The NOFA summer conference: A place to learn, gather with friends, share in a bounty of organic food, and celebrate and revive the spirit.

Just ask some of the people who have been to a few…

Like Rich Newburg, who has attended for the past 15 years. Or Bill Duesing, who has been coming to the conference since 1975! Or one of our newer attendees, like Kaethe Armitage who is returning this year for her second teen conference.

Rich Newburg is an organic gardener who practices sustainable landscaping and gardening for wildlife at his home in Marblehead, MA. When he is not gardening, he can be found promoting and teaching about rain barrels at the local farmer’s market.

Rich loves being surrounded by amazing people from all walks of life at the conference. From laborers to professors, single folks to families, young children to teenagers, he enjoys mingling with enlightened, aware individuals who are trying to improve the condition of ourselves and the world we live in.

He describes the conference as a glorious and satisfying experience – and considers it a “local vacation”, complete with great food and entertainment.

Kaethe Armitage, 15, has not attended quite as many conferences as Rich…yet. She has, however, wanted to be a farmer from a very young age. Her teacher, Jen Caron, runs the teen workshops and thought that the conference would be a great way for her to get a little closer to the farming community.

Armitage was looking forward to spending time with friends she already knew - but by Sunday had bonded with the entire group of teens. Caron could see the connections within the diverse group get stronger, and recalls a moment toward the end of the conference when a big cheer erupted from the whole group as Kaethe made a good shot in a game of pool.

Kaethe loved how excited everyone seemed to be at the conference. She sat in with a group of inner city kids who had farming programs at their schools or rooftop gardens, and was inspired by their enthusiasm about gardening, and how hard they tried, even with limited access to land and space. She found herself interacting with friends, but also with other teens from a background different than her own.

This year, she is coming back not only to take part in the workshops and events, but also as a presenter! Kaethe owns her own goats, which now have babies on the way, and she will present with Jen on how to raise and breed them.

Goat Husbandry is just one of a great teen workshop lineup – see the full list on our website!

For others, the conference is not so new. Since 1975, Bill Duesing of Old Solar Farm in Connecticut has missed only a handful. He looks forward to the event to reconnect with old friends and also make some new ones.

Bill said he could not recall a year when he wasn’t excited about the keynote speakers – and anticipates it even more now that we have two speakers instead of one. He found it hard to pinpoint his favorite part of the conference. Food, meals with friends old and new, camping, interesting workshops, exhibits, and just being with other attendees were some of the things that came to mind.

Bill describes the conference as fantastic and educational. He finds the range of workshops wonderful, and feels that there is truly something for everyone.

We agree! And so does Jonah Bois, aged 5. When asked what he remembered about last year’s conference, it didn’t take him long (continued on page 39)
Our Microbiomes

by Jack Kittredge

One of the major biological breakthroughs of the last quarter of the 20th century was the understanding that we coexist with literally trillions of other organisms. They inhabit our intestinal tract, our skin, our urogenital tract, our oral and nasal cavities – any part of the body with any kind of opening to the outside world.

They are bacteria, viruses and fungi and our relationship with them is complex. For starters, we would not long survive without them. They help us digest our food, synthesize vitamins for us, protect us from pathogenic agents and are a major component of our immune systems. We have evolved with particular distinct populations – picked up from our ancestors – and their impact upon us is as fundamental as is ours upon them. Each of us has a unique set of these microbes, and together they constitute a person’s “microbiome”.

Studies with germ-free animals have shown that they are far more susceptible to infection than their colonized counterparts. Apparently the interference with invading pathogens by domestic microbes vastly reduces the opportunity for a virulent pathogen to take hold. Studies have also shown the importance of “priming” one’s immune system at an early age by exposing it to a wide variety of microbes, something every toddler does instinctively – much to the dismay of his or her parents!

This issue of The Natural Farmer is devoted to exploring this new awareness – that in order to stay healthy we must be colonized by trillions of germs! Readers of the last issue, on Soil Health, will remember that we discussed the vast number of microbes in soils and the number of different species found in healthy soils. The healthy soil is the home of a rich variety of microbes, something every toddler does instinctively – much to the dismay of his or her parents!

Prevention is better than cure, and we must get back our health. We do not need a long list of bacteria, viruses and fungi to store away, but we do need to recognize their role in our health and especially in the health of our children. We need to establish a healthy relationship with micro flora and fauna, not epidemics. We need to re-establish a healthy relationship with our foods. We need to recognize that antibiotics, disinfectants, and anti-microbial treatments of the conventional grower do not bring the same level of health as is ours upon them. Each of us has a unique set of these microbes, and together they constitute a person’s “microbiome”.

The bacterium Enterococcus faecalis, which lives in the human gut, is just one type of microbe that will be studied as part of NIH’s Human Microbiome Project.

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Managing Soil Temperature

04.07.09—In the wild, where our crop plants evolved their microbial partnerships, plants are provided with nutrients from soil by the work of partner microbes in their employ. In the greenhouse, it is important that the grower provide soil conditions to support the efforts of those same plant employees in the soil. The grower should seek to mimic the soil conditions of the plant’s evolutionary history. It pays to know, and manage, soil temperatures. One of the main actors in soil temperature dynamics is water. Cold water shocks the system—even warm water will cool soil by evaporation to well below air temperatures unless heat is provided under the media. Assuming good media and sound plant material, most greenhouse problems relate to water, watering, and water temperature effects on soil life. Generally, dryer is better, both because of the thermal effects and because water displaces air in soil.

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Seeking farmer to work with 25-30 acres fields in Southern Worcester County (Massachusetts) to create healthy/could be nutrient dense pasture in exchange for the hay; no chemicals or fertilizers used for decades if ever. Seeking farmer to pasture cows there during summer. Seeking folks who would like to begin CSA in same area. Also seeking info/help to graft ancient apple tree varieties onto new stock to continue lines. Please contact Susan (508) 667-6719.

For Sale - abandoned farm consisting of 150 acres, 255 Lynch Rd, Little Falls, NY 13365, a geographically and ecologically varied land form consisting of excellent soils, rolling topography, sheltered ravines, maturing forest with frontage on West Canada Creek and paved town road. Land will meet standards for organic certification. For details contact Judi Letourneau for more information, via email, pjletourneau@comcast.ne or phone, 603-472-2152.

Organic farmer with thirty plus years of crop production seeks cooperative position. Owned and operated Clark Farm CSA from 1994 to 2005. We raised a wide array of veggies, cut flowers plus culinary, tea and medicinal herbs. Other offerings were adult and children’s classes ranging from the basics, wild edible plant ID, complete organic gardening courses. I have lots of specialized equipment, greenhouses, etc. I need quarters for indoor cat, self and safe dry storage. Long term position preferred. If interested call John Clark at 203-841-6110 or write John Clark, Clark Farms CSA, POB 860, CT 06798.

Food Donations Needed / Marketing Opportunity. Sally Fallon will be coming to NH this coming January and we are seeking local food for the conference. Over 200 people will attend, seeking ways to improve their health and nutrition. This is a great opportunity to let people know about the great food that is available locally. Contact Judi Letourneau for more information, via email, pjletourneau@comcast.net or phone, 603-472-2152. Also visit the web site to learn more about the conference www.fourfoldhealing.com/conference/Help Wanted. Real Pickles is a small business, based in Greenfield, MA, producing raw, naturally fermented pickled foods from local, organic vegetables. We need help, beginning late June. Up to 5 days/week in summer, up to 3-4 days/week in fall and beyond. Includes all aspects of production, preparing fresh ingredients for fermentation and packaging finished product into glass jars. Work is physically demanding. Applicants should be hard-working, reliable, and able to lift 50 lbs. Work location: Greenfield, MA. A great opportunity to learn all about the ancient art of lactic acid fermentation! For more information, call Dan at 413-325-3372.

CSA Gardener – Teacher - Caretaker (May ’09). Start-up of Sustainable Life Education & Retreat Center. Part-time position with housing on 240-acre Derbyshire Farm, Temple, NH, site of CSA from 2005-08. Nonprofit GEO Institute ran international ecovillage college program through UNH in ’90’s. Now restarting with focus on common nature of self - world, inner-out, presence-peace. Curriculum for sustainable, mindful, integral life education. Property adjoins 3,000 protected acres of Wapack National Wildlife Refuge. Includes 5 houses. 1 1/2 hrs. from Boston. Also looking for volunteers, venture partners, and people interested in eco-village/cohousing. — Contact Bruce Kantner, 603-654-2523 or bruce@tellink.net.

Vegan family of four seeking farmable land to start small organic/vegan farm with minimal carbon footprint. Open to partnership. We’re planning to grow vegetables, small fruits & berries, herbs & spices, medicinals, ornamentals and potted plants. Our goal is to operate in an efficient/environmental sustainable manner utilizing as much renewable energy as possible [solar, wind & bio], contribute some foods to the soup kitchens and eventually teach others to do the same. We also welcome any advice/guidance & other useable assistance from any agency and farmer. Thanks! Contact David @ 603-290-3179, 516-821-0000 or davidlew1@gmail.com.

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Michelle Sandy (Mid Atlantic) 866-412-1380
Richard Klossner (Midwest) 303-319-6899
Larry Hansen (West) 888-406-6556

www.HorizonOrganic.com
Alberta Fresh Produce Contamination Study Finds No Difference Between Organic and Conventional

Contradicting claims by some ideologues that organic produce, because of the use of manure in growing, is more likely to contain pathogens than conventional produce, a federal-provincial study of fresh produce in Alberta, Canada has not been able to find significant differences in produce grown by the two systems. 673 samples of lettuce, spinach, tomatoes, carrots, green onions and strawberries were purchased at 36 Alberta public and farmers markets during the summer of 2007. The samplers asked vendors for information on whether the produce was grown organically or conventionally. The samples were then tested for E. coli, Salmonella, E. coli O157:H7, and Campylobacter (and some for Cryptosporidium). While some E. coli was found in both organic and conventional samples, demonstrating that there is room for improvement throughout the produce production chain, no significant pathogen differences were detected between the two production methods.

source: Journal of Food Protection, Vol. 72, No. 2, 2009 (pages 415-420)

Free Booklet on Organic Certification for Vegetables

NOSS chair and organic inspector Jim Riddle has written a 24 page booklet which explains organic certification requirements in common sense, understandable terms. It goes into requirements for organic seeds, seedlings, greenhouses, crop rotations, soil amendments, pest and disease control, harvest and storage. It also covers transition to organic with examples of recordkeeping forms. It can be downloaded at http://www.pe.noc.fas.usda.gov/organic/vegetable.pdf. For a free printed copy contact Molly Werner at 507-752-7372, or Email mwerne082@umn.edu. source: Organic Broadcaster, March/April 2009

“Naturally Raised” Label Greenwashing

The USDA has issued a voluntary standard for producers wishing to use the label “naturally raised” on their meat. The animal must have been raised without growth promotants, without being fed animal by-products, and without antibiotics (except certain coccidiostats for parasite control). But the animal could have been cloned or genetically engineered, raised in confinement without ever seeing the outdoors, in poor hygiene and overcrowded conditions, could have been fed growth promotants, and with a diet laced in pesticides.

source: Acres, USA, March 2009

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US. Organic Sales Grow by 17.1 Percent in 2008

U.S. sales of organic products, both food and non-food, reached $24.6 billion by the end of 2008, growing an impressive 17.1 percent over 2007 sales despite tough economic times, according to the Organic Trade Association (OTA). The survey, conducted by Lieberman Research Group on behalf of OTA, measured the growth of U.S. sales of organic foods and beverages as well as non-food categories such as organic fibers, personal care products and pet foods during 2008. Results show organic food sales grew in 2008 by 15.8 percent to reach $22.9 billion, while organic non-food sales grew by an astounding 39.4 percent to reach $1.648 billion. As a result, organic food sales now account for approximately 3.5 percent of all food product sales in the United States.


US and Canada Agree to Organic Equivalency

The governments of the US and Canada have agreed to make a wider equivalency to organic standards. This is expected to be available in winter 2009. “Participants can mail back their forms, but we encourage them to do a better job than the Bush administration,” said Gary Keough, director of the NASS New England Field Office. Survey participants are required to respond by June 17. Results are expected to be available in winter 2009. “Participants can mail back their forms, but we encourage them to complete the survey online,” said Gary Keough, director of the NASS New England Field Office.

source: USDA to Conduct First Wide-Scale Survey of Organic Producers

The 2007 Census of Agriculture counted over 20,000 U.S. farms engaged in organic production. To learn more about how the growth of organic production is changing the face of U.S. agriculture, the USDA’s National Agricultural Statistics Service (NASS) will soon conduct its first wide-scale survey of organic agricultural producers and producers in transition to organic agriculture. NASS will mail the Organic Production Survey in early May to all known organic producers in the United States. They are required to respond by June 17. Results are expected to be available in winter 2009. “Participants can mail back their forms, but we encourage them to complete the survey online,” said Gary Keough, director of the NASS New England Field Office. Survey participants are required to respond by June 17. Results are expected to be available in winter 2009. “Participants can mail back their forms, but we encourage them to complete the survey online,” said Gary Keough, director of the NASS New England Field Office.

source: NASS press release, April 17, 2009

Organic Cropping Systems Can Be As Profitable As Conventional Systems

Is conventional cropping more profitable than organic farming? Is it less risky? To answer these questions, the University of Wisconsin’s College of Agriculture and Life Sciences and Michael Fields Agricultural Institute agronomists established the Wisconsin Integrated Cropping Systems Trial (WICST) in 1990. This research is funded by USDA-ARS. Systems ranging from species-diverse pasture and organic systems to more specialized conventional alfalfa-based forage and corn-based grain systems were compared at two sites in southern Wisconsin from 1993 to 2006.

“In our study we found that diversified systems were more profitable than monocropping,” explains Joshua Posner, University of Wisconsin. Feed grade premiums the organic systems were more profitable than the Midwestern standards of continu-

Household Cleaning Products Create a Bacterial Timebomb

Fabric softeners, disinfectants, shampoos and other household products are spreading drug-resistant bacteria around Britain, scientists have warned. Detergents used in factories and mills are also increasing the odds that some medicines will no longer be able to combat dangerous diseases. The warning has been made by Birmingham and Warwick university scientists, who say disinfectants and other products washed into sewers and rivers are triggering the growth of drug-resistant microbes. Soil samples from many areas have been found to contain high levels of bacteria with antibiotic-resistant genes, the scientists have discovered – raising fears that these may have already been picked up by humans.

In their study, the scientists looked at quaternary ammonium compounds (QACs) that are used in many household cleaning goods. Huge volumes of these chemicals are flushed from homes and factories into sewers and rivers. In high concentrations, QACs kill bacteria. However, it turns out that the piece of DNA that promotes crop rotations and organic farming practices.


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Mercury Filling Removal for livestock grazing that calls for having animals browse on plants. The researchers suggest a new alternative to monocultures reliant on biodiversity to avoid catastrophic loss of available plants due to pests and parasites, while threatening the survival of target species. The researchers say secondary compounds play an important role in the health of animals, plants, soil and people, but little is known about them because labs currently cannot conduct routine analysis of secondary compounds. The authors call for creation of a database to record the interactions between secondary and primary compounds, document potential toxicity, and to help instigate research into how these compounds may benefit health and nutrition.


Coffee and Dementia?
A recent study published by the Journal of Alzheimer’s Disease suggests that middle-aged coffee drinkers are less likely to develop dementia and Alzheimer’s disease (AD) later in life. Researchers analyzed data collected from subjects from 1972 to 2017, and then re-observed 1409 (71%) of these men and women later in life, at ages 65-79. The study was undertaken because “…the long-term impact of caffeine on the central nervous system was still unknown, and as the psychopharmacologic processes leading to Alzheimer’s disease may start decades before the clinical manifestation of the disease,” said head researcher Mia Kivipelto of the University of Kuopio in Sweden.

Coffee drinking was broken into 0-2 cups a day, 3-5 cups a day, and greater than 5 cups a day. The lowest risk was among the 3-5 cup drinkers.

The study concludes that “…coffee drinking is associated with a lower risk of dementia/AD”, concluded Kivipelto.

source: WholeFoods, March, 2009

Antibiotics Pose Concern for Ethanol Producers
The ethanol industry must be wondering where the bottom is. Profits are slim or non-existent and about 20 percent of all U.S. plants are shut down. In addition, ethanol’s main by-product, which is sold as livestock feed, has raised potential food safety concerns. Several studies have linked the by-product known as distillers grain to elevated rates of E. coli in cattle. And now, distillers grain is facing further scrutiny because the Food and Drug Administration has found that it often contains antibiotics leftover from making ethanol.

Mark von Keitz with the University of Minnesota’s Biotechnology Institute said, in ethanol production, the main enemy is a bacterial bug that makes lactic acid. “What these organisms do is they also compete with the yeast for the sugar,” said von Keitz. “But instead of making alcohol they make primarily lactic acid.” Enough of the bacteria are present, von Keitz said fermentation can be ruined. "What people operating these plants are trying to do is to keep these lactic acid bacteria in check," said von Keitz. “And one way of doing that is with the help of antibiotics.” That raises two potential concerns. One is that these treatments might promote the growth of bacteria that are resistant to antibiotics. The development of these ‘super-bugs’ is a major concern in health care because they reduce the effectiveness of medicines. The second concern is that the antibiotics could find their way to humans through the food chain.

source: Minnesota Public Radio, March 24, 2009

Bill Gates Funds GM
The Bill and Melinda Gates Foundation has awarded the Donald Danforth Plant Science Center in Monsanto’s hometown of St. Louis, Missouri, $5.4 million to be devoted to political and lobbying activities designed to break down regulatory resistance to genetically modified crops in Africa. The center hopes to secure the approval of African governments to allow field testing of nutrient-enhanced GM bananas, rice, sorghum, and cassava. So far, there have been no takers.

source: Acres, USA, March, 2009

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US Farms Grow While Farmland Shrinks

According to the 2007 Census of Agriculture, American farmland decreased since 2002 by a little less than 2%, or by 16.2 million acres to 923,095,840 acres. But the number of farms has increased by about 4%, to 2,204,792. These new farms tend to be diversified, have fewer acres and lower sales with farm operators also working off-farm. Nearly 30% more women are counted as principle farm operator. Farmers and ranchers still control 41% of the land area in the US. For more information on the study, visit the website of the American Farmland Trust, www.farmland.org.

source: Acres, USA, April, 2009

Who Funds CAFOs? We Do!

Concentrated Animal Feeding Operations (CAFOs) produce some 300 million tons of untreated manure each year, about twice that generated by the entire human population of the United States. The USDA’s Environmental Quality Incentives Program (EQIP) was originally designed to help farmers deal with erosion control, nutrient management, and other conservation activities. In 2002, however, Congress made these funds available to CAFOs and eliminated the cap on payments. Since then, at least $35 million a year in taxpayer money has been given to hog and dairy CAFOs for manure disposal. The total cost of cleaning up contaminated soil under all CAFOs would approach $4.1 billion, suggests the Union of Concerned Scientists.

source: Acres, USA, April, 2009

A Report from the National Organic Standards Board Meeting

by Dave Rogers, Policy Advisor, NOFA Vermont

According to Woody Allen “eighty percent of success is showing up.” And so, when the National Organic Standards Board (NOSB) holds it semi-annual meetings, scores of representatives from organic farming organizations, certifying agencies, environmental groups, consumer associations, businesses and trade organizations from around the country turn out in force. To a considerable extent,

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DUNG BEETLES — by Charlie Walter. Dung beetles have always been nature’s “pest control” recyclers — in a way, they are the first organic farmers. They also find the carcasses of industrial farming as farmers subside the many benefits of grass-based livestock production. Dung beetles are a solid sister at rebuilding the right place on the farm and ranch. Charles Walter delves deep into modern science and ancient history, traditional beliefs and the best practical advice toservice the whole thing. His hope is that you can create a new animal to work more closely with nature — to this amazing organisms. Anyone interested in organic forms of farming will be enchanted by the intriguing tale of the dung beetle. Softcover, 240 pages.

#6432 — $24.00

SMALL FARMS ARE REAL FARMS — by John Hard. Since the middle of the 19th century, American farming policy has taken the nation into the dead end of industrial farm production and food distribution. Raising, as its agriculture is biologically based, has been transformed into an industrial process, thus diminishing the economic and cultural values upon which the nation was founded. Along the way, small farms have been ridiculed and dismissed as inconsequential — but now the seeds of a rural renaissance are being planted, not by these industrial behemoths, but by family-scale farmers. In this collection of essays by one of America’s most eloquent and influential proponents of sustainable agriculture, the multifaceted uses for small farms is built using logic and facts. Softcover, 272 pages.

#6583 — $29.00

POULTRY MANAGEMENT — by Ronald Kay. This book covers everything the backyard farmer needs to know about poultry husbandry — including pasturing and selective herbal medicine and homeopathy. The author presents permaculture principles of value in raising poultry, creating a diverse base of plant life for the birds to choose from, all the way to complete success. Softcover, 154 pages.

#6452 — $29.00

GROUND TREASURY — NATURALLY — by Alanna Moore. From housing to feeding, from selection to breeding, this book covers everything the backyard poultry farmer needs to know about poultry husbandry — including pasturing and selective herbal medicine and homeopathy. The author presents permaculture principles of value in raising poultry, creating a diverse base of plant life for the birds to choose from, all the way to complete success. Softcover, 154 pages.

#6452 — $29.00

FOUNTAIN OF NATURAL FARMING — by Harold Willis. It’s the longline ecological farming and research model that will explore the foundational concepts of natural farming and issues the call for clean foods and forms of agricultural production. In this single volume, this author details the interactions between soil chemistry, microflora, beneficial plants and livestock. He discusses the current problems in agriculture and suggests how lessons from nature provide the roadmap to efficiency, effectiveness and profitability. This book does not circle pre-existing notions of what farmers need to do to form better, but also passes along an understanding of the art of ecological agriculture. This book is certain to become a classic of clear farming and one of the most heavily bookmarked texts in Acres U.S.A. Softcover, 294 pages.

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the continued success of the “USDA Organic” label in the marketplace depends on the decisions and recommendations of the NOSB. And along with it, of course too, does the success of thousands of organic farmers and organic food manufacturers in this country, and others too. People who care about organic agriculture show up – and speak up – when the NOSB meets.

The establishment of the NOSB was included in the 1990 Organic Foods Production Act and functions as an advisory body to the USDA’s National Organic Program (NOP). Its 15 members -- four farmers, two processors, one retailer, one scientist, three public interest advocates, three environmentalists, one USDA accredited certifying agent -- “assist” the NOP and the Secretary of Agriculture in developing organic standards and provide advice on the rules and practices that guide the work of the NOP. Attending an NOSB meeting is to be a witness to the slow, deliberative and never-to-end shaping of the future of organic agriculture.

The most recent NOSB meeting took place on May 4-6th in Washington. As usual, the agenda was packed with discussions and polite disagreements among Board members and stakeholders about the questions and decisions under consideration -- some extremely important, others trivial, depending on one’s perspective. For example:

Will certified organic farmers be required to adopt practices to promote biodiversity on their farms? For several years the Board and several non-profit organizations have been working to develop specific recommendations for required practices to protect and enhance species diversity and wildlife resources on organic farms. Proposed standards have been discussed at previous NOSB meetings. At this meeting they were formally approved by the Board and forwarded to the NOP for implementation.

Should nanomaterials be allowed in the manufacture and packaging of certified organic products? Nanomaterials are engineered products made up of particles of such small size (nano-scale) that unusual and poorly understood physical, chemical and biological properties may emerge. The NOSB’s Materials Committee wished to hear comments related to the use and compatibility of nanotechnology in certified organic products and packaging materials. The majority of attendees who spoke on this subject were firmly opposed, drawing comparisons to biotechnology and GMOs. Some spoke on this subject were firmly opposed, drawing comparisons to biotechnology and GMOs. Some

Should new animal welfare standards be developed for livestock production? For some time the Board’s Livestock Committee has expressed interest in developing new standards pertaining to the humane treatment of livestock in organic systems. At this meeting it presented several specific cattle welfare standards for discussion. While the need for explicit animal welfare standards is generally acknowledged, representatives of farm organizations and certifying agencies expressed concerns about their practicality and farm-level effects. The Livestock Committee will continue to work on proposed standards and may have them ready for a formal vote by the Board at the next meeting in November.

These are just a few of many issues discussed during the 3-day meeting. Others included: new standards for organic personal body care products; bivalve mollusk aquaculture on seafloor parcels; inspection requirements of certified retail establishments; and the allowance of more than a dozen synthetic substances used in the production or processing of certified organic products.

Those interested in reading the NOSB’s discussion documents and recommendations on any of the above, as well as written comments by dozens of stakeholders, may do so by Goggling “national organic standards board” and following the links under “Find Meeting Information”. NOFA Vermont’s submitted comments may be found at www.nofavt.org, under Programs/Advocacy.

An unexpected – and exciting – “event” at this meeting was a visit by the USDA’s new Deputy Secretary of Agriculture, Dr. Kathleen Merrigan. Many readers of TNF know that Kathleen is a longtime advocate of organic agriculture, local foods and family farming. She is an author of the 1990 Organic Foods Production Act and a former environmentalist representative on the NOSB. In recent years she has been a professor at Tufts University’s Friedman School of Nutrition Science and Director of its Agriculture, Food and Environment Program.

She was received at the meeting with a round of enthusiastic applause – and a few hugs from old friends. In her new role as #2 at the USDA her office will serve as “sustainability central at the USDA”. And she brought some very good news to the meeting:

• A formal announcement of a new NRCS EQIP Organic Initiative that will immediately provide $50 million in dedicated funding to support resource conservation practices on certified organic and transitioning farms in all 50 states. This pilot program is intended to address the difficulty many organic and transitioning farmers have in “competing” with CAFO’s and industrial-scale farms for EQIP (Environmental Quality Incentive Program) funds in many states. If successful, this pilot program will be expanded and further developed in the future.

• An announcement that the National Organic Program has “grown up” and will be elevated to full division status within the USDA’s Agricultural Marketing Service; a new NOP Executive will be hired. (More applause.) The significance of this development was not lost on members of the NOSB and everyone else at the meeting. For a number of years the failure of the NOP and the Secretary of Agriculture to implement dozens of important NOSB recommendations has been a source of continuing discussion, frustration and increasing concern among organic farmers, processors, certifiers and consumers. (Indeed, a recommendation pertaining to more rigorous evaluation of the NOP’s performance was approved by the NOSB at this meeting.) Kathleen announced that “it is time” for organic standards to be enforced at home and for standards to be strengthened to achieve equivalency with international organic standards. (More applause. Some swooning.)

In responding to a number of questions Kathleen emphasized that the integrity and credibility of the USDA Organic label is of paramount importance, and that transparency would be the new “watchword” in NOP rule-making and decision-making. She expressed her interest in developing “exciting and creative” new directions in organic and sustainable agriculture research. She reiterated her support for the development of meaningful animal welfare standards, a topic that she presented on at a 2007 NOSB meeting, and cautioned the organic community to “not let the perfect be the enemy of the good” in making progress on this and other issues.

Kathleen also took note of the recent planting and dedication of a new USDA organic garden – “The People’s Garden” -- on the grounds of the USDA. Secretary Vilsack and USDA staff took part. She said that the garden will be used to “help us talk about the importance of organic agriculture and organic standards at the USDA”.

Finally, she cautioned those at the meeting that she would inevitably disappoint them at times. Despite her strong and longstanding support for organic and sustainable agriculture, many of the USDA’s positions and decisions will prove to be at odds with the interests and goals of organic farmers and advocates. She’ll be doing what she can. So far, so good.
Northeast Organic Farming Association of New York Appoints New Executive Director

by Scott Chaskey, NOFA-NY Board President

In December of 2008 the Board of Directors of NOFA-NY began a search process in order to find a committed and dynamic individual ready to assume the position of permanent Executive Director, to build on the twenty five year plus history of the organization, and to lead us into the next phase of education and advocacy in support of New York state farmers, gardeners, and citizens.

After a careful review of the candidates, we have unanimously agreed to appoint Kate Mendenhall to the position of Executive Director. As a highly valued employee of NOFA-NY for several years, Kate is in possession of an intimate knowledge of the organization, and she is overflowing with creative ideas as well as a passion to improve the future of organic farming and gardening in New York State. We are confident of her understanding of the territory, her passion for issues relating to the interdependence between land and people, and of her ability to work with a broad range of citizens to build strong relationships and fruitful coalitions. We are pleased to announce that as of May 2009 Kate Mendenhall will assume the role of Executive Director of NOFA-NY.

Kate has worked with NOFA-NY for the past three years as the Projects Coordinator and knows the organization well. She brings to the Executive Director role six years of non-profit experience and a master’s degree in organic agriculture. Her passion for and dedication to the organic movement has been the focus of her professional career.

“I was drawn to the organization because of its strong commitment to sustainability and its vibrant community of organic farmers, gardeners, and eaters. New York boasts a long, rich history in the national organic movement and has a diverse agricultural climate, which creates an exciting place to work on food and farming issues,” says Mendenhall. “NOFA's mission and its programming are both inspiring and well-matched for my personal and professional goals and values.”

“I am honored at having been selected as the next NOFA-NY Executive Director from a pool of extremely qualified candidates. I look forward to continuing to work with the organization’s Board of Directors, talented staff, dedicated members, and the broader agricultural community to keep organic farming and gardening growing,” adds Mendenhall. “In the current economic climate, supporting local, organic farming and gardening is extremely important for our state’s food security and local economies. I look forward to helping grow our regional food system to meet the growing need for local, sustainable, nutritious, and accessible foods across New York State.”

Kate holds a BA in biology from Bowdoin College in Brunswick, ME and an MA in organic agriculture from Goddard College in Plainfield, VT. She is a graduate of Cornell’s LEAD-NY agriculture leadership program. She and her husband Zach Borus, a family medicine resident, live in Rochester, NY with one dog and three city chickens.

Please join us as we welcome Kate to her new position within this community of farmers, gardeners, and citizens!
Special Supplement on Microbes and Human Health

Microbes and Human Health
by Jack Kittredge

Most of the cells in your body are not your own, nor are they even human. They are microbes, mostly bacteria. In sheer numbers, bacterial cells in the body outnumber our own by a factor of 10. Some estimate that 50 trillion bacteria representing 500 species live in the digestive system alone, where they’ve remained largely unstudied until the last decade. As scientists learn more about them, they’re beginning to chart the complex symbiosis between these tiny organisms and our health. Increasingly, scientists are coming to realize that we are best viewed as walking “superorganisms,” highly complex conglomerations of human cells, bacteria, fungi and viruses.

Luckily for us, these cells are on the whole “commensal”, sharing our food but doing no real harm. (The word derives from the Latin meaning to share a table for dinner.) In fact, they are often beneficial: Our commensal bacteria protect us from potentially dangerous infections, for instance. They do this through close interactions with our immune systems.

Microbiomes

The particular collection of microbes that live in a human body or other specific environment is called a “microbiome” and for most their association is quite ancient. They have been selected through evolution because they help us survive and adapt to changes. We pick up the particular microbial populations we possess initially from our mothers — through exposure to her own microbiome during passage through the birth canal, and from her nipples and breast milk when nursing. Many factors such as duration of breastfeeding and bottle-feeding, medications, and the environment affect the type of bacteria that colonize a child’s intestinal tract.

Dr. Allan Walker, Professor of Nutrition and Pediatrics at Harvard Medical School, says that infants don’t have all of their gut bacteria at birth. They acquire more up until about 2 years of age.” During the first couple of years, infants are on a continuing quest to add to their microbiome by picking up and tasting everything they can fit into their mouths. Scientists think that such behavior may well have a basis in evolutionary survival. Microbial exposures early in life cause mild inflammation that calibrates the body’s responses to other pathogens and contaminants later in life. Without exposure as infants, people can end up with unbalanced immune systems.

Some of the most challenging medical problems we currently confront require a fuller understanding of the role of microbes in human health. According to Dr. Martin Blaser, NYU Medical Center microbiologist, “Many of the most difficult problems in medicine today are chronic inflammatory diseases. These include rheumatoid arthritis, lupus, atherosclerosis, eczema and multiple sclerosis. One possibility is that they’re autoimmune or genetic diseases. The other possibility is that they are physiological responses to changes in microbiota.”

Problems of the elderly are also involved with these microbial populations. About 70 percent of our body’s immune system is located in the digestive tract and as we age, our immune function weakens. Dr. Simin Meydani, Associate Director of the Jean Mayer USDA Human Nutrition Research Center on Aging at Tufts University is experimenting with the idea that changing the bacterial populations in the gut of older people could yield positive results for their health.

Our intestines, of course, have evolved with these microbes and have enabled colonization in certain areas. Most of the bacteria in the gut live in the more protected distal (end) of the small intestine and in the large intestine (colon). The gut flora in these areas make up 60% of the fecal mass. The top and middle parts of the small intestine and stomach are rich in digestive acids, bile and pancreatic secretions, which can destroy the bacteria.

One interesting study showing the diversity of microbiomes among people was published in Genome Research. A team sequenced bacteria found in saliva samples taken from 120 healthy volunteers from North America, South America, Western Europe, Eastern Europe, Africa and Asia. Not surprisingly, they observed considerable diversity...
of bacterial life in the overall saliva microbiome, both within and between individuals. But when comparing samples from different geographic areas they found not much variation, suggesting that bacteria within the mouth of a person’s neighbor is likely to be just as different as those in the mouth of someone on the other side of the world.

“The saliva microbiome does not vary substantially around the world,” said Mark Stoneking of the Max Planck Institute in Leipzig, Germany, who led the study. “Which seems surprising given the large diversity in diet and other cultural factors that could influence the human salivary microbiome.”

**Probiotics**

As more attention is drawn to the role of microbes in human health, a number of products called “probiotics” (also “prebiotics” and “synbiotics”) have come onto the market. Probiotics contain “friendly” bacteria, which you may already be getting if you eat yogurt, drink kefir or sip buttermilk. They contain strains of bacteria that convey health benefits when eaten regularly and in high enough quantities. These days you can find them in dairy foods and several dietary supplements.

Prebiotics are plant substances, such as the inulin found in chicory, onions, garlic, artichokes, bananas, wheat and asparagus. Poorly digested by the stomach, these prebiotics nourish friendly bacteria in the intestine, allowing them to multiply and squeeze out other harmful microorganisms.

And synbiotics? They’re a combination of both friendly bacteria and the food that enables them to thrive. They’re not usually found naturally in foods, but are now added to products such as the yogurt Activia Light.

These products have become so popular that they rank among “the top five foods that people say they want to add to their diets,” says Harry Balzer, vice president of a Chicago-based company that tracks want to add to their diets,” says Harry Balzer, vice president of a Chicago-based company that tracks

Prominent doctors are also enthusiastic about the potential of probiotics. “Probiotics have resulted in complete elimination of eczema in 80 percent of the people we’ve treated,” says Dr. Joseph E. Pizzorno Jr., a practicing physician and former member of the White House Commission on Complementary and Alternative Medicine Policy. Pizzorno says he’s used probiotics to treat irritable bowel disease, acne and even premenstrual syndrome. “It’s unusual for me to see a patient with a chronic disease that doesn’t respond to probiotics.”

There are many proposed mechanisms by which probiotics may protect the host from intestinal disorders. The sum of all processes by which bacteria inhibit colonization by other strains is called colonization resistance. Much work remains to classify the mechanisms of action of particular probiotics against particular pathogens. In addition, the same probiotic may inhibit different pathogens by different mechanisms. Listed below is a brief description, by Rial D. Rollé, Department of Microbiology and Immunology at Texas Tech University Health Sciences Center, of mechanisms by which probiotics may protect the host against intestinal disease.

**Production of inhibitory substances.** Probiotic bacteria produce a variety of substances that are inhibitory to both gram-positive and gram-negative bacteria. These inhibitory substances include organic acids, hydrogen peroxide and bacteriocins. These compounds may reduce not only the number of viable cells but may also affect bacterial metabolism or toxin production.

**Blocking of adhesion sites.** Competitive inhibition of bacterial adhesion sites on intestinal epithelial cells is another mechanism of action for probiotics. Consequently, some probiotic strains have been chosen for their ability to adhere to epithelial cells.

**Stimulation of immunity.** There is recent evidence that stimulation of specific and nonspecific immunity may be another mechanism by which probiotics can protect against intestinal disease. For example, peroral administration of *Lactobacillus GG* during acute rotavirus diarrhea is associated with an enhanced immune response to rotavirus. This may account for the shortened course of diarrhea seen in treated patients. The underlying mechanisms of immune stimulation are not well understood, but specific cell wall components or cell layers may act as adjuvants and increase humoral immune responses.

**Changes in Microbiomes**

Modern humans are bacteria-killing machines. We assassinate microbes with anti-microbial products like hand soap, mouthwash and bathroom cleaners. But some scientists say we’re overdoing it. All this killing may actually cause diseases like eczema, irritable bowel syndrome and even diabetes.

“After the Second World War, when our lifestyles changed dramatically, allergies increased. Autoimmune diseases like diabetes and inflammatory bowel disease are increasing,” says Kaarina Kukkonen, a University of Helsinki allergy expert. “The theory behind (what causes) the diseases is the same: Lacking bacterial stimulation in our environments may cause this increase. I think this is the tip of the iceberg.”

Dr. Martin Blaser’s specialty is Helicobacter pylori, a bacterial strain once common in every human stomach but now rare in the West. Its disappearance may have benefits: H. pylori-related inflammation is associated with peptic ulcers and some stomach cancers. However, H. pylori also reduces acid reflux, which in turn is associated with asthma and esophageal cancers. H. pylori’s decline, says Blaser, correlates with a rapid rise in those affiliations as well as obesity because the bacteria help regulate production of two hormones, ghrelin and leptin, that affect metabolism and appetite.
The expanding interest in microbiomes and the role of microbe colonies is human health is rapidly being reflected in microbiological research. A University of Maryland research scientist is a member of the team that recently completed the first ever large-scale gene sequencing of the human gut, home to the trillions of bacteria that make it possible to digest our food. The findings should lead to a better understanding of how microbes in the gut contribute to health and diseases such as cancer and Crohn’s Disease.

Mihai Pop, a bioinformatics researcher with the university’s Center for Bioinformatics and Computational Biology, and formerly with The Institute for Genomic Research (TIGR) where the study was based, was in charge of assembling the huge volume of data about this environment that contains ten times more bacterial cells than there are cells in the entire human body.

In a study published in the June issue of the journal Science, the researchers analyzed the combined genomes of all bacteria present in stool samples to better understand the bacteria’s role in human health. “We sequenced all of the genes we could find to allow us to look at the big picture,” says Pop, who also was involved in sequencing anthrax samples after 9-11, when he was at TIGR. The project represents a growing trend of sequencing a large environment to understand its parts.

Seeing the Unseen

Most of what is known about the microbes that live in the human gut has been learned from samples grown in a Petri dish. “But only one percent of bacteria is able to grow in a Petri dish,” says Pop. “We can now look at bacteria that we couldn’t see before. By looking straight at the environment, we can see all of the organisms, even those we can’t culture.” By sequencing, “we could also recognize the chemical pathways used by bacteria in digestion, culture.” By sequencing, “we could also recognize the chemical pathways used by bacteria in digestion,” said Pop.

Following the sequencing of the human genome, scientists quickly saw that the next step would be to show how human genes interact with environmental factors to influence the risk of developing disease, the aging process and drug action. But because environmental factors include the gene products of trillions of bacteria in the gut, they get very complex indeed. The information in the human genome itself, 3 billion base pairs long, does not help reduce the complexity.

“The human genome provides only scant information. The discovery of how microbes in the gut can influence the body’s responses to disease means that we now need more research into this area,” says Jeremy Nicholson, professor of biological chemistry at Imperial College London, about a study there of how these microbes interact with the body. “Understanding these interactions will extend human biology and medicine beyond the human genome and help elucidate novel types of gene-environment interactions, with this knowledge ultimately leading to new approaches to the treatment of disease.”

Nicholson’s colleague, professor Ian Wilson from Astra Zeneca, believes the “human super-organism” concept “could have a huge impact on how we develop drugs, as individuals can have very different responses to drug metabolism and toxicity.”

“The microbes can influence things such as the pH levels in the gut and the immune response, all of which can have effects on the effectiveness of drugs,” Wilson said.

The Imperial College research demonstrates what many have long claimed: We are not islands—interrelationships are key. Specifically, the human genome does not carry enough information on its own to determine key elements of our own biology. We must understand that of our microbiomes, too.

According to a TIGR press release about the gut study, sequencing the genome of an entire system to understand its parts, a process called metagenomics, is a growing trend. “Scientists at TIGR and elsewhere have recently scoured up whole environmental samples, from soil to sea, to study the diverse genomes contained within them,” said the release. “The idea is to survey a complex community in one fell swoop, examining how whole ecosystems of genomes respond to environmental perturbations,” and, in the case of humans, how microbial ecosystems contribute to health and disease.

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Farm fresh foods have nourished humanity since the dawn of agriculture, but in our modern culture the freedom to eat traditional foods that have not been pasteurized, homogenized, hydrogenated, irradiated, fumigated etc., is being increasingly challenged. Over sixty years ago, Sir Albert Howard declared “fresh food from fertile soil” the birthright of humanity. He, along with other organic pioneers, ignited the organic agricultural movement. Among the many forces behind this movement, there is a human craving for truly authentic traditional foods straight from local organic farms.

The new consumer hunger for traditional, organic nutrient-dense foods is exemplified by the raw milk movement. Raw milk was part of the organic agricultural movement from its inception. The early organic pioneers Walter Northbourne, Eve Balfour, and Jerome Rodale were all advocates for raw milk. As early as 1940, Walter Northbourne summarized the issue in his classic Look to the Land, “So long as people go on being fooled by advertisement (blatant or concealed) of processed foods, so long will they and the farmers be at the mercy of vast distributing concerns, whose every interest seems to be opposed to the people’s real nutritional necessities. How can it be otherwise in a world of specialization and urbanization? Effective distribution seems to necessitate sterilization, which means killing, for failure to sterilize may mean infection in bulk. Hence the outcry for the pasteurizing of milk. But sterilization reduces the resistance to infection and the power of assimilation of the consumer of that which is sterilized. So yet more sterilizing seems to be necessary. A vicious circle again, of a type which should by now be familiar.”

In The Living Soil by Eve Balfour (1975 edition, first published in 1943) she discusses her concerns with compulsory pasteurization: “It is still possible for some country folk to get unpasteurized milk legally, but in towns and cities there is no longer any source of supply. This is to be regretted. With the high standard of hygiene which all producers of milk for sale must now follow, and with the ease of refrigerated transport, there is much to be said for having two classes of milk—‘cooking milk’ which might just as well be pasteurized, because it is going to be heated anyway, and ‘drinking milk’ (for those who wanted it) which would be raw milk, supplied under license from certified healthy cows. Nutritionally there is a world of difference between the two. Pasteurization, and also of course cooking, injures both the vitamin and calcium content of milk, and the beneficial lactic acid bacteria, which...
A Milk Experiment You Can Do At Home

Good quality farm fresh raw milk has different microbial and physical properties than processed milk.

Here is a simple experiment people can try at home: Take a container of store bought pasteurized whole milk and pour it into a glass and let it sit out on a counter. Right beside it place another glass and pour into it farm fresh raw milk. Over the next seven to ten days observe with your nose and eyes what happens in each glass. Do not eat this, but take note of which contain a substance that most resembles food.

attack disease organisms (and in the process cause souring) are killed by heat, leaving pasteurized milk as a perfect breeding ground for any subsequent contamination.” In this same book chapter, she quotes Dr. Robert McCarrison to provide a perspective on the “something” of freshness: “There is something in freshness and quality of foods which is not accounted for by the known chemical ingredients of food: proteins, fats, carbohydrates, minerals and vitamins.”

In 1958, Jerome Rodale succinctly and loudly spoke out for organic raw milk: “It is not organic to produce milk organically, and then to pasteurize it.”

By 2003, however, when the USDA national organic program (NOP) standards were established, it allowed for organic milk to be pasteurized. This heat process, which denatures enzymes, kills beneficial bacteria, and lowers the nutritional value of the milk, arguably undermines the traditional values of the organic system of food and farming.

Raw milk today continues as an unresolved and contentious issue. Although the USDA-NOP standards allow milk to be pasteurized and labeled “USDA Certified Organic”, it is not the end of the battle for organic raw milk. Originally the USDA-NOP standards also allowed organic foods to be irradiated. The policy regarding irradiation, however, was eventually reversed after a huge public outcry from the organic community. At the time of this policy reversal, the organic raw milk movement was less well-organized to resist compulsory pasteurization. The already existing laws mandating that all milk be pasteurized, before sale, in many states also created an insurmountable obstacle to maintaining the integrity of organic milk as a fresh food under the “USDA Certified Organic” label. Another limitation to resolution of this issue is that many people are not well-informed about the nutritional value and safety of organic raw milk.

In the early decades of the organic agricultural movement, the USDA and Land Grant Universities ignored or shunned organic agriculture but the movement continued to grow despite the skepticism. It was the 1980 USDA Report and Recommendation on Organic Farming that seemed to initiate the needed change in attitudes towards organic. While much has changed today, with organic agriculture experiencing growth and a higher level of institutional acceptance, the raw milk movement continues to face major educational and legal challenges.

Some institutions have begun to organize educational and research programs on raw milk. For example, in 2006 the University of Nebraska held a round table on raw milk which was summarized into an Extension fact sheet on Raw Milk Use and Safety. In the spring of 2008, the Rutgers New Jersey Agricultural Experiment Station organized and hosted a seminar series on raw milk to bring the latest science and objective discussion to the public. Excellent summaries of some of the Rutgers University sponsored raw milk seminars have been posted on the web by the Rodale Institute (titles and links below). In March 2009, raw milk was on the program for the Northeast Pasture Consortium (involving USDA-ARS, land grant colleges, and non-profit research institutions) annual meeting where Mark McAfee of Organic Pastures, a raw milk dairy farm in California, was invited to speak. While these progressive educational programs were important events to draw attention to the raw milk issue, much more research and extension programming is needed to overcome a persistent institutional bias against raw milk. Non-governmental organizations with active raw milk educational programs include The Weston A. Price Foundation and the Farm to Consumer Legal Defense Fund.

Many people, including scientists, have little knowledge about the historic and economic circumstances that lead to the pasteurization of milk in the first place. One of my Extension programs for Rutgers Cooperative Extension is an ongoing effort to collect scientific literature and news articles about raw milk and to share this information electronically with other scientists at Rutgers University, and the public as requested. The best general reference work on the subject of raw milk, that I am aware, is: The Untold Story of Milk, The History, Politics and Science of Nature’s Perfect Food: Raw Milk from Pasture-Fed Cows, by Dr. Ron Schmid (revised and updated second edition, New Trends Publishing, 2009). This book chronicles how the feeding of whiskey swill to cows in inner city dairies lead to unhealthy cows and poor quality of milk produced under very unsanitary conditions. Two different approaches were used to deal with this milk crisis.

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“We splitting wood for 3 wood boilers used to take a lot of time...we hired Lance and he did all our splitting in 12 hours! That made our life easier and more productive.”
Stu Thurber, Lilac Ridge Farm, Brattleboro, VT
SoPhTec is a good track record of safety. When raw milk is sold in states where raw milk sales are allowed, there is a high level of consumer choice with respect to milk. There is evidence of an acceptable level of food safety to enable informed choice about high-quality organic raw milk. However, in some states, the impression that pasteurization of milk makes the milk safer is misleading. The fact is that pasteurization is sometimes linked to sickness and death. In 1985, it was pasteurized milk that was responsible for a massive outbreak of Salmonellosis in Illinois, that affected more than 168,000 people (Journal of the American Medical Association, vol. 258). In 2000, pasteurized milk from a dairy plant in Pennsylvania was responsible for a multi-state outbreak of E. coli O157:H7, that affected more than 168,000 people (Journal of the American Medical Association, vol. 301, 2009).

New Jersey, where I live. Like other raw milk drinkers in New Jersey, I must drive past local farms that wish to sell raw milk on my way to farms in neighboring Pennsylvania, where sales are permitted. Dairy farmers able to direct-market raw milk find it to be more profitable than selling milk to a processor. Direct-marketing of pasteurized milk from the farm is a less profitable option for small dairy farmers, due to the large investment required for pasteurization equipment. In fact, compulsory pasteurization drove many small dairy farms, for pasteurization equipment. In fact, compulsory pasteurization drove many small dairy farms out of business. Considering that milk pasteurization laws were introduced about a century ago, and given today’s level of technology (milking machines, modern refrigeration, stainless steel, animal disease testing, etc.) and greater knowledge of food microbiology, there is a good track record of safety. When raw milk is produced with careful attention to sanitation and good livestock health, the likelihood of illness attributable to raw milk consumption is small but not zero. There has not been an apparent increase in incidence of food borne disease associated with raw milk consumption over the last decade following increased demand and consumption of raw milk.

Members of the organic community, already familiar with the history of the organic agricultural movement, will know that many scientists and people in positions of authority have over the years made false and misleading statements about organic agriculture that did not stand up to the reality witnessed daily on real organic farms. With this in mind, any intelligent freedom-loving person that cares deeply about food quality can make an informed choice about high-quality organic raw milk versus pasteurized milk. Or one can simply submit to the dictates of authorities and accept their pronouncements about raw milk at face value. Unfortunately, many of the pronouncements by “authorities” against raw milk are uninformed and based on a selective review of scientific literature.

A summary of my own analysis of the milk literature follows:

1) Government agencies typically point out the risks of drinking raw milk without acknowledging comparable food safety risks associated with consuming pasteurized dairy products. This leaves the impression that pasteurization of milk makes the milk perfectly safe, but the facts are that pasteurized milk is sometimes linked to sickness and death. In 1985, it was pasteurized milk that was responsible for a massive outbreak of Salmonellosis in Illinois, that affected more than 168,000 people (Journal of the American Medical Association, vol. 258).

In 2000, pasteurized milk from a dairy plant in Pennsylvania was responsible for a multi-state outbreak of Salmonellosis. In 2007, an outbreak of Listeria, that sickened five people and killed three men and one unborn child, was linked to properly pasteurized milk in Massachusetts (Journal of the American Medical Association, vol. 301, 2009). In this recent Massachusetts outbreak, the pasteurized milk came from a facility where the operations were reported to be “adequate”.

2) There is a considerable body of scientific literature reporting that raw milk is superior in nutrition to pasteurized milk. For example, raw milk supplies more vitamin C than pasteurized milk. Raw milk has been found to be more effective at preventing or helping children recover from scurvy than pasteurized milk. Raw milk has active enzymes that aid in the digestion and assimilation of nutrients from the food. These same enzymes are destroyed by pasteurization. Several animal and human feeding trials have demonstrated better growth and performance with raw milk compared to pasteurized milk. This gives many examples for superior nutrition with raw milk over pasteurized, I am not aware of a single study showing that the nutritional quality of milk is improved by pasteurization.

3) Raw milk contains microbial growth inhibitors such as lactoferrin and the lactoperoxidase system. While pasteurization kills pathogens, most of the antimicrobial properties of raw milk are also destroyed by pasteurization. Thus, contamination after processing is a concern with pasteurized milk. Vegetable and fruit growers, and other farmers, may wonder about the relevance of the raw milk issue to their farming operation. For one, many people who travel out-of-state to purchase farm fresh raw milk also like to purchase other farm fresh foods including meat, eggs, vegetables, and fruit from the same farm. The current situation with raw milk is unsustainable in terms of energy consumption for travel and it is inequitable to local farmers who could profit from this growing niche market. It’s the milk that brings customers to the farm market each week. Got Raw Milk? For another, food processing strategies such as pasteurization, fumigation, and freeze-drying are alternative to a salt based softener. Total system cost for the home is only $409 - shipping & handling included (residential US).
Food irradiation, intended to ensure food safety may initially begin as voluntary programs but they can eventually become compulsory. Such has been the case with raw milk, raw almonds, and raw apple cider. Irradiation has recently been permitted for salad greens. Irradiation of organic foods is currently not allowed under USDA-NOP rules. Most people who seek organic do not want irradiated foods anyway. But what if this irradiation treatment were mandated?

The current situation with raw almonds is instructive. In 2007, the USDA imposed a “pasteurization” (processed as steam treatment or fumigation with propylene oxide) mandate on all domestically produced almonds. Imported almonds are exempt from the rule. The mandate is causing economic hardship for organic almond producers who could supply truly raw almonds that are in demand by many consumers. The USDA rule is also deceptive in that treated almonds are allowed to be labeled as “raw.” There is nothing inherently unsafe about raw almonds, but for the way they are typically harvested by sweeping them up from the orchard floor—which sometimes, by chance, also sweeps up animal droppings. The Cornucopia Institute is supporting efforts by organic almond farmers attempting to overturn the raw almond treatment mandate.

The movement to mandate that apple cider be pasteurized is just as controversial. Some consumers prefer raw apple cider and some apple growers want to provide this truly fresh product. Sale of raw apple cider is not allowed in some states. Placing a warning label on raw foods to indicate that they may contain pathogens may be an acceptable approach to both farmers and consumers, but new mandatory ‘technological fixes’ to control food safety may initially begin as voluntary programs but they may eventually become compulsory. Such has been the case with raw milk, raw almonds, cider, or salad greens.

People who have a passion for truly farm fresh foods are willing to go the extra mile to satisfy their desire for farm fresh foods. I see this every week when I meet other people from New Jersey on my weekly trips to the organic dairy farm in Lancaster County, Pennsylvania. Over 550 people participated in the founding of The Farm to Consumer Legal Defense Fund, www.farmtoconsumer.org. This organization was formed for the purpose of defending “farmer rights to sell grass-based meats, raw dairy, fresh produce, and other nutritious products directly to consumers.” It also “supports the consumers’ right to obtain such products from farmers.” The organization provides legal advice and legal representation, when farmer and consumer rights are in question.

Perhaps the widespread restoration of farm fresh raw milk as a staple food will one day become a reality and a new chapter will begin in the history of the organic farming movement. For a history of organic farming see: www.westonaprice.org/farming/history-organic-farming.html. In the forward to the Untold Story of Milk Sally Fallon writes: “Twenty years ago organic agriculture was a fringe movement, barely on the mainstream radar scope, a subject commentaries treated with derision and politicians with scorn… Raw milk today is a fringe movement, a crusade of underdogs, a pesky mouse against the entrenched lions of medicine and politicians with scorn… Raw milk today is a fringe movement, a crusade of underdogs, a pesky mouse against the entrenched lions of medicine and industry.”

Today organic food is in greater demand and more popular than ever, but food policy that mandates unnecessary processing is increasingly restricting consumer freedom to enjoy truly authentic fresh organic foods. Much concern has focused on how long-distance-transport impacts food freshness, yet industrial food processing may be doing even greater harm to food quality. One of the ecological philosophies of the organic system is that only natural, unrefined raw materials be used to “feed the soil” and build soil fertility. Another is the production of compost through the biological process of fermentation. In general, these same principles carry over to the management of organic foods in that they are ideally fresh, raw, minimally processed, or fermented. Thus, whether it is fertilizer or food, the same general philosophy of avoiding harsh industrial processing technologies applies. Sir Albert Howard predicted that soil fertility would one day be the foundation of the public health system of the future, but such a vision requires that “fresh food from fertile soil” not be mishandled or restricted in its pathway to the people.

Rutgers University Raw Milk Seminars:
1) Raw Milk, Mother Nature’s Inconvenient Truth by Mark McAfee, Organic Pastures Dairy: http://www.rodaleinstitute.org/20080515/n1
2) Raw Milk Wars, Government’s Attempt to Dictate What Foods We Can Consume, David G. Cox, Attorney at Law, Lane, Alton & Horst LLC: http://www.rodaleinstitute.org/20080612/n1
3) Raw Milk, A Microbiology Primer, Dr. Mark Gebhart, MD, Wright State University: http://www.rodaleinstitute.org/20080717/n1
4) A Risk Assessor Takes a Look at Raw Milk, Dr. Don Schaffner, http://www.rodaleinstitute.org/20080911/n1

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The Many Benefits of Probiotic Foods

by Jill Ebbott

Need a good reason to get into the kitchen and make up some sauerkraut or yoghurt or other health-giving probiotic food? Here are a few of the facts and factoids known about these special foods and about good bacteria, in general:

• Fermentation preserves food.
• Beneficial organisms promote bowel regularity.
• Consistent use of probiotic foods can resolve Leaky Gut Syndrome and yeast overgrowth.
• Live fermented foods fine tune and recalibrate the immune system.
• They detoxify the colon.
• Fermentation increases digestibility of fermented starches (for example, real sourdough bread), making them 2 times more digestible.
• Eating probiotic foods increases the bioavailability of minerals.
• Microbial organisms create some B vitamins (folic acid, riboflavin, niacin, thiamin, biotin), as well as vitamin K. On a good diet, we do well to take in about 200-300mg/day.
• Fermented foods function as antioxidants.
• Lactobacilli create omega-3 fatty acids.
• Fermented foods function as antioxidants.
• Microbial organisms produce acetic acid, lactic acid, and alcohol that retain and increase nutrients.
• Fermentation preserves food.
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• Live fermented foods fine tune and recalibrate the immune system.
• They detoxify the colon.
• Fermentation increases digestibility of fermented starches (for example, real sourdough bread), making them 2 times more digestible.
• Eating probiotic foods increases the bioavailability of minerals.
• Microbial organisms create some B vitamins (folic acid, riboflavin, niacin, thiamin, biotin), as well as vitamin K. On a good diet, we do well to take in about 2mg/day of B6 through food, but a properly balanced gut can make 200-300mg/day.
• Fermented foods function as antioxidants.
• Lactobacilli create omega-3 fatty acids.
• Fermentation produces superoxide dismutase, GTF chromium, and glutathione, among others.
• The culturing process removes some toxins from foods.
• The fermentation of whole grains before preparation prevents naturally-occurring phytic acid from binding with minerals and blocking their absorption.
• Lactobacillus fermentation inhibits growth of diarrhea-related bacteria such as Dysentery, Shigella, Salmonella, and E.Coli.
• Fermentation organisms produce acetic acid, lactic acid, and alcohol that retain and increase nutrients.
• A well-balanced gut will absorb about 1% of ingested toxins. A badly dysbiotic gut will absorb about 95% of ingested toxins.
• Cultures compete with potential pathogens for receptor sites at the mucosal cell surfaces of the intestines.
• Studies have found probiotics can prevent cavities and ease gum disease.
• In a double-blind study of infants, supplementation of a standard milk-based formula with probiotic organisms (Bifidobacterium lactis and Streptococcus thermophilus) significantly reduced the frequency of colic.
• A study of infants found that those fed with either of the two probiotic formulas had fewer episodes of fever and diarrhea than those fed a standard formula. Of the two bacteria, L. reuteri was more effective in preventing illness.
• Cultured foods increase infant survival rates.
• Swedish researchers have reported that good bacteria may be as effective as antiseptics in preventing transmission of dangerous pathogens to hospital patients. Those swabbed with the probiotic bacteria Lactobacillus plantarum 299 did just as well as those cleaned with the antiseptic Chlorhexidine.
• Use of fermented foods prevented scurvy on historic long-term voyages.
• A visit to the Civil War Cemetery and Pest House in Lynchburg, VA details the success of Dr. John Hay Terrill in treating Smallpox. Giving his patients probiotic food? Here are a few of the facts and factoids known about these special foods and about good bacteria, in general:

Lacto-fermented Apple Ginger Soda

Makes one quart
1/2 large or 1 small organic apple
Thumb-sized piece of organic ginger, grated
Juice of 2 large organic limes or 3 small organic key limes
3 T. Whey (strained from high-quality yoghurt or made from raw milk)
1 t. sea salt
Purified, non-chlorinated water
Put the first five ingredients into a glass quart jar. Add enough water to fill up to an inch from the top. Loosely close lid. Leave on counter for three days, then tighten cap and refrigerate. Strain to drink. This beverage will last many months in the refrigerator.

Jill Ebbott is a holistic health counselor specializing in helping her clients achieve vibrant health through the wise use of nutrient-dense foods.

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Germs, or microbial life, are like higher forms of life in that they are set in their form and hence can be divided into species and families. He claimed that each species caused a specific disease. This led to the identification of pathogens, disease causing microorganisms, and the beginning of the modern pharmaceutical industry: each pathogen has a drug or several drugs to destroy it. Louis Pasteur also is credited with the process which is named after him, Pasteurization, to heat kill microorganisms.

Antoine Beauchamp discovered that microbial life was not like higher animals in that a microbe is "pleomorphic"—capable of changing form and nature depending upon the "milieu" or environment in which it lives. Without the use of modern scientific equipment, he postulated that there are tiny specks within plant and animal cells not destroyed when a cell dies. He called them microzymas and demonstrated that they change form and can initiate change and activity in other microbes. He also discovered that there is a symbiotic relationship between microorganisms and larger animals. Pasteur’s work was embraced although it was well known even at that time that he plagiarized Professor Beauchamp’s work, and has become the understanding of the role of microbes in the world. They are to be feared and eliminated as they cause disease.

I no longer believe the germ theory and instead have embraced the ideas of Antoine Beauchamp. What modern medicine calls disease caused by germs; fever, mucous, coughing, pus, inflammation, runny noses, rashes, etc…is the therapy of the body to rid itself of foreign and toxic debris whether from outside exposure or arising from within.

A perfect example is a splinter. Pus and inflammation arise from within the body as a therapy to dissolve and eliminate the splinter. The same is true for coughing up mucus. The body is encapsulating and eliminating foreign substances that have gotten into the lungs. We don’t want to take anti-bacterial anything as that would stop the therapy, eventually leading to a more toxic internal environment requiring more drastic measures by the body or the eventual demise of the body as it is no longer viable. There is a place for the use of antibiotics…when the therapy is consuming the body, the process can be halted for a time while other supportive detoxifying therapies can be used.

Antoine Beauchamp claimed it is all about the environment. Food, water, sunshine, thoughts, relationships, beliefs all affect our internal and external environments. When these are not adequate and/or are toxic, bacteria arise from within the body, literally. Cells change and try their hardest to restore balance.

Unfortunately, modern medicine has controlled our approach to disease and has been dispensing drugs to combat “bugs” for many decades. These have created different environments and thus led to the evolution of drug-resistant bacteria.

In the gut, the balance of beneficial organisms to non-beneficial ones plays a critical role in our internal environment. Beneficial bacteria care for the gut cells, ensuring that the wall is impermeable and there are loads of enzymes to digest complex carbohydrates. When we take antibiotics, birth control pills, encounter stress, eat a diet high in carbs and low in good fats, natural fibers and proteins, the population of the gut changes. Toxins from the more virulent microorganism strains release toxins into the body causing internal chemistry changes. Microorganisms arise to try to clean up the mess.

This is much more complicated and detailed than I have presented, yet it is also very simple. Louis Pasteur said before he died, “Beauchamp was right. It is all about the milieu." This invites us to assume responsibility for our health and the health of the planet by caring for the environment, internal and external. The soil and our gut are similar. We are in a wonderful and important relationship with microorganisms. Let us give up the war on them and discover the amazing health of living in harmony.
As soon as we are born, bacteria move in. They stake claims in our digestive and respiratory tracts, our teeth, our skin. They establish increasingly complex communities, like a forest that gradually takes over a clearing. By the time we’re a few years old, these communities have matured, and we carry them with us, more or less, for our entire lives. Our bodies harbor 100 trillion bacterial cells, outnumbering our human cells 10 to one. It’s easy to ignore this astonishing fact. Bacteria are tiny in comparison to human cells; they contribute just a few pounds to our weight and remain invisible to us.

It’s also been easy for science to overlook their role in our bodies and our health. Researchers have largely concerned themselves with bacteria’s negative role as pathogens: The devastating effects of a handful of infectious organisms have always seemed more urgent than what has been considered a benign and relatively unimportant relationship with “good” bacteria. In the intestine, the bacterial hub of the body that teems with trillions of microbes, they have traditionally been called “commensal” organisms — literally, eating at the same table. The moniker suggests that while we’ve known for decades that gut bacteria help digestion and prevent infections, they are little more than ever-present dinner guests.

But there’s a growing consensus among scientists that the relationship between us and our microbes is much more of a two-way street. With new technologies that allow scientists to better identify and study the organisms that live in and on us, researchers are beginning to understand that because the human body constitutes their environment, these microbial communities have been forced to adapt to changes in our diets, health, and lifestyle choices. Yet they, in turn, are also part of our environments, and our bodies have adapted to them. Our dinner guests, it seems, have shaped the very path of human evolution.

In October, researchers in several countries launched the International Human Microbiome Consortium, an effort to characterize the role of microbes in the human body. Just over a year ago, the National Institutes of Health also launched its own Human Microbiome Project. These new efforts represent a formal recognition of bacteria’s far-reaching influence, including their contributions to human health and certain illnesses. “This could be the basis of a whole new way of looking at disease,” said microbiologist Margaret McFall-Ngai at the 108th General Meeting of the American Society for Microbiology in Boston last June. But the emerging science of human-microbe symbiosis has an even greater implication. “Human beings are not really individuals; they’re communities of organisms,” says McFall-Ngai. It’s not just that our bodies serve as a habitat for other organisms; it’s also that we function with them as a collective. As the profound interrelationship between humans and microbes becomes more apparent, the distinction between host and hosted has become both less clear and less important — together we operate as a constantly evolving man-microbe kibbutz. Which raises a startling implication: If being Homo sapiens through and through implied a certain authority over our corporeal selves, we are now forced to relinquish some of that control to our inner-dwelling microbes. Ironically, the human ingenuity that drives us to understand more about ourselves is revealing that we’re much less “human” than we once thought.

To find a biological answer to the question “Who are we?” we might look to the human genome. Certainly, when the Human Genome Project first produced a draft of the 3 billion-base-pair sequence, it was touted as a blueprint for human life. Less than a decade later, however, most experts recognize that our genomes capture only a part of who we are. Researchers have become aware, for example, of the influence of epigenetic phenomena — imprinting, maternal effects, and gene silencing, among others — in determining how genetic material is ultimately expressed. Now comes the notion that the genomes of microbes within us must also be considered. Our bodies are, after all, composites of human and bacterial cells, with microbes together contributing at least 1,000 times more genes to the whole. As we discover more and more roles that microbes play, it has become impossible to ignore the contribution of bacteria to the pool of genes we define as ourselves. Indeed, several scientists have begun to refer to bacterial colonies take many interesting, even intriguing shapes. Recent experiments growing them on agar plates have revealed the existence of large-scale collective motions, in the form of whirls and jets. One wonders how the information to create such global structures is transferred from one microscopic bacterium to the many millions in a colony.

The Body Politic
The Deep Symbiosis Between Bacteria and Their Human Hosts is Forcing Scientists to Ask: Are We Organisms or Living Ecosystems?

by Courtney Humphries

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the human body as a “superorganism” whose complexity extends far beyond what is encoded in a single genome.

The physiology of a superorganism would likely look very different from traditional human physiology. There has been a great deal of research into the dynamics of communities among plants, insect colonies, and even in human society. What new insights could we gain by applying some of that knowledge to the workings of communities in our own bodies? Certain body functions could be the result of negotiations between several partners, and diseases the result of small changes in group dynamics — or of a breakdown in communication between symbiotic partners.

Recently, for instance, evidence has surfaced that obesity may well include a microbial component. In ongoing work that is part of the Human Microbiome Project, researchers in Jeffrey Gordon’s lab at the Washington University School of Medicine in St. Louis showed that lean and obese mice have different proportions of microbes in their digestive systems. Bacteria in the plumper rodents, it seemed, were better able to extract energy from food, because when these bacteria were transferred into lean mice, the mice gained weight. The same is apparently true for humans: In December Gordon’s team published findings that lean and obese twins — whether identical or fraternal — harbor strikingly different bacterial communities. And these bacteria, they discovered, are not just helping to process food directly; they actually influence whether that energy is ultimately stored as fat in the body.

Even confined in their designated body parts, microbes exert their effects by churning out chemical signals for our cells to receive. Jeremy Nicholson, a chemist at Imperial College of London, has become a champion of the idea that the extent of this microbial signaling goes vastly underappreciated. Nicholson had been looking at the metabolites in human blood and urine with the hope of developing personalized drugs when he found that our bodily fluids are filled with metabolites produced by our intestinal bacteria. He now believes that the influence of gut microbes ranges from the ways in which we metabolize drugs and food to the subtle workings of our brain chemistry.

Scientists originally expected that the communication between animals and their symbiotic bacteria would form its own molecular language. But McFall-Ngai, an expert on animal-microbe symbiosis, says that she and other scientists have instead found beneficial relationships involving some of the same chemical messages that had been discovered previously in pathogens. Many bacterial products that had been termed “virulence factors” or “toxins” turn out not to be inherently offensive signals; they are just part of the conversation between microbe and host. The difference between our interaction with harmful and helpful bacteria, she says, is not so much like separate languages as it is a change in tone: “It’s the difference between an argument and a civil conversation.” We are in constant communication with our microbes, and the messages are broadcast throughout the human body.

Common bacterial colony shapes, margins, and surface characteristics

- Punctiform (under 1 mm diameter)
- Round
- Filamentous
- Irregular

- Smooth (entire)
- Curled
- Wavy
- Lobate
- Filamentous

- Smooth
- Concentric
- Wrinkled
- Contoured

Different proportions of microbes in their digestive systems. Bacteria in the plumper rodents, it seemed, were better able to extract energy from food, because when these bacteria were transferred into lean mice, the mice gained weight. The same is apparently true for humans: In December Gordon’s team published findings that lean and obese twins — whether identical or fraternal — harbor strikingly different bacterial communities. And these bacteria, they discovered, are not just helping to process food directly; they actually influence whether that energy is ultimately stored as fat in the body.

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of medical and environmental microbiology have launched the Human Microbiome Project, the fields of the human body, from rear molars to intestines, bacterial communities in various microclimates of animals, with recent surveys, for instance, of the uncharted territories -- acidic lakes, deep-ocean hydrothermal vents, and frozen tundra, to name but a few -- to see what life might exist there. For the most part, microbiologists focused mainly on "isolating" bacteria: removing them from their natural contexts and growing them in culture dishes in the lab. This approach was the only way to observe and understand bacterial cells in great detail. But it also created huge gaps in knowledge about bacterial life. It focused on the fraction of microorganisms that can be grown in culture, and it overlooked the highly complex and diverse ways in which they actually live together -- an approach akin to studying humans by confining them in prison cells while ignoring the cities and communities that make up their natural habitat.

This narrow view of microorganisms began to change when new genetic sequencing technologies -- which fished the genes directly out of water or soil samples -- made it possible to collect information about microorganisms without having to isolate them. These studies revealed an incredible amount of genetic abundance and diversity; the microbial world was a far bigger and denser landscape than anyone had previously known. A further leap in technology has been the ability to sequence large numbers of genes rapidly. Even without "seeing" the organisms themselves, scientists can now sequence tens or hundreds of thousands of genetic fragments from an environmental sample. The resulting science of metagenomics eschews traditional ideas about studying the natural history of a particular organism in favor of a global view of the genes that exist in a community.

Using these new metagenomic methods, environmental microbiologists have delved into uncharted territories -- acidic lakes, deep-ocean hydrothermal vents, and frozen tundra, to name but a few -- to see what life might exist there. Gradually, some have applied the new tools to explore the "environments" of humans and other animals, with recent surveys, for instance, of the bacterial communities in various microclimates of the human body, from rear molars to intestines to nasal passages. And with these studies and the launch of the Human Microbiome Project, the fields of medical and environmental microbiology have begun to merge. The resulting hybrid discipline embraces the complexity of a larger system; it's integrative rather than reductive, and it supports the gathering view that our bodies, and the bodies of other animals, are ecosystems, and that health and disease may depend on complex changes in the ecology of host and microbes.

In 2007, Cornell University microbiologist Ruth Ley coauthored a paper arguing that human microbiome studies could bridge the divide between biomedical and environmental microbiology. Like Jeffrey Gordon, her coauthor and mentor, Ley studies bacteria in the human gut. But while Gordon, Ley, and their fellow microbial sleuths might have hoped for a core set of organisms that would define the human microbiome, so far the reality is proving far more complicated. While only a few major groups of the world's bacteria live in the human body, within these groups are countless bacterial species that vary greatly from person to person. "The more people look at it, it seems like an endlessly diverse system," says Ley. The landscape of the body presents a wide range of habitats. In the nutrient-rich land of the intestines, communities appear to be fairly stable over time, while early indications show the harsher environment of the skin attracting itinerant communities that come and go. Communities can be as localized as the neighborhoods of a city; the inner elbow contains a different group of residents than the forearm.

Furthermore, in contrast to habitats such as the deep sea, where emigration and immigration are rare events, many microbial communities associated with humans are affected by constant interactions with microorganisms coming in from the environment. Microbes in the gut, for instance, encounter bacteria that ride in on the food we consume. These visitors introduce a huge, unpredictable component that makes any determination of a core microbiome all the more difficult. In order to develop well-framed research questions, it's crucial that microbiologists learn how to differentiate between co-evolved species and these itinerant "tourists."

What we do know, however, is that our own personal microbes tend to be partly inherited -- most of us pick up bacteria from our mothers and other family members early in life -- and partly shaped by lifestyle. Ley, who has surveyed the gut bacteria of several species, says that diet is an important factor in determining the communities that live in an organism. Even with our processed foods and sterilized kitchens, Ley says, humans are not radically different from other animals that share our eating habits.

The individuality of each person's microbiome might complicate the project of studying human-
Bacteria spiraling out in a striking growth pattern

Microbiome information will also have implications for practical concerns, such as how we deploy antibiotics. Might those antibiotics we down at the first sign of an upset stomach be waging an unjustified civil war? Where do the massive quantities of antibiotics we feed to our livestock ultimately end up, and do they disrupt delicate ecological balances? We have lived with microbes for our entire evolutionary history; how has the widespread use of chemicals that kill them changed those long-forged evolutionary relationships?

Few people are more familiar with life’s interdependence and the blurriness of its distinctions than microbiologists. The recent metagenomic studies have revealed a daunting amount of diversity in microbial life, with none of the clear divisions we’re used to in the “macro” world. Among bacteria, the entire concept of species breaks down; it’s difficult for scientists to even categorize what they are seeing. Genomes offer a picture of life that is fluid and ever changing.

To come to terms with this diversity, microbiologists are today relinquishing the desire to name names. When studying a community, they no longer focus on developing a roster of who is there; instead, they ask what kinds of genes are present and what their functions are. In the human microbiome, which species we harbor may be less important than what they are doing.

William Karasov, a physiologist and ecologist at University of Wisconsin-Madison, believes that the consequences of this new approach will be profound. “We’ve all been trained to think of ourselves as human,” he says. Bacteria have been considered only as the source of infections, or as something benign living in the body. But now, he says, it appears that “we are so interconnected with our microbes that anything studied before could have a microbial component that we hadn’t thought about.” It will take a major cultural shift, says Karasov, for nonmicrobiologists who study the human body to begin to take microorganisms seriously as a part of the system.

Equally challenging, though in a different respect, will be changing long-held ideas about ourselves as independent individuals. How do we make sense of this suddenly crowded self? David Relman suggests that how well you come to terms with those long-forged evolutionary relationships?

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He also believes that we might have something to gain by embracing our bacterial side. Bacteria are often dismissed as simpler, less sophisticated, and less worthy of our consideration. "We put a lot of weight on a life form’s ability to think independently," Relman says, but microbes have achieved fantastic evolutionary success by operating on a very different principle. Microbial communities are filled with examples of self-sacrifice for the benefit of the larger colony. They form physically close communities in which some cells exist solely to provide structural support or protection for others. This “intertwining of fate,” as Relman puts it, is something that humans could consider more seriously in the dynamics of their own societies, instead of focusing so keenly on individual identity and success.

Perhaps we could learn a lesson in fluidity from our symbionts. Science is always challenging us to let go of treasured categories and divisions. The theory of evolution, for instance, forced us to see species as points along a shared history, rather than as fixed identities. Symbiosis goes a step further by showing us how species are linked by more than history; they are living together in a continuous, interconnected now.

When scientists in 1977 first discovered life in the deep-sea hydrothermal vents, including gigantic tubeworms living in scalding-hot water filled with hydrogen sulfide, they could not explain it. Until then, all life was thought to derive its energy from the sun, but this habitat was far from any light. Then scientists found that the worms harbored symbiotic bacteria, which fed on hydrogen sulfide, turning this poison into something usable by other life forms. The discovery underscored the fact that life as we know it is built upon microbes, whether we look in the deepest oceans or our own intestines. We once had the luxury of ignoring the diminutive members of our bodies and other ecosystems. Now the blinders are off.

This is a reprint of an article that originally appeared in Seed magazine, Volume 2, Issue 21 April 2009. Included here by permission. Courtney Humphries is a freelance science writer in Boston. She’s the author of Superdove: How the Pigeon Took Manhattan...and the World.

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You versus Germs

by Mary Ruebush

You need all your immune defenses because your body is constantly under attack by germs. They lurk on elevator buttons and on shopping cart handles. They travel through coughs and sneezes by your coworkers and your kids. What we call germs are microorganisms of all sorts, but especially harmful bacteria, viruses, fungi, and parasites. So does being under constant attack mean you’re going to get sick all the time? Of course not.

Here’s a major reason dirt is good. Your immune system has been exquisitely fine-tuned by millions of years of evolution to let you live in balance, more or less, with all the many dangerous microorganisms that are out there. But to do that, your immune system needs to be exposed to germs to build your ability to produce the right response quickly. If you somehow were raised in a sterile environment where all those microbes were eliminated, your immune system wouldn’t ever get activated. If you then had to leave your sterile environment to join the real world, you’d be an easy target for any germ that came along, because your immune system would be very slow to respond correctly.

Why do all those germs want to get into you? Because inside, you’re nicely warm and wet, with a good supply of nutrients — exactly what a germ needs to thrive and multiply.

Not every germ is dangerous. Right now, as you read this, even if you just took a shower and washed with antimicrobial soap, the outside of your body teems with literally trillions of microbes — bacteria, viruses, fungi, and assorted parasites. On the inside, you’re just one big microbe ranch. Inside your mouth alone are some six hundred bacterial species; there are hundreds of millions of bacteria in every drop of your saliva. In all, the typical human probably harbors some 10 trillion microorganisms, outnumbering the cells of your body by about 10 to one. For the most part, our bodies have evolved to coexist with the germs around us, even the harmful ones. We all carry around a massive load of microorganisms of all sorts, but especially harmful bacteria that are either harmless or even helpful.

The smallest invaders of your body are viruses. These organisms are extremely small. How small? A thousand viruses would fit inside a red blood cell, and about 20 bacteria would fit inside a red blood cell. Conversely, fungi are about 1.5 times the size of a red blood cell, and parasites start at about three times the size of a red blood cell. A virus is really just some genetic material (DNA or RNA) wrapped in a protein coating, making it about as small as a red blood cell, and parasites start at about three times the size of a red blood cell. A virus is really just some genetic material (DNA or RNA) wrapped in a protein coating, making it about as small as a red blood cell, and parasites start at about three times the size of a red blood cell.

Bacteria are a category of germs that are larger than viruses. They’re still considerably smaller than your immune cells, which means that phagocytes can easily engulf and digest them. Bacteria have an edge over phagocytes, however. They can multiply extremely fast, so fast that they may often simply overwhelm the ability of your phagocytes to eat them all. That’s one reason your body’s ability to form an abscess is so important to your immune defenses. Those bacteria that can’t be eaten quickly can still be walled off and killed by bulging neutrophils and by the other cells of the immune system.

How Your Immune System Defends You

Once a harmful germ manages to breach your outer defenses by getting through your skin or mucosal surfaces, your immune system immediately goes into action. Let’s say you gash your finger with your garden clippers. Your first response is to swear loudly. Your immune system’s first response is inflammation.

Any breach of your body’s external barriers, such as a cut, lets germs enter and start multiplying. Your body’s response is almost instantaneous: The area around the cut becomes red, swollen, hot, and painful. What’s happening is that the blood vessels nearest the infected area get a little swollen and “leaky,” which allows white blood cells to enter the area more easily. The area swells up with blood, fluid, and white blood cells, all of which provide outward pressure. The pressure pushes invaders out of your tissues, or at least keeps them from penetrating any farther inward. The rush of fluid and increased blood flow to the area also cause the other classic symptoms of inflammation: redness, heat, and pain.

Inflammation is an automatic response to injuries and illness. No matter how you manage to hurt yourself, and no matter what invader manages to get in, white blood cells will rush out of the bloodstream and into the area in response. Inflammation plays several critical roles in protecting you. First, it brings in the phagocytes, which will attempt to eat any invader and wall off...
the area from further invasion. Second, it increases blood flow into the area and makes the blood vessels in the area a little leaky. That carries in more white blood cells and lets them escape out of the bloodstream and into the tissue more easily. Inflammation’s effects aren’t limited to the immune system. In the case of your cut finger, for instance, the swelling also brings in other substances, such as platelets to clot the blood, which will begin the healing process. Once the inflammatory process is launched, your macrophages and neutrophils go into action. Since the most likely place to encounter an invader who makes it through a barrier is just past the barrier, macrophages particularly like to hang out just below the surface of your skin and just below the surface of the epithelial cells — in your throat, for instance. Most of the time they have a leisurely life, cleaning up bits of debris from your own cells. But when they encounter an invader, they get annoyed. Macrophages are already the largest of your immune system cells — they’re about twice the size of T or B cells. Angry macrophages immediately start engulfing and digesting as many invaders as they can catch and start getting even bigger. At the same time, the macrophages send out a help signal calling for backup.

The first responders to the emergency signal are neutrophils, which are the most numerous and aggressive white blood cells in your body (they make up about 70 percent of your white blood cells). Neutrophils are the foot soldiers of your immune system. They flood into the area from the bloodstream and launch a kamikaze attack on the invader. They eat as much as they can, gorging themselves on both the invading bacteria and the debris of your own injured cells. When they can’t eat any more, they become bulimic and start ejecting the digested bits out into the infected area. Neutrophils are expendable — they eat until they can’t eat any more, then they blow up. The substance the neutrophils eject is acidic and helps to clean up the area of infection, though it may not seem that way to you when you look at the red, oozing cut on your finger. The result of the kamikaze attack is pus: the liquefied debris of dead and dying bacteria and dead and dying cells. This is what causes boils, pimples, styes — what doctors call an abscess. While an abscess might be a sign that your immune system is hard at work.

When you’re sick with something like a cold, your immune system’s first response is inflammation as well. It’s more complicated than what you can cut your finger, but your red, swollen nose, fever, and sore throat are all signs of inflammation.

The macrophages and neutrophils are in a race against the invader. Bacteria can multiply very rapidly, producing a new generation in just minutes. Many harmful bacteria also give off dangerous toxins that cause many of the symptoms of illness, such as diarrhea from salmonellosis. Bacteria live in your body in the spaces in between cells, where macrophages and neutrophils can find and eat them easily.

Viruses, however, bore their way into your cells and take over, using your own cells to reproduce themselves. Reproduce they do, in large numbers. When the baby viruses burst out of the cell to find new cells to infect, the host cell dies.

Because it can take several days or even longer for your T and B cells to be fully activated, the macrophages and neutrophils hold the fort against the infection while the adaptive immune system cells work behind the lines to organize a major offensive.

While they’re busy fighting the infection, macrophages also send help messages to your T cells, telling them to start organizing their attack. To understand how this works, think of macrophages as very messy eaters who have burped up crumbs of their meal and now have the crumbs (actually, bits of protein from the invader) stuck on them. Some of these macrophages leave the infected area and head to the nearest lymph node, taking their crumbs with them. They’re looking for T cells, and the nearest lymph node is the quickest way to find them.

Your lymph nodes are small, bean-shaped structures that filter and recirculate lymph, the clear fluid that bathes the intercellular spaces of your body. You have about five to six hundred lymph nodes in your body; clusters of them are found in the underarms, neck, chest, abdomen, and groin. To your B and T cells, lymph nodes are like dating bars. They're looking for T cells, and the nearest lymph node is the quickest way to find them.

When enough cells have built up, they head out of the lymph node to join the battlefront. Once they get to the battlefield, chemical messengers are sent from helper T cells. They help stimulate the other immune system cells to keep proliferating and keep attacking. Once the immune response to a bacterial infection gets started and helper T cells are stimulated, these cells will encourage B cells to produce just the right antibody for maximum destruction. The B cells then reproduce themselves into their counterpart antigens on the germ and mark it for destruction.

The immune system response. Because they’re all identical, you could think of them as the general directing the overall battle, or the coach directing the game. The helper T cells send out chemical signals to the other immune cells that coordinate and amplify the attack. Some of these signals tell B cells to get to work producing antibodies, proteins that attach to the antigens on the invader and tag it for destruction by macrophages and neutrophils. Other helper T cells stimulate more phagocytes to go to the site of the infection and make them eat even faster. A hyperactivated macrophage can get so large that it can actually engulf a single-celled parasitic invader.

The germ becomes studded all over with antibodies, which clog up its cell wall. Antibodies make the germ so attractive and easy to grab that the macrophages and neutrophils gobble even faster. Some types of antibodies can increase the eating speed of phagocytes (phagocytosis) by up to 4,000 times!

Viruses pose a special problem for your immune system. Phagocytes are very good at gobbling up invaders floating around in your blood and tissues, but they can’t recognize, much less attack, invaders such as viruses that get inside a cell. To solve this problem, Mother Nature has devised a special mechanism to recognize infected cells and kill them specifically. This stops the virus in its tracks, while sparing uninfected cells.

This special signaling system is called the major
What Is Dirt?

Germs are everywhere: around us, on us, in us. I use the word dirt as a sort of shorthand for all the various ways we come into contact with all those germs. That obviously means soil, because humus, the organic part of soil, is crammed with bacteria, fungi, protozoa, and even viruses. It also means all the other germ-laden things we normally encounter, such as raw foods, and all the germ-laden places we go, like public bathrooms and kindergarten classrooms. Because our bodies are well adapted to handle a certain level of dirt, too much cleanliness can actually be harmful. The reasons dirt is good are many. That doesn’t mean I think we should live in filth, drink contaminatated water, eat contaminated food, and so on, all in the name of exercising our immune systems.

Starting in the 1870s and 1880s, public health measures in American cities brought clean water, regular garbage collection, public bathhouses, and other sanitation steps to their residents. The incidence of dangerous diseases such as cholera and typhoid dropped markedly, definitely a good thing. Today most of us live at a high level of public cleanliness — our water and food supplies are very safe, our trash is hauled away, and widespread vaccination and public health measures have virtually eliminated many of the infectious diseases that killed so many a century ago. After well over a century of battling successfully against germs, we have the idea that if pretty good cleanliness is good, then supergood cleanliness is even better. Supergood cleanliness has started to backfire badly on us. For good health what we need is more dirt, not less, in our lives.

by the same germ, your immune cells will recognize it immediately and churn out exactly the right response to destroy it. It all happens so quickly that you probably won’t even notice.

It’s a process that begins in infancy and continues throughout your lifetime. Before you’re even born, Mother Nature gives you the basic tools to create a strong immune system.

This is from “Why Dirt is Good: 5 Ways to Make Germs Your Friends” by Mary Ruebush, Ph.D. published in 2009 by Kaplan Publishing. This book is reviewed in this issue on page 40.

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The reduction of infectious diseases in industrialized countries over the past 50 years has been a major achievement of public health and sanitation. During that same time period, allergic and autoimmune diseases have been on the rise. Growing evidence supports the “hygiene hypothesis”, a theory that exposure to micro-organisms, especially in early childhood, provides protection against developing allergic and autoimmune diseases. Probiotics are species of bacteria and yeast that live in the intestinal tract and provide health benefits to their host. They are also an effective alternative treatment for many conditions.

For hundreds of thousands of years, people have consumed non-sterile milk and other foods that were rich in micro-organisms. Relatively recent practices of sterilizing food and using baby formulas instead of breast milk have decreased the bacterial content in our diet. Probiotics are naturally found in cultured dairy products such as yogurt and kefir, aged cheese, microbrew beer and wine, and fermented foods such as kimchi, tamari, miso, tempeh, and sauerkraut. Adequate amounts of probiotics in the intestinal tract have been shown to modulate the immune system, inhibit the growth of pathogens, and provide beneficial compounds such as short-chain fatty acids and vitamins. Butyrate, a short-chain fatty acid, is a by-product of the fermentation of indigestible dietary carbohydrates, known as fructo-oligosaccharides. It is a major source of energy for cells in the colon. Without butyrate, the protective barrier made by the cells of the gut may be compromised.

Frequency of childhood infections is a factor influencing the development of allergic and autoimmune diseases. More than eighty autoimmune diseases have been identified, which affect an estimated 5-8% of the US population.¹ Autoimmune disease is when the body attacks its own organs, tissues, and cells. Viral and bacterial infections can trigger autoimmune disease, but they can also have a protective effect. Exposure to micro-organisms may help the immune system to develop normal responses, and regulate inflammation. In 1966, Leibowitz et al. suggested

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that the risk of developing multiple sclerosis is greater among people who grew up in homes with a high level of sanitation.\textsuperscript{2}

Lack of exposure to intestinal parasites may be a driving force behind the increase of autoimmune diseases. Several studies comparing settings with high and low parasitic exposure have shown that children growing up in rural areas with higher helminth infections tend to have lower rates of allergic diseases. Children from more urban, highly exposed settings, on the other hand, have a much higher risk of various atopic diseases. A number of studies have linked exposure to helminths to a down-regulation of the immune response.\textsuperscript{3,4}

However, over-sterilization of our environment is also in dispute the success of public health programs in saving lives from preventable diseases. Children raised on a farm or with household pets, especially during the first year of life, are less likely to develop allergies and asthma, or inflammatory bowel disease.\textsuperscript{5} Allergic diseases include asthma and eczema. Together they are called “the atopic triad”. Children who have eczema are more likely to acquire asthma or allergies later in life. Research indicates that taking a probiotic in the last month of pregnancy confers some protection against the development of atopy to environmental antigens.\textsuperscript{6} Children who have eczema are more likely to acquire asthma or allergies later in life. Research indicates that taking a probiotic in the last month of pregnancy confers some protection against the development of atopy to environmental antigens.\textsuperscript{6}

Infectious diarrhea causes several million deaths worldwide each year.\textsuperscript{7} Children are the most susceptible, especially in developing countries. Rotavirus and food-borne bacteria, such as salmonella, also infect up to 30% of the population in developed nations. There is a vaccine available for rotavirus. In addition, lactobacillus and bifidobacterium have been shown to be effective for the prevention and treatment of acute infectious diarrhea. Probiotics are useful for the prevention of antibiotic-associated diarrhea.\textsuperscript{8} Probiotics decrease the frequency and severity of antibiotic-associated diarrhea. Probiotics disrupt the normal bacteria of the intestinal tract, which increases the likelihood of overgrowth of pathogenic bacteria. Clostridium difficile produces profuse, watery diarrhea, and intestinal inflammation.\textsuperscript{9} Clostridium difficile accounts for 25% of antibiotic-associated diarrhea. There is strong evidence to support the use of lactobacillus species, and other probiotics in preventing and treating post-antibiotic diarrhea.

Urinary tract and vaginal yeast infections may be alleviated or prevented by probiotics. Most vaginal and bladder infections originate from bacteria in the colon. Escherichia coli (E. coli) is responsible for urinary tract infections in 85% of cases. Overgrowth of bacteria or yeast in the genitalia can result in discharge, odor, and discomfort. Normal vaginal flora includes lactobacillus, which can be disrupted because of antibiotic use and hormone imbalance. Women often get yeast infections after a course of antibiotics. There is some clinical evidence to support that oral and vaginal administration of probiotics may alleviate infection and prevent reoccurrence.

Over the last 50 years, there has been an increase in allergic and autoimmune diseases in developed countries. During the same time period, infectious diseases have decreased. In developing nations, where sanitation and infection control is lacking, there is a much lower incidence of allergic and autoimmune disease. The hygiene hypothesis may partly explain this difference. No one can dispute the success of public health programs in areas such as vaccination, antibiotics, and improved hygiene in saving lives from preventable diseases. However, over-sterilization of our environment is not beneficial either. Exposure to worms and germs, especially in childhood, provides stimulation that helps the immune system develop and respond appropriately. It just goes to show that a little bit of dirt might be good for you.

8. FAO/WHO. Health and nutritional properties in food including powdered milk with live lactic acid bacteria. 2001. Dr. Stacey Munro is a naturopathic physician and a graduate of Southwest College of Naturopathic Medicine, in Tempe, Arizona. She owns Nature’s Helper Medical Clinic in Windsor, Connecticut. Her specialty is the natural treatment of chronic diseases, such as type II diabetes, digestive problems, asthma, allergies, and cardiovascular disease. She can be reached at (860) 688-2275, or www.NaturesHelperMedical.com.
9. Dr. Karen Conway is a pediatrician at Riverbend Medical Group in Chicopee, Massachusetts. She graduated from University of Massachusetts Medical School in Worcester, Massachusetts, and completed residency at Phoenix Children’s Hospital in Phoenix, Arizona. She enjoys all children, but especially twins. She can be reached at (413) 594-3111 or www.RiverbendMedical.com.

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A Message from the Northeast Organic Dairy Producers Alliance.
Probiotics Basics

About Probiotics

Probiotics were defined by a group of experts convened by the Food and Agriculture Organization of the United Nations (FAO) as “live microorganisms administered in adequate amounts which confer a beneficial health effect on the host”. Most probiotics are bacteria, which are small, single-celled organisms. Bacteria are categorized by scientists with genus, species and strain names.

For example, for the probiotic bacterium, Lactobacillus rhamnosus GG, the genus is Lactobacillus, the species is rhamnosus and the strain is GG. Sometimes strains are also referred to by a marketing (non-scientific) name. In this case, the marketing name is LGG.

What Makes a Probiotic?

The requirements for a microbe to be considered a probiotic are simple. The microbe must be alive when administered, must be documented to have a health benefit and must be administered at adequate amounts. Some infections, once thought self-limiting or readily treatable with antibiotics, are now limiting or readily treatable with antibiotics. Infections are another area with potential for probiotics. For centuries, folklore suggested that fermented dairy products containing live active cultures are healthful. Recent controlled scientific investigation supports these traditional views, suggesting that probiotics are a valuable part of a healthy diet. For example, sometimes it is claimed that probiotics may reduce the levels of Streptococcus mutans, the cause of dental caries, in the oral microbial community. A health benefit of this type would not require survival through the intestine.

Role of Probiotics in Health

Probiotics in Food” considered more fully what probiotics are derived from the definition (See FAO above). The requirements for a microbe to be considered a probiotic are simple. The microbe must be alive when administered, must be documented to have a health benefit and must be administered in adequate amounts. The microbe must be identified at the genus, species and strain levels shown to confer the benefit. These criteria are derived from the definition (See FAO above). A report on “Guidelines for the Evaluation of Probiotics in Food” considered more fully what minimum assessments a probiotic must undergo. The findings were:

- Probiotics must be identified at the genus, species and strain level, using appropriate molecular and physiological techniques.
- The strain should be deposited in an internationally recognized culture collection so that scientists are able to replicate published research on the strain.
- Probiotics must be identified at the genus, species and strain level, using appropriate molecular and physiological techniques.
- Before use, the safety of the microbe must be fully considered.
- Properly controlled studies must be conducted which document a health benefit in the target host.
- Ability to keep the probiotic alive at required levels shown to confer the benefit. These criteria are derived from the definition (See FAO above). For example, sometimes it is claimed that probiotics may reduce the levels of Streptococcus mutans, the cause of dental caries, in the oral microbial community. A health benefit of this type would not require survival through the intestine.
- Those with some familiarity with this field may recognize culture collection so that scientists are able to replicate published research on the strain.
- Appropriate in vitro and animal assessments must be conducted to better understand the physiological attributes of the strain. However, the choice of what assessments are used should be based on assess-
ments that are relevant to the probiotic function in the target host. Care must be taken to not overextend conclusions from in vitro and animal tests that have not been validated and shown to have relevance in the target host. Properly controlled studies must be conducted which document a health benefit in the target host.
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- Before use, the safety of the microbe must be fully considered.
- Properly controlled studies must be conducted which document a health benefit in the target host.
- Ability to keep the probiotic alive at required levels shown to confer the benefit. These criteria are derived from the definition (See FAO above). For example, sometimes it is claimed that probiotics may reduce the levels of Streptococcus mutans, the cause of dental caries, in the oral microbial community. A health benefit of this type would not require survival through the intestine.
- Those with some familiarity with this field may recognize culture collection so that scientists are able to replicate published research on the strain.
- Appropriate in vitro and animal assessments must be conducted to better understand the physiological attributes of the strain. However, the choice of what assessments are used should be based on assess-
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recognized as more serious health threats. Bacterial vaginosis used to be considered just an annoyance. Now we know it is associated with low birth weight infants and increased risk of sexually transmitted diseases. New foodborne pathogens have emerged as prevalent and life threatening, including Shiga-
like Escherichia coli strains. Multiple antibiotic resistances are a continual threat in the battle against once-treatable infections. And in non-industrialized nations, infections such as rotavirus claim the lives of hundreds of thousands of infants yearly. Prevention of infections before they occur is clearly the better alternative. Certain probiotics may be a safe, cost-effective approach that adds a barrier against microbial infection.

How Probiotics Work

To understand how probiotics work, it is important to understand a little about the microbiology and physiology of the human gastrointestinal tract.

Human beings, like all animals, play host to many types and high numbers of microbes on our skin, in our mouths, in women’s vaginal tracts, and all the way through our gastrointestinal tract. In fact, it has been estimated that there are more microbes associated with the human body (about $10^{13}$, or 100,000,000,000,000 bacterial cells) than there are human cells in it (about $10^{13}$). In addition to this very large number of bacteria, there also is a very large diversity of bacteria. It has been estimated that more than 1000 different species, or types, of bacteria make their homes on humans.

Taking this into consideration, it is not surprising that microbes have been found to play an important role in human health. Most of these bacteria are not harmful, and in fact contribute positively to normal human growth and development. But some of these bacteria can have negative influences. It is therefore important that the balance of microbes be maintained to favor the beneficial bacteria over the potentially harmful ones.

Human Gastrointestinal System Review

The digestive process begins as soon as food enters the mouth. The process of chewing increases the surface area of food particles, making the food more susceptible to digestive enzymes, including those in saliva. Smaller food particles also travel more easily (and therefore more quickly) throughout the small and large intestines. In the stomach, food is mixed with gastric juices, containing digestive enzymes and hydrochloric acid. In the intestines, the food is mixed with gastric juices, containing digestive enzymes and hydrochloric acid. This mixture, known as

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**Proposed health benefits stemming from probiotic consumption**

- Suppression of endogenous pathogens, eg. antibiotic-associated diarrhea
- Control of Irritable Bowel Syndrome
- Control of Inflammatory Bowel Diseases
- Alleviate food allergy symptoms in infants
- Strengthened innate immunity
- Lower serum cholesterol
- Bile salt deconjugation and secretion
- Improved lactose tolerance
- Reduction in risk factors for colon cancer
- Normalised intestinal microbiota composition
- Immunomodulation

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chyme, is then actively pumped out of the stomach and into the small intestine. There, more enzymes and bile are mixed with the chyme, and breakdown of dietary proteins, fats, and carbohydrates is completed. Some carbohydrates are not digested by human enzymes and will pass undigested through the colon.

Most nutrients are absorbed in the small intestine. Within about 4-6 hours of eating, what is left of the food passes into the large intestine, or colon. Waste material accumulates, water and electrolytes are absorbed and fecal matter is stored until it passes out through the rectum every 24-48 hours.

Microbe Role in GI Tract

The microbes present in the gastrointestinal tract have the potential to act in a positive, negative or neutral manner. Due to unfavorable conditions, microbes are not very prevalent in the stomach or upper small intestine. However, toward the lower small intestine, they begin to attain higher populations (10⁸-10¹⁰/gm of small intestinal contents) and in the colon they constitute about 10¹⁰-10¹²/gm of colon contents (a very large number).

Considering the high number of microbes in the intestinal tract, what are their effects? It is known that microbes in the large intestine continue the digestion process on food components that were not digested in the small intestine, such as lactose in lactose-intolerant people or some fibers resistant to the enzymes they encounter in the small intestine.

There is evidence of non-digestive microbial activities as well. Certain intestinal microbes are known to help produce specific vitamins. Also, in studies done with special microbe-free laboratory animals, evidence is strong that without normal microbial populations, the immune system functions poorly, and resistance to certain diseases including antibiotic bacteria is greatly reduced. Other evidence suggests that intestinal microbes might act on pre-carcinogenic or mutagenic (capable of inducing genetic mutation) compounds. Depending on the specific microbe, mutagenic or carcinogenic activity can be either increased or decreased.

It is apparent that there are advantages in skewing the balance of bacteria toward beneficial ones. Both lactobacilli and bifidobacteria are normal inhabitants of the healthy intestine. Although they are not the dominant genera in either the small or large intestine of adults (bifidobacteria are generally the dominant flora of breast-fed infants), they are non-pathogenic and their presence is correlated with a healthy intestinal flora. The metabolic end products of their growth are organic acids (lactic and acetic acids) that tend to lower the pH of the intestinal contents, creating conditions less desirable for harmful bacteria.

The gastrointestinal tract also serves to bridge the gap between “inside the body” and “outside the body.” Along this interface, microbes and foreign antigens are entering or passing through the GI tract interact with important components of the immune system. This interaction serves to prime or stimulate the immune system for optimal functioning.

Normal microbial inhabitants of the GI tract also reinforce the barrier function of the intestinal lining; decreasing passage of bacteria or antigens from the intestine into the blood stream. This function has been suggested to decrease infections and possibly allergic reactions to food antigens.

There have been hundreds of papers published on the characterization of and health benefits associated with probiotic cultures and the pace of publication of new papers is accelerating. Some of these publications describe clinical studies designed to determine how probiotic cultures may influence a variety of health conditions. These are very complex questions, and research is still actively being conducted to clarify the role of probiotics in human health.

Scientific Support for Efficacy

The following provides a rationale for probiotic impact on a variety of health targets:

**Allergy.** Allergy is on the rise in industrialized nations. It is estimated that the incidence of asthma in the United States doubled between 1980 and 2000. Scientists have proposed a hypothesis known as the ‘hygiene hypothesis’ to explain the rise in allergic conditions such as asthma and eczema. This hypothesis is based on observations that lower allergy incidence is associated with environments that have greater numbers of microbes, such as day care centers, farms, or in homes with siblings or pets. Sanitary living environments and the consumption of processed foods have limited the number of microbes in the diet. The hypothesis suggests that the exposure of infants to microbes before the age of six months helps the immune system mature to be more tolerant of exposure to allergens later in life (“Early Care May Boost Immunity To Asthma,” August 2000, Washington Post.). Certainly, microbial colonization of the gut in early life is important to the development of a properly functioning immune system.

**Cancer.** In general, cancer is caused by mutation or activation of abnormal genes that control cell growth and division. (A substance that causes a mistake in genes is known as a mutagen). Most of these abnormal cells do not result in cancer since normal cells usually out-compete abnormal ones. Also, the immune system recognizes and destroys most abnormal cells.

Many processes or exposures can increase the occurrence of abnormal cells. Precautions that minimize these exposures decrease the risk of cancer. Among the many potentially risky exposures are chemical exposures. Cancer-causing chemicals (carcinogens) can be ingested or generated by metabolic activity of microbes that live in the gastrointestinal tract. It has been hypothesized that probiotic cultures might decrease the exposure to chemical carcinogens by (1) detoxifying ingested carcinogens, (2) altering the environment of the intestines and thereby decreasing populations or metabolic activities of bacteria that may generate carcinogenic compounds, (3) producing metabolic products (e.g., butyrate) which improve a cell’s ability to die when it should die (a process known as apoptosis or programmed cell death), (4) producing compounds that inhibit the growth of tumor cells, or (5) stimulating the immune system to better defend against cancer cell proliferation.

Research suggests that the consumption of probiotic cultures may decrease cancer risk. Researchers testing the effect of the consumption of fermented milks, probiotic cultures, bacteria or extracts of bacteria have found:

- A reduction in the incidence of chemically induced tumors in rats.
- A reduction of the activity of fecal enzymes (β-glucuronidase, azoreductase, nitroreductase, and 7-α-dehydrogenase) postulated to play a role in colon cancer in human and animal subjects.
- Degradation of nitrosoamines.
- A weakening of mutagenic activity of substances tested in the laboratory.
- Prevention of damage to DNA in certain colonic cells.
- In vitro binding of mutagens by cell wall components of probiotic bacteria.
- Enhancement of immune system functioning.

**Diarrhea.** Many types of diarrheal illnesses, with many different causes, disrupt intestinal function. The ability of probiotics to decrease the incidence or duration of certain diarrheal illnesses is perhaps the most substantiated of the health effects of probiotics. A paper published in 2002 reviewed nine studies on the effect of Lactobacillus as therapy for diarrhea in children. This paper concluded that “Lactobacillus is safe and effective for children with acute infectious diarrhea.” Although this meta-analysis can be criticized for combining data from different species of bacteria and strains of probiotics, only one analysis, the positive nature of the conclusion suggests that at least for this indication and for these strains, positive results have been obtained.

One common form of diarrhea is that associated with the consumption of antibiotics. The purpose of antibiotics is to kill harmful bacteria. Unfortunately, they can kill normal bacteria as well, and consequently disturb normal intestinal function. (Note that it is certainly NOT true that antibiotics “wipe out” all beneficial bacteria; some can act broadly and exactly on your normal, non-pathogenic bacteria.) It is important to realize that the microbiota of the healthy person is quite resilient and in most cases will return to a pre-antibiotic status with no intervention. But it is hypothesized that supplementing the intestine with probiotics might help stabilize antibiotic-induced dysbiosis and minimize disruptive effects.

A serious complication of antibiotic therapy can be the onset of colitis due to Clostridium difficile. This condition can be refractory to subsequent antibiotic treatment, resulting in ongoing recurrences. A few small studies have suggested that certain probiotics can prevent relapses of C. difficile colitis. A recent metaanalysis concluded that the probiotic yeast, Saccharomyces boulardii was the most effective probiotic treatment for this condition.

Another common form of diarrhea is experienced by travelers. Studies evaluating the effect of probiotics on travelers’ diarrhea are equivocal. There is a need for further research in this area for more convincing findings. One metaanalysis of 12 studies on travelers’ diarrhea concluded that certain probiotic products may offer a safe and effective method to prevent traveler’s diarrhea with no indication of serious adverse events.

**Elevated Blood Cholesterol.** Cholesterol is essential for many functions in the human body. It acts as a precursor to certain hormones and vitamins and it is a component of cell membranes and nerve cells. However, elevated levels of total blood cholesterol or other blood lipids are considered risk factors for developing coronary heart disease. Although humans synthesize cholesterol to maintain minimum levels for biological functioning, diet also is known to play a role in serum cholesterol levels. The extent of influence varies significantly depending on the types of dietary saturated fats consumed.

**Extended remission of superficial bladder cancer in human subjects.**

Taken together, these results suggest that probiotic cultures may positively influence the gastrointestinal environment to decrease the risk of cancer.

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on the order of 10-20 mm Hg. These results suggest containing fermentation-derived gamma-amino in milk; 2) bacterial cell wall components from from the proteolytic action of fermented milk containing two tripeptides derived derived from the growth of certain lactobacilli: 1) mildly hypertensive adults for three compounds or elevated blood pressure. Antihypertensive effects compliance with taking the prescribed therapy, and the side effects of antibiotics, improves patient but eradication has not been achieved. Probiotics metabolic activity or colonization by humans suggest that some probiotic strains or milk fermented with a probiotic strain can reduce the objectivity of the journal’

Heliobacter pylori. Heliobacter pylori is a bacterium which colonizes the stomach and can cause gastric ulcers and gastric cancer. The effect of probiotics on H. pylori has been studied. Mechanistic studies in laboratory assays or in animal models have shown that antibacterial substances including (but not limited to) organic acids produced by some lactobacilli inhibit the growth and survival of this pathogen. When tested in humans, results are mixed. Results in humans suggest that some probiotic strains or milk fermented with a probiotic strain can reduce metabolic activity or colonization by H. pylori but eradication has not been achieved. Probiotics have also been used to manage side effects of triple antibiotic therapy used to treat H. pylori infections. In these studies, the use of probiotics decreases the side effects of antibiotics, improves patient compliance with taking the prescribed therapy, and increases the rate at which H. pylori is eradicated.

Hypertension. About 50-60 million people in the United States are estimated to have hypertension, or elevated blood pressure. Antihypertensive effects have been documented in animal models and in mildly hypertensive adults for three compounds derived from the growth of certain lactobacilli: 1) fermented milk containing two tripeptides derived from the proteolytic action of L. helveticus on casein in milk; 2) bacterial cell wall components from cell extracts of lactobacilli; and 3) fermented milk containing fermentation-derived gamma-amino butyric acid. Systolic blood pressure was decreased on the order of 10-20 mm Hg. These results suggest that consumption of certain lactobacilli, or products

made from them, may reduce blood pressure in mildly hypertensive people. Viability of the Lactobacillus is not required for the effect. Such fermentation-derived, but non probiotic, products have been developed in Japan (Aneal S) and Europe (Evolus).

Irritable Bowel Syndrome. Irritable bowel syndrome (IBS) is a functional bowel disorder that can be characterized by symptoms of abdominal pain, cramps, gas, bloating, diarrhea and constipation. Surveys estimate the prevalence rate ranging from 10-20% of the adult population and the condition is diagnosed 3 times more often in women than men. A few controlled studies have been conducted evaluating probiotics and IBS. Some symptom relief (primarily from diarrhea or abdominal pain or bloating) has been reported in studies published to date.

Inflammatory Bowel Disease. Inflammatory bowel diseases such as ulcerative colitis and Crohn’s disease, are serious intestinal diseases that can lead to the surgical removal of the colon. The cause of these diseases is not known but it has been hypothesized that an intolerance to the normal microbiota in the gut leads to inflammation and resulting pathology. Efforts to identify a single microbe associated with the disease has failed, leading some to suggest that it is a pathogenic microbial community, not a single microbe, that is responsible for IBD. The role of gut flora in the progression of these diseases has led some researchers to study the impact certain probiotic bacteria might have on maintaining the state of reduced inflammation that occurs during remission stages of the diseases. Several controlled, clinical trials have shown that high levels of certain probiotic strains can extend the disease-free remission period. Studies also have documented this effect on remission of pouchitis. But not all studies have shown benefits. This is an active area for research.

Immune System Modulation. The immune system defends against microbial pathogens that have entered our bodies. The immune system is extremely complex, involving both cellular and antibody-based responses to potential infectious agents. Immunodeficiency can result from certain diseases (e.g., cancer, AIDS, leukemia) or, to a lesser extent, from more normal conditions such as old age, pregnancy, or stress. Autoimmune diseases (e.g., allergies, rheumatoid arthritis) or genetically induced bowel diseases) also can occur due to misdirected immune system activity.

Probiotic cultures have been shown in a variety of test systems to stimulate certain cellular, biochemical and antibody functions of the immune system. Animal studies have shown an effect of yogurt or lactic acid bacteria on enhancing levels of certain immunoreactive cells (e.g., macrophages, lymphocytes) or on modulation of immune factors (cytokines, immunoglobulins, interferon). In addition, some studies have shown improved survival of pathogen-infected laboratory animals consuming probiotics as compared to animals consuming a control diet. Results accumulated so far suggest that probiotics may provide an additional tool to help your body protect itself.

An exciting area of research has been documenting the ability of certain probiotic bacteria to modulate immune dysregulation. Studies have shown that some probiotics are effective in decreasing the development of allergy and relapse of inflammatory bowel disease.

Kidney Stones. High levels of oxalate in the urine is a risk factor for the development of kidney stones. Utilization of oxalate by intestinal bacteria limits its absorption. A probiotic preparation that contained bacteria that were able to degrade oxalate in vitro was shown to reduce oxalate fecal losses in six patients. These results suggest that manipulation of the gut flora with the right probiotic bacteria may have a positive impact on gastrointestinal tract oxalate levels and may decrease oxalate absorption. These results are intriguing, but preliminary.

Lactose Intolerance. The inability of adults to digest lactose, or milk sugar, into adulthood. People of northern European descent are unique in retaining the ability to produce the lactase-digesting enzyme, lactase, into adulthood. Consumption of lactose by those lacking adequate levels of lactase produced in the small intestine can result in symptoms of diarrhea, bloating, abdominal pain and flatulence. These symptoms are due to undigested lactase reaching the large intestine and being fermented by the colonic microbes. These microbes can produce gases and products that lead to watery stool.

The inability to comfortably consume dairy products not only limits people’s freedom to choose preferred foods, but also potentially compromises calcium intake, threatening bone health. It has been documented scientifically that many lactose intolerant individuals are able to consume fermented dairy products, such as yogurt, with fewer symptoms than the same amount of unfermented milk, even though yogurt contains about the same amount of lactose as milk. Yogurt was found to aid digestion of lactose because the lactic acid bacteria used to make yogurt deliver lactase to the small intestine, where it breaks down the lactose before it reaches the colon. In addition to yogurt starter bacteria, L. acidophilus and bifidobacteria have been shown by several studies to improve digestion of lactose, although the extent of this effect varies depending on the yogurt starter cultures, Lactobacillus bulgaricus and Streptococcus thermophilus. Only yogurts that have not been heat-treated after fermentation (i.e., contain live active cultures) confer this benefit.

Necrotizing enterocolitis. Necrotizing enterocolitis (NEC) is a gastrointestinal disorder that affects premature infants. It is characterized by infection and inflammation leading to significant morbidity and mortality in this high-risk population. Probiotic supplementation to study the risk of NEC in preterm infants. A recent review of studies targeting efficacy and safety of probiotics for infants at risk for developing NEC was conducted. Taken together, studies suggest that probiotics lower the risk of mortality in preterm infants, but additional studies on best strains for this application, short- and long-term safety and required dose must be conducted.

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36 The Natural Farmer Summer, 2009

The Organic Standard is an international monthly journal that enables individuals and organisations to keep up-to-date on developments concerning worldwide standards and certification issues in the organic sector.
Oral health. One study conducted with children aged 3-6 years in day care centers evaluated the ability of the milk containing L. rhamnosus GG to reduce the incidence of dental caries. Only a subset of the study group, children aged 3-4 years, showed any statistically significant reduction in dental caries incidence. Other studies have documented that other probiotics, e.g., L. reuteri or Bifidobacterium animalis DN173 010, can reduce salivary levels of cariogenic Streptococcus mutans in young adults.

Small Bowel Bacterial Overgrowth. Under certain conditions (production of low stomach acid, kidney dialysis and others), microbial populations in the small intestine can increase beyond normal levels. This is termed small bowel bacterial overgrowth. The misplaced microbes can produce byproducts from their growth that can be toxic. Researchers have found that feeding high levels of certain probiotic strains can control the toxic effects of these microbes. This is another example of the ability of probiotic strains fed in high numbers to modulate the activity of other intestinal bacteria.

Staying Healthy. The value of probiotics to reduce the risk of, rather than treat, disease has recently become appreciated more fully. Studies have been conducted in healthy populations, with end points such as decreasing the incidence of colds, winter infections, or even absences from work or day care. These controlled human studies provide support that certain probiotic strains consumed as part of a daily diet will increase the number of illness-free days, or improve growth for undernourished children. These effects are likely mediated by immune enhancement or effects on other intestinal bacteria. Mechanistic studies have not always accompanied positive clinical indications.

Vaginosis. The vagina and its microbiota form a finely balanced ecosystem. Disruption of this ecosystem can lead to a microbiological imbalance and symptoms of vaginosis. Vaginosis used to be considered a mere annoyance, but now is being examined for a role in serious conditions including pelvic inflammatory disease, pregnancy-related infections, or even absences from work or day care. Other recent studies have not shown positive results, highlighting the importance of use of effective strains and delivery systems.

Probiotics & Dairy Products

Probiotic bacteria have a long history of association with dairy products. This is because of the same bacteria that are associated with fermented dairy products also make their homes in different sites on the human body, including the mouth, the gastrointestinal tract and the vagina. Some of these microbes, therefore, can play a dual role in transforming milk into a diverse array of fermented dairy products (yogurt, cheese, kefir, etc.) and contributing to the important role of colonizing bacteria. Dairy products may provide a desirable “probiotic delivery vehicle” for several reasons. To date, however, there is little research on the impact of delivery vehicle and probiotic efficacy for any of the possible formats. This is an important area for future research.

Dairy foods can protect the probiotic bacteria. Traveling through the human digestive tract can be a challenge for bacteria. High acid levels in the stomach and exposure to pancreatic secretions such as digestive enzymes and bile in the small intestine can lead to the injury and death of a percentage of orally administered probiotics. Although some bacteria are more resistant than others to this stress, consumption of probiotics with food, including milk, yogurt and other dairy products, buffers stomach acid and can increase the chance that the bacteria will survive into the intestine.

Refrigerated storage of dairy products helps promote probiotic stability. Although the lactic acid content of yogurt can be a barrier to culture stability, short-term refrigeration generally promotes stability.

The content of the www.usprobiotics.org website is primarily developed by Dr. Mary Ellen Sanders. Through her business Dairy & Food Culture Technologies, Dr. Sanders consults on all aspects of probiotic applications in the food and supplement industries. She believes probiotics will flourish only if available products are scientifically validated, responsibly produced and accurately labeled. She strives to balance the potential consumer benefits of probiotics with an understanding of the emerging science. Based on her extensive work with manufacturers, academicians and regulators, Dr. Sanders offers a comprehensive perspective to those interested in the continued emergence of the probiotic industry.
Thank you organic farmers, for all that you do.

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to exclalm - the turtle races! And the ring tossing
game at the fair!

Young, not so young, or somewhere in between…
don’t miss this very special event.

Registration is now up online at www.
nofasummerconference.org. Register before July
6th and be entered into a drawing for a FREE
registration to the 2010 Summer Conference! Still
not sure how to apply to attend? Here are a few more
reasons to come to the conference this August:

**Food!**
A small sample of the menu for the week-end:

**Friday Dinner:**
Sausage Gumbo - Tofu with Hot Black Bean Sauce
w/ Brown Rice - Orzo Salad with Tomato and
Arugula - Roast Cauliflower with Garlic - Salad Bar
-Carrot Cake w/ Cream Cheese Frosting

**Saturday Breakfast:**
Omelet Bar - Red Flannel & Vegan Hash - Oatmeal
w/ assorted toppings - Breakfast Bar (bagels &
spreads, yogurt, granola, fruit) - Blueberry Lemon
Scones

We are excited to be offering workshops for Spanish
speakers for the first time at this year’s conference!
The workshops, all held on Saturday will be as
follows:
8am - 9:30am -- Intro to Soil Fertility: Frank
Mangan 10am - 11:30am – Introduction to Agricultural
Marketing: Derek Mitchell 1am - 2:30pm – Intro to Permaculture: Eric
Toensmeier

Please contact Adrianne@nofamass.org with comments/ideas/questions about this exciting development!

**Saturday Fair Events!**

SALSA! You can salsa dance, and you can eat
salsa, but how about a salsa recipe that makes you
want to dance? Got a favorite recipe of your own
for mouthwatering, tangy, spicy flavor on a chip
made with interesting, yummy organic ingredients?
We’re looking for a winner! If you’d like the chance
to have your salsa named 2009 NOFA Salsa of the
Year, bring two quarts of salsa to the Fair Ground
by noon on Saturday, Aug. 8. We’ll provide the chips and
the voting. First come, first serve for anyone who’d like to cast a
vote!

In Memoriam: Bill McElwain
by Kate Rossiter

April 19 marked the passing of a New England
agricultural visionary, Bill McElwain, founder of
Green Power Farm in Weston, Mass, and Nesenkag
Farm in Litchfield, New Hampshire, died peacefully
at his home in Milton, MA. He was 90.

Julie Rawson, executive director of NOFA/Mass,
recently called Bill McElwain “a pioneer.” Brian
Dohame describes in his book, Reclaiming the
Commons: Community Farms and Forests in a New
England Town, how Green Power Farm came to be in 1971:

“Green Power was the brainchild of one remarkable
man, Bill McElwain. Bill was a Harvard graduate and
had been a New Hampshire carrot farmer, a private
school French teacher, and an urban low-cost housing
activist. During a family bike ride in the fall of 1969
the proverbial light bulb went on in Bill’s head. As
he and his family rode down a dirt lane off Merriam
Road, they discovered a large, weed-covered field
owned by a Jesuit seminary called Weston College.
Nearby was another field where a commercial
grocer had had some reason left a lot of cabbage to
rot. Here were good food and good land going to
waste in Weston, while people in the inner city were
growing hungry. Wasn’t affordable food as central to
people’s well-being as affordable housing? A quick
comparison of urban and suburban supermarkets
revealed that produce cost more in the city and was of
lower quality. The Green Power idea was born.”

And don’t forget another new event, the Fair Barter/
Swap Area. Bring farm-crafted goods (or services)
of all kinds to the Fair for bartering. We are also
going to try to create a networking area for folks to
talk, interact, and exchange ideas related to organic
farming. The area will be organized by topic to
make it easy to meet like-minded folks.

As usual, we welcome Open Mike musicians of all
stripes (and ages) to our Fair Music Stage. If you’d
like more information about the Fair, or have other
ideas for events??” you’d like to suggest, call
Tricia Cooper at 617 558 3332 or email her at
triciaannecoop@gmail.com

**Community Farming Workshops**
This year, the NOFA/Mass Community Farm
Initiative is presenting a 5 part track of workshops
specifically developed for New England farmers,
managing, and doing business planning for
community farms. These unique farms are publicly
owned and are operated by a core of farmers to serve
community needs for 1) local and healthy food and 2)
for food and farming education. The interest in
the model has been increasing significantly as
people confront challenges of food insecurity and
search for meaningful forms of work that foster self
reliance and pride.

On Saturday at 10:00 AM, Heather Scott of the
newly-established Medway Community Farm will present
proofen methods to garner neighbor and
municipal official support for some community farms and for
moving a project from discussion to reality. At
1:00 PM, Lynda Simkins of the Natchitoches
Organic Farm will present ways to draw upon the
vast potential of public schools as centers for
food-based education and community service, especially
during the summer months.

On Sunday at 8:00 AM, Greg Maslowe of Newton
Angino Community Farm will present management
strategies for incorporating middle school-aged youth
and older as meaningful contributors and active
learners on community farms. At 10:00 AM, Richard Rudolph from Rippling Waters Farm in
Scoffe Falls, Maine will discuss the lessons and
experiences of the dedicated citizen group that
founded and now manages the farm. Running the
weekend out, at 1:00 PM, Grey Lee of Land’s Sake,
a community farm in Weston, MA, and Wayne
Castonguay of Appleton Farm in Iwpipe, MA will
consider practices for farming different types of
preserved and public land. They’ll highlight ways
for community farms to demonstrate the value of public land for
farming and farm-based education to local officials and
residents.

For the next 15 years, Bill inspired the community to share his vision for agriculture, environmentalism and
land conservation. He partnered with the town
to hire young people to work on the farm, giving
those who turned here early years he helped
shape my future life in farming and agriculture. And
I know I am only one among many people that
Bill inspired; many others who worked with him have
made careers in farming, forestry and land
management. Thirty-eight years after it began,
Hope For Life Farm (now part of Land’s Sake Farm)
continues to connect youth to the land and teaches them about sustainable agriculture, environmental issues and community involvement, and in very year more than 500 pounds of fresh
vegetables, grown with the help of these young
people, is delivered to Boston soup kitchens. Bill
McElwain’s legacy lives on in many important
ways.

A memorial service for Bill will be held at The
Josiah Smith Tavern in Weston Center on June 27.

Kate Rossiter works with the Extension Program at
NOFA/Mass, and at American Farmland Trust.

Mass Grass has organized the 2nd Annual Grazing
School as part of the conference on Saturday, August 8th. These workshops will provide information
to farmers about starting a grass-based livestock operation or improving their existing
operation. These workshops are open to all Summer Conference participants:

• Grazing 101 – Sarah Flack, Grazing Consultant
  Pasturing in Rhode Island and Wayne
  Stephen Herbert, Professor of Agronomy, University of
  Massachusetts

• Alternative Health Practices for Livestock
  – Joseph Bonelli, Research Economist, University of
  Connecticut, and Kristin Castraturo, Marketing and
  Production Specialist, University of Rhode
  Island

• A pasture walk at the UMass Pasture Research Centre – Dr. Ken
  Mass, UMass Extension and the USDA Natural
  Resources Conservation Service. Mass Grass also
  sponsored a series of Pasture Walks and Field
  Schools for 2009. For more information visit www.
  massgrass.org or contact Kate Rossiter, NOFA/Mass
  Extension Staff (413) 498-2271, or krossiter@nofamass.org.

Important Reminders!

Sponsoring the Summer Conference is a wonderful
way to maximize business exposure – first to 1,500
attendees throughout the three-day conference. Also, sponsorship places your name and logo on
the Summer Conference web site through the end of
2009, linking you and your web site to all attendees who are so interested in grazing. Sponsorships
also provide revenue that enables NOFA to offer scholarships to some who would
otherwise not be able to attend. For more information, contact Bob Minnocci, (617) 236-4893, bob@
nofamass.org or visit the Summer Conference web
site: http://www.nofasummerconference.org/.

Do you have an organic product to sell? Are you
involved in agricultural education or advocacy? The conference is a great place to network, and a
great opportunity to reach an informed and
interested crowd of 1,500 + people. Advertise in
the program guide distributed to all conference
attendees, or exhibit in the main tent open to
all attendees throughout the three-day conference.
Sponsorships also provide revenue that enables
NOFA to offer scholarships to some who would
otherwise not be able to attend. For more information, contact Bob Minnocci, (617) 236-4893, bob@
nofamass.org or visit the Summer Conference web
site: http://www.nofasummerconference.org/.

We are continuing to “go green(er),” in an attempt to
conservere sources we decided not to send paper
version of the registration form to all NOFA chapter
members this year. We have sent out emails to
direct all of you wonderful conference-goers to the
nofasummerconference.org, where you register
online and see updates on the conference. We
encourage you to register this way.

However, if you prefer to submit your summer
conference registration on paper, please don’t
hesitate to contact the NOFA Summer Conference
headquarters at 978-355-2853 - we’ll be happy to
send you the registration form!

See you soon!
Handy Guide to Your White Blood Cells, or Your Body's Cellular Army

<table>
<thead>
<tr>
<th>System</th>
<th>White Blood Cell Type</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Innate Immunity</td>
<td>Monocyte</td>
<td>Circulates in your blood until needed in the tissues; then exits the bloodstream and becomes a macrophage</td>
</tr>
<tr>
<td></td>
<td>Lymphocytes</td>
<td>Invade your body, engulfing and digesting invaders.</td>
</tr>
<tr>
<td></td>
<td>Granulocytes</td>
<td>Invade your body, engulfing and digesting invaders.</td>
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<tr>
<td></td>
<td>Macrophage</td>
<td>The big eater—destroys invaders by engulfing and digesting them.</td>
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<td>Adaptive Immunity</td>
<td>B cell</td>
<td>Antibody-producing cells</td>
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<td>Cells that control the immune response</td>
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<td>Killer T cell</td>
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analyzing your sites and considering plants as design elements: forms, lines, color, zones of use, natural assets like ponds or hills. He thinks like a permaculturist and uses many of their ideas for layout and practical design. In the second he focuses on site realities such as climate, soil, sun, and your own characteristics and values. Do you have a site where the winter won't kill certain plants? Lee includes a hardiness zone map in the appendix. Do you get too much summer heat for successful fruiting of that finicky variety? He also includes a map of 12 heat zones based on days above 86°F. Of course he knows that these are gross tools and any area has microclimates which vary in their suitability for producing fruit. Rolling slopes produce pockets of heat and cold, walls and pavements retain daily heat and radiate it back at night, exposures facing south in our hemisphere warm up faster than northerly ones, thus hurrying or retarding bloom dates significantly.

The third chapter deals with the specifics of the plants’ needs – for site, planting, staking, pollination, pruning, pests and fertility. Tips on what to do with newly received plants until you get a chance to deal with them, how to put 2 cross-pollinators into a space where you can only fit one, why to hold back the soil amendments when first planting, when and how to grow in pots, and how to spot mineral deficiencies in your soil from the appearance of the plants all help new growers achieve the wisdom of experienced orchardists. Chapter four includes specific examples of landscape plans where fruiting plants are major design elements around house, pool, patio, deck, foundation and children’s garden. The second half of the book is a guide to the over 10-12 college credits


Twice in the last several years, I have attended mushroom conferences in Sonoma County, California. Whereas other conferences I’ve attended have focused on the gathering, sorting, and identification of mushrooms, the Sonoma County folks treat them primarily as an ingredient in their cooking, an integral part of the gourmet meals provided. The wines flow continuously. Food and wine are serious matters in northern California. Jonah Raskin, a resident of this region, explores the farming-consuming connection. The jacket’s photographs, attractive though they are, highlighted the table and meals in varying states of completion. No pictures of farm laborers here, so I had my trepidations about the amount of farming exploration. My expectations were met and exceeded. The stories the reader can gain a better understanding of the renaissance in farming in northern California.

The book is first and foremost a series of profiles (reflected in the fact that two-thirds of the two dozen or so photographs are of people) and through their stories the reader can gain a better understanding of the renaissance in farming in northern California. There is some history, but mostly it is an account of them—that’s—doing and why they are doing it.

On another level, the book is a journey. The author, at forty-five, began to reflect upon his “finite amount of time on earth” (I’ve been there) and determined to spend a year “in search of health, harmony, and a sense of place.” The book represents an account of that journey.

Field Days is professionally written. As well it should, Raskin serving as a professor of Communication Studies at Sonoma State University and having written two previous books: American Screams: Allen Ginsberg’s Howl and the Making of the Beat Generation and For the Hell of It: The Life and Times of Abbie Hoffman (oh, those 60’s!).

There is even a NOFA connection: two friends from college were contacted and briefly cited: Allen Young, NOFA member, neighbor, and fellow gardener in Royalston, Massachusetts; and Liz Henderson, farmer, author, activist, and unofficial conscience of NOFA.


It has become my habit to learn a little more about our keynoters for the NOFA Summer Conference by getting copies of recent books they have written. I’ve always enjoyed eating mushrooms, but never knew much about how to raise them, so I was intrigued to get a copy of Mycelium Running. I hadn’t really thought much about fungi, except for the annual case of athlete’s foot that I get, but
recently have been immersed in the topic, as the nutrient density folks rely heavily on the work of mycorrhizal fungi for improved soil nutrition.

Mycelium Running is clearly a work of love. Paul Stamets started out as a logger in the Pacific Northwest and in time went from cutting down trees to being an avid preservationist of old growth forests. The book is entirely fascinating, well-researched, and based on years of experience from a person who clearly knows his stuff. The photographs in this book are phenomenal, not only representing all sorts of mushrooms, but there is an extra bonus of pictures of Stamets’ family and co-workers throughout.

Part I, The Mycelial Mind, discusses the similarities between mycelium and the internet, the mushroom life cycle, mushrooms in their natural habitats, and the medicinal mushroom forest. Mycelia are essential for life on the planet. Single-cell organisms that form chains that rapidly reproduce, they are the first to move into an otherwise barren landscape, and their presence attracts bacteria, larger animals and plants, and eventually regrowth.

Mushroom types include the saprophytic mushrooms (the decomposers), parasitic mushrooms, and mycorrhizal mushrooms. The mycorrhizal mushrooms are the ones that are of particular interest to me as a farmer because they work symbiotically with root hairs of plants to extend the plant’s reach, enabling it to receive more nutrition faster than without their assistance, and in the end develop healthier plants.

According to Stamets, “Mushrooms share a deeper evolutionary history with animals than with any other kingdom, so humans and mushrooms share risks of infection from some of the same microbes.” He discusses the means by which mushrooms prevent and heal viral disease and microbial disease. Mycelia are adept as molecular disassemblers, breaking down “eat” it and re-populate themselves. Mycoforestry can be used to accomplish the following goals: preservation of native forest, recovery of woodland debris, enhancement of replanted trees, strengthening sustainability of ecosystems, and economic diversity. It is in this section that I really came to understand what happens when a logger comes in and cuts down a forest, replants it, cuts it down two or three more times, and then leaves it. The soil life forms, of which the mycelia are the basis, erode away and are otherwise destroyed such that forests once could sustain very large and powerful trees are no longer able to re-grow. One tip that I took away from this section was a reminder that when cutting down trees, one should cut what’s left into small enough pieces so that the debris will touch the ground as much as possible, allowing the mycelia to “eat” it and re-populate themselves. Mycoforestry is a newly emerging science, an offshoot of ecosforestry practices, with an emphasis on the role of beneficial fungi.

Mycorestoration is the use of fungi to repair forest communities. It is Stamets’ contention that without fungi, there are no forests. Mycology can be used to target and consume the bacteria and protozoa in a forest, leaving the house intact.

Part II of the book is all about growing mycelia and mushrooms. “Key to growing mushrooms … is to grow mycelium … Mycelium is the cellular fabric of our food web and although pervasive in nature, getting a mycelial mat to infuse through a virgin habitat is both an art and a science.” The chapters in this section include inoculation methods (spores, spawn, and stem bucks); cultivating mushrooms on straw and leached cow manure; cultivating mushrooms on logs and stumps; and gardening with gourmet and medicinal mushrooms. Also discussed in this section are the nutritional properties of mushrooms, followed by a careful description of their taxonomy, distribution, natural habitats, natural method of cultivation, seasonal temperature range for mushroom formation, harvest hints, nutritional profiles, medicinal properties, flavor, preparation and cooking, and their mycorestoration potential.

One of the most important take-home messages that I got from this book on mushroom-raising was that mushrooms thrive in woodchips. I was delighted when my son Chuk, the landscaper/handyman, called me up and said he had two truckloads of wood chips, and would I like them. I eagerly accepted the shipment, spread it on our blueberry patch, and called up Fungi Perfecti (Stamets’ commercial mushroom business) and ordered Metarhizium mycelium on a sterilized rice medium to attract the ants who took the infected rice into their nests and committed involuntary suicide, leaving the house intact.

In Part II Stamets discusses mycorestoration. There are chapters on mycofiltration, mycoforestry, mycoremediation, and mycopolitides. “Habitats, like people, have immune systems which become weakened due to stress, disease or exhaustion. Mycorestoration is the use of fungi to repair or restore the weakened immune system of environments. … The art of this emerging science is in the selection of species and, of equal importance, their timely introduction.”

Mycorrhizal mushrooms can help save the world. According to Stamets, the technology is out there to do serious clean-up of toxins in our environment. In this chapter he discussed Chernobyl and other toxic incidents and the things that scientists learned about how mushrooms will concentrate toxic substances. Mushrooms in these environments are extremely dangerous to eat, but the scientific experimentation in this realm involves using mushrooms to concentrate the toxins, with an overall goal of cleaning the surrounding areas.

Mycofiltration is the use of mycelium as a membrane for filtering out microorganisms, pollutants, and silt. “Mushroom mycelium has an unquenchable appetite for organic debris. Taking advantage of this appetite, the mycological landscaper can select mushroom species that target and consume the bacteria and protozoa in a habitat.” In this section, Stamets discusses how mycofiltration can be used effectively on farms.

Mycology is the study of fungi as healing arts centers. Stamets goes into great detail about the means by which they are the first to move into an otherwise barren landscape, and their presence attracts bacteria, larger animals and plants, and eventually regrowth.

Mycology includes the nutritional properties of mushrooms, followed by a careful description of their taxonomy, distribution, natural habitats, natural method of cultivation, seasonal temperature range for mushroom formation, harvest hints, nutritional profiles, medicinal properties, flavor, preparation and cooking, and their mycorestoration potential. One of the most important take-home messages that I got from this book on mushroom-raising was that mushrooms thrive in woodchips. I was delighted when my son Chuk, the landscaper/handyman, called me up and said he had two truckloads of wood chips, and would I like them. I eagerly accepted the shipment, spread it on our blueberry patch, and called up Fungi Perfecti (Stamets’ commercial mushroom business) and ordered Metarhizium mycelium on a sterilized rice medium to attract the ants who took the infected rice into their nests and committed involuntary suicide, leaving the house intact.

In the mycopesticides chapter, Stamets shared an intriguing personal experience he had, where his home in the middle of the old-growth forest was being destroyed by carpenter ants. He used Metarhizium mycelium on a sterilized rice medium to attract the ants who took the infected rice into their nests and committed involuntary suicide, leaving the house intact.

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Heavens Above! Organic in the time of the Obama Administration

by Steve Gilman
NOFA Interstate Council Policy Coordinator

By some measures happening in Washington these days you might think the organic movement has gone to Heaven-on-Earth. Yes, that was the actual U.S. Secretary of Agriculture Tom Vilsack who came in mid-March to say nice things at the inaugural meeting of the National Sustainable Agriculture Coalition (NSAC).

And good heavens there’s the new number two, USDA Deputy Secretary Kathleen Merrigan, who showed up to speak at the packed May National Organic Standards Board (NOSB) meeting. Her street creds include writing the originating organic legislation back in 1990 and more recently, Director of the Tufts University Center for Agriculture, Food and Environment. She came to announce the promotion of the National Organic Program (NOP) to a full stand-alone department within USDA, along with $50 million in special funding for organic practices under the Environmental Quality Incentives Program (EQIP). After inviting everyone to come on over to her office for individual 5 minute one-on-ones that evening, she stayed for an hour on to answer any and all questions.

And if Agribusiness didn’t already have major concerns over the Merrigan appointment, much to their chagrin organic gardens are springing up in highly symbolic places. Over on Pennsylvania Avenue the First Lady is taking a hands-on approach to putting in an organic vegetable garden on White House grounds. At the USDA complex, Secretary Vilsack participated in jackhammering up part of a parking lot to install the People’s Garden – in what will become a six acre organic demonstration plot that is due to be certified by Pennsylvania Certified Organic (PCO).

To be sure, organic initiatives also took some giant steps forward in the recent (Bush) Farm Bill, thanks to a lot of good work on the Hill by a wide range of sustainable food advocates across the country – organic certification cost share, EQIP funding, increased research dollars and crop insurance among them. There was also an increase in designated funding for the NOP – with the proviso that the program’s workings become more transparent and functional – hence the importance of its elevation into a separate department with more employees under new leadership within USDA’s Agricultural Marketing Service.

NOC and NOAP

In this respect, NOFA’s membership in the National Organic Coalition (NOC) – an alliance of grassroots organic farming organizations with environmental, food and consumer groups – connects us to the expertise needed to access policy-makers and influence policy. And after holding listening sessions for the National Organic Action Plan (NOAP) around the country over a three year period, NOC convened a Summit session at the end of February to develop a consensus on organic issues and policy direction that creates a legitimate basis for the next steps.

We’re going to need this cohesion. Although this is a time of great opportunity it’s also marked by major challenges. Included in the public comment testimony at the NOSB meeting, for instance, was an expressed desire to reopen the 1990 Organic Food Production Act to make changes. While some sections of the law are certainly unwieldy, such a move could open the Act to manipulation by special interests that have their own benefit at heart, with dire effects on the integrity of the organic label.

The organic and sustainable ag community is also deeply enmeshed in the food safety legislation that is picking up speed in Congress. In NOFALand and around the nation many small and mid-scale farmers involved in localized, farm-direct sales to customers are concerned that they will be left out of the food safety deliberations and become subject to laws that are solely suited to the largest producers. Together with a NSAC task force and a NOC food safety committee NOFA reps have been making the case for developing distinct scale-appropriate and risk-based educational and technical assistance parameters for growers involved in localized farm-direct sales at Farmers Markets, Community Supported Agriculture (CSA) programs, roadside stands as well as local restaurants, direct wholesale and farm-to-school programs.

Food safety legislation

Chairman Henry Waxman (D-CA) of the Energy and Commerce Committee has jurisdiction over the House food safety legislation. Although the committee already has a full plate putting together major climate change, energy and health care legislation, food system oversight has been placed on the fast track. While the timing is extremely fluid at this point, they’re looking to put together a bill before Memorial Day and move it to the floor for a vote by the end of June.

Meanwhile, only a few features from a number of earlier-circulated bills are expected to figure in the final markup. The House Food Safety Modernization Act (H.R. 875) put forth by Congresswoman Rosa DeLauro (D-CT) was primarily aimed at moving food safety oversight into a separate agency, for instance, but the general thrust now is to fix the FDA and give it expanded recall and oversight capabilities.

H.R. 875 set off a tremendous Internet firestorm among smaller-scale growers around the country due to some uncertain and misinterpreted language that seemed to threaten farmers’ ability to stay in business. Clarifications made during subsequent NOFA visits to DeLauro’s Washington office, however, specified that farm-direct sales growers are exempt under her bill.

More worrisome to farmers at this point is The Food and Drug Administration Globalization Act (H.R. 759) from Rep. John Dingell (D-MI) which contains onerous food traceability standards requiring inappropriate and expensive electronic bar coding equipment for every farm regardless of size or potential risk to consumers. It also creates an elaborate user fee system that could unduly affect smaller growers. And H.R. 1332, The Safe Food Enforcement, Assessment, Standards and Targeting (FEAST) Act, from Rep. Jim Costa (D-CA), a member of the House Agriculture Committee, would enact mandatory standards at all levels in the food chain: from the farm, to packing, processing and distribution along with the retail level.

But Heaven can wait. There’s plenty of work to be done.

Secretary of Agriculture Tom Vilsack addresses the National Sustainable Agriculture Coalition

Secretary of Agriculture Tom Vilsack addresses the National Sustainable Agriculture Coalition
Reflections on Almost 30 Years as an Unconventional Farmer

by Robin Ostfeld

Most professions come with stereotypes. The aggressive, greedy lawyer, the golf-playing, callous doctor, the money-grabbing salesperson. Of course anyone engaged in these professions is a whole, complex person, who may be acutely aware of the half-truths that imbue any stereotype. As a female, middle aged, college educated, and Jewish farmer, I am very sensitive to the positive and negative stereotyping of American farmers.

There is the overarching image of the Grant Wood painting - a strong but workworn couple standing stiffly together, the man gripping a pitchfork and wearing faded overalls, the pinched faced woman with an apron tied around her narrow waist. They portray the farmer as a conservative, dull, and plodding stoic, not unlike the oxen that plowed the land 100 years ago.

Then there is the slightly more modern, affable farmer, always a white man. He is more affluent, a bit more technologically savvy, and like most Americans, has gotten a little chubbier. He is sort of like Santa Claus, the jovial provider of gifts. His sack full of goodies is the milk his dairy produces to keep America's children strong, the wheat or corn sack full of goodies is the milk his dairy produces to keep America's children strong, the wheat or corn that feeds our livestock, or the orange groves that keep our grocery stores full of sweet tangy juice.

He's a TV character to the suburban and urban populations, most of whom have never met a farmer face to face.

A third cultural farmer icon has arisen in the last 30 years or so. It started out as the hippie farmer, a third cultural farmer icon has arisen in the last 30 years or so. It started out as the hippie farmer, a third cultural farmer icon has arisen in the last 30 years or so. It started out as the hippie farmer, a third cultural farmer icon has arisen in the last 30 years or so. It started out as the hippie farmer, a third cultural farmer icon has arisen in the last 30 years or so. It started out as the hippie farmer, a third cultural farmer icon has arisen in the last 30 years or so. It started out as the hippie farmer, a third cultural farmer icon has arisen in the last 30 years or so. He and his wife tending a terraced vineyard or heirloom tomato patch. These are nouveaux farmers. They were not born into farming families and did not grow up hefting hay bales or driving tractors. They chose farming because it is undesirable. Physical labor that is actually clean, while dirt, or manure, or grease, is degrading. For me, and I am contributing to society. Money is in the bank, I am smiled at, doors are held open and haven't prevented her hair from showing the reality of many obstacles must be overcome to start from scratch as a farmer.

Here's another paradox. The land, buildings, and equipment needed to start a viable farm represent a very large investment. But the work involved in farming doesn't measure up to the wealth of ownership. There are definitely class issues at work here. Manure smells bad. Dirt is dirty. Farm work, when done by hand, is literally stooping low. I have become accustomed to the condescending, cold looks of grocery store clerks and gas station attendants when they see me come in wearing my work clothes. Of course, I could pass as a shop assistant at play here too. A man who works hard and gets dirty is to be admired. Especially if he's young and muscular. But a woman who doesn't have clean fingernails and hasn't prevented her hair from showing the effects of the wind, is very low indeed. When I am cleaned up and depositing the weekly farm earnings in the bank, I am smiled at, doors are held open for me, and I am contributing to society. Money is clean, while dirt, or manure, or grease, is degrading. What's wrong with this picture? It's a reflection of the disdain we have for the actual mechanics of life. Symbols representing physical wealth are desirable, while the actual work of raw commodities, be they oil, grain, minerals, livestock, is undesirable. Physical labor that is actually productive is considered boring, chore-like, or even degrading, while physical labor in the form of sports or workouts at the gym is a desirable leisure activity.

Where conflicts arise between farm and golf course, between rural and suburban, it is generally because of a lack of common ground - pain intended - between the landscape of leisure and the landscape of production. This is where small scale, environmentally conscious farming can bridge the gap. No one wants a huge feedlot with thousands of cattle in the midst of their neighborhood. But a small herd of grazing animals can be integrated easily, and can contribute to the quality of life and diversity of suburban living. Community gardens and rooftop gardens contribute to environmental education of city dwellers. It almost goes without saying that farmers markets are a big boost to quality of life to any community lucky enough to have one. Is there any better place to see farmers as real people, and farming a profession worthy of respect? Is there any better way for consumers to gain access to fresh, high quality local food? Food co-ops should also be recognized as essential in the transformation of local food availability. Long before the giant chain stores climbed on the bandwagon -- or should we say hay wagon? -- member-owned co-ops were promoting and educating their members about the benefits of purchasing local products.

Ingrained attitudes toward farmers are changing, in part because of the local food movement. It's a byproduct that has gone unnoticed by the consumers that drive the effort. But the new generation of farmers will benefit by the growing numbers of shoppers who want to know who grows their food, and also how, why and where. I read an article in a farmer's trade journal in which the author claimed that consumers who think that buying food locally will help to reduce global warming are misguided. The author claimed that the amount of fossil fuels saved by reducing transportation is "trivial". The article pointed out some little-known ways to reduce global warming in our food purchases, including reducing cooking time by consumption of raw foods, reducing food waste in general by minimizing portion size, and minimizing gasoline powered trips to the grocery store. But the main idea that went unexplored was the social benefit of the local food movement. Even if it's impact on global warming is indeed trivial, (which I doubt), it's a mistake to ignore the less quantifiable benefits.

I have been a farmer for almost 30 years. In those years the organic movement has grown from an almost unheard of tiny niche of U.S. agriculture, to the vibrant, growing, vital minority it is today. The local food movement has exploded onto the awareness of the American consumer in the last 10 years, as evidenced by the rapid growth of farmers' markets, community-supported agriculture, and demand for locally grown in retail stores.

The subtle change that is most gratifying to me personally is the gaining respect that small farmers have earned, as they have become real people to an ever increasing number of consumers. I've witnessed the change in attitude face to face with people who purchase my produce. To some, I am an almost anonymous vendor, someone who exists to fulfill his or her needs. These are most likely to be the people who complain about high prices or are otherwise rude and dismissive. One older man, when hearing the price of his bag of tomatoes, proclaimed "That's highway robbery!" and set the bag down roughly, walking away. Now, the last I heard, highway robbery is being stopped at gunpoint and having your valuables forcefully removed from your possession. It has nothing in common with choosing whether or not to purchase certain salad ingredients. But this lack of respect for the farmers' livelihood, and appreciation of the time, skills and investment required to produce those tomatoes, has decreased exponentially as the familiarity between farmer and consumer has increased.

As I try to find hope in the future, for improving both environment and economy, I see the promising trend of respect for the profession of farming as a bright spot. If more young people can have access to affordable land and the education needed to become stewards of the soil, producing quality food, we will all benefit. Farmers have traditionally passed on their skills and resources from one generation to the next. I am proud to have taught, in one way or another, over 100 young people the skills of...
Organic Turfgrass Course Covers Soil Health, Water Conservation During the NOFA Summer Conference in Amherst, MA - also in NJ and CT

by Kathy Litchfield

Landscapers, homeowners, municipal employees, land conservation folks and anyone wanting to learn organic turfgrass management methods, is invited to attend the 5th annual NOFA Organic Lawn & Turf Course, being held for the first time during the NOFA Summer Conference!

On Friday, Aug. 7 from 8 a.m. to 5 p.m., the course will be held in the Student Union Ballroom of UMass Amherst, next to the Summer Conference Exhibitors’ Tent. The day-long course will cover all aspects of organic turfgrass management and maintenance, including the science behind the cultural practices of maintaining a beautiful, healthy, organic lawn, town common, park or athletic field.

The course is organized by the NOFA Organic Land Care Program, governed by a volunteer committee of scientists, organic land care professionals and activists. It is offered annually in August in three states, and will also be held on Tuesday, Aug. 18 at Duke Farms in Hillsborough, NJ and on Thursday, Aug. 20 at Manchester Community College in Manchester, CT. The curriculum for all three courses is the same, and aims to educate and support students in organic lawn and turfgrass care and maintenance. Each course includes 6.25 hours of education, an hour for lunch (provided) and an hour of Q&A with NOFA Accredited Organic Land Care Professionals.

This April, The NOFA Organic Land Care Program launched its new online searchable database of NOFA Accredited Land Care Professionals called AOLCP Search. This database was created to serve as a resource to homeowners and property managers searching for professionals who can maintain their property organically.

NOFA Professionals can personally access their account and update it at their convenience. Along with a description of their work and the services they provide, NOFA Organic Land Care Accredited Professionals (AOLCPs) can also post pictures of their work or crew.

To all the people who care deeply about where their food comes from, who have expressed appreciation for having access to quality produce, who go out of their way to buy local and who make eye contact with farmers, treating us with respect – Thank you! You have made a difference. Slowly, by tiny increments, change happens.

NOFA OLCs offer a variety of services such as design, pruning, installing and maintaining gardens, lawn maintenance, landscape construction and a host of other services. We are happy to be able to provide this invaluable resource for homeowners or property managers looking for specific organic services in their area! Visit AOLCP Search at www.organiclandcare.net/aolcp/ to find an AOLCP near you!

Send to: The Natural Farmer, 411 Sheldon Rd., Barre, MA 01005

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This issue contains news, features, and articles about organic growing in the Northeast, plus a special supplement on Microbes & Human Health