiasm, a really strong energy and engagement with what Sally was saying.”

Rothenberg, 61 and constantly told by his doctor to go nowhere near cholesterol and saturated fats, gleaned a lot from Fallon’s presentation. “I thought it was extremely worthwhile, I learned a great deal, and I’m going to change how I eat,” he said.

From a very personal standpoint, I’d like to share with readers of this publication that I had the pleasure of spending the weekend with the young people, your children, who through their creativity, compassion, and remarkable insight refreshed and inspired me and my Children’s Conference comrades for the weekend and beyond. In the future, when the state of the world and this country may lead you to give in to feelings of despair, please consider spending some time (or more time) with young people. It is also heartening to consider that it is at such convergences that our youth gain practical skills and make people-connections that they may

(continued on page 33)
Irrigation and Agriculture

Anyone who has followed the story of America’s surge in agricultural productivity knows that it would not have been possible without extensive use of irrigation. Much of the West and Southwest owe their prosperity to huge federal dams and irrigation projects – agriculture accounts for over 90% of water consumption in many Western States. More recently, the natural corn and soy-growing regions have been extended from the heartland of Illinois and Iowa to the high plains of Nebraska and even Colorado with deep wells and center-pivot traveling irrigation booms. Since 1969 the nation’s acreage of irrigated cropland has expanded by about 30%.

But in the last 30 years field water application rates per acre have actually declined 15% because of more careful use of this resource. These days sophisticated trickle irrigation systems are connected to soil humidity gauges and flow timers to enable exactly the right moisture to reach high value vegetables and small fruits throughout their growth, with very little waste.

In the Northeast of course, largely because of our high level of rainfall, irrigation is not as important as in other regions. Even so, an astonishing 39% of small family-sized farms (ones between 10 and 50 acres) in the NOFA states use irrigation. This issue of The Natural Farmer is dedicated to discussing the conditions of soil, climate and cropping which might make irrigation appropriate for you. We meet farmers for whom irrigation is a crucial component of their farm’s operation. And we keep up with technical innovations and products on the market in this farm supply industry.
Please help us thank these Friends of Organic Farming for their generous support!
NOFA/NH seeks to purchase rural land to create a Model Farm to demonstrate the viability of a diversified organic farm. A central NH location is preferred. The land should have the potential to be a diversified farm to provide a year-round income, as well as the potential for living quarters. Please contact Bob Bower at (603) 456-2319 or the NOFA-NH office at nofanh@innevi.com.

MOFGA Seek Stewards for Modern Farmhouse. The Maine Organic Farmers and Gardeners Association seeks individual or couple committed to organic agriculture and public outreach to share resident stewardship at the Common Ground Education Center in Unity, Maine. The successful candidate(s) will participate in MOFGA’s Journeyperson Program, which trains people to be successful farmers in Maine. Journeypersons farm part of MOFGA’s property and generate income from the crops they raise. Compensation will be a monthly stipend. The position will be available in the late Fall of 2003. For more information or an application, call MOFGA at 207-568-4142 or visit MOFGA’s website — www.mofga.org.

Cutflower and Vegetable Business Opportunity: Partner wanted for 2004 season and beyond for small organic operation in Plainfield, NH. Must have a passionate desire and the ability to market, harvest and deliver high quality vegetables and flowers to farmers markets, restaurants, and retailers. To discuss possibilities ph/fax 603-526-6011 or gypsymeadows@earthlink.net

Learn the Basic Principles of Biodynamic Farming & Gardening in a one year part-time program presented by the Pfeiffer Center in Chestnut Ridge, NY, consisting of eight Saturday workshops and a final one-week intensive, September 13, 2003 - Summer, 2004. Taught by leading practitioners including Will Brinton, Steffen Schneider, Jennifer Greene, Craig Holdrege, Mac Mead and Pfeiffer Center Director Gunther Hauk. For information: 845-352-5020 ext. 20. Email: info@pfeiffercenter.org Website: www.pfeiffercenter.org.

Organic Farm Development Consultant needed for a new organic farm start-up in Suffield, CT. Eighteen cleared producable acres. Lots of creative potential. Holistic resource management a plus. Please contact Amy Ruzbasan, Brightside Farm, 246 North Main Street, Suffield, CT 06078. Tel.#’s 1-860-668-1511, 1-860-306-8259, email: aruzbasan@cox.net

Organic Raw Milk for sale at our farm. Our cows are 100% grassfed too! Chase Hill Farm, Warwick, Mass. $4.00/gallon, $2.00/half gallon, (978) 544-6327 or chaschillfarm@yahoo.com.

Greenhouse for Sale: 20’ X 96’, used 3 months, includes propane furnace, woodstove, convection fan and tube, inflation kit, and benches. $5000 or BO. Also other vegetable farm equipment available. Call 315-287-0176

Organic dairy farmer desperately needed to take over operation of small, thriving production of non-antibiotic, non-hormone, certified raw milk and pasteurized milk, butter, ice cream, yogurt, cottage, cream and hard cheeses. Established delivery route and on-site store. 40-cow dairy; land and buildings owned by town who rents or leases out farm. Someone please rescue this vital enterprise from autumn closing. The Town Farm Dairy, 73 Wolcott Road, Simsbury, CT 06070, 860-658-5362.

Many Hands Organic Farm has many offerings for sale: Certified organic, all by the NOFA/Mass certification program: garlic braids are $14 post paid. The braids each contain 13 soft neck garlic bulbs from our 2003 crop and are wonderful presents. Free range chicken fed certified organic grain from Kraemer Feeds in PA: 6 lbs average. Fresh chickens available October 26. $3.00/lb for ten or more birds, otherwise $3.50/lb. Free range pork (Tamworth/Gloucester Old Spot crosses) available mid October at $5.75/lb by the cut, or $5.25/lb by the half or whole pig. (978) 355-2863, julie@mhof.net, www.mhof.net.

For more current listings, check www.nofaic.org and click on “Exchange”
The Natural Farmer

Fall, 2003

Notes

New Resource for Information on Organic Agriculture: OrganicAgInfo is an on-line database of research reports, farmer-to-farmer information, outreach publications, and more at www.organicaginfo.org. The database can be searched by keywords, region, crop, or livestock type. All information on this web site can be accessed free of charge. If you have information on organic agriculture that you think would be useful to others, you can upload it to the site yourself. Any information submitted on-line will be reviewed by our team of reviewers before being posted. source: OPRF Email, June 17

Scathing Report on Genetically Modified Food and Crops Explodes "frankenfood" Myths: Two major reports released critical findings about genetically modified (GM) food and crops because of potential risks to human health and the environment, while making the case that better ways are readily available that are also sustainable. The report, at www.foodfirst.org/progs/global/ge/ispo/report.pdf is called The Case for a GM-Free Sustainable World, and is a dossier of evidence on the known problems and risks of GM crops. "Many scientists are concerned over the safety of GM," said Dr. Mac-Wan Ho, director of the Institute of Science in Society in the United Kingdom and lead author of the report. source: Food First press release, June 16

Biosafety Protocol to Enter into Force: The Cartagena Protocol on Biosafety - a protocol under the Convention on Biological Diversity (CBD) - will enter into force on 11 September this year. On 13 June, the island state of Guam became the 144th country to ratify the protocol, thus triggering entry into force 90 days later. The aim of the Protocol is to control the transfer of living modified organisms (LMOs) and the adverse effects their release into the environment might have on countries' ecosystems. The Protocol reflects directly the precautionary principle, and establishes an advance informed agreement (AIA) procedure for import of LMOs. On trade implications of the Protocol, Klaus Töpfer, UNEP Executive Director, said that, "avoiding potential conflicts between trade laws and the biosafety regime will require good will and careful management." The US has not ratified the CBD and will not be a Party to the Protocol when it enters into force. source: Bridges Weekly Trade News Digest - Vol. 7, Number 22, June 18, 2003

Swiss to Vote on GE! Switzerland may be the first nation in the world to ban genetically modified crops and foods. In a July 14 petition with well over 100,000 signatures was recently submitted to the Swiss government, thereby mandating that the issue be placed on the general election ballots. Although Switzerland's Swiss based biotech corpora- tion has promised to sway the vote in its favor with a heavily financed pro-GMO campaign, polls show that over 70% of Swiss citizens refuse to eat genetically engineered foods. source: Organic Consumers Association press release, May 22, 2003

Organic Market Reaches $23 Billion: The global market for organic food and drink reached $23 billion in 2002, says a new study from Organic Monitor. The study says increasing demand in North America helped "drastically" the increase. North America overtook Europe as the largest market for organic food and drink. The study also reported that there are almost 23 million hectares of organic farmland in the world, including the United States, 3.8 million hectares in Europe, and 3.4 million hectares in Brazil. The report predicts continued growth in the global organic food industry, although at slower rates than in the past year. source: www.organicmonitor.com, July, 2003

Frankenfood Added to Dictionary: Once a decade Merriam-Webster updates their Collegiate Dictionary. The new edition has added the word "Frankenfood." Here is how it is listed: "Frankenfood (noun) [from Frank-en-(as in Frank-enstein) + food] (1992) genetically engineered food http://www.merriam-webster collegiate.com/info/new_words.htm.

Is Organic Food Better? A study in the January 2003 Journal of the American Medical Association found that organic fruit and vegetables had 25% more vitamin C, 68% more beta-carotene, 21% more vitamin E, 11% more thiamine, and 8% more ascorbic acid than conventionally grown. source: New York Times, June 16, 2003

Britain’s Largest Supermarkets Won’t Stock GE Crops: Britain's largest supermarkets — Tesco TSCO.L, Sainsbury SBRY.L, Safeway SWF.L and Asda WMT.N - were invited to express their options as part of the government-sponsored national debate on whether the gene-spoiled crops are commercially viable. A spokesman for Britain’s largest supermarket, Tesco, said it would only stock GM foods if consumers demanded them. "We will only include all breeds of organic food, or own- brand products after consulting with our customers, and that’s unlikely to change unless they tell us differently," he added. The meeting comes just a few weeks after the British Retail Consortium, representing 90 percent of the country’s high-street stores, told government agriculture officials they would still refuse to stock GM crops. The farmers were given the green light to grow the crops on a commercial scale. source: Reuters, July 17, 2003

Call for Proposals: Interdisciplinary Symposium. The University of New Hampshire Office of Sustainability Programs is organizing an interdisciplinary symposium on “Eating as a Moral Act: Ethics and Power from Agrarianism to Consumerism.” The forum will be held on the UNH campus in Durham, NH from July 24 to 26, 2003. The UNH will offer 20-minute presentations to be delivered at four or five plenary sessions related to the symposium’s main theme are sought. Send abstracts by October 15, 2003 to the Office of Sustainability Programs, 107 Nesmith Hall, Durham, NH 03824. For more information, please call 603-862-4088.

British GM Report a “Scandal”: Former British Environment Minister Michael Meacher called the government’s just released report a “public scandal.” The report on the effects of eating food from genetically modified food. “This is just a rehash of what the committee doesn’t like it and the Government seems deter- mined to over-rule all opposition.” The lead author on the report’s risk assessment chapter was an employee of Monsanto. “Naive, and biased,” is how a scientist who quit the panel in disgust describes the report. Also of interest: A recent study published in the Journal of the American Medical Association shows that industry-sponsored studies are nearly four times more likely to conclude pro-industry findings than studies by scientists who are not industry-sponsored. (Is anyone surprised?) source: Weekly Watch Number 34, 07/28/2003

Organic Food Makes Good Mother’s Milk. Two maternity hospitals in Switzerland have found that pregnant women whose diets consist of over 50% organic food deliver babies with higher (and healthful) levels of aspirin, and bolsters the immune system. source: New York Times, July 16, 2003

Hardiness Zones Creep North. The USDA Hardiness Zones (available at www.magna.missouri.edu) show the lowest temperatures that can be expected each year in the US, in bands representing 10 Fahrenheit ranges. An updated map, based on climate data from 1987 to 2001, shows that many zones have moved slightly north because of the warming temperatures. source: Growing for Market, June, 2003

Maryland Stops Holding Processors Responsible for Chicken-Farm Waste. Maryland’s Republican Gov. Robert Ehrlich abandoned rules that hold poultry growers responsible for pollution generated by chicken waste flinging into the Chesapeake Bay. He reversed the Democratic administration that forced the large farms to deal with the environmental damage that comes from their industry. Across the state’s Delmarva Peninsula near the bay, fewer farmers are shipping chicken waste to poultry corporations. The corporations deliver the birds or eggs to growers, provide the feed and then collect the animals for slaughter. But they leave the farmers with the tons of manure produced by the birds. As the number of birds raised on the Eastern Shore has surpassed the capacity of the cropland to absorb their manure, the waste has often washed into waterways, fueling algae blooms that choke the water of oxygen and light. source: Washington Post, June 13

Callouts

Endorsed by the Organic Trade Association has endorsed the Right To Know Act, Real Solutions to World Food Safety Act, The Genetically Engineered Food bills - The Genetically Engineered Crop and Animal OTA Endorses Kucinich Genetic Engineering

Merriam-Webster’s has made several findings of measurable impacts including: Organic farmers are more likely to be female, hold a college degree, and be full-time farmers. The average organic farmer is 7 years younger than the average U.S. farmer. Retail price premiums for organic foods average 10% to 30% higher than conventional. Farm price premiums are 70% to 250% more than what conventional farmers receive. Counties with organic farms have stronger farm economies and a higher rate of job creation. Financial economies through total sales, net revenue, farm value, tax values, paid, and purchases of fertilizer, seed, and repair and maintenance services. Counties with organic farms have more committed farmers and give more support to rural development with higher percentages of residents who own their homes. The average organic consumer spends $2,700 to $4,500 annually on organic products. The organic sector employs many women. The average organic farmer is 7 years younger than the average U.S. farmer. The average organic farmer has made several findings of measurable impacts including: Organic farmers are more likely to be female, hold a college degree, and be full-time farmers. The average organic farmer is 7 years younger than the average U.S. farmer. Retail price premiums for organic foods average 10% to 30% higher than conventional. Farm price premiums are 70% to 250% more than what conventional farmers receive. Counties with organic farms have stronger farm economies and a higher rate of job creation. Financial economies through total sales, net revenue, farm value, tax values, paid, and purchases of fertilizer, seed, and repair and maintenance services. Counties with organic farms have more committed farmers and give more support to rural development with higher percentages of residents who own their homes. The average organic consumer spends $2,700 to $4,500 annually on organic products. The organic sector employs many women. The average organic farmer is 7 years younger than the average U.S. farmer. The average organic farmer

There are interesting visual effects in the full report

Court Supports Corporate Ag Interests (surprise)? The District of Columbia federal court ruled that the EPA must continue to use human clinical test data in its assessment of pesticide risks. According to industry sources, if this type of clinical testing data could not be used, the risk factor under consideration would increase 500%, and more products could have been prohibited. The issue emerged in December, 2001, when the EPA itself decided to adopt stricter standards in its regulatory decision making process. CropLife, Amvac, Bayer Cropscience and the American Chemistry Council all sued the agency. source: Vegetable Growers News, June, 6, 2003

OFTA Endorses Kucinich Genetic Engineering

Callouts

The USDA hardi- ness Zones Creep North. The USDA Hardiness Zones (available at www.magna.missouri.edu) show the lowest temperatures that can be expected each year in the US, in bands representing 10 Fahrenheit ranges. An updated map, based on climate data from 1987 to 2001, shows that many zones have moved slightly north because of the warming temperatures. source: Growing for Market, June, 2003
Australian approval of GM canola stalled by the states. Although the Australian government has given the green light for the commercial release of genetically modified canola (oil seed rape), intense opposition has resulted in all but one state government imposing moratoriums on the planting of this crop. In the last six months, the state governments of South Australia, Victoria, Western Australia and New South Wales have all announced moratoriums on the commercial release of canola. While Queensland is the only state not to have announced a moratorium, Bayer’s GM canola is not appropriate for the Queensland climate. Driving the state governments’ change in policy is opposition to GM canola by farming interests including the Australian Wheat Board, the Australian Harvester Board, Pulse Australia and even the grower of genetically engineered cotton, the Tynams Agricultural group. Their opposition reflects the insistence by customers that their grain meet strict standards. Saudi Arabia, the world’s largest importer of barley, has indicated that they may refuse to trade barley with Australia if it entered cotton, the Tynams Agricultural group. Their opposition reflects the insistence by customers that their grain meet strict standards. Saudi Arabia, the world’s largest importer of barley, has indicated that they may refuse to trade barley with Australia if it has grown GM canola.

Whole Foods’ stores get certification. Although retailers are not required to get organic certification under the National Organic Program, all of Whole Foods’ 140 stores have now received it from Quality Assurance International of San Diego. Other retailers, including several retailers, including one of the world’s largest grocery chains, are currently in the certification pipeline. Apparently retailers are taking the step as a show of good faith and support for the national effort. source: Organic Business News, June, 2003

The best science money can buy? A study published in the Journal of the American Medical Association (JAMA) reveals a significant association between industry sponsorship and pro-industry conclusions than are studies that are not industry-sponsored. The JAMA analysis concludes that industry-sponsored studies are nearly four times more likely to reach pro-industry conclusions than are studies that are not industry-sponsored. source: Nature 424, 369, July 24, 2003

Animal Pharm Folds. The company that helped clone Dolly is in deep trouble. Animal Pharm, as one after another of its technologies unravel. PPL Therapeutics, the company that made its fortunes on Dolly the cloned sheep 6 years ago, announced on 18 June that its partner, the German drug giant Bayer, has suspended development of recombinant alpha-1 anti-trypsin, a treatment for emphysema. This was one of PPL’s major projects. In response, PPL said it will lay off up to 140 of its 165 employees in both UK and New Zealand and scrap plans for a £42 million manufacturing plant. The company itself could fold, some analysts say. When PPL was set up in 1989, the company hoped to clone flocks of genetically modified sheep and cows that would produce therapeutic proteins in their milk. But the firm has been forced to sell off several projects within the past few years, including the somatic cell nuclear transplant cloning that produced Dolly, as the technology has come up against insurmountable hurdles. Meanwhile mass slaughter has begun of up to 3,000 transgenic sheep at the company’s two farms in East Lothian. The animals must be slaughtered and incinerated on the same day under strict Home Office regulations to avoid environmental risks; and meat from the animals cannot be sold as food. source: Biotech Activists listserve 07/30/03

Jose Bove walks free after serving just five weeks of a 10-month jail sentence for destroying gene-modified plants. French radical activist Bove’s release came after the public prosecutor in Montpellier, where Bove has been in prison since late June, announced he would not appeal a judge’s order on Friday to release Bove early under a home detention regime with limited freedom. Bove spent six weeks in jail in early 2003 for smashing up a McDonald’s restaurant. And he was convicted in November for ripping up gene-modified rice and maize plants in 1998 and 1999. source: Reuters, Aug 2

Vatican hails GM food. Archbishop Renato Martino, head of the Pontifical Council for Justice and Peace, said that the Vatican was preparing an official report on genetic modification, to be published in September, which would come down in favor of genetic modification. Until the statement, the Vatican had been neutral in the confrontation between the European Union and the United States over GM food. The forthcoming Vatican study will argue that the future of humanity is at stake and that there is no room for the argument advanced by some environmentalists that “nature is good and man is bad.” source: The Times (London), August 4, 2003

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The Global Food Index
Original data from International Society for Ecology and Culture, PO Box 9475, Berkeley, CA 94709

- Miles traveled by typical plate of food in US: 1,500
- Miles traveled by typical plate of food from CSA or farmers market: 45
- Percentage of US energy consumption used by the food system: 20
- Last year that North Pole melted: 2001
- Years since previous North Pole melt: 50,000,000
- Percentage change in US use of pesticides since 1945: 3,200
- Percentage of American children with measurable amounts of pesticide in their urine: 90
- Percentage of US food dollar going to typical farmer: 9
- Percentage of food dollar going to CSA or farmers market farmer: 80
- Number of reasons to buy global food rather than local food: 0

USDA to require permits for pharma plants. The US Department of Agriculture’s Animal and Plant Health Inspection Service is amending its regulations pertaining to plants designed to produce industrial compounds (pharma crops). Firms wishing to move, field test or import pharma plants must apply for a permit. Previously, APHIS allowed such activities under its notification process, originally added to the biotechnology regulations to expedite genetically engineered plants considered low risk. Recently, however, genetically engineered pharma crops have utilized new, less familiar processes and non-food, non-feed traits that no longer qualify for the notification process, the agency says. source: USDA News August 5, 2003

Food Producers in China go GM-Free. Thirty-two food producers operating in China announced their official commitment not to sell GM food. In what amounts to the first public rejection of GM food by food producers, the 32 companies, with 53 brand names, sent formal statements to Greenpeace in July, confirming that they do not use GM ingredients in their products sold in China. Local companies committed to eliminating GM ingredients include large soy sauce producers in the Southern China region, such as Pearl River Bridge, Lee Kum Kee and Amoy, as well as a major soy milk brand, Vitaoy. Internationally known brands such as Wyeth, Mead Johnson, Wrigley and Lipton, which already have non-GM policies in other countries, made similar commitments for China. Local food companies committing to non-GM products will benefit from China’s new policy, introduced in March this year, which allows to keep production in the largest soy production provinces in Northeast China GM-free. China is the centre of origin for soy beans, so the impacts of GM soy on biodiversity could be great. source: 08/03/2003 press release from Institute of Science in Society.

Suit to regain control of own genes advances. In 1987 individuals suffering from Canavan disease sought help from geneticist Reuben MataIon at Miami Children’s Hospital. With their consent he obtained cells from the patients, collected over 5000 tissue samples, which he and the hospital then secretly patented. They then charged royalties to use the samples and restricted the number of labs working on the disease. This June a Miami judge ruled that the families who originally collaborated with MataIon could challenge the patent. “This will be a landmark” said an attorney for the families, referring to lawsuits on abuse of patent rights. source: Gene Watch, July-August, 2003

The Natural Farmer Fall, 2003

Original data from International Society for Ecology and Culture, PO Box 9475, Berkeley, CA 94709

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- Percentage change in US use of pesticides since 1945: 3,200
- Percentage of American children with measurable amounts of pesticide in their urine: 90
- Percentage of US food dollar going to typical farmer: 9
- Percentage of food dollar going to CSA or farmers market farmer: 80
- Number of reasons to buy global food rather than local food: 0
by Frank Phelan
General Manager, Living Earth

Oh, the glory of greens! After giving in to that irresistible urge to graze on platefuls of greens during the summer, it is comforting to know that several months from now, some of the greens in the gardens will still be “ripe” for the picking and tastier than ever.

On that stage which is the autumn garden, most of the vegetable troupe has already packed it in until the next growing season. Many of the greens are hearty enough to ride through the season as a long running hit. They actually get more flavorful after being nipped by a frost and can sometimes be harvested into December, especially if there is an insulating blanket of snow.

Prior to the advent of year round produce availability in temperate climates, the sight of the season’s first greens would be reason for much joy and celebration. As the long, arduous winter melted into spring, fresh greens would nourish and cleanse the body with vitamins, minerals, and enzymes that may have been lacking during this period. After subsist- ing on dried, pickled and preserved foods, a harvest of fresh greens would have been a wondrous, almost magical experience. With all due respect to a certain fast food chain’s marketing campaign, a bunch of newly picked greens was the original concept in “eat fresh.”

Another reason these were prized in traditional cultures was the fact that many of them have bitter properties. Americans tend to overindulge in foods that are sweet and/or salty and avoid bitter ones. A variety of greens with bitter properties such as dandelions, watercress, chicory and mustard can stimulate the secretory glands. These include the digestive juices of the salivary glands, stomach and small intestine. These secretions activate liver function and activate the flow of bile, especially important in the digestion of fats and oils.

We are now blessed with an incredible assortment of fresh greens throughout the year. They are power- packed with nutrients, enzymes, antioxidants and co-factors so important to a healthy constitution. They are naturally low in fats, sugars, and salts that are so pervasive in today’s processed foods. And remember that there are certain to be more impor- tant nutrients encoded in research on these wonder foods continues.

The greens that were consumed by our ancestors were either picked growing wild or cultivated according to the inherent wisdom of nature. There really is no need to tamish their majesty with pesticides or herbicides, so always look for organi- cally grown varieties of greens.

In these uncertain times, getting the goodness of these wonder foods continues. There are several colorful varieties including green (swiss chard), red (ruby chard), and mixed (rainbow chard). Chard makes a great alternative to any dishes calling for spinach.

Chicory- Sometimes referred to as curly endive, chicory is related to the lettuces and is a member of the same family- Asteraceae. Its wild mane of curly, notched leaves have a sharp, somewhat bitter taste that can add some zip to salads and garnishes. Frisée is a delicate, feathery leaved variety that is often found in mesclun mix (a potpourri of tender young lettuces and greens). Radicchio, a red-leaved variety, has been cultivated in Italy for almost 500 years. It resembles a small cabbage in shape with rough red leaves and a contrasting white ribbing. Ribadicio, another component of mesclun, can add zest and color to salads and side dishes.

Collards- Often associated with “soul food” cuisine of the south, collards are a variety of non-heading cabbage. They originated in Africa and are closely related to kale. The leaves are relatively large and smooth and are considered one of the most nutri- tious greens. They are usually pickled for cabbage or grape leaves and stuffed with your favorite savory filling including seasoned rice, cous cous or quinoa. It has been purported that Julius Caesar would eat a mess of collards after banquets to ward off indiges- tion.

Dandelions- Dandelion is a derivation of the French “dent de lion” which means tooth of the lion and describes the jagged, toothed leaves. While some regard dandelion as a pesky weed, they have been valued as medicinal and food herbs for centu- ries. Dandelions have natural diuretic properties and are rich in potassium, a mineral often depleted by many greens and is the most abundant mineral in our body, with 99% in the stomach, intestine, kidney and bladder.

Dandelions may possess potent anticancer factors. It has been purported that Julius Caesar would eat a mess of collards after banquets to ward off indigestion.

Escarole- Although it superficially resembles a robust head of leaf lettuce, escarole is actually a variety of endive. This close cousin of chicory is slightly bitter and may be eaten raw in a salad or cooked. Escarole is popular in Italy and is particu- larly good sauteed in olive oil with plenty of garlic or in a soup complemented by cannellini beans.

Kale- Like collards, kale is another variety of non- heading cabbage. The leaves are quite different from collards in that they are spiky and curly. Kale is typically deep green or bluish green but can also range from bright red to purple in ornamental varieties. Kale grows best in cooler climates and is favored in northern European countries, especially Scotland. Along with broccoli, cabbage, collards and mustards, kale is a cruciferous vegetable that may possess potent anticancer factors.

Mustards- Another member of the Cruciferacea family, mustards contain several sulphur compounds that give this green its distinctive sharp, peppery tang. Mustards originated in Asia Minor and are usually a light yellow - green with frilly leaves although many modern selections contain varying degrees of spiciness. Tatsou is a deep green variety with a spoon shaped leaf and is relatively mild, while the Green Wave variety is quite hot and spicy. Mustards are a staple of southern soul food cuisine and are also popular in China and Japan where they are sometimes pickled or fermented.

Turnip Greens- Turnips are one of the oldest vegetables known to man. In this country they are grown primarily in the south where the greens are prized as just much as the roots. Turnip greens that are large and deep green are the best. The greens from aged turnips can get quite tough and become strong-tasting. Turnip greens can be braised, steamed, or sauteed but generally take a bit longer than other greens.

Watercress- This relative of the mustards grows in cold running streams and brooks of the north and springs. Watercress originated in the Mediterranean and was brought to this country by the early Euro- pean settlers. The small, rounded, deep green leaves have a peppery tang and make a great addition to salads or sandwiches. Add watercress to soups just before serving so that the delicate leaves wilt but don’t disintegrate. Use it instead of parsley for a uniquely refreshing garnish.

There’s Gold in Those Greens

Greens are a nutritional gold mine that we should all tap into for optimal health and longevity. Along with other cruciferous vegetables known to man. In this country they are grown primarily in the south where the greens are prized as just much as the roots. Turnip greens that are large and deep green are the best. The greens from aged turnips can get quite tough and become strong-tasting. Turnip greens can be braised, steamed, or sauteed but generally take a bit longer than other greens.

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There’s Gold in Those Greens

Greens are a nutritional gold mine that we should all tap into for optimal health and longevity. Along with other cruciferous vegetables

Three Vitamin All-Stars

Vitamin A- Greens are exceptionally rich in carotenoids which are also called provitamin A or vitamin A. There are two types of carotenoids, xanthophylls and xanthins, there are other bioactive compounds (phytochemicals) that are continually being discov- ered that may also play significant roles in our health and well-being.

Three Vitamin All-Stars

Calcium- We usually associate this mineral with milk and other dairy products, but many greens contain significant amounts of this most abundant mineral in our body, with 99% residing in bones and teeth. Calcium is necessary for muscle contraction, nerve impulse conduction and heart function. Calcium is an alkaline mineral and...
plays an important role as a buffer for the blood. Asian women, who get much of their calcium from vegetable sources, have lower incidences of osteoporosis than their dairy-eating American counterparts.

**Magnesium** - About 70% of the magnesium we absorb goes into bone formation. The other 30% plays important roles in carbohydrate and amino acid metabolism, heart function and neuromuscular contraction. It is also important in converting blood sugar to cellular energy and for calcium absorption. Magnesium is involved in many other biological processes including nucleic acid and protein synthesis, maintaining cell membrane integrity and regulating the intracellular flow of calcium ions. Since magnesium is an essential component of the chlorophyll molecule, fresh greens are a reliable source of this mineral.

**Potassium** - In this age of excessive sodium intake, potassium’s importance to health cannot be overstated. It is found primarily in the fluid of the cells where 98% of our potassium stores are located. Potassium works in conjunction with sodium (found primarily in fluid outside the cell) to regulate the water balance in our bodies. It is important for stimulating nerve impulses, normalizing the heartbeat and along with calcium, regulating neuromuscular function. Potassium plays a necessary role in regulating blood pH and blood pressure, as well as being involved in many metabolic enzyme reactions.

**Phytochemicals in Greens**

Another important category of nutrients found in greens and other vegetables are biologically active compounds called phytochemicals. At a time when 1 of 3 Americans will be diagnosed with cancer at some point in their lives, it is encouraging to know that many of the greens contain these potent anticancer compounds.

Phytochemicals have the ability to increase the production of anti-cancer enzymes or augment their biological activity. These enzymes may act as blocking agents that can neutralize carcinogens or prevent them from directly contacting the cells. They may also act as suppressing agents that inhibit malignant changes in the cells that may have already been exposed to carcinogenic agents.

The cruciferous vegetables (kale, collards, mustards, etc.) are particularly rich in two groups of phytochemicals, the indoles and the isothiocyanates. Indole-3-carbinol inhibits certain estrogen metabolites that are known carcinogens and can actually increase those estrogen metabolites that exhibit protective properties against some cancers including breast cancer.

Sulforaphane is an isothiocyanate also found in the crucifers. It has the ability to induce the production of two potent antioxidant and detoxification enzymes: glutathione–s–transferase and quinone reductase.

There is no doubt that many more phytochemicals will be added to the growing list found in greens as more research and analysis is initiated on the healthful benefits of vegetables.

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**Nutritional Values for Select Greens**

(Values based on 1 cup raw greens)

<table>
<thead>
<tr>
<th>Green</th>
<th>Vitamin A (iu)</th>
<th>Folic Acid (mcg)</th>
<th>Vitamin C (mg)</th>
<th>Calcium (mg)</th>
<th>Magnesium (mg)</th>
<th>Potassium (mg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arugula (20 gm)</td>
<td>474.6</td>
<td>19.4</td>
<td>3.0</td>
<td>32.0</td>
<td>9.4</td>
<td>73.8</td>
</tr>
<tr>
<td>Beet Greens (38 gm)</td>
<td>2318.0</td>
<td>5.7</td>
<td>11.4</td>
<td>45.2</td>
<td>27.4</td>
<td>207.8</td>
</tr>
<tr>
<td>Chard (36 gm)</td>
<td>1188.0</td>
<td>5.0</td>
<td>10.8</td>
<td>18.4</td>
<td>26.2</td>
<td>136.4</td>
</tr>
<tr>
<td>Chicory (180 gm)</td>
<td>7200.0</td>
<td>198.0</td>
<td>43.2</td>
<td>180.0</td>
<td>54.0</td>
<td>756.0</td>
</tr>
<tr>
<td>Collards (36 gm)</td>
<td>1376.6</td>
<td>57.8</td>
<td>12.7</td>
<td>52.2</td>
<td>3.2</td>
<td>60.8</td>
</tr>
<tr>
<td>Dandelion (55 gm)</td>
<td>7700.0</td>
<td>14.9</td>
<td>19.3</td>
<td>102.9</td>
<td>19.8</td>
<td>218.4</td>
</tr>
<tr>
<td>Kale (67 gm)</td>
<td>5963.0</td>
<td>19.4</td>
<td>80.4</td>
<td>90.5</td>
<td>22.8</td>
<td>299.5</td>
</tr>
<tr>
<td>Mustards (56 gm)</td>
<td>2968.0</td>
<td>104.7</td>
<td>39.2</td>
<td>57.7</td>
<td>17.9</td>
<td>198.2</td>
</tr>
<tr>
<td>Turnip Greens (55 gm)</td>
<td>4180.0</td>
<td>106.7</td>
<td>33.0</td>
<td>104.5</td>
<td>17.1</td>
<td>162.8</td>
</tr>
<tr>
<td>Watercress (34 gm)</td>
<td>1598.0</td>
<td>3.1</td>
<td>14.6</td>
<td>40.8</td>
<td>7.1</td>
<td>112.2</td>
</tr>
</tbody>
</table>

The soil receives water from rain or irrigation, stores some of it, and makes some of it available to plants. All of these functions are controlled by the physical properties of the soil. During a rain or irrigation event, water must enter (infiltrate) the soil and then move downward (percolate). If the infiltration and percolation rates of the soil are at least as great as the rate of precipitation or irrigation, the soil will absorb the water. However, if the rate of water application exceeds the soil's ability to take it in, then run-off or puddling will occur. If water application exceeds the soil's capacity to store moisture in the root zone, water will move farther down, carrying soluble nutrients beyond the reach of plants. If it moves far enough, the nutrients contaminate ground water. We will review some basics regarding physical properties of soil and how they affect irrigation practices. We will also discuss methods of improving the soil and how to determine when and how much irrigation is needed.

Soils are composed of solid particles with spaces between them. The soil particles consist of tiny bits of minerals and organic matter. The areas between them are called pore space and are filled with air and water. It is desirable for an agricultural soil to consist of about one-half soil particles and one-half pore space by volume. A compacted soil would have less pore space than one in good tilth. Ideally, pore space by volume. A compacted soil would have less pore space than one in good tilth. Ideally, an agricultural soil should have about one-half pore space, and the other half should consist of solid soil particles. Moisture content varies considerably with factors such as soil drainage and the amount and frequency of rain or irrigation. For most agricultural crops conditions are best when the amount and frequency of rain or irrigation are at least as great as the rate of precipitation or irrigation. Water movement through the soil is one of the most important factors to consider when and how much irrigation is needed. The pull of gravity and even pull it upward. This is called capillary action and acts in the same way water is lifted in a straw or narrow tube. Water will be lifted more in a narrow tube than in a wide one, and, in the soil capillary action is much greater in micro pores than in macro pores. Clay soils absorb and retain more water than sandy soils, but are typically poorly drained and not well aerated. Sands are well drained as a rule, but retain little water. Silts fall somewhere in between. Loams combine some of the moisture retention characteristics of the clays with the aeration of the sands and are widely considered the best agricultural soils. Sandy soils are coarse-textured and are often referred to as “light” because they are easy to work. Clay soils and fine-textured and their particles will bond tightly together when they dry out after being wet. These soils can become very hard and difficult to work and are often called “heavy”. The terms “heavy” and “light” do not refer to weight; sands actually weigh more than clays.

**Structure** is another term used to describe physical attributes of soils. While texture refers to the sizes of mineral particles, structure is the over-all arrangement or aggregation of soil particles. Terms such as loose, hard-packed, granular and cloddy are among those used to describe structure. Soil structure can be modified by activities such as tillage, moisture level, freezing and thawing, root growth, earthworms and other soil inhabiting animals and driving or walking on the surface.

Very sandy soils nearly always have a loose structure because they don’t form aggregates or become hard-packed or cloddy. Fine-textured soils can become hard-packed. This forces soil particles closer together, reducing pore space. This condition interferes with root growth, inhibits movement of water into (infiltration) and through (percolation) the soil. The micro pores in fine textured soils can easily be filled with too much water to the exclusion of oxygen and water.
of air, limiting the exchange of gases (oxygen and carbon dioxide). Plants of water on the surface of coarse-textured soils facilitate infiltration and percolation of water and the exchange of gases, but they retain little water for crop use. By loosening and aggregating the soil, we can improve water infiltration and percolation and gas exchange and still maintain the ability to retain water for plant growth. An aggregated soil consists of granules that resemble crumbs. A granule consists of many clay or silt particles clumped together. A well granulated soil has micro pores within the granules and macro pores between them and is both moisture retentive and well aerated.

Natural activities such as freezing and thawing and the movement of roots contribute to granulation of soils. Tillage at proper levels of soil moisture causes granulation, but it can destroy aggregates if done when the soil is too dry or wet. Excessive tillage in an effort to prepare a fine seed bed, especially when soils are dry, destroys soil aggregates. It is very easy to over work a soil with a rototiller. Rain or irrigation can also destroy soil aggregates. Soils should be managed to create and maintain soil aggregates as much as possible.

Biological activities are important to the granulation process. Earth worms pass soil through their digestive systems, adding viscous juices which bind particles together. Earth worms play a major role in granulation. By increasing the proportion of micro pores, these soils are more plant available to water. Biological activities are important to the granulation process. Earth worms pass soil through their digestive systems, adding viscous juices which bind particles together. Earth worms pass soil through their digestive systems, adding viscous juices which bind particles together. Earth worms pass soil through their digestive systems, adding viscous juices which bind particles together. Earth worms pass soil through their digestive systems, adding viscous juices which bind particles together. Earth worms pass soil through their digestive systems, adding viscous juices which bind particles together.

Figure 5

How much water do crops need?

A common rule of thumb is one inch per week. It requires about 27,000 gallons to apply one inch to one acre. Rain may supply some of or all of this or none at all. This requirement can be less or greater, depending largely on weather conditions. Under cool, humid, and cloudy conditions with little wind, very little water is used, but if it is hot, dry, sunny, and windy, as much as one-third of an inch of water per day (more than two inches per week) can be removed from the soil by evapotranspiration.

Soil moisture and scheduling irrigation. As mentioned earlier, in a soil in good tilth, about half the volume consists of solid particles and half is pore space. If all the pore spaces are filled with water, the soil moisture is bound tightly by soil particles and is plant base. Be sure to flag their locations so they are visible when using a drip or trickle system.

Determine when to irrigate

There are a number of ways to estimate when water should be applied. A simple method is to dig down into the root zone, grab a handful of soil and evaluate it for moisture. This is not very scientific, but many growers are quite successful with this method. Squeeze the soil in your hand to form a ball. If water can be squeezed into the ball, the soil is at 50 to 75% of field capacity and it is about time to irrigate. At this moisture content, a sandy loam will form a weak ball that falls apart easily and does not stick. A clay feels pliable and becomes slick; a clay feels slick and will form a ribbon if squeezed between your fingers. The best way to take a sample is to use a probe which removes a core of soil to what ever depth you desire. This takes a bit of work in stony or hard packed soil.

Another simple method is to set a pan of water in the field where it is not shaded by the crop. Use a wire cover to prevent birds and animals from disturbing the water in the pan. The weight of water lost from the pan will be about the same as that lost from the soil due to evapotranspiration. A large plant canopy increases transpiration, but decreases evaporation through the soil surface. Tensiometers measure evaporation from the soil. You will need to consider these factors when using an evaporation pan. If you can obtain a pan that measures water loss due to weather conditions on the rate of evaporation.

When you apply water through a sprinkler system, add the same amount (in inches) to the pan as you applied to the field. By calibrating your irrigation system, you can adjust the limitations when using a drip or trickle system. Tensiometers are excellent tools for monitoring soil moisture. They work well with any irrigation method and are useful in determining when to start and stop the system. They consist of a tube with a porous ceramic cup at the lower end and a vacuum gauge at the upper end. They are filled with water and placed in the soil so the ceramic cup is at the depth you want to monitor. As the soil dries, moisture is drawn from the tube, through the cup and into the soil. This creates a vacuum in the tube which is measured by the gauge (see Figure 5). The measurement is in centibars. A centibar is equal to a unit of pressure and can be used in pairs; one usually placed to measure soil moisture at a depth of four to six inches and the other at 12 or 18 inches depending on the depth of rooting for the crop. As the soil dries, both units will show increased vacuum, but the shallow one will show a higher reading because that is where the soil dries first. When the appropriate reading is reached irrigation should begin. When the deeper unit shows a decreased reading, irrigation should cease to prevent excess water moving below the root zone. Tensiometers can be used to monitor the soil moisture at the root zone, giving a reading that is much closer to the actual soil moisture in the root zone. Tensiometers can be used to monitor the soil moisture at the root zone, giving a reading that is much closer to the actual soil moisture in the root zone. Tensiometers can be used to monitor the soil moisture at the root zone, giving a reading that is much closer to the actual soil moisture in the root zone. Tensiometers can be used to monitor the soil moisture at the root zone, giving a reading that is much closer to the actual soil moisture in the root zone.
An Irrigation Equipment Primer

compiled by Jack Kittredge

For those who don’t irrigate, the range of options may seem endless. There certainly are lots of companies, systems, and individual components on the market. But most of the things you need to know to design a system are pretty obvious.

Water Source

You need a source of water that can supply what you need during the heaviest period of demand. It needs to be able to recharge quickly enough that you will not run it dry. Surface water (rivers, lakes, ponds, reservoirs) is excellent for this purpose. Wells can also be used, but drilling far enough to find heavy water volumes can be costly. Public water systems meter what you take and this can become expensive if you use large volumes.

Water Pressure

The water has to flow to where you want it. Unless you are ideally suited to use gravity (like some Wyoming stock operations where mountain melt was channeled by the early settlers to green up lowland hayfields) you will use a pump. The pump has to be sized to provide enough pressure for your peak times when you may want to irrigate several fields at once. These calculations are not simple and involve the width and length of your lines, the type of emitters, etc. Best do this with an expert from the company you are buying equipment from.

Filters, Regulators, Valves, Gauges, Supply Lines

There are many variants of these, but generally filters are necessary when you are using any source of water which can be contaminated by algae or other growth. Regulators maintain pressure at the levels you want, valves divert the water and turn it on and off to specific parts of the system, gauges let you see what is going on, and supply lines get the water from your pump to the applicators.

Applicators

There are basically two kinds of applicators: overhead and drip. Drip is applied by laying drip emitting tubing in the root zone of your plants at the beginning of the season. When in use, drops of water ooze out of the tubing at specified distances and supply only the crop plants. Weeds (unless they are right in the root zone) are left to wilt and die. Overhead is applied by sprinklers of one sort of another to the entire crop area indiscriminately, weeds and all.

Drip is obviously more careful of water and helps immensely with weed problems. But it has to be laid down in the spring and taken up in the fall, both of which require a lot of labor. It is easy to damage by careless handling.

Overhead can be set up to do a crop and then moved to another field, leaving the field open to tractor cultivation, truck traffic, etc. without worry. The equipment is more expensive and it requires much higher pressures, but once purchased is quite durable.

Below are pictured a few of the basic devices used in each system.

Impact sprinklers for an overhead system come in various models and designs. This, Nelson’s brass F33, covers a full circle and can be used with water pressures from 25 to 80 psi.

Dripline comes in all shapes, sizes and prices. This is a pressure compensating retrievable style, priced for reuse as opposed to discarding after one use. The pressure compensating feature is achieved by the labyrinth pattern on the insert – the greater the pressure the larger the labyrinth.

Pressure gauges tell the operator the psi (pounds per square inch) of the entire system. Mounted on either side of a filter they can indicate when flushing is needed.

Regulators, by use of a spring, keep outlet pressure at a uniform, pre-set level. The low flow unit pictured is designed for a flow range of 1 to 5 gallons per minute.

Cutting Edge Large Scale Solar Irrigation System

A Pennington, New Jersey, company announced last year that it had developed the technology to run pumps up to 600 horsepower in size using nothing but solar power. Traditionally solar power has been used to run smaller direct current (DC) devices, or stored in batteries and then run through an inverter as needed to make alternating current (AC) – the kind which drives most large motors. But the AquaMax system, according to owner WorldWater Corporation, incorporates patented new technology to directly run large AC pumps, enabling irrigation in remote areas not on the grid without the limits associated with battery storage. Since irrigation is needed most in periods of heavy sunlight, solar panel in left foreground powers pump seen in center of picture to provide water to a drip irrigation system used to raise cabbage (background).
Farming in Paradise

by Jack Kittredge

Lancaster County, west of Philadelphia, is renowned for the quality of its farmland. This is the center of Pennsylvania Dutch country, homeland to thriving communities of Amish and Mennonite farmers intermixed with the “English.” Dairy farms are still viable here, including several organic ones. The farming base of the economy is obvious in the number of farm-support businesses that have found a successful niche here—fertilizer producers, equipment suppliers, distributors of fresh produce. It’s refreshing to see towns where small scale agriculture still works as a way of life!

Not that all is sweetness and harmony. There is some development pressure, with lots of people coming in from New York and Philadelphia. They come for the quality of life and build homes on what once was farmland. But the Amish hold on to their land to pass it down, so not too much goes on the market. What does is more and more expensive. Sometimes the new neighbors get upset about the smells and dust of a nearby farm and complain to the township. But generally people adjust, work it out.

In one Lancaster County town, Paradise, Chris Petersheim has built up a successful farm and organic food distribution business. So successful, in fact, that he has been able to lease a second farm and employ a full time farmer there as well.

“I came from a farming background,” Chris relates. “I hadn’t had any experience with organic farming, though. We had a ten-acre farm that my uncle farmed, and we had a large garden. I worked at a greenhouse for 19 years as a seedling supervisor, however. They used a lot of chemicals and I didn’t think it made any sense to be spraying your broccoli and then eating it. One winter I became sick and I thought it was because of the chemicals. I sent off for Organic Gardening and started doing organic in our own little garden. That was 1977. We bought this place in 1980 and started organic farming.”

Chris grows a fairly wide variety of crops on the two farms, 4 and a half acres in Paradise and ten acres at the other place—a half hour away. Paradise Organics has a delivery route to Philadelphia twice a week as well as a local route. A number of CSAs have pick-ups there, including one from Maryland with 200 shareholders. (It was so wet this spring that they didn’t get a lot of their crops in the ground.) Both farms, as well as the wholesale produce business, are certified by PCO, Pennsylvania Certified Organic.

Chris’s irrigation lines go underground from the pump to a number of these distribution boxes. That way he can avoid driving on the supply lines. His latest project involves installing electrically controlled valves in the boxes so that he can turn on and off water to 12 different zones from a central control panel.

Petersheim has two greenhouses, both on drip irrigation, to keep a steady flow of product through the seasons. They are each 30 by 144 feet. In one, which is heated, he grows tomatoes, peppers, zucchini, cucumbers and foot-long green beans in the winter, planting them in early February and getting crops during the spring. The tomato harvest started in May and kept up until the outdoor ones came in. Peppers were planted at the same time, with green ones ready by May and red peppers coming by June. In the fall Chris starts them up again and keeps them producing until New Year’s Day. We shut it down for January and then restart again. In the greenhouse without much heat he grows kale, chard, mustard and collards. The cooler one goes year-round because he starts onion transplants there in December.

When it comes to planting, Chris lays down the drip and plastic first, then punches holes in the plastic for planting. He likes to use plastic both for weed control and to increase the bed heat for earlier ripening. On crops like kale and collards, which are planted in March and are still producing leaves until Thanksgiving, plastic is essential. Same with squash, cucumbers and tomatoes.

Lettuce, however, goes through the bed so fast that it just needs one hoeing before being harvested. Then the bed is retilled and replanted to get three crops in a season. With salad greens he gets fourplantings. Chris counts on clover to suppress weeds in the pathways, and uses a push cultivator rather than doing hand weeding.

The farm uses a lot of repellents and traps for insects. Yellow sticky traps catch cabbage flies and leaf miners, and Chris likes a product called EM5, which is a soil inoculant to increase microbial life but includes garlic and habañero pepper as insect repellents. They also use Fertrell fertilizer, getting a special blend after doing a soil analysis each year, and apply liquid fish through the irrigation system.

Labor on the farm varies a lot depending on the day, says Petersheim: “On a picking day we might have 10 people working here. We have one Mexican fellow who is my main man. He gives me 70 hours a week— he likes the work!
I have a couple of truck drivers because we do pick up product. Counting my family – the children and my wife – I usually have 8 to 10 people here twice a week for picking. I also have a fellow who loves to cultivate. He comes evenings after his job. I have good help for labor but I lack a little help for the management of everything. It’s a lot of work for me.”

One of the farm’s neighbors is not organic, so Chris has established a buffer zone in which he grows seed potatoes for next year. He green sprouts them in the greenhouse before planting, and then covers the far half of his beds with remay to get some potatoes ready for early harvest. He shuts off the irrigation to those beds as they are harvested, cutting the stalk about a week before the potatoes are ready in order to toughen up the skin. That helps a lot to protect them during handling, he says. He also uses Surround on the black plastic to reflect the heat. You can bake them under plastic if it gets too hot. He does the same for the tomatoes.

Chris stresses the importance to his operation of his drip irrigation system. “Our rainfall here isn’t adequate. It’s a limestone loam soil. It holds water well but dries out too. There’s enough rain for crop farmers, but not for folks who grow produce intensively, like us. Even with all the rains this spring, we were watering in between them. We do lettuce and salad mix all summer long. That’s the only way to get them through the summer – constant water. When the plant gets dry it gets stressed and that will send it into bolting. You can keep it from being stressed with enough water every day.”

On a bright sunny day he has to apply extra water with his tractor sprayer for new plantings. He uses irrometers to measure the soil moisture. Watching them closely, he says, is the key to irrigating, especially for tomatoes to control cracking. He uses the 6 inch ones, instead of those that go 12 or 18 inches deep, because he waters regularly. If watering a given area when it’s really dry, he’ll run water for two hours. If he gets rain or it’s cloudy, he’ll hold that back to one hour.

When Petersheim moved onto the farm in 1980 it had a well which put out 8 to 10 gallons a minute. He knew that wouldn’t do, he says: “We made a new well that we’re using now which puts out 28 gallons a minute. We have a one and a half horsepower pump, and a proportion pump to measure out fertilizer depending on how much water is flowing through. We use straight fish or microbes. We used to have a hose. But you have to move that for mowing so we decided to put everything underground. It’s all sloped so it will drain out to prevent freezing.”

The line goes underground from the well to valve boxes in the field, where it is broken into 12 different zones. The main line is two inch, and one inch lines come off of that to feed headers of one inch flat tubing. The boxes have a cover on them so you
can drive over them. The valves come out the sides and feed the beds.

“Right now we turn the valves on or off by hand at these boxes,” Chris explains. “But we’re in the process of going all automatic with electric valves. In a week or two we’ll have that in place and can automatically program the watering pattern for the whole farm from a control box. Once I get my electric valves in I’ll be happy!”

Perersheim will also have a garden hose hookup at each box to water just one bed directly. He uses 15 pounds of pressure per square inch for the drip line. A pressure regulator installed in the line controls that and reduces it from the well pressure of 30 to 40 pounds.

For the drip system itself, he uses Chapin tape with emitters every 8 inches and prefers shut-off valves between the header and each drip line without knobs. He says they break when you drive over them. He likes the kind you open and shut with a screwdriver.

After visiting with Chris in Paradise for awhile, I went with him to his other farm, a half hour away in Rothsville, Pennsylvania. The soil is a little sandier here than in Paradise, and there is more space here. Corn, winter squash, onions, garlic, shallots, leeks, melons and most of the vine crops for the operation are raised here. This farm is managed by Jim Crawford, who lives there with his wife and four children. Jim used to be Chris’s foreman in Paradise, but wanted his own place to farm. Now Chris isn’t too involved there except with the scheduling. They work up a farm schedule for planting in the winter, and Chris sells the product. He goes over once in awhile to visit, but hadn’t been there for three weeks before my interview.

Because of the sandy soil on his farm, Jim has to do a lot of irrigating. Fortunately, with the land came an excellent spring that has been dug out to create a big reservoir. In normal years it can handle all the farm’s irrigation needs. Last year during the drought, however, it could only irrigate for two hours before Jim had to let the spring recharge. This year, with all the early rain, the spring is full of water!

“This five horse pump will handle 70 gallons a minute,” Jim explains. “That will take two overhead sprinkler lines at 45 psi plus six-tenths of an acre of drip tape – all at the same time. With a heavier soil and more water I might use more overhead. But last year we had to watch out how much we pumped because it didn’t refill fast enough. This year, with all the rains, it might go down 6 inches.”

This spring Jim and Chris buried three inch pipe carrying water from the pump to each of the fields they irrigate. “We pitched all the buried pipe to be able to drain it in winter,” Jim says. “We buried 3 inch line but it comes up in each field to 2 inch pipe because that’s the size you need for 60 gallons per minute. Then we split it off to one inch for the driplines because we’re only watering 5 beds. One inch is more economical than going inch and a half. The key is the filter and the pressure regulator. The filter is $17
for one inch and $105 for inch and a half! You can buy a lot of one inch filters for $105!

“We have only a course filter for the overhead,” he continues. “We took a 5 gallon bucket and drilled it full of holes. Then we put the intake pipe into it and drilled that full of 1/4 inch holes. We filled the rest of the bucket with gravel and sank it in the water. That seems to work well. The sprinkler nozzles never plug. The only time we have any trouble with it is when we move the pipe. In the moving we seem to scoop a little dirt in there and that gets pushed all the way down to the end and plugs the last nozzle. So we take the endcap off and flush the line whenever we move it.”

The pump picks up water through the bucket filter and brings it first to a check valve so it doesn’t return. Then there’s a throttle valve that prevents water hammer — that beginning blast of water which drives the endcap off the line. Since you can’t regulate the pump on start-up — it’s either off or on — the throttle valve prevents a sudden surge of pressure. Then the water comes through an injector that puts the microbe solution in it. Then valves distribute the water. A goes underground to the main field, and B goes to field 2 across the stream and field 3 across the street where the onions are. C runs out on this side of the road to a number of short rows getting overhead irrigation. Each dripline header has its own filter in the valve that feeds it.

Designing a good irrigation plan is somewhat complicated, Jim says. First you have to decide what to use where. “On this farm here the soil is generally pretty sandy. It dries out pretty fast. So we need to irrigate. But a lot of plants don’t like to get wet. Potatoes don’t like to get wet. Nor do tomatoes. They lend themselves a lot better to driptape than to overhead. So if there is a risk of fungal problems or disease, drip is better. With our vine crops we haven’t had much disease. The main reason we have them on drip is for weed control.

“If you don’t have the system sized right,” he continues, “at the end of your run the beds will be a little drier, and at the start a little wetter, than you want. Five hundred feet is the normal number for maximum length of a bed to maintain a good flow. We have Chapin drip tape and that’s what they recommend. Once you go past that you have to go to a low flow tape, 0.22 gallons per minute as opposed to 0.5. With one inch headers you cannot irrigate ten 500 foot beds at a time. You can irrigate 6 beds with one inch. You take your gallons per minute of your drip tape, which is half a gallon per hundred feet with 8 inch drippers. Then you calculate what flow you’re going to consume and that’s what sizes your pipe here. That’s why I have five beds here. I could do six with my water, but that doesn’t work for my set-up for other reasons. We spray with fish, Surround, something every week. We have ten beds in the drive row. That allows us to spray five beds at a time with a one-way boom sprayer, turn around and get the other five on the way back.”

It does take Jim a lot of time to hook all his drip up. Then he has to take it all down at the end.

“You have to roll up several thousand feet of driptape at the end of this crop,” he cautions. “Chris moves his to the side, tills, puts his next crop in and puts the driptape back. There’s a fair amount of labor in just moving driptape. That’s the advantage

![Photo by Jack Kittredge](image-url)
of overhead. You can cultivate without ever having to worry about snagging a dripline and poking a hole in it. You can drive across your ends without worry about snagging something because overhead is just one line. With these nozzles at our pressure we can water 50 feet wide with it. With overhead irrigation the set up time is less, tear down time is less, and cultivation is much handier than with driptape.

"When we started here," he continues, "we thought we could irrigate weekly, or certainly no more than every four days. But we were wrong. I can get a one inch rain, wait 24 hours, and cultivate. Those sprinklers put on between 0.1 and 0.2 inch per hour. So I’d have to run them for 5 to 10 hours to get one inch of rain. And in 24 hours you could about do it again!"

Jim and Chris bought used piping from a farmer who had enough to do all their sections, so they don’t have to move any from one field to the next. When they redo a field, of course, they do have to take up all the pipe. They also have irrometers set up to measure soil moisture. When they get up to 10 inch rain, wait 24 hours, and cultivate. Those sprinklers put on between 0.1 and 0.2 inch per hour. So I’d have to run them for 5 to 10 hours to get one inch of rain. And in 24 hours you could about do it again!"

Jim starts thinking about irrigating again. On his sand loam soil, he figures, to get results comparable to 1 to 2 hours on the driptape he’d have to run his overhead probably 4 to 6 hours. Theoretically that should last him for a week, but it doesn’t. He says he could run it overhead for 3 hours every day and it would not be too wet!

Jim actually has both driptape and overhead irrigation on his onions. "I have five rows, then a two-foot swath for the overhead line, then another 5 rows. I plant them with a transplanter and I can get the overhead set up right away to water them. It takes a while to set up the driptape for every row. But with onion you want to dig them and let them cure in the field. Once they’re curing you don’t want them to get wet. Now, I have earlier and later varieties and I need to water the later ones while the earlier ones are curing. So I planted the shorter season onions in the center and the later ones on the outside rows. Once the early onions in the center are dug and curing, I can shut the overhead off while we continue to irrigate the rest with driptape.

There are three suppliers of irrigation equipment in the area that Chris and Jim patronize, two in Lancaster County and one in Adams County. Both Rain-Flo and Nolt’s have catalogs and will ship via UPS. Rain-Flo sells T-tape for drip systems. At 12 inch dripper spacing you get 0.45 gallons per minute per hundred feet for normal tape, and low flow tape is 0.22 gpm. Their catalog has a chart telling you how to calculate gallons per minute per acre.

Jim explains: “We were doing row spacing for tomatoes at 72 inches and we were using 12 inch drippers. So by consulting the intersection of the dripper rate and the row spacing, you can see we’d need 33 gallons per minute per acre of tomatoes. But if your beds are a tenth of an acre you just scale it down. That number tells you how much water your pump and water source have to supply.

“Of course Chris has Chapin tape instead of T-tape,” Jim continues, so his flow rate is different. He has 8 inch drippers but his flow isn’t 0.67 gpm but 0.5 gpm. If you have 200 feet of Chapin tape at
Jim farms the ten acres with only his family (his oldest is 15) and a hired high school boy during the summer. They get extra help during the harvest, but until then are on their own. So far this year they feel lucky to be as far along as they are, since so many farms were unable to get into their fields early because of the rains.

Jim is proud to be a farmer and glad he can raise his kids on a farm. “I was raised on a farm in Missouri,” he says. “I learned a lot of common sense and valuable skills that I never thought twice about. It’s what you do. Then I had my children. I was doing remodeling and construction. They would come with me once in awhile and nail things together and build things out of wood. But it wasn’t until we started farming that I could see them take off. Their knowledge level soared – how engines work, how you think through and develop a system. Last winter we were talking about how we’re going to cultivate. We came up with a little wedge-shaped piece we’re going to put in front of the planter. It makes a furrow that we plant down into and then we come along and roll the soil down into that furrow. That allows us to smother the weeds. It works pretty good. I see that my oldest two sons are very good at problem solving. Now they have the opportunity to put it into practice. Most people, because they don’t know how things work and how to fix them, rely heavily on someone else for everything.”

Jim’s onions are irrigated by both driptape and overhead sprayers. He uses the overhead system early on, before he has the drip system set up. But he uses the driptape later, when the early varieties are harvested and drying in the rows. If he used the overhead system then, the drying onions would be ruined.
Estimating Soil Moisture by Feel and Appearance

by USDA Natural Resources Conservation Service

Evaluating soil moisture is one of an irrigator’s most important management tools. Determining the status of the soil moisture reservoir guides the decision of not only how much to irrigate, but also when to irrigate. The “appearance and feel” method of monitoring soil moisture using a soil probe is still a valid procedure no matter how sophisticated the irrigation scheduling system. A measurement of soil moisture is essential to update knowledge of the need for and timing of irrigation, and the “appearance and feel” method can be used to obtain that information.

In addition to indicating how much moisture is in the soil, this method also reveals where that moisture is located in the profile. This information is important to the irrigator as well as the dryland farmer. The depth of water penetration from irrigation or rainfall is useful in planning and making management decisions. For example, problem areas with compacted soil layers that restrict water penetration may be detected with the soil probe.

Soil texture, the relative amount of sand, silt or clay contained in a soil, is an indicator of the amount of water a soil will hold. Available water capacity is the maximum amount of moisture the soil will hold that plants can use. The values of available water for four basic textural classes are given in Table I.

<table>
<thead>
<tr>
<th>Soil texture</th>
<th>Available water (inches/foot)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fine sand or loamy sand</td>
<td>1.0 to 1.1</td>
</tr>
<tr>
<td>Sandy loam</td>
<td>1.4</td>
</tr>
<tr>
<td>Loam or silt loam</td>
<td>2.0 to 2.5</td>
</tr>
<tr>
<td>Silty clay or clay loam</td>
<td>1.8</td>
</tr>
</tbody>
</table>

The textural classification of a soil is important not only for knowing how much water potentially can be held for crop use, but also for visual inspection. Different soil types respond differently to the methods described in this guide, which is one of the keys to making the soil moisture determination. The county soil survey, which can be obtained through your Cooperative Extension Service office or the Soil Conservation Service, includes discussions on soil texture and available water capacity of your soils.

**Sampling and Evaluation Procedures**

A soil probe, soil auger, or spade can be used to extract a soil sample. Evaluate the soil moisture at one foot intervals from the surface to the bottom of the active root zone. The active root zone for most irrigated crops is approximately 3 feet deep. When checking for water penetration or soil moisture for dryland crops, probe to the depth of 4 to 5 feet.

To begin learning the appearance and feel of your soil at particular moisture contents, start early in the spring one or two days after a heavy rain. At this point the soil moisture level should be near field capacity, or holding 100 percent of the water that it can naturally retain. Likewise, probe the soil at the end of the growing season when the profile is likely to be dry. Knowing the appearance and feel of your soil at the wet and dry ends of the spectrum will help make determinations during the midseason. Use the photos and descriptions in the following section when assessing soil moisture. The number and location of sampling sites depends on both the uniformity of the soils in the field and the irrigation procedures. Check problem areas in the field in addition to the starting and stopping areas of your particular irrigation system. Sample a minimum of four sites in different parts of the field.

**Guides for Estimating Soil Moisture**

When using a soil probe to extract the samples, the following procedures will make the job easier.

1. Determine texture of soil.
2. Squeeze small handful of soil firmly.
3. Observe the condition of the ball and your hand.
4. Attempt to form a ribbon of the soil between your thumb and forefinger.
5. Observe what happens.
6. Compare your observations with the photos and descriptions in the guides.

Procedure for evaluating soil moisture using photo guides and descriptions:

1. Determine texture of soil.
2. Squeeze small handful of soil firmly.
3. Observe the condition of the ball and your hand.
4. Attempt to form a ribbon of the soil between your thumb and forefinger.
5. Observe what happens.
6. Compare your observations with the photos and descriptions in the guides.

**Calculating Soil Moisture Status**

After estimating the soil moisture, the amount of water in the soil reservoir can be calculated using Table I. The following example illustrates the calculation:

2. Available moisture at field capacity = 2.4 inches/foot.
3. Current soil moisture status = 50% available soil moisture remaining (from appearance and feel method evaluation).
4. Amount of soil in sample = 1 foot.
5. Available moisture remaining in sample = (50) x (2.4 inches/foot) x (1 foot) = 1.2 inches.

Complete this calculation for each sample extracted. The total of the moisture remaining for all samples is the water still available in the sampled profile.
The Natural Farmer Fall, 2003

We all stand witness to the worldwide economic crisis of agriculture. Within our ‘global economy’ farmers everywhere are being forced to pursue policies that threaten the life of the earth as well as the future of humanity. What important role can biodynamic agriculture play in helping us solve the complexity of problems we see in our world today?

Please join us at the Gateway Center in Ames, Iowa as we explore a host of whole systems approaches to growing, marketing and community-building based on this nearly eighty-year effort in alternative agriculture. Talks and workshops presented by experienced growers and researchers, lively entertainment, good food, and the opportunity to meet and exchange ideas with folks from across the country, promise to make this an exciting and informative weekend.

Available speakers include:

- Walter Goldstein – The Farmer as Observational Scientist
- John Reganold – Assessing Agroecological Sustainability in Biodynamic Systems
- Steve Jones – Breeding for Low-Input and Perennial Agroecosystems
- Dewane Morgan – Questions Raised as a Result of Twenty-Eight Years Work with Biodynamics on a Midwestern Farm
- Fred Kirschenmann – Sustaining an Economic Future for Mid-size Midwestern Farms
- Lavinia McKinney

On Saturday, choose from a wide range of workshops including:

- Paul Dettlof – Homeopathic Care of Animals
- Günther Hauk – Working with Bees in an Organic Way
- Sarah Flack – The Nuts and Bolts of Food Preservation
- Francis Thicke – On-Farm Processing and Local Marketing of Dairy Products
- Dewane Morgan – How Does One Make the Transition to Biodynamics: Parts 1 & 2
- Mark Shepard – Designing Perennial Agriculture Systems: Parts 1 & 2
- Walter Goldstein – Growing Open-Pollinated Corn
- Ernie Harvey – Farming to Support Community
- Matt Liebman – Managing Weeds on the Diversified Farm
- Günther Hauk & Fred Kirschenmann – Spirituality in Agriculture
- … and others on topics as diverse as biodynamics for the home garden, self-sustaining mini-farms, farming to support community, CSA, seed-saving, composting, the effect of organic/biodynamic standards, and much more.

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biodynamic@aol.com

November 14–16, 2003 in Ames, Iowa

Biodynamic Farming & Gardening Association
Annual Conference

Place-Based Agriculture: The Economics, Ecology and Community Ethics Behind Self-Sufficient Farms

We all stand witness to the worldwide economic crisis of agriculture. Within our ‘global economy’ farmers everywhere are being forced to pursue policies that threaten the life of the earth as well as the future of humanity. What important role can biodynamic agriculture play in helping us solve the complexity of problems we see in our world today?

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Available Soil Moisture Remaining Appearance of soil

<table>
<thead>
<tr>
<th>Available Soil Moisture Remaining</th>
<th>Appearance of soil</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-25 percent available</td>
<td>Dry, loose, will hold together if not disturbed, loose sand grains on fingers with applied pressure.</td>
</tr>
<tr>
<td>25-50 percent available</td>
<td>Slightly moist, forms a very weak ball with well defined finger marks, light coating of loose and aggregated sand grains remains on fingers.</td>
</tr>
<tr>
<td>50-75 percent available</td>
<td>Moist, forms a weak ball with loose and aggregated sand grains on fingers, darkened color, moderate water staining on fingers, will not ribbon.</td>
</tr>
<tr>
<td>75-100 percent available</td>
<td>Wet, forms a weak ball, loose and aggregated sand grains remain on fingers, darkened color, heavy water staining on fingers, will not ribbon.</td>
</tr>
<tr>
<td>100 percent available</td>
<td>Wet, forms a weak ball, moderate to heavy soil/water coating on fingers, wet outline of soft ball.</td>
</tr>
</tbody>
</table>

Available Soil Moisture Remaining Appearance of soil

<table>
<thead>
<tr>
<th>Available Soil Moisture Remaining</th>
<th>Appearance of soil</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-25 percent available</td>
<td>Dry, forms a very weak ball, aggregated soil grains break away easily from ball.</td>
</tr>
<tr>
<td>25-50 percent available</td>
<td>Slightly moist, forms a weak ball with defined finger marks, no water staining on fingers, grains break away.</td>
</tr>
<tr>
<td>50-75 percent available</td>
<td>Moist, forms a ball with defined finger marks, very light soil/water staining on fingers, darkened color will not stick.</td>
</tr>
<tr>
<td>75-100 percent available</td>
<td>Wet, forms a ball with wet outline left on hand, light to medium staining on fingers, makes a weak ribbon between the thumb and forefinger.</td>
</tr>
<tr>
<td>100 percent available</td>
<td>Wet, forms a soft ball, free water appears briefly on soil surface after squeezing or shaking, medium to heavy soil/water coating on fingers.</td>
</tr>
</tbody>
</table>
### Sandy Clay Loam, Loam, & Silt Loam

Percent available: Currently available soil moisture as a percent of available water capacity.

<table>
<thead>
<tr>
<th>Available Soil Moisture Remaining</th>
<th>Appearance of soil</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-25 percent available</td>
<td>Dry, soil aggregations break away easily, no staining on fingers, clods crumble with applied pressure.</td>
</tr>
<tr>
<td>25-50 percent available</td>
<td>Slightly moist, forms a weak ball with rough surfaces, no water staining on fingers, few aggregated soil grains break away.</td>
</tr>
<tr>
<td>50-75 percent available</td>
<td>Moist, forms a ball, very light staining on fingers, darkened color, pliable, forms a weak ribbon between the thumb and forefinger.</td>
</tr>
<tr>
<td>75-100 percent available</td>
<td>Wet, forms a ball with well-defined finger marks, light to heavy soil/water coating on fingers, ribbons between thumb and forefinger.</td>
</tr>
<tr>
<td>100 percent available</td>
<td>Wet, forms a soft ball, free water appears briefly on soil surface after squeezing or shaking, medium to heavy soil/water coating on fingers.</td>
</tr>
</tbody>
</table>

### Clay, Clay Loam, & Silty Clay Loam

Percent available: Currently available soil moisture as a percent of available water capacity.

<table>
<thead>
<tr>
<th>Available Soil Moisture Remaining</th>
<th>Appearance of soil</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-25 percent available</td>
<td>Dry, soil aggregations separate easily, clods are hard to crumble with applied pressure.</td>
</tr>
<tr>
<td>25-50 percent available</td>
<td>Slightly moist, forms a weak ball, very few soil aggregations break away, no water stains, clods flatten with applied pressure.</td>
</tr>
<tr>
<td>50-75 percent available</td>
<td>Moist, forms a smooth ball with defined finger marks, light soil/water staining on fingers, ribbons between thumb and forefinger.</td>
</tr>
<tr>
<td>75-100 percent available</td>
<td>Wet, forms a ball, uneven medium to heavy soil/water coating on fingers, ribbons easily between thumb and forefinger.</td>
</tr>
<tr>
<td>100 percent available</td>
<td>Wet, forms a soft ball, free water appears on soil surface after squeezing or shaking, thick soil/water coating on fingers.</td>
</tr>
<tr>
<td>Crop</td>
<td>Water needs: 1&quot; per 30 days</td>
</tr>
<tr>
<td>------</td>
<td>-----------------------------</td>
</tr>
<tr>
<td>Bean</td>
<td>18</td>
</tr>
<tr>
<td>Brassica</td>
<td>20</td>
</tr>
<tr>
<td>Library</td>
<td>22</td>
</tr>
<tr>
<td>Corn</td>
<td>24</td>
</tr>
<tr>
<td>Cucurbit</td>
<td>26</td>
</tr>
<tr>
<td>Eggplant</td>
<td>27</td>
</tr>
<tr>
<td>Green</td>
<td>28</td>
</tr>
<tr>
<td>Onion</td>
<td>29</td>
</tr>
<tr>
<td>Pepper</td>
<td>30</td>
</tr>
<tr>
<td>Potato</td>
<td>31</td>
</tr>
<tr>
<td>Pumpkin</td>
<td>32</td>
</tr>
<tr>
<td>Radish</td>
<td>33</td>
</tr>
<tr>
<td>Sunflower</td>
<td>34</td>
</tr>
<tr>
<td>Tomato</td>
<td>35</td>
</tr>
<tr>
<td>Watermelon</td>
<td>36</td>
</tr>
</tbody>
</table>

Critical moisture periods indicate the time that moisture stress can cause impact on otherwise healthy crop. Drought tolerance indicates a crop's ability to withstand short periods of drought without significant reduction in yield. Late requires frequent irrigation, midrange needs irrigation in most years, high seldom needs irrigation.
Vegetable Crop Irrigation

D. C. Sanders
Extension Horticultural Specialist
Department of Horticultural Science
North Carolina Cooperative Extension Service
North Carolina State University

Vegetables are 80 to 95 percent water. Because they contain so much water, their yield and quality suffer very quickly from drought. When vegetables are sold, a “sack of water” with a small amount of flavoring and some vitamins is being sold. Thus, for good yields and high quality, irrigation is essential to the production of most vegetables. If water shortages occur early in the crop’s development, maturity may be delayed and yields are often reduced. If a moisture shortage occurs later in the growing season, quality is often reduced even though total yields are not affected. Most vegetables are rather shallow rooted and even short periods of two to three days of stress can hurt marketable yield. Irrigation is likely to increase size and weight of individual fruit and to prevent defects such as toughness, strong flavor, poor tipfill and podfill, cracking, blossom-end rot and misshapen fruit. On the other hand, it reduces soluble solids in muskmelons and capsaicin in hot peppers if applied during fruit development.

Growers often wait too long to begin irrigating, thinking, “It will rain tomorrow.” This often results in severe stress for the portion of the field that dries out first or receives irrigation last. Another common problem is trying to stretch the acreage that can reasonably be covered by available equipment. Both of these practices result in part or all of the field being in water stress. It is best that a good job be done on some of the acreage rather than a “half-way job” being done on all the acreage.

Drought stress can begin in as little as three days after a 1-inch rain or irrigation in such crops as tomatoes in soils like those in the Piedmont of North Carolina. Thus, frequent irrigation is necessary for maximum yield. Soil moisture requirements differ with the crop and stage of crop development. Soil moisture availability varies with the amount of water in the soil and the type of soil. Soil type is very important in planning for and using an irrigation system.

Up to 1.5 inches of water is needed each week during hot periods to keep vegetable crops that have a plant spread of 12 inches or more. This need decreases to .75 inches per week during cooler seasons.

Droplet size and irrigation rate are also very important in vegetable crops. Large droplets resulting from low pressure at the sprinkler head can cause damage to young vegetable plants and contribute to crust when soil dries. Irrigation rate is also important in sandy soils that absorb water more readily than clay soils. However, clay soils have a greater percent of the water available. Irrigation rate will depend on soil type but application rates should not exceed 0.40 inch per hour for sandy soils, 0.30 inch per hour for loamy soils or 0.20 inch per hour for clay soils. High application rates will result in irrigation water running off the field, contributing to erosion and fertilizer runoff.

Improving stands - Most vegetables have small seed which are planted 0.75 inch deep or less. When seeds are planted shallowly, the upper layer of soil can dry rapidly, leaving the seed half germinated with not enough soil moisture to complete germination. When this happens, no stand or at best an incomplete stand will result. An irrigation of 0.50 to 0.75 inches immediately after planting should be applied to settle the soil and to start seeds germinating. For larger seeded crops, irrigation a few days prior to seeding is desired. If seeds are slow to come up due to cool temperatures or slow germination, then irrigations of 0.75 to 1 inch per acre should be applied as needed. This should be done to keep the area around the seed moist until seedlings emerge. Irrigation is a valuable tool in getting a good, uniform stand which insure high yields. Good uniform stands also mean uniform harvest dates and more efficiency of production.

Vegetable transplants also require good soil moisture. A light irrigation of 0.50 to 0.75 inch per acre will help establishment by providing a ready supply of water to young broken roots. Irrigation at planting time can also reduce soil crusting and hasten seedling emergence. If 0.50 to 0.75 inch of irrigation is slowly applied, either with low rates or by turning the irrigation system off long enough to allow water to soak in, crusting can be reduced and stand will be improved.

Product development and fruit set - Wide fluctuations in soil moisture injure fruit crop vegetable like tomatoes and peppers. These fruits contain large amounts of water and depend on this water for expansion and growth. When soil moisture is allowed to drop below the proper level, the fruit does not expand to produce maximum size before it ripens, thus reducing yield. If moisture is allowed to fluctuate too much, blossom end rot can occur and fruit is no longer usable.

If moisture fluctuation occurs during the fruit expansion stage, fruit cracking will occur. Fruit cracking usually occurs when inadequate water has been applied and then heavy rains bring too much water. The best way to prevent fruit cracking is a steady moisture supply. Second growth or knobs in potatoes are also caused by soil moisture fluctua-
Rooting depth - It is important that the soil profile be filled with water at each irrigation. Frequent light irrigations result in shallow root systems. Shallow root systems result in plants being stressed even in short periods of water deficit. On the other hand, excessive irrigation leaves crops vulnerable to leaching from rain or irrigation. It is important that shallow rooted crops receive more frequent irrigations.

Preferred minimum soil moisture - Soil moisture is measured with a tensiometer or soil block. The former is preferred for sandy soils and the latter for clays and loams. Tensiometers report soil moisture in centibars (.001 bar). Soil blocks report available soil moisture (ASM).

Amount and timing - Irrigation amounts and time between irrigations are critical to efficient irrigation practices.

Critical moisture periods - Critical periods of irrigation needs can best be defined as that time when soil moisture stress can most reduce yield in an otherwise healthy crop. This is not to say that it is the only time in the life of the crop that moisture stress reduces yield. It is, however, the time when stress has the greatest effect.

Irrigation method - Vegetable crops differ in which method of irrigation can be used economically in their production.

Drought tolerance - Drought tolerance is an indication of a crop’s ability to withstand short periods of drought without significantly reducing yield.

Defects from stress - Most vegetables respond to water deficit with reduced yield and quality. However, most crops also express this stress with growth abnormalities.
The Basic Parts of a Drip System

Valve-
Use any valve you want! They can be automatic or manual. If you use an anti-siphon valve it has a built-in backflow preventer which saves money! (But be sure to read up on backflow preventers first, as anti-siphon valves won’t work in some places.)

Backflow Preventer-
You need to use a backflow preventer on ALL drip systems. No exceptions!

Pressure Regulator-
Most drip systems will need a pressure regulator. You need one if your water pressure is over 2.8 bars (40 PSI). If in doubt, install one. The regulator can go before or after the valve. Traditionally it is installed after the valve.

Filter-
You must use a filter. Drip emitters have very small openings that are easily clogged. City water is not free from stuff that will clog your emitters! Use a 150 mesh screen or one with a higher mesh number like 200 mesh. The filter may be installed before the valve or pressure regulator, but the inexpensive plastic filters often sold for drip systems should be installed after the pressure regulator. Use a top quality filter and install it right at the water source so it protects the valves and the pressure regulator too. Most valve failures result from sand or rust particles clogging of the tiny passages inside the valve! Use a filter that is the same size as, or larger than, the valve.

Emitters-
Most emitters emit 4 liters/hour (4.0 l/hr) of water. That’s about 1 gallon per hour (1 gph). A lower flow rate is even better, like 2.0 l/hr (0.5 gph, often referred to as “1/2 gallon per hour”) emitters. Use pressure compensating emitters if you are irrigating a hilly area. There are many different types and brands available.

Multi-Outlet emitters are very popular, but they can cause problems. Use single outlet emitters for a less troublesome drip system.

Mainline-
The mainline is the pipe that goes from the water source to the valves. In the illustration of a very simple drip system above the gray colored vertical pipe under the valve is a mainline. The mainline may be made of galvanized steel, copper, SCH 40 PVC, SCH 80 PVC, CI 315 PVC, Heavy Wall Polyethylene (SDR 7 or SDR 9). Do not use polyethylene for the mainline unless approved by your local building officials. Polyethylene has a low burst pressure and should only be used for mainlines where local conditions are appropriate.

Sub-Main-
The sub-main is the pipe that goes from the valves to the connection point of the drip tube. Many small drip systems do not have a sub-main, in those systems the drip tube connects directly to the valve. The illustration of a very simple drip system above shows a system without a sub-main. Sub-mains are usually CI 200 PVC pipe or standard weight polyethylene (poly) pipe. You use a sub-main when multiple drip tubes are needed.

Drip Tubing-
Drip tubing is a thin wall polyethylene tube, and is generally produced in metric sizes. Common sizes are 12 mm (0.455” or 3/8”), 16mm (0.620” or 1/2”), 18mm (0.720” or 1/2”), and 24mm (0.940” or 3/4”). Do you see the problem? Two sizes are commonly referred to as “1/2 inch” in the USA! The fittings for these two are not interchangeable. So make sure you know what you’re getting when you buy it! Do not bury drip tubing underground- gophers and moles love to chew buried tubing!

Adapters and fittings-
Used to attach the drip tube to the other parts. Important- make sure the fittings are the exact right size! Using fittings made for a different tubing size will result in the tube blowing out of the fitting. 9 times out of 10, when a tube blows out of a fitting it is because the fitting is the wrong size.

End Cap-
The end cap is important. Without it the water all runs out the end of the drip tube. (Well, duhhhh...)
Many people are coming to support organic agriculture as fundamental to living in health with the earth. Help them stay in touch with this vital movement, and show your own good taste. Give a year’s subscription (4 issues) to The Natural Farmer for only $10 ($18 outside of US).

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The presence of strong markets nearby made Long Island a haven for farmers, who found that crops which don’t like dampness do well there. Once it was potatoes that dominated local agriculture, now vineyards are popping up everywhere. Organic production is also growing in the area, however, made easier by innovations in irrigation technology and materials. One such operation is Matt Kuszynski’s Golden Earthworm Farm.

“The length of the growing season”, Matt says, “and the sandy soil are benefits of growing here. Also, I don’t have any rocks. I never have to deal with rocks. Up on the Sound they have them, but not here. I’ll come across a rock once in every two years.”

Although most of Long Island was once farms, few farmers anymore can touch the land prices in the area. Even preserved land, where the development rights have been sold, goes for $20,000 to $30,000 an acre. One piece of 50 acres Matt knew of, even shorn of its development rights, for $50,000 an acre two years ago.

“Land prices went up like 50% in the last three years”, he says. “Originally, most of the homes here were seasonal, but in the last few years a lot have become year-round. Now everyone wants to start a vineyard. They have money from other businesses and they want to invest it in something. And of course there’s a lot of status in having your own vineyard, your name on the label. But, to their credit, they are keeping the land in farming.”

Matt leases 2 adjacent pieces of land for his operation. One piece has a farmstand, orchard, long driveway and storage buildings. The people who developed the farmstand started in 1978 or 1979. They raised some produce there, but bought in the majority. It was mostly a tourist farm with cows, burros, chickens, and antique farm junk laying around. School kids came out...
on trips and it was a well known place in the community. In 1997 Matt rented land from them for his operation, but a couple of years later they wanted to move to Virginia and sold the place to neighbors.

The neighbors liked to have a farm there, says Matt, and had enough money that it was not a big deal to tie some up in the property. So, in a handshake, Matt took over the farmstand for his storage and began to manage the perennials that were there. He also rents land behind the farmstand piece from other people, who own 65 acres of protected land of which Matt is farming roughly 20. That land had been fallow for 20 years.

Kuszynski runs a CSA and does four farmers markets on the weekend. He also has a few wholesale accounts — health food stores around the island. This year he opened a new CSA in Forest Hills, a neighborhood in Queens, that has 47 members. His other CSA consists of five drop-offs around the island, in people’s garages, as well as at the farmstand. Those amount to 99 shares, so altogether the farm is servicing 146 shares. The CSA goes until the Tuesday before Thanksgiving. The last three years he has had lettuce until then. Tomatoes produce until the end of October, usually. Springs are kind of torrential on the island, and it doesn’t warm up as fast as other places. But the season in the Fall goes on forever, he says.

“I like to grow a lot of varieties for the CSA,” Matt explains, “so we can pick and choose the best for them. Then whatever is excess I try to sell wholesale. Lettuce is something we do well and we wholesale a lot of it. Also we do lots of squash, sugar snap peas, heirloom tomatoes, red and green chard, kale, lots of crops. Two thirds of the production is normal crops, maybe better varieties. The rest is stuff maybe people haven’t seen before. I find it hard, however, selling new varieties of lettuce to stores. Restaurants are fine with it. But stores here don’t have any extra room and don’t want to try new things.”

Kuszynski is especially pleased with the Queens CSA because they have a core group. None of the others have that – he just drops off to them. It was hard getting them organized, he says, so he had to be convenient for them. People on Long Island are used to buying from farmstands — 50 of which exist right around Matt — and they’re not used to the CSA model.

“I’d like to do mostly CSA and farmers market sales,” he sighs, “with only a few stores. We don’t really have the money for land or machinery to produce in the volume you have to for wholesale. It’s true that diversity is very confusing, but at least you can get the money per acre that you need to pay workers.”

With the farmstand property Matt inherited an existing small orchard. He tries to run that organically and sprays with kaolin clay for curculio, but he hasn’t been able to get successful tree fruit that way. So he still uses a little fungicide. Some people don’t want the non-organic fruit, he has found, so he offers a separate fruit share for $50 for peaches and apples. He also sells them at the farmers markets and has to wholesale some of the peaches because they are so perishable.
Matt has a hard time getting his sandy soil to hold organic matter since there’s so much oxygen in it. In the back piece the soil, which was in grass for many years, runs about 3.5 to 3.8 percent organic matter. Up front, however, it is more like 1.8 to 2 percent. He put a lot of compost on this year, getting it from a nearby farm that composts leaf waste from landscaping operations. Before planting he also sprays the fields with liquid fish, sugar, humic acids, Nitro Max and boron or manganese. But he finds that using his irrigation operation is a good way to supply nutrients during the season.

“Just this year I got a liquid fertilizer from California — Biolink — to put in the drip water,” he says. “It’s a 5-5-5 formulation made of digested blood meal and sulfate of potash and some bone meal. They digest it and it will go through our filters. I thought we could use it for extra fertilization for the tomatoes after they’re half-grown and starting to fruit. Usually by the time the plants are big we run out of nutrients and we don’t have a way to go in and add them. Also, Peaceful Valley has a sulfate of potash which is ground fine enough to pass through the filters. But calcium is the big issue. I haven’t found any good way to administer that.”

Golden Earthworm Farm has about 28 acres planted this year. It’s the first year they have the correct amount of fields to rotate crops properly, Matt feels. The salad mix has been double cropped in the past, but he doesn’t like to leave the fields exposed. He wants to get a cover crop in fast.

“If I don’t take care of a field,” he winces, “I get incredible grass invasions. I have big plans for my cover crops and keeping fallow fields. I’ve used hairy vetch and rye, and that worked very well. It really benefited the soil a lot. But I also want to use crimson clover, and oats and peas in the fall. I like to get a legume and a grass at the same time. Summer is more flexible. If I could cover crop in the summer I’d use buckwheat or cowpeas. Right now my goal is just to eradicate weeds in the summer. I’d like to do a little of what Anne and Eric Nordell in Pennsylvania do with their fallow periods. But I’d have to put time into managing that land. And time — and organization — are the hardest things to come by!

“As for weeding,” he gestures, “if you had yourself together and your cultivation stuff ahead you’d be fine. But on the top end of these rows the plants are smaller because they had weed competition in their early stages. We hand weeded, but if we had used plastic mulch there wouldn’t have been any need.”

When it comes to pests, Matt has a lot of deer pressure on the back land and is trying to put up a high tensile deer fence to surround 5 and a half acres of fields. He uses row covers for flea beetles and root maggots, and kaolin clay on the tree fruit. His father, John, manages the tree fruit and does a lot of the tractor work, the precision seeding and bed preparation. Not many fathers could work for their sons, I remarked, but Matt shrugged.

“I run the place and he works here, but he gets his ideas heart! He’s gone through various career and always likes to learn things. Farming is so complex he’s fascinated by it. He prefers not to deal too much with people, so if you can get him out here that’s great!”

Besides his father, who works full time from March until September, Matt has Mexican workers who come back in the spring as the season progresses. In July he had four of them working, plus a guy who was an intern last year and wanted to come back. All...
told Kuszynski employs between 2 and 8 people during the season.

Matt used to bake in the winter, but now he farms into December with carrots and other produce. Then he does all his paperwork in the winter, sorting through a huge box full of paper that he stuffs things into during the season.

“We run this operation on a shoestring,” he says. “It’s hard to do what needs to be done when you don’t have the resources of time or money or people.”

Matt’s biggest problem, farming on Long Island, is of course water. The soil simply doesn’t hold moisture very long and there isn’t enough regular rain to supply what the roots need. So irrigation is fundamental to his management and success.

Originally Matt drew water from a small pond on the land. But pond water contains algae and other contaminants that wreak havoc on driplines. For a while he tried to filter the algae out, but filters that work well on algae are very expensive, involving two or more cannisters of sand with water circulating between them. So, ultimately, he decided to put in a well.

“There are various types of water on Long Island,” he explains. As you go down further you can tap into other waters, colder and older. On the North Shore you can see these turbines with big engines attached. Those are for when the water goes below 20 feet. Then a propeller goes down into the water and drives it up. Our water comes from shallow wells. The well here is five feet to water, which is the only reason this type of pump works here.”

What he is referring to is a high pressure 25 horse-power gasoline pump which puts out 50 to 60 pounds of water pressure per square inch.

“This moves an amazing amount of water,” he continues, gesturing at the device. “We’re doing 22 sprinklers (it can do 30) at 7 to 8 gallons a minute each. It’s rated 200 to 300 gallons per minute, depending on how far it has to push the water. It will run for a three-hour segment, delivering maybe an inch of water, and use maybe four gallons of gas. It’s pretty economical.”

The sprinkler system doesn’t need a filter, of course. Any contaminants going into it will just be blown out the other end. But this pump also serves the farm’s driplines, so all the water is run through a fine mesh to catch small particles like sand or rust which might plug up drip emitters. As the filter traps more and more material the water pressures before and after the filter begin to diverge. Matt checks gauges at those points and when they are significantly different, he opens a flush valve that clears the filter.

Kuszynski speaks highly of Rain-Flo, the Pennsylvania irrigation company that put his system together: “They have a really good assortment of pumps. I guess any irrigation company does, but they seem to be just a little more creative.”

Both overhead sprinklers and driplines are important to the farm. Matt has enough pipes and sprinkler heads to do at most one acre at a time. The sprinklers, at his pressure, will throw water evenly for about 25 feet. His beds are 6 feet in center, so one sprinkler can do four beds on each side, or 8 beds altogether, for a span of 48 feet. The beds are roughly 420 feet long so his 22 sprinklers can cover two beds at one time. In 3 hours the acre is irrigated, the pipes and sprinklers are dismantled, moved, set up in the next two beds, and in four runs the 4-acre field is irrigated.
For his drip system Kuszynski makes a planting line and then lays drip about 4 inches off the side of that. Much farther than that on his soils, he figures, and water will leach downwards before ever reaching his crop’s roots. He often does two rows of drip down the middle of crops planted in three rows, like lettuce or broccoli. With peppers, tomatoes and eggplants, he usually plants 2 rows. His row spacing is heavily determined by the fact that he has only two cultivators, so either a spacing works with a cultivator’s setting or the crop has to be cultivated by hand. In any case, usually the dripline is right where you want to cultivate, he says. So Matt has come up with the solution of burying his driptape, using a clever tractor-mounted injector.

“I don’t like using plastic very much,” he states. “So I bought this injector which can lay it underground so we don’t have to drive over it and cultivate over it and it doesn’t fly around and get cut with hoes. I find it very interesting. I haven’t seen anyone do buried drip lines for vegetables on the East Coast. Drip is a big pain, but I like it because it’s very efficient. It allows us to farm more acres because I don’t have that many pipes for the overhead system. You can expand a lot based on drip because it’s cheap. In areas where people don’t need to irrigate a lot it may not be worth the trouble to bury it. But we always irrigate here. It makes things so simple.”

His drip injector was invented by a California company. A chisel shank opens the soil and regular T-tape, mounted in rolls on a spindle, is fed into the opened furrow. To start the tape off by yourself, he says, just jam a rebar through it to hold the tape to the ground and take off with the tractor. The tape unrolls as the injector feeds it into the channel it is cutting. You can use two people, of course, with one holding the tape in place at the starting point.

“There’s a retrieval system,” Matt continues. “You can roll it right back up and use it again. But the retrieval system is pretty expensive because it uses hydraulics. I can’t afford it. So we pull up the tape by hand and throw it away because we haven’t gotten good enough at getting it back in good shape. I usually wait too long and it’s tangled with weeds. Theoretically, though, it would be a good system.”

He uses the lighter, 8 mil tape, but hopes eventually to use a heavier grade and retrieve it at the end of the summer. He also hopes, eventually, to bury the line, make up the beds, and then do stale beds — let the weeds germinate and then cultivate to get rid of them before planting. He thinks that if someone had a system down and time to do it, buried drip would work wonderfully for stale beds.

One caveat to those interested in copying the buried driptape idea, however, is this: Know thy driptape! Kuszynski ordered a product with emitters every 4 inches, figuring it would be good for sandy soil. But when he finally got it he discovered it was a side emitting tape. It wouldn’t run through his machine because it was an inch and a half wide. He ended up using it as surface driptape on his blackberries, figuring he didn’t want to bury tape under perennial crops.

The decision about when to use drip and when to use overhead sprinklers is complicated, Matt says: “If it’s dry out and you’re using drip, you hardly have to weed at all except where the water is. I might convert to drip everywhere, but the tape gets pretty expensive and I’d have to put in several lines per bed. In clay it will spread sideways better, but in sand it will only spread maybe 12 inches before it goes down. These are 17 inch rows so I’d have to use two lines per row.
“The hardest thing about sprinkling, however,” he continues, “which you don’t have to worry about with drip, is that it has to be worked around the tractor and picking schedules. The headers are in the way for doing any work. So often we don’t irrigate because we’re working in the field at the time we want to irrigate. If you had a 2-acre field that you didn’t have to work in, fine. You could irrigate and then move the stuff out and move the tractors in. But here we can’t get the logistics right. We’re picking five days a week. You could leave pipes in the rows permanently, with tractor passage on both sides and just hooking up headers when you need them. Then you’d need a lot of pipe, but it might be worth the investment because you’re not moving pipe all the time.”

An important aspect of sprinkling, Kuszynski feels, is that it increases germination.

“We usually have horrible weeds,” he reflects, “but one year when it was unusually dry there were hardly any weeds except where the sprinklers were. Drip helps because the weeds aren’t getting splashed by water. Sprinkling seems to encourage germination.

“On the other hand,” he continues, “germination is important when you are sowing seeds. You want splashing then. I know in California they use sprinklers to germinate seeds, then they take them out and use drip to grow the crop. They’re very good at it.”

Matt, like many young farmers, has great personal optimism fueled by energy, curiosity, and love for his craft. Yet he recognizes that his own future is likely one of hard work without a large economic return. At the end of our interview he became philosophical about the state of farming in today’s world.

“It seems to be structured now,” he observes, “that in America agriculture is one of the hardest ways of making a living. It’s outrageous that the US is able to dump corn in Mexico and drive those farmers off the land! There is an effort to do the same in Cuba, but so far the embargo has held them off. For whatever reason, local self-sufficiency in Cuba has built up over the years. It’s nice to see an alternative to the Western development model be given a chance!”
Conference (continued from page 1)

take with them for the rest of their lives. As only the most public symbol of the value of young people at the conference, the 2nd Annual (revived) Parade to kick off Saturday’s fair was the result of a lot of good work done in advance by the children. (I’m still not sure who let those two chickens have such ‘free range’ in the parade, however.) The parade nearly brought Rawson to tears. “It was really moving to see all those kids—and many of them kids of color—coming around, chanting, and, of course, it was our old farm truck that was leading the way.”

Though it may be viewed by some as secondary or frivolous, the fair is perhaps a good place to start talking about the nuts and bolts of the conference, as it was the fruit of a lot of labor by first-time fair coordinator Tricia Cooper (who also starred as the unlikely heroine Cindy in Friday night’s skit). Some slightly different geographic coordinates on campus certainly didn’t change the old-fashioned good time feeling, and the fun had by people of all ages. The fair games were a hit as always, and the pie-eating contest attracted lots of onlookers and produced lots of cheers and howls. Also, buoyed by a last-minute publicity campaign, the Liberty Cabbage Theatre Revival played their show Oligarchy to a packed house during the fair. The weather only gave in at the very tail end of the fair, at which time many of us were ready to partake in the glories of local food in the dining hall. By the way, was that maple ice cream exquisite or what?

On the subject of food, all those who participated in the planning, preparing or making of food at the conference deserve our thanks and appreciation, from Ellen Kittredge, who planned the menu, coordinated the local meal, and hustled for donations, to Marcy and the Hampshire dining hall staff who executed Ellen’s plans, to the Seeds of Solidarity folks and Chuk Kittredge and the NOFA Nibbles crew.

What about the workshops? Lots of people attended Fallon’s main conference workshops, with the room full to bursting for her 8 a.m. Saturday slot. But, as with all years, the conference was way more than one big name. A few workshops that got rave reviews were Michael and Karma Glo’s Pastured Pig Production, Kathy Ruft and Kathy Lawrence’s Food Democracy, and Kathy Ruft’s Access to Land. Judging by all the cuttings around the Hampshire campus, folks really did get hands-on in Bill MacKentley’s Hands-on Pruning, and Suellen Rust’s Growing and Marketing Cut Flowers yielded some beautiful cuts to spruce up the registration tent on Friday and beyond.

Rawson, for her part, enjoyed Maria Skinner’s workshop Guts and Grace: Dancing together through Life. “It was just fabulous,” she said.

Saturday’s debate on whether to jump ship from the National Organic Program was completely packed. While debate organizer Jack Kittredge was a little disappointed that no one took a really strong stand against the NOP, he did think everyone did well in presenting their case. Mark Dunau, a New York farmer who initiated the Farmer’s Pledge for those farmers who agree to a strong statement on their principles and practices, ably demonstrated how such grassroots action has the support of many farmers who are and aren’t getting certified under NOP. In a debate that stretched well over the allotted time, there was much audience participation, and there were many folks who were trying to synthesize the two sides and come to some kind of consensus.

(continued on next page)
It is because of such instances that Rawson feels that many people are ready for NOFA to make more decisions as a 7-state organization, and overall, to be more visible as an organization. “We seem to be moving not away from, certainly, but beyond just being about self-education, where people seem interested in advocacy,” she said.

This could be reflected in next year’s conference with a big event on Saturday night (in place of the debate) that would focus on how to place the concerns of the organic community into the political arena. With next year being a presidential election year, the hope is that this event could attract some high visibility people so that organic farmers and advocates could strategize and possibly bend the ear of the powerful.

As for the 2003 conference entertainment, the contradance had perhaps more happy dancers than ever before, even though it had to be moved inside and there was no ice cream available. Dirty Rice gave people—some of the same, some different—an opportunity to dance again on Saturday night, and they made the most of it. On a painfully sticky night, people weren’t afraid to sweat, and sweat they did. The open mike coffeehouse again was a great chance for NOFA members to show off their many talents.

Going into the conference there were about 840 people registered, and as Rawson said at the Friday keynote, we met our goal of having more than 1,000 participants. The final attendance numbers were 1019 adults, 46 teens, and 100 children. State by state, there were 575 from Mass., 144 from Conn., 87 from NH, 66 from VT, 153 from NY, and 33 from NJ. The farthest participant was from New Zealand. We also had people from Pennslyvania, Maine, Ohio, Kentucky, Florida, Nevada, New Mexico and Canada. More scholarship money was given out this year than any in the past, with 70 participants receiving money to attend the conference. Even in a tight economy, there were lots of people who found the time and money to make it to the conference. That certainly seems to reflect a strong commitment to the goals of NOFA.

Although the conference is past, we still want your feedback! There are certainly many evaluation forms in Julie Rawson’s possession already, and many more in transit, but, as always if you have any comments or suggestions about any aspect of the conference—be it the menu, a keynote idea, workshops, the children’s program, etc.—please send those along to Julie Rawson at 411 Sheldon Rd. Barre, MA 01005, 978-355-2853 or julie@mhof.net. If you would like to present a workshop in 2004 contact Julie by December 31. And if you would like to help with any aspect of the conference, or if you’d like to take the plunge and join the conference committee and have some real fun, please contact her also. Otherwise, we’ll get working on 2004.
NOFA-NY would like to share with TNF readers our Farmer’s Pledge in the hope that other NOFA chapters may also offer it as a way to publicly demonstrate progress - this is our first draft. In future years, if you choose to use it, we are open to revising the wording with your suggestions. So far, 63 New York organic farms have signed the pledge and plan to display it for their customers. Some of these farms are certified organic, some have dropped certification, some are never certified and yet all stand united behind these principles. NOFA-NY views this pledge as a powerful marketing tool to enable people who support socially and ecologically sound agriculture to link directly back to the farmers growing and processing to guide their food choices so they can vote with their dollars for the kind of agriculture they want.

How the Pledge Was Born

Over the past thirty years, the organic farming movement worldwide has accomplished the monumental task of developing ecological standards for food production. Organic farmers, gardeners, researchers and activists have contributed thousands of volunteer hours to this task. These standards are so thorough that farms of any size can study them and convert to organic management. Among the primary reasons that this success has been the adoption of many portions of these standards by the USDA National Organic Program (NOP) and the American Organic Standards (AOS) of the Organic Trade Association.

In the marketplace, slowly but surely, the organic label has achieved recognition and, for some crops, a premium price. Attracted by this premium market, industrial scale farming enterprises in California and other western states have converted several thousand acres to organic crops, and mainstream agribusinesses have purchased some of the small companies that established NOFA-NY to broaden their organic food offerings. While using ecological production methods, these larger entities have not embraced the social justice and rural development aspects of organic agriculture. As a result, they are able to supply organic products at a lower price than small scale independently run family farms.

Faced with these realities and the mandatory nature of the NOP, organic farmers and activists, who have been frustrated and even threatened by the NOP, have turned to OTA to make the organic label stand for the entire set of values embodied in our movement, decided that it is time to articulate more precisely the social and quality of life concerns of organic agriculture.

The Farmer’s Pledge is a commitment to a broad set of principles that goes far beyond the NOP and the AOS by addressing larger issues, community values and marketing. It is a commitment by either certified organic farmers or uncertified organic farmers can make to their customers and neighbors.

The Farmer’s Pledge is not a substitute for certification, which is a service whereby a third party scrutinizes the detailed operations that affect the farm, and then has the paper records of the farm reviewed by qualified peers for compliance with the regulations set forth in the standards. Instead, the Farmer’s Pledge is that - a pledge or commitment that does not imply that anyone is looking over the shoulder of the farmer. It may serve the small organic farmers who have never been certified in the past. For one reason or another, they have offered certified organic farmers the opportunity to say more to their customers about how they farm. It is both, a marketing tool and a way to help us recognize the numbers of small farmers who have a very strong ecological approach to farming, are treating and paying labor in a socially responsible way and are working towards once again making farming an integral part of communities everywhere.

We would like to thank Mark Dunan, John Gorzyński, Wes Gillingham, Elizabeth Henderson, Karl North, Neil Fitzgerald, Richard Mandelbaum, Michael Sligh and others, for helping to write the ideas contained in the pledge. We hope to update the pledge annually and welcome everyone’s input.

The Pledge Farmers Are Signing

Knowing your farmer is the best assurance that the food you buy is responsibly grown; grown with methods that recognize the inherent implications of the web of life in all our individual actions. Northeast Organic Farming Association of New York (NOFA-NY) believes that farmers should work in harmony with natural forces and leave the little piece of the world over which they have stewardship, in better condition than when they found it.

To further enable consumers to identify the farmers they want to support with their food dollars, NOFA-NY has established a Farmer’s Pledge, separate and distinct from USDA Certified Organic. Farmers and market gardeners who wish to use the following pledge have signed an affidavit which they display for customers and neighbors to view. This pledge is based on the integrity of the farmer/gardener. Those who sign this pledge agree that consumers may inspect, by appointment, their farm/garden to judge the truthfulness of this statement. NOFA-NY does not investigate or make any guarantee that the individual farmer is complying with the Farmer’s Pledge.

This pledge arises from the expressed need of growers who have a fundamental disagreement with the usurpation and control of the word “organic” by the USDA, and those certified farmers who want to pledge to an additional philosophical statement about their growing practices.

WE PLEDGE THAT IN OUR FARMING, PROCESSING, AND MARKETING WE WILL:

• reject the use of synthetic insecticides, herbicides, fungicides, and fertilizers;
• reject the use of GMOs, chemically treated seeds, and toxic materials, irradiation, and sewage sludge;
• treat livestock humanely by providing pasture for livestock, access to water, freedom from sludge, livestock, banning cruel alterations, and using no hormones or antibiotics in feed;
• support agricultural markets and infrastructures that enable small farms to thrive;
• maintain and build healthy soils by farming practices that keep soil building crops annually, using compost, cover crops, green manures, and reducing tillage;
• conserve natural resources by reducing erosion and pollution of air, soil and water through responsible farming;
• maximize the nutritional value of food and feed by practicing careful post harvest handling;
• practice minimal processing for all food products to preserve the natural nutritional value of food: NO use of irradiation, ultra-pasteurization, excessive heat, synthetic preservatives, or GMO processing agents or additives;
• reduce the ecological footprint of farms and homes by limiting energy use and converting to renewable sources of energy;
• reduce food miles by selling produce locally and regionally;
• conserve beneficial habitat for wildlife and encourage biodiversity;
• help preserve farmland and farming know-how;
• ensure food safety by using potable water for washing crops;
• handle raw manure and soil amendments with care;
• use ecological business practices;
• pay a living wage to all farm workers and acknowledge their freedom of association and their right to collective bargaining;
• treat family members and farm workers with respect, and ensure their safety on the farm;
• work in cooperation with other farmers and with the neighboring community to create a more sustainable way of life;
• sustain the land in healthy condition for future generations.

Public Seed Initiative Update (Summer 2003)

With the 2003 growing season in full swing The Public Seed Initiative is continuing and refining its focus on improving farmers varieties that work well for them. Replicated and unreplicated trials of new and unreleased public varieties are continuing this summer. We are trying to find the best of the new that will do well for organic growers and at the same time call attention to the specific needs that organic farmers have in regard to variety selection and development. In this vein we are doing two additional things. In cooperation with Brian Caldwell of NOFA-NY we will be conducting a survey of organic growers to try to determine what they are specifically looking for in varieties for the way they farm. It is important to find out what growers are looking for in terms of variety selection. We expect to start surveying in late Fall of 2003 when growers have a little bit more flexibility in their schedules.

Although we are continuing trials we are having trouble finding additional potentially good varieties that are not already being tried and assed in Organic systems. This has lead to interest at Cornell in becoming involved in breedng specifically for Organic systems. There are some projects that we are involved with this year with other potential projects in the works. In conjunction with the Restoring Our Seed Project in Maine, Cornell is working on dehybridizing a classic pickle variety and further selecting it for organic systems. A second project is working on introducing cucum- ber mosaic virus resistance into the King of the North bell pepper and then further selecting this pepper for better performance in organic systems.
The Fatal Harvest Reader: The Tragedy of Industrial Agriculture
edited by Andrew Kimbrell
published by Island Press
369 pages, paperback, $16.95
review by Jack Kittredge

Fatal Harvest is a stunning book, replete with beautiful full-color pictures on almost every page. It’s available for a $100 donation, I believe it is, to the Center for Food Safety, 660 Pennsylvania Ave., SE, Washington DC 20003, 202-547-9359. Andrew Kimbrell is the executive director and, in the interest of full disclosure, I must reveal that my daughter Ellen is currently an intern there (and says they’re doing great work!)

The Fatal Harvest Reader is a stripped down version of the original – virtually the same text but no pricey pictures. If you are like me you get plenty of pretty pictures looking out of your window, so the stripped down version is adequate. Kind of like that beat up but serviceable pick-up in the yard.

And what a text it is! Kimbrell has put together food issues of our time. Over two dozen authors – people such as Wendell Berry, Jim Hightower, Michael Sligh, Jerry Mander, and Helena Norberg-Hodge write on Agrarianism, Biodiversity vs. Monoculture, Machine Logic, Natural vs. Industrial Agriculture, Pesticides, Irradiation, Water, Wildlife, Pollinators, Agribusiness, Intellectual Property in Life, Globalization, Organics, Good Taste, Food Security and more. Anyone seriously reading this will have taken a crash course in Agriculture and Food Policy 101 more thorough and revealing than anything currently available in higher education.

On top of all that Kimbrell himself writes the first chapter, one debunking the Seven “Myths of Industrial Agriculture”: 1) that it will Feed the World, 2) that it is Safe, Healthy and Nutritious, 3) that it is Cheap, 4) that it is Efficient, 5) that it Offers Choice, 6) that it Benefits the Environment and Wild-life, and 7) that all its problems will be solved by Biotechnology.

This first chapter should be published as a separate pamphlet for mass distribution through CSAs, food coops, in schools and universities, and everywhere else activists and ordinary Americans are beginning to raise questions about our way of life. It is a compelling analysis of the big lie we have been sold about food and farming, but also suitable for a full reading in only an hour or so. For someone who has been uneasy about our food system without knowing why, it presents a paradigm shift.

My only regret is that I don’t think Fatal Harvest deals adequately with the way the forces of industrial agriculture have seized intellectual power, taking over the universities and “science”. From the researchers who are in the pockets of agribusiness to the believing nutritionists and extension agents who peddle their falsehoods with a well-meaning innocence, this control is maintained with grants, contributions, political connections, influence on boards overseeing promotions and tenure and, when necessary, the naked fist of dismissals and forced retractions.

But that is a minor quibble concerning a good book that should be widely read. Ask your library to order a copy. Send one to a friend or relative. Give it to your kid’s high school Social Studies (do they still have that?) teacher. Fatal Harvest puts the modern food system in clear perspective and suggests an alternative vision which can’t help but entice any thinking person.

Healthy Foods from Healthy Soils - A Hands on Resource for Educators
by Elizabeth Patten and Kathy Lyons - Illustrated by Helen Stevens
Tribury House, Publishers, Gardiner, Maine 2003. 256 pages, $19.95
reviewed by Audrey Cronin

Today, with our fast-paced lifestyle and food-on-the-go menus, the interconnectedness between soil and the food we eat has been lost. Many children today do not know where food comes from. This book can be an excellent resource for parents, environmental educators, volunteer coordinators, home-schoolers and service groups to teach children about the cycle of food; where it comes from, how our bodies use food and what happens to food waste.

The book is divided into four sections: “Where Does Food Come From?”, “Choosing Food for Body & Soul”, “Putting ‘Garbage’ to Work”, and “Let’s Grow Our Own”. It gives creative ways to teach children of kindergarten age through grade six by using stories, games, hands-on activities, songs and puppets. Children can create their own collages, learn how to keep a journal, chart food waste and learn to love worms.

Each chapter gives a recommended grade level(s) and benchmark for science literacy. Lessons can be used separately or linked together and each lesson gives additional resources, including those available through the internet. The directions are clear and each chapter gives a goal and background information. It is a basic and very user-friendly teaching tool. I highly recommend it.

Anyone Can Build A Tub-Style Mechanical Chicken Plucker: Complete Instructions for the Kimball Whizbang
by Herrick Kimball
Published by Whizbang Books, P. O. Box 1117, Moravia, NY 13118, (315) 497-9618, hckimball@baldcom.net, www.whizbangbooks.com
60 pages, $19.95 postpaid
reviewed by Jack Kittredge

I’ve plucked my share of chickens, turkeys, geese and ducks (Kimball claims his plucker works on the other poultry breeds too) and appreciate the advance in efficiency. It is a basic and very user-friendly teaching tool. I highly recommend it.
Herrick. You’ve done small scale farmers a real one together and share it between them. Thanks, several families working together could easily put your side throughout the process because he gives how important each piece is. When you can use any tant would a small change be? Kimball really backs lot of project books tell you exactly what you need, several commercial sources for these as well. Buying almost everything you need in case you to talk to people and ask questions in order to find carpentry skills, not be afraid of electricity, and like take on this project. You’ll need to match disparate the kind of person who likes to do that, however, bearings, pulleys and belts, a heavy plastic tub – by This is no project for the faint of heart. You are $500! says you can even buy all new parts and do it for some of the key components free or at low cost. He Kimball’s can be built for under $500 is that 1) you

Massachusetts Independent Certification, Inc. (MIC) is seeking new members for its Board of Directors, and the Grower’s Committee. MIC, (formerly known as the NOFA/MA Certification Program) is a non-profit business dedicated to providing affordable third party certification of environmentally productive agricultural organizations as a 501(c) 3 corporation. Board and Committee members serve as volunteers.

The Board of Director’s oversees the organization as a whole and primarily works on long range planning and financial management. Skills that would be beneficial to the Board include experience with legal issues, business planning, marketing, research and policy, as well as energy and enthusiasm to devote toward refining and developing MIC’s long term organizational sustainability.

The Certification Committees evaluate applications and ensure that applicants are in compliance with the organic standards, as laid out by the USDA’s National Organic Program and MIC’s Program Manual. There are currently two committees, a Grower’s and a Processor’s Committee that would be beneficial for the Processing Committee include includes background in processing, food safety and value-added products. Experience that would be beneficial to the Grower’s Committee include background in soil science, vegetable production, livestock production and specialty crop production (mushrooms, cranberries…).

Please contact Ed McGlew, Chair of the Board of Directors, if interested in any of the above opportunities. Meetings are generally held once every two months in Belchertown, MA, although more regionally located meetings may be possible in the future. Email: emcglew@pssci.umass.edu

Farm Fresh Recipes: Ready-to-copy recipe cards for market producers by Janet Majure published by Growing for Market, PO Box 3747, Lawrence, KS 66046, 800-307-8949, www.growingformarket.com 104 pages, spiral-bound paper, $20 plus $4 shipping review by Jack Knighttede Growing for Market is one of the most useful alternative ag periodicals available. I always pick it up anticipating some practical suggestion we can use here. I often find one there.

They have kept my faith with this book – a compendium of almost 100 recipes, each based on one common primary fresh ingredient. This is how Julie and I think about cooking for at least half the year: “We have a lot of beets right now. How can we use them?” That is certainly a common CSA shareholders think. “What use is this Swiss chard. (Judging by my bag, the farm certainly seems to have a lot of it this year!) I wonder what kind of supper I can make with it?”

Now we have a practical book that answers those all-too-real questions. And not only does it answer them. It allows us to photocopy whatever pages we want and pass them on to the members of our CSA. The pages come three recipes to a page, each recipe designed to fit onto a 3 by 5 index card.

The day we got it I thumbed through the 55 primary ingredients in the contents, from Apples to Zucchini. I decided, since our Mulberry tree was just beginning to give us their fruit, to try The things like mulberries, pawpaws, and gooseberries are listed under “Mixed Bag” which seems strange to me in the sense that I have heard “Barberas” and “Fruit, assorted” which might better have been used. But why quibble? is

The result? Delicious! High praise from the help who gobbled them down greedily. We expect to try more recipes and have already photographed appropriate ones for our shareholders. Thank you, Janet! May you sell out and include even more in the next edition!

Wild Predators? Not in My Backyard! by Eugene L. Fytnce published by Fytnce Enterprises, RR 1, Almonte, Ontario, Canada, K0A 1A0, 613-256-1798 115 pages, paperback, $20.00 review by Jack Knighttede

This is an interesting little book! Fytnce comes from a background of raising sheep and having to deal with coyotes. But he has tried here to cover as possible prey cattle, sheep, goats, hogs, various poultry and pets. For predators he covers bears, the large cats, the various canines — wolves, coyotes, foxes, dogs, mustelids like skunks, fishers, mink and weasels, the opossum, the raccoon, rats, raptors like eagles, hawks and owls, crows, ravens and turkey vultures.

He gives the North American range for each of these predators as well as a quick description of their biology and hunting behavior. I found this section particularly useful in helping me understand the enemy. For protective measures he covers overall precautionary farm design, range considerations, housing and fencing options, and the use of guard animals including dogs, llamas and donkeys.

Fytnce’s authority is a mix of published sources, documented studies, anecdotes he has heard, and his own experience and judgement. Julie and I have raised here all the beef except goats (he does not mention rabbits, which we raised for years) and he covers all the questions and possible solutions we have faced: fencing, electric wire, cattle wire, poultry wire and electric (both net and spread), permanent housing, range housing, chicken tractors, dogs and cats as protectors, precautionary grain management, hunting and trapping.

He directs the book primarily to small holders, although there are sections even to large operations and their somewhat different priorities and options. Although sometimes his observations revert to the cautious and obvious: “check with your extension agent, follow all applicable local laws and codes,” generally I found them practical and appro- priate.

I would have put far more stress on the importance of dogs in protecting farmsteads than he does. For him dogs seem important more of the time while for us they are what has enabled us to raise both produce and livestock surrounded by woods and the various critters who crawl, hop, run or fly through it on the way to our place and the free eats. The smells, sounds, and sight of our dogs have always been our first (and often only) line of defense. If you’re interested in raising livestock in a place where nature still surrounds you (which it does in most of the northeast) this would be a good book to peruse. It may frighten the faint of heart to consider all the creatures out there whose purpose is to be your undoing. But better to be forewarned and come up with a plan than surprised some morning by the carnage of the previous night in an ill-protected chicken house.


This is a slender volume, one hundred twenty one pages of which only 58 are text. Indeed, it is more a pamphlet than a book. What could justify a $7.50 price tag?

Well, those fifty-eight pages are filled with basic information on the most important differences in animals as opposed to more industrial methods of livestock rearing. It is efficiently organized, the first chapter making the case against conventional methods and subsequent chapters building the case for grass. She covers all the usual stuff (CLAs, Omega III, etc.) as clearly as possible even though I’ll have to take her word on the scientific stuff. The 20% acid sounds like English Class, bad memories – “Mr. Murphy, go up to the board and conjugate linoelic acid”, at least she does try to bring it down to the level of the non-technical reader (I estimate that at 99.99% per cent of the population).

So who will read this book? Obviously, most NOFA members who are also carnivores have exposure to at least some benefits of grassfed. From Allan Nation’s work from the point of view of the rancher to Sally Fallon’s emphasis on nourishment, it’s out there already. Still, many people could use a primer on the subject and she will negotiate a bulk pur- chase that may be worth it to people raising and selling locally to consumers who need to be edu- cated.

The book does list a lot of sources and has adequate bibliographical notes. Had I not already been a convert to the Church of Rotational grazing, this book would have at least sent me out to look for a grassfed prime rib.
Organic Farming Research Foundation Announces New Deadline

Deadline: December 15, 2003

Having disbursed nearly $1.2 million in organic research grants since 1990, the Organic Farming Research Foundation (http://www.ofrf.org/) has announced that it will be adding a second grant application deadline (December 15) to the existing deadline of July 15.

OFRF funds research into organic farming/food systems and dissemination of research results to organic farmers and growers interested in making the transition to organic production systems. Projects should involve farmers in both design and execution and take place on working organic farms whenever possible and appropriate. OFRF may also support innovative educational programs that reach or benefit a significant number of organic farmers and ranchers.

The foundation encourages modest proposals. The average grant amount for the past two cycles was approximately $7,600. OFRF will not fund a project for more than $15,000 a year. Matching funds from other sources and/or in-kind contributions from cooperators are encouraged but not required.

OFRF is particularly interested in supporting research that is not only relevant to, but takes place in, certified organic systems. OFRF does not normally fund studies that compare, as a primary objective, conventional systems with organic systems.

International grants will be awarded only for exceptional projects, with preference given to qualified applications from North America. See the foundation’s Web site for complete program details.

RFP Link: http://www.ofrf.org/research/application.html<br><http://www.ofrf.org/research/application.html>
Rhode Island: President: Fritz Vohr, In the Woods Farm, 51 Edwards Lane, Charlestown, RI 02813 (401) 364-0050, fvrh@earthlink.net
   Vice-President: Isabel Barten, 69 Lenox Ave., Providence, RI 02902 (401) 941-8684
   Secretary: Jeanne Chapman, 25 Yates Ave., Coventry, RI 02816 (401) 828-3229, afallic@mindspring.com
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   Membership: Karen Giles, 450 Cardina Back Rd., Charlestown, RI 02813 (401) 364-1684, recycledgold@mindspring.com

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   * Mayra Richter, 29 Metcalf View, Underhill, VT 05489, 802-899-3586, ezipern@earthlink.net

NOFA Membership
   You may join NOFA by joining one of the seven state chapters. Contact the person listed below for your state. Dues, which help pay for the important work of the organization, vary from chapter to chapter. Unless noted, membership includes a subscription to The Natural Farmer.

   Send dues for a friend or relative to his or her state chapter and give membership in one of the most active grass roots organizations in the state.

   Connecticut: Individual or Household: $35, Business/Institution: $50, Supporting: $100, Student (full time, supply name of institution) $20
   Elizabeth Obelenus, 4 Park St., Suite 208, Concord, NH 03301, (603) 224-5022, fannah@imevi.com
   60 So. Main St., PO Box 886, Pennington, NJ 08534-8886, (609) 737-6848, femmedeau@earthlink.net
   Massachusetts: Individual: $30, Family: $40, Low Income: $20, Supporting: $100
   Erin Amezzane, 323 Front St., New Haven, CT 06513-3206, (203) 787-7417, Erin@earthlink.net
   *VS Camilla Roberts, 1215 VT Rte 12, Woodstock, VT 05091 (802) 380-2961, camil@sover.net
   * Kirsten Novak Bower, 65 Wortheim Ln., Richmond, VT 05477 (802) 434-5420, kbower@juno.com
   * Rick John Cleary, 407 Rt. 15, Underhill, VT 05489, (802) 899-3808, vofo@nofavt.org
   * Carol King & Lisa Engelbert, 840 Front Street, Binghamton, NY 13905, (607) 724-9851, fax: (607) 724-9853, certificedganic@nofan.org
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   Vermont: Individual: $30, Farm/Family: $40, Family: $35, Business: $50
   * Karen Johnston, 591 Lansing Rd. #A, Fultonville, NY 12170 (518) 583-4613, kjohnston@verizon.net
   * Steve Gilman, 130 Ruckytucks Road, Stillwater, NY. Tel: 607-245-7417, shillinglaw@post.harvard.edu
   * Paul MacNicol, 282 Bible Hill Rd., Francetown, VT 05043 (803) 547-6220, jbyington@theophanyholding.nv.com
   * Mayra Richter, 29 Metcalf View, Underhill, VT 05489, 802-899-3586, ezipern@earthlink.net

Calendar
   Saturday, September 7: 2nd Annual Harvest Festival, YMCA Family Park on Murray Avenue, Worcester, MA for more info: 508-799-9139 or www.worcesterco.org
   Tuesday, September 9: Organic Fish & Kelp Fertilization of Pasteure & Hay Land, Randolph Center, VT for more info: 802-656-3834
   Saturday, September 13: “Boodocks” Grazing: Sheep in the Woods, W. Topsham, VT for more info: 802-656-3834
   Saturday, September 13: Sale of World Class Devon Cattle Seedstock, Remington, VA for more info: 413-657-7709
   Tuesday, September 16: Diversifying an Organic Vegetable Operation, 5-7 PM. The Farm at Miller's Crossing, Hudson, NY, for more info: 518/271-0744, fax: 518/271-0745 http://www.capital.net/~farmfood/
   Friday, September 19 – Sunday, September 21: 15th annual Green Nations Gathering in Rock Hill, NY for more info: 802-293-5996, greenpam@aol.com http://www.greennations.org
   Monday, September 22: Sheep Grazing for Fiber Production, Brattleboro, VT for more info: 802-656-3834
   Sunday, October 12th: second annual Maine Food Festival in Unity, ME for more info: erictoh@tithom.com or 207-525-3104.
   Monday, October 13th: NEON field day on cover crop intensive rotation at Anne & Eric Nordell's Farm in Beech Grooe, PA. Lunch will be available for more info: contact Maxine Welcome at 607-255-3436
   Saturday, October 18: Let’s Get Growing, a workshop about school gardens in Bangor, ME for more info: 207-990-0467
   Saturday, November 1 – Wednesday, November 5: 7th Annual Community Food Security Coalition Conference, Boston, MA for more info: 310-822-5410
   Friday, November 7 – Sunday, November 9: Carolina Farm Student Stewardship Annual Conference in Rock Hill, SC for more info: 803-542-2402
   Friday, November 14, 2003: 2003 Regional Forum “Sustainable College Dining: Tilling The Soil, Turning The Tables” at New Haven, CT for more info: Melina D’Ambrosio 207-380-5508 or Brian Shillinglaw 857-225-2501, shillinglaw@gost.harvard.edu
   Three Saturdays, November 22, 2003: April 10 and May 29, 2004 at 9 a.m. to 5 p.m.: In-depth study of the nine Biodynamics lectures with Gunther Hauk. Chestnut Ridge, NY. Tel: for more info: 845-520-5020 ext. 20. Email:info@gpfefircenter.org, Website: www.gpfefircenter.org
   Through February 1, 2004: Migrant Farmworkers in the Northeast, exhibit at National Heritage Museum, Lexington, MA for more info: 781-656-5517

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Long Island vegetable grower Matt Kaszynski uses both drip and overhead irrigation on his sandy soils. Here he shows the impact sprinklers he likes to run in his lettuce.

News, features, and articles about organic growing in the Northeast, plus a Special Supplement on

Irrigation