The Natural Farmer

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

On-Farm Research

Photo courtesy Susan Sauter

Taking soil samples was a key aspect of measuring the nitrogen in various plots

Inside This Issue

Dave Cassell, New Hampshire Small Farmer, Eyes 28th Straight Conference – Summer 2002

By Steve Lorenz

Perhaps the worst time New Hampshire subsistence farmer Dave Cassell ever had at a NOFA Summer Conference was in the early 90s when there were some bad rains. Cassell, who always camps, had set up his tent in a slight depression.

"Somehow the rain water slipped through, and it was just a big mess," he says in a way that makes you know he knows how to take the good with the bad.

But save that rather wet experience, Cassell has nothing but fond memories of the 27 NOFA summer conferences he's attended, which is to say, all of them.

"It's always a vacation for me," Cassell says. "There's good food, good thoughts. I'll take a walk around campus after dinner to see what wild stuff is growing, or I can walk by the book dealer, or see the keynote speaker. About the only problem I have is there's not enough time to do everything."

He only wishes the conference was bigger, that more people came to it or other organic growing conferences.

"It seems we're reaching the converted more than getting new people," he muses.

More than 50 years ago, when Cassell was growing up on a 430-acre Virginia farm, he says it was still a pretty good time for farmers. His family had dairy cows and beef cows, chickens. They grew grain and vegetables. In a word, the farm was diverse.

Not so nowadays, he laments, except for those in the organic movement.

And in his experiences flying and driving around the country as an internal auditor for the Navy, a job he retired from several years ago, Cassell saw fewer and fewer home gardens.

"You look for gardens in people's yards, and you don't see them. You see a lot of grass, but that's not real tasty."

In his trips to his old home in Virginia, he sees big developments going up, and no food getting put in. At the Summer Conference, Cassell says, there are plenty of people who aren't farmers or gardeners, but consumers.

"These are people 2, 3, 4, or 5 generations removed from farming," Cassell says. "And all you need to be is one to not know how things are done. But they're there, and the animals are there, and these consumers and their kids are getting good exposure to farm life. Maybe that's the key."

He says even though his travels have taken him all over the world, and he's chosen to live in New Hampshire, it's heartening to know he's not as 'far' from his childhood as he might have thought he'd be: on 10.5 acres, he grows much of his own food, and he heats with wood. Although it's not always less developed, Cassell likes New England: the seasons, the woods, the solitude.

And he likes the opportunity to go to the NOFA Summer Conference. In 27 years, he's seen the conference — and the organization — grow, get more organized, and grow some more.

"I always learned something every year, at the very least," Cassell says.

He recalls one particular year in the 80s at Johnson State College, where he saw "lots of innovative technology, driven by desperation."

The demonstrations included one man living way off the grid showing how he used an alternator from a police car and motorcycle parts to give him light. And other people showed slides of their walk-in refrigerator, which had a huge block of ice in the middle to keep everything cold throughout the year.

One thing Cassell looks forward to every year is the food at the conference, but he remembers when it was more "hit and miss."

"Early on, we prepared meals ourselves with volunteers and whatever contributions we received. You got what happened to be coming out."

In later years, when professional cooks prepared the meals, the food was great, and some chefs really got into organic food, making it an education for them as well as the conference participants, Cassell says.

Over the 27 years, Cassell saw lots of campuses — University of New Hampshire, Green Mountain College, Franklin Pierce, Williams— which all had their benefits and disadvantages. But Hampshire College, with its rural setting, its more central location, its own farming operations, is the right place to be, Cassell says.

"We really found our home in Amherst," he says.

As you'll find if you look at your registration form, the NOFA Summer Conference is not just about organic farming and gardening. That suits Dave Cassell just fine. In fact, that's what he likes most about it.

"It's the coming together of ideas," Cassell says. "From composting toilets and building technology, and it's tied into different religions and sexual orientations. Hearing Wally and Juanita Nelson talk about their voluntary simplicity. It's not just meticulous about organic gardening and farming. You're enriched by going much further around, around human life. Every year, it's a circle."

We hope the arrival of this summer issue of The Natural Farmer finds you all well. And if the weeds are getting to you, or the grubs, or maybe that drought, remember: the Summer Conference is just around the corner.

Dave Cassell is going for the 28th straight year. He says it's all a "gradual, steady learning process." Do you need refreshing in certain areas? Are you trying to expand your horizons or your farm operations? Or are you looking to change your life's work? Have you gone to almost as many conferences as Dave, or are you thinking about coming to your first? If you're the "converted" and you're coming, do you know any folks who aren't converted? Let's try to expand. In us all lies the possibility of growing the organic movement exponentially.

We're not going to lie: Just like Dave Cassell, you'll have conflicting workshops—two, maybe three or four at a time that you really must go to—but if that's the conflict of your summer, if that's the source of consternation, then that's a good thing. So come to Hampshire College in Amherst, Massachusetts on August 9th (or the 8th for the exciting pre-conference with Joel Salatin) and meet good people to share good

thoughts and good food. And maybe you'll see summer conference devotee Dave Cassell at the contradance. If you do, be sure to say hi.

Interstate Council Retreat Plans for NOFA's Future - Summer 2002

By Bill Duesing

In 2001, NOFA marked its 30th anniversary. Early in 2002, the NOFA Interstate Council held its first retreat.

The Interstate Council was formed when there were just two NOFA chapters — Vermont and New Hampshire. The Council oversaw joint NOFA activities — the Summer Conference and *The Natural Farmer (TNF)* — and it represented all NOFA members who didn't live in either of the two original NOFA states. In 1982, the Interstate Council awarded chapter status to Massachusetts and Connecticut, which each had over 50 NOFA members who requested it. In the next few years New York, Rhode Island and New Jersey each formed NOFA chapters, too.

The Council has had no staff. It has contracted with Jack Kittredge since 1988 to produce *TNF*, since 1987 with Massachusetts to produce the Summer Conference and with various NOFA members to oversee a fundraiser or produce a book proposal as needed. The only regular support the council receives is a $1500 fee from the Summer Conference.

The Council is made up of two representatives from each chapter. It meets four times a year to oversee the Summer Conference and *TNF*, as well as an enlarging portfolio of publishing, fundraising and communications ventures. Because of this growth, as well as the changes brought about in some states by the National Organic Program, the Council felt the need for a retreat to consider the organization and the big picture. The Council hired Julie Rawson to plan a retreat.

Representatives from each of the seven state chapters were invited to spend the weekend of March 22, 23 and 24 at the Woolman Hill Retreat Center in Deerfield, Massachusetts, reviewing NOFA history, sharing information about chapter programs and administration and planning for future NOFA work that would benefit from collaboration among the chapters.

All chapters sent representatives except Rhode Island, which was sorely missed. Those attending and their reports of chapter activities provide a good picture of NOFA today.

Who was there and state reports

Vermont was represented by **Kirsten Bower**, financial manager, **John Cleary**, certification administrator and board member **Camilla Roberts**. Vermont has 750-800 members, certifies 23,000 acres on 230 farms (including 55 dairy farms) has a budget of $350,000, four full time staff, five part time staff, a full time consultant and eight inspectors. The chapter's 11 programs include apprenticeship, bulk order, certification, loan fund for farmers, farm share, farmers market development, CSA support, ag education, dairy tech, social action, winter conference and summer workshops. Vermont NOFA is forming a limited liability corporation to take over certification.

New Hampshire was represented by board president **Dan Holmes**, council representative **Polly MacNicol**, and part-time staff person, **Elizabeth Obelenus**. NOFA NH has 276 members, a budget of about $13,000, a bulk order, newsletter and holds workshops and summer farm tours. The state government runs the certification program in New Hampshire.

Massachusetts was represented by board president **Jonathan von Ranson**, by council representatives **Michael O'Bannon** and **Tom Johnson**, by *TNF* editor **Jack Kittredge** and by NOFA Mass coordinator and Summer Conference coordinator **Julie Rawson**. Massachusetts has 750 members and 60 certified farms, a budget of $250,000 (including $100,000 for the Summer Conference and $65,000 for the bulk order program with CT and RI) and has many staff (from very part time to three at half time) to operate 22 programs. NOFA/Mass has spun off its certification program to Massachusetts Independent Certifiers, Inc. which will use the NOFA/Mass label.

Connecticut was represented by board president **Peter Rothenberg**, board members **Marion Griswold** and **Erin Amezzane** and staff person **Bill Duesing**. Connecticut has 350-400 members, 55 certified farms, an $80,000 budget, one full time and three part time contractors for its certification, education, conference and membership programs. Connecticut works with Massachusetts on the very successful CT/Mass NOFA Organic Land Care Program. This year, CT NOFA will turn its certification program over to the Connecticut Department of Agriculture.

New York is a big state. It was represented by council rep **Steve Gilman**, executive director **Sarah Johnston**, **Dick DeGraff**, state council president, **Elizabeth Henderson**, who represents NOFA on various national and international organic organizations and **Kay Magilavy** who is the NOFA web site coordinator. NOFA NY has between 900 and 1300 members, 203 certified farms, a $180,000 budget for certification (with 2.5 staff plus part-time inspectors) and a $140,000 budget (with the director and a full-time farm educator) for the rest of the organization. NY's programs include a two-day winter conference, a Transitions conference, a seed growing and breeding project and a fund-raiser dinner. New York is creating a limited liability corporation to carry on certification.

New Jersey was represented by executive director **Karen Andersen** and board president **Stephanie Harris**. Currently the chapter has 350 members, 69 certified farms, a budget of $160,000 for 2002 with three full-time, two part-time staff and a few consultants. NOFA NJ will run the New Jersey State certification program with funds from the state.

On to the retreat…

We reviewed purposes of the corporation (see box) and the Council's history and current programs in addition to *TNF* and the Conference, now in its 28th year. The Council has published The Real Dirt (1994 and reprinted in 2002), four reports on the "Farmer to Farmer Information Exchange" and a "CSA Farm Network" directory. All of these resulted from an individual with an idea and funding from USDA's SARE (Sustainable Agriculture Research and Education) program.

The Council has also raised funds to support its work and to share with the chapters, including from 5% and coupon days at Bread and Circus/Whole Foods stores, from Margot Dilmaghani's "Gardens of the Heart" CD and from the "Tofu Tollbooth".

The Council has tried to encourage cooperation among the certifiers in the northeast through the Northeast Interstate Organic Certification Committee. It has supported some of Elizabeth Henderson's travel to national meetings regarding the NOP, and some state certifier travel to a national meeting.

That was all Friday night.

On Saturday we evaluated current projects, studied organizational development and strategic planning, discussed political and social action (what chapters are doing, what the council has and could do and our limitations as a non-profit educational organization). Before we stopped on Saturday we brainstormed future Council projects and set priorities.

On Sunday morning, the group worked to put a plan and funding in place to accomplish the priorities we'd discovered the day before.

But first, there were decisions to make on an immediate project. NOFA had just received a $33,000 grant from SARE to create 8 more books in the Organic Principles and Practices Handbook Series started by NOFA/Mass and edited by Jonathan von Ransom. The Council has pledged $8,000 toward the project and NOFA/Mass will contribute $11,000.

Chelsea Green Publishing Company had already expressed interest in distributing the series, including reprints of the Soil and Weed Management volumes already published. Now they were offering to publish them, too, providing a larger print run and wider distribution. The assembled representatives chose to co-publish with Chelsea Green.

And, on to planning:

Website: Although the Council has had a web site with links to the state chapters for quite a while, it had no content. After reviewing a number of applications and viewing the web work of a number of applicants, the council contracted with Paul Kittredge to provide 20 hours per month of web content work. Check out the improved site at www.nofaic.org

Policy: A policy committee was created to coordinate the development of NOFA policies regarding national and international issues. Elizabeth Henderson will represent NOFA at the International Federation of Organic Agriculture Movements (IFOAM) meeting in Vancouver in August with support from the Council. Liz is very anxious to pass her knowledge on to a capable person interested in national and international policy and the meetings where they are hashed out. Call her at 315 331-9029 or email ehendrsn@redsuspenders.com if you are a budding organic policy wonk and want to train with one of the best in the country. New York and Vermont have passed policy resolutions at their annual meetings and will share them with the rest of the states.

Local Organic Campaign committee: There was a lot of interest in finding a way for the states to work together to promote local and organic food in the northeast. A committee was established to create a plan for the next council meeting.

Insurance: Tom Johnson has connections in the insurance industry and agreed to check out the possibility of the Council being able to help provide affordable group insurance for NOFA members or farms.

Whole Foods/Bread and Circus fundraiser and farmer relations: The retreat participants agreed that if we are to work with these stores to raise money, that we should also work with them to encourage more purchasing from local, organic farmers and work with other chains, too. Two thousand dollars was allocated for planning work on this project. Tom Johnson of Massachusetts will coordinate this job.

The Natural Farmer and the Summer Conference didn't need any attention at this time. They are in the hands of skilled staff people with adequate funding.

Strategic Planning: We agreed that this would be useful for our organization and that a committee should present a proposal at the next council meeting.

Internal communications: To encourage better communication, we agreed that each chapter should send its newsletter to five key people in the other chapters.

Farmer to Farmer conference: Although this wasn't high on our priority list, there are some intriguing funding possibilities with possible connections to creating the content for the Handbook Series.

Winter Conference Timing: The Council has long hoped to spread out the state winter conferences to avoid conflicts in getting speakers and attracting attendees. As of now, NY, NJ and MA all have their conferences on the 4th weekend in January. MA will try to move its conference to the 1st weekend in February. Vermont's conference is the 2nd weekend in February and CT's is the 1st weekend in March.

Leadership Training: We will investigate strategies for training a new generation of organic and sustainable agriculture leaders in the Northeast.

Chapter Support: It was agreed to allocate $2,000 each to the RI and NH chapters for them to use to pay for training and consultants to help get over the organizational rough spots they are now in.

Part time staff: The assembled representatives felt that some paid coordination was critical to manage the many projects that the Council has going at this time. I was hired for 14 hours a month until November to keep all the balls in the air.

Certification coordination: A small committee was established to find ways for the certification programs to work together in helpful ways.

Other stuff: It was decided where to store the NOFA archives, important documents and what the chapters should share with each other.

That seems like quite a bit decided upon and started for one weekend. It was a lot of meeting. However, the weekend also provided a wonderful opportunity to meet more of the talented and dedicated people who are involved with NOFA and to enjoy delicious meals together. The early risers even got to walk on some of the many trails of the very hospitable and beautiful retreat center.

Many thanks go to Annie Hassett, who planned and prepared delicious meals, provided some great music and led a group Chi Gong exercise Sunday morning, to Juanita Nelson who talked to us about a principled life on Saturday evening and answered questions, as well as to Julie for organizing the weekend and to all those who gave up a spring weekend to plan for NOFA's future.

If you see the place where you could use your talents to advance NOFA's work, let me know at 203-888-5146, or bduesing@cs.com.

The council will meet next on Sunday morning at the Summer Conference. NOFA members are welcome. Since the meeting is just one workshop period long, the agenda is usually short. If you have something you think the council should consider, contact me or your council representative ahead of time.

From the NOFA Council's articles of incorporation:

The purposes for which the corporation is to be formed are:
to educate its membership and the public about the benefits of natural, organic, ecological agriculture, including the implications relating to the health of all life on the earth; to provide marketing and agricultural buying services for growers; to provide educational and informational services pertaining to the natural husbandry of the earth that is permanent, renewable, and sustainable; to promote the growth of local, cooperative farm organizations which emphasize ecologically sustainable agricultural principles; to demonstrate through pilot projects the feasibility and benefits of restoring local and regional agriculture. NOFA will provide these services in a non-discriminatory manner consistent with its not-for-profit status.

Organic Agriculture in the 2002 Farm Bill - Summer 2002

By Elizabeth Henderson

With the toothache of the Organic Farm Production Act (OFPA) to deal with, the National Campaign for Sustainable Agriculture Organic Committee has been very cautious about further involvement with USDA. For the 2002 Farm Bill, our committee developed a list of 8 Programmatic Recommendations: seven out of the eight actually passed through the legislative gauntlet and emerged in recognizable form.

Here is a quick summary. The Farm Bill:

1. Provides $5 million in funding starting in 2002 and available until expended for a national organic certification cost-share program to assist producers and handlers of agricultural products in obtaining certification under the National Organic Program. (We had asked for $3.5 million a year.)

2. Expands the organic agriculture research and extension initiative to include on-farm research and development for working organic farms, determination of desirable traits for organic commodities, and identification of marketing and policy constraints on the expansion of organic agriculture. $15 million is provided to fund these organic farming research initiatives, $3 million per year for 2003-2007. (We had asked for $45 million, but $15 is a good start.)

3. Requires the Secretary of Agriculture to ensure that segregated data on the production and marketing of organic agricultural products is included in the ongoing baseline of data collection regarding agricultural production and marketing, and to facilitate access to organic research conducted outside of the United States. (We had asked that USDA specifically track the impact of the National Organic Program on small farms.)

4. Exempts farmers who produce and market 100% organic products from paying an assessment under commodity promotion laws. (The Organic Trade Association had pushed for an organic promotion and marketing check-off program. None of the organic farming associations agreed with the OTA on the need for this. Perhaps Leahy listened to NOFA-VT instead of OTA.)

5. Establishes the Conservation Security Program. See the other article on the Farm Bill for more detail on this one. We will have to watchdog the Rule-making to be sure that organic farms are included and that the farm plan written for organic certification can also serve as a conservation whole farm plan, giving organic farms access to tier three funding, the highest level.

6. Acknowledges the importance of the preservation of genetic resources and public plant breeding. (We had also asked for increased funding for public breeders.)

We asked that all USDA personnel receive training in organic agriculture. Outside the Farm Bill process, the NRCS recently signed a memo of agreement with the OTA to train its staff in organic agriculture.

Our request for mandatory seed testing and labeling of GMOs, and the accreditation of GMO testing labs, did not go anywhere in the Farm Bill. This is a big loss for us, especially since the bill includes $15 million a year to "enhance foreign acceptance of agricultural biotechnology and US agricultural products developed through biotechnology."

The Farm Bill also contains report language related to organic transition and the issue of the availability of organic feed: "The Managers urge the Secretary to assist producers, processors and firms interested in shifting production into organic products in making this transition and, to the extent possible, work to eliminate unnecessary, over burdensome and any other barriers to this process. As soon as practicable, the Secretary is urged to undertake a study to ascertain the availability of key inputs into organic production, including the availability of organically produced feedstuffs for the organic production of livestock and poultry." (This final point may actually be a victory in disguise. A big chicken producer in Georgia has been pressuring USDA to allow the production of organic chickens with less than 100% organic feed. Field Dale Farms in Georgia is already marketing 300,000 organic chickens a week. Its certifier, the Georgia Crop Improvement Association, a new outfit, allows an exemption from the 100% feed requirement.)

And another little victory: the Farm Bill contains no language related to organic fish. There has been an on-going effort by Senator Stevens of Alaska to have wild ocean fish declared organic.

The NCSA Organic Committee, which I co-chair with Michael Sligh of the Rural Advancement Foundation International (RAFIUSA), has been meeting intensively since the first version of the Federal organic rule outraged us all back in 1997. We consult by conference call every few weeks and meet face to face three or four times a year, usually in conjunction with a meeting of the NOSB. The Organic Committee includes over 40 members, representatives of organic farming associations, certification programs, consumer and environmental groups from all over the country. A steering committee of 8 oversees the work of the larger group. Besides Michael and me, the members are Mark Lipson of the Organic Farm Research Foundation, Margaret Mellon of the Union of Concerned Scientists, Melanie Adcock, a vet and for many years on the staff of the Humane Society of the US, Joe Mendelson, a lawyer with the International Center for Technology Development, Roger Blobaum of Organic Watch and a member of the IFOAM accreditation committee, and Nancy Taylor, a farmer from Idaho. Marty Mesh of Florida Organic Growers and chair of the OTA Organic Certifiers Council, Jim Riddle, vice chair of the NOSB and founding member of the Independent Organic Inspectors Association, and Lynn Coody, presently a private consultant after many years as a technical advisor to organic farmers with Oregon Tilth, often join us. Liana Hoodes, until recently Associate Director of NCSA, staffs the committee, setting up calls, helping with agendas, arranging for meetings, communicating with other NCSA initiatives, and generally enabling us to work effectively.

Restoring Our Seed - Summer 2002

By CR Lawn, Project Coordinator

Did you ever wonder how generations of farmers without advanced degrees not only produced their own seed, but developed the food-crops that we eat today? Until a few hundred years ago seed production was an integral part of farming. Although we have created a vital organic movement, we have almost forgotten an essential aspect. Seeds are too important to be left in the hands of the giant trans-national corporations.

A group of New England farmers and small seed companies has come together to reclaim our seed heritage. We are pleased to announce that SARE has funded Restoring Our Seed to strengthen our local seed network and to provide farmers and gardeners with knowledge for skilled organic seed production.

Our Seed School will cover the basic seasonal aspects of organic seed crop production: a winter seminar on whole farm seed cropping systems, summer field days at demonstration farms on selecting for local adaptability and disease resistance, and a fall seed harvesting and cleaning workshop. The Seed School will address new marketing opportunities for farm-produced certified organic seed stimulated by the new organic rule. Learn ways that growing seed can diversify your farm and increase your profits.

The Seed School will be conducted in Maine, 2002-3, Vermont, 2003-4, and Massachusetts, 2004-5.

Join us in fascinating workshops that cover:

- how to integrate growing seed into your existing farm production,
- how to restore native habitats to bring in beneficial insects and pollinators,
- proper spacing, isolation distances, and populations for robust seed crops,
- how to detect off-types and diseased plants,
- how to rogue and select to improve varieties for local adaptation,
- when to harvest, and how efficiently to clean and store your seeds,
- farmer-research projects to select for increasing plant yield, cold-hardiness and disease resistance, and the role of native habitats,
- community education and youth projects on the power of saving and growing seed.

Our website www.growseed.net will post details and dates of activities and Seed School workshops with contributions of New England's master seed growers. We invite your contributions, articles, stories, photos, and ideas how Restoring Our Seed can work for you. Internship opportunities and needs will be posted. This project is supported in part by the funds of the USDA Cooperative Agreement 2002-38640-11740.

Winter Seminar
Seed Production and Crop Improvement in Whole Farm Systems
John Navazio and Frank Morton

This seminar will incorporate aspects of John's "Fundamentals of Crop Improvement in Organic Agriculture" and Frank's presentations on "Whole Farm Systems for Crop Production" - to provide seed growers with basic knowledge and skills for:

- organic seed production, and
- selection and breeding to adapt crops for sustainable farming in New England.

A key aspect of a truly sustainable, bioregional agriculture is to identify and improve suitable crop varieties through farmer selection of seed stocks. These farmer-bred varieties will then excel under the environmental conditions and cultural techniques used by the farmers of that bioregion. This is in sharp contrast to our current reliance on crop varieties bred under chemically intensive conventional farm operations.

Summer
Field Days in Selection and Disease Prevention
The art and science of field selection for local adaptability and disease resistance: roguing, population genetics, disease identification and biocontrols and general management to harvest.

Fall
Seed Harvest, Cleaning and Conditioning
Seed harvesting, cleaning, conditioning, processing and storage techniques, germination and seedling testing, organic treatments for seed-borne disease, strategies to combine use of vegetables with sale of their seed.

Seed Stewards Education Program
Eli Kaufman
Seed-saving, once an essential skill passed from generation to generation by farmers and gardeners, is almost a lost art, as is the farming heritage out of which it arose. By growing and saving seeds, each person can become a link to restore food and farming traditions in their own community. Seed Stewards involves young people in action-projects to restore wild habitats, grow seed, and breed vegetable varieties to nourish a sustainable food system.

This project is supported in part by the funds of the USDA cooperative agreement 2002-38640-11740. If you have any questions or thoughts, feel free to contact me by email: crlawn@fedcoseeds.com

Farmers Made the Difference in Vermont Town Meeting Votes Against GMOs - Summer 2002

By Sandy Snyder, Westfield, Vermont

For years the public and social organizations in Vermont have been speaking out about Genetically Modified Organisms (GMOs), while some conventional farmers continued to maintain they should be permitted to plant GMO seeds. It was a stalemate.

No one thing was the magic bullet that led to change in Vermont, but here is a list of some of the things I know about:

- Social change organizations are loosely connected and share information with each other. For example - Hunger Mountain Coop (food store) cooperated with Rural Vermont (a farmers' organization) to identify which foods sold in the Coop were GMO-free.

- Vermont Genetic Engineering Action Network (GEAN) is organized specifically to focus on the GMO issue.

- Multiple organizations, including NOFA-VT, invited Dr. Margaret Mellon of the Union of Concerned Scientists to come and speak about GMOs at the Vermont State House. Dr. Mellon called for large sections of the country to be "GMO-free" so we do not lose our older seed varieties from cross-pollination.

- Complaint was made to Hunger Mountain Coop that Roundup inhibits three essential amino acids needed by humans and cows. Humans and cows can not manufacture these amino acids, but must get them from their food supply. Someone found out and wrote a humorous article in the local newspaper about this and other issues regarding the coop.

- Monsanto initiated law suits in Canada, the US, and elsewhere against farmers who never planted GMO seeds, but had GMO genes in their crops from cross-pollination. Monsanto claims they "own" the genes and farmers must pay regardless of how the genes got there.

- Monsanto developed "technology agreements" which are contracts farmers must sign when they buy GMO seeds. The maximum amount farmers can collect from Monsanto if the seeds fail is the cost of the seeds.

- The Farm Bureau and the Vermont Grocers Association continue to support use of GMOs.

- NOFA-VT, Rural Vermont, Vermont GEAN, The Institute for Social Ecology and others got together and developed a Town by Town campaign asking most especially that farmers tell their local governments they favored no GMOs.

- Collectively the organizations developed:
    a. a sample petition
    b. a list of state newspapers and information on how to write articles
    c. ideas for how to word local petitions
    d. legal guidelines for how to get the petitions included on town meeting agendas

e. four or five "reprints" of articles explaining issues surrounding GMOs.

- Rural Vermont, an organization which serves many conventional farmers, began writing quality newsletters about farm economics, mad cow disease, and problems farmers face when planting GMOs.
- NOFA-VT and others wrote informative articles about GMOs in their newsletters and asked farmers to contact government officials and told how to get petition packets.
- Letters about GMOs were sent to local papers by local people
- In Westfield (my town), a petition was circulated and filed on time. Then the town farmers, both conventional and organic, had a public meeting prior to town meeting day. This was written about in two local newspapers.
- On town meeting day, town officials were worried they could not "enforce" a moratorium. So the wording was changed from "town selectmen shall declare a moratorium" to "citizens shall declare a moratorium". This passed on a voice vote.
- 31 Vermont towns discussed GMOs on town meeting day (March 5). 28 passed resolutions against genetic engineering. Two towns tables the resolutions and one rejected it. Four Vermont towns already had resolution in place from last year. According to the Institute for Social Ecology, ten other municipalities in the US are also on record as being against GMOs.

Persons who would like information about a sample petition packet should contact the Institute for Social Ecology Biotechnology Project, 118 Maple Hill Rd., Plainfield, VT 05667, (802) 454-7137, info@nerage.org

For copies of the newsletters written by Rural Vermont call (802) 223-7222 or write 15 Barre St,, Montpelier, VT 05602.

Fill the Full Man's Plate: Report on the 2002 Farm Bill - Summer 2002
Special Supplement on On-Farm Research

By Elizabeth Henderson

Have you ever watched a hand wrestling match between a very determined ten year old and a professional prize fighter? The odds are 1000 to 1 against the boy. He is young and inexperienced, his hand is small and his arm short. His only assets are youth, optimism and fierce drive. The combatants clasp hands. The boy strains with all his might. For a few exhilarating moments, he holds back the downward pressure of the mature, seasoned athlete's arm. Then the inevitable occurs: in a flash of power, the pro crushes the boy's arm to the mat. That is kind of what my experience has been watching the 2002 Farm Bill unfold. The growing grass roots movement for sustainable agriculture is that valiant ten year old. And we deserve a lot of credit for persistence, nerve and resourcefulness. In the end, we won a few crumbs from the glutton's table, and while that is better than nothing, we have to face the reality that we have a long way to go to achieve social justice, equity, and community food security in federal farm policy.

After months of haggling, the Senate and House conferees agreed upon a Farm Bill. The 2002 Farm Bill, a compendious compilation a thousand pages long of food and farm legislation covering commodity payments, rural development, food stamps, nutrition, agricultural research, and conservation, will last 6 years. I think if we asked most readers of TNF what the big issues in food and farm policy are, they might answer - saving family-scale farms, feeding the hungry, shifting investments from bioengineering to biological solutions, stopping the circle of poison, and reducing farm chemicals. The Congressional conferees, however, had other fish to fry. Should they set the loan rate for soy beans at $5.05 or $5.01, and for corn at $1.98 or $2.02? Till these burning questions were answered, everything else hung in the balance.

The commodity title, the center-piece of the Farm Bill and the biggest chunk of taxpayer money, determines the allocation and size of payments to farms which produce the program crops - corn, soybeans, grains, cotton, sugar and peanuts. This bill will not change the historic pattern of making the biggest payments to the biggest farms.

For those of you who have not been following every twist and turn in this saga, let me provide some background information. The National Campaign for Sustainable Agriculture is a coalition of hundreds of organizations from around the country, including organic farming associations, the National Farmers Union, the National Family Farm Coalition, the Rural Coalition, consumer and environmental groups, the Humane Society and other animal rights groups, faith organizations, community food security groups, and others. The NOFAs have been involved since its inception as the Dialogue for Sustainable Agriculture in 1992. The NCSA does not have a party line. Member organizations gather annually to develop policy priorities based on their own priorities. In the words of NCSA Executive Director Kathy Lawrence, "what distinguishes the National Campaign is:

- *Practical, concrete, policy initiatives* borne of grassroots experience and ingenuity, coupled with in-depth knowledge of the federal legislative process;
- *The strength, diversity, expertise, and passion* of our grassroots and national partners, *committed to making under-represented voices heard*; and
- A *holistic, inclusive vision of sustainable agriculture,* based on the integration of economic, environmental, and social justice."

This year's annual meeting of the National Campaign for Sustainable Agriculture (NCSA) in February opened on a note of excitement. Throughout the fall and winter, the NCSA staff had been coordinating the efforts of member organizations around the country to break the "Freedom to Fail" mold of the old Farm Bill and to cast sustainability for family farms as the centerpiece of the new one. The major national environmental organizations had finally awakened to the significance of agriculture as an environmental issue and committed their resources to work on changing the Farm Bill. As a result, for the first time, a little of the big Farm bill money for commodity programs will go instead for conservation to farms of any size and with any crops through the Conservation Security Program.

Against all expectations, the Senate version of the Farm Bill incorporated measures that would limit the power of the few large meat packing companies and increase the chances that small farmers would be able to attain fair contracts. Although the House hurried its version of the Farm Bill through without any grassroots participation, the House-Senate Conference that negotiated the final bill adopted a few of the most important gains from the Senate version. However, in the lengthy back room dealing amongst the conferees, the big boys muscled their way through again. Despite motions to instruct from the House, which passed with large margins, the conferees paid no attention to the demands to limit payments and restrict packer ownership of livestock. "Fill the full man's plate. Hosanna!" is the central theme of the 2002 Farm Bill.

Below is a summary of farm bill "wins" and "losses" written by the staff of the National Campaign for Sustainable Agriculture, incorporating summaries from Campaign for Contract Agriculture Reform, the Campaign for Family Farms, the Community Food Security Coalition, Midwest Sustainable Agriculture Working Group/Sustainable Agriculture Coalition, National Family Farm Coalition, and Rural Coalition/Coalicion Rural. All of these groups cooperated in the Farm Bill struggle.

Wins and Losses in the 2002 Farm Bill

In late February, partners within the National Campaign for Sustainable Agriculture developed a summary of what the National Campaign would actively fight for in the farm bill conference committee. The following summary of our wins and losses in this farm bill is built upon this summary. We had many major wins, and a few stinging losses.

The National Campaign does not support the farm bill passed by Congress because we feel the huge subsidies for the biggest farming and factory livestock operations are glaring examples of corporate welfare policy that will hurt farm and ranch communities and are not in our true national interest.
However, the sustainable agriculture movement achieved some major victories and had a profound impact on the quality of the farm bill debate. The issues that were the biggest sources of debate — real payment limitations, contract agriculture reforms, prohibition against large meatpacker ownership of livestock, the important new Conservation Security Program — were our issues. We won the Conservation Security Program and many other important provisions, and we will continue to fight for those issues we lost.

Farm Bill Victories

Conservation Security Program This is a visionary new farm program that bridges a gap between commodity programs and land retirement programs, providing financial incentives for conservation on working lands, needed support for family farms and ranches, and environmental benefits such as clean water and air for all Americans, both rural and urban alike.

WIN: Full Conservation Security Program will be established as an entitlement program, making it the first conservation program to be on par with commodity programs (i.e. if a farmer or rancher qualifies, she or he can participate in the program).

Beginning Farmer and Rancher Provisions These secure a new generation of farmers and ranchers, support the beginning farmer and rancher development program, credit program reforms and targeted incentives in the Senate bill. There are twice as many farmers over age 65 as under age 35, and in the 140 years of USDA's existence there has not been a USDA program for new farmers or ranchers (except FSA loan programs). $15 million per year mandatory spending on this program is a small but vital investment in the future of U.S. agriculture.

WIN: The farm bill establishes the Beginning Farmer and Rancher Development Program, but funding will be discretionary (we'll have to fight for it in annual appropriations process). The farm bill also reforms the credit title to improve programs for beginning farmers and ranchers, and the bill includes cost-share assistance to help beginning farmers and ranchers participate in conservation programs.

Value-Added Market Development Program This works for small and mid-size farms that are trying new and alternative ways to increase farm income.

WIN: Hard-won language was adopted to allow the Value-Added Market Development Program to include how an item is produced (e.g. grass-fed, free range, organic, etc.) to qualify as value-added.

Mandatory Country of Origin Labeling Provisions require mandatory labeling of meat, produce, peanuts and farm raised fish by its country of origin to allow U.S. consumers to know and choose the origin of their food.

WIN: Country of origin labeling will be voluntary this year and next, but will become mandatory for all beef, lamb, pork, wild and farm-raised fish, peanuts, and produce (fruits and vegetables).

Food Stamps for Legal Immigrants Restores food stamp benefits to legal immigrants in the Senate farm bill.

WIN: This provision is in the farm bill.

USDA Equity and Justice Reforms These provisions increase accountability and transparency in all USDA programs and services, including support for the USDA Assistant Secretary for Civil Rights.

WIN: The farm bill authorizes the creation of a USDA Assistant Secretary for Civil Rights and puts in place important reforms for County Committee election procedures. The USDA will also be required to better track and evaluate participation by limited resource and socially disadvantaged farmers in USDA programs.

Outreach and Assistance for Socially Disadvantaged Farmers and Ranchers Strengthens and expands support for Outreach and Assistance for Socially Disadvantaged Farmers and Ranchers (often referred to as Section 2501) and the Indian Extension Program.

WIN: Funding increased (but still discretionary) for Outreach and Assistance for Socially Disadvantaged Farmers and Ranchers and historically black land-grant colleges and other minority-serving land-grant institutions, including the Indian Extension Program.

National Organic Certification Cost Share Program This provides assistance to small farmers who choose to implement environmentally sound practices in compliance with the USDA's National Organic Program. $3.5 million per year.

WIN: The final conference agreement kept the Senate farm bill language allowing a maximum federal cost share of 75% and the maximum payment made to a producer or handler under this provision is $500. However, the conference report cut funding for the National Organic Cost Share Program to $5 million total over the life of the farm bill. This is in addition to $1 million already made available through the crop insurance bill for the Northeastern states.

Community Food Projects Increased funding for assistance to Community Food Projects begins at $4 million and moves to $7.5 million.

WIN: Community Food Projects will receive $5 million in mandatory funding per year for the six years of the Farm Bill. The farm bill also improves the program by allowing for planning grants for comprehensive, multi-stakeholder solutions including policy councils, mini-grants and support for a national clearinghouse on "Innovative Programs to Address Common Community Problems."

Purchase of Locally Produced Foods Section 458 of the Nutrition Title in the Senate bill provided for Purchase of Locally Produced Foods.

WIN: Institutions participating in the National School Lunch and Breakfast programs are encouraged to purchase local foods where practicable, and a seed grant fund was authorized at $400,000 for 200 institutions. This funding will need to be appropriated by a separate appropriations bill.

Farmers' Market Nutrition Programs Provisions in the Senate bill provided $15 million for the WIC Farmers Market Nutrition Program this year and raised funding for the Senior Farmers Market Nutrition Program to at least $25 million.

WIN: The WIC FMNP will receive an additional $15 million in the current fiscal year 2002 to substitute for funds that were withheld to support caseload in the regular WIC Program. Along with the $10 million released in January, this infusion of funding will take the program to a $25 million funding level, thus allowing current states and tribes to expand their programs and potentially allowing five new jurisdictions (Arizona, Five Sandoval Indian Pueblos in New Mexico, Hawaii, Montana, and Puerto Rico) that applied for federal funds this year to join the FMNP. The Senior FMNP is authorized for the full six years of the bill, with mandatory funding of $15 million per year.

Farmworker Assistance Senate provisions increased funding for emergency grants to assist low-income migrant and seasonal farmworkers.

WIN: The bill removes restrictions on the amount of money that can be put into emergency grants to assist low-income migrant and seasonal farmworkers in the case of disasters and authorizes up to $10 million dollars for grants to nonprofit organizations, coalitions and institutions to train farmworkers in new technologies and specialty skills necessary for high value crops.

Farmers Market Promotion Program There was $25 million mandatory funding in the Senate bill for the Farmers Market Promotion Program.

WIN: The Farmers Market Promotion Program is established in the farm bill to make grants to eligible entities to establish, expand and promote farmers' markets but the funding is discretionary (we'll have to fight for it in the annual appropriations process).

Farm Bill Losses

Real Payment Limitations We supported payment limitations in the Senate bill because they set real limits, close loopholes and restore a measure of fairness, integrity and equity to farm programs. We are concerned about the amount of farm income that is dependent upon government payments. We need to close loopholes, and enforce real limits (as the Senate bill does), and go in the direction of farmers getting a fair price from the marketplace.

LOSS: Despite the fact that these payment limitation provisions were passed by a large majority on the Senate floor and the House voted by a large margin to urge the House conferees to support the Senate provisions, these real payment limitations were dropped from the farm bill.

Ban Against Meatpacker Ownership of Livestock Senate provisions banned ownership of livestock by large meatpackers to limit their market power and price manipulation, and improve market competition for cattle, hogs and lamb.

LOSS: Despite being passed as an amendment twice on the Senate floor and growing bi-partisan support in the House, the farm bill conferees dropped this provision.

Contract Agriculture Reforms Contract farmers need basic standards in fairness: we supported the Senate contract reform provisions to permit farmers to share terms of contracts with family and trusted advisors, and prohibit forced arbitration clauses.

LOSS and WIN: The most significant contract ag reform prohibition against the use of forced arbitration clauses in contracts (or giving farmers a choice in resolution of disputes with industry arbitration or lawsuit) was dropped. However, in a partial win new reforms that will allow producers to share contract information with family and key advisors, and that will give the Grain Inspectors, Packers and Stockyards Administration oversight over pork production contracts, are in the farm bill.

Rural Entrepreneurs and Microenterprise Assistance Program We liked the Rural Entrepreneurs and Microenterprise Assistance Program in the Senate bill because it helps low and moderate income individuals acquire the skills and financing necessary to establish new, small businesses in rural areas and receive continuing technical assistance as the individuals begin operating their new businesses. Support $10 million per year mandatory funding of this essential program.

LOSS: Included in the Senate farm bill, this provision was dropped by the conferees.

Organic Research Program The Organic Research Program in the Senate bill provided federal funds for research on production practices that protect land and water resources and help producers access growing markets. - $45 million total

LOSS and WIN: The farm bill will not establish the Organic Research Program but we did win funding for the Organic Research Initiative which will include organic breeding, marketing, and policy research as priority areas within USDA Research, Education and Economics programs make available $3 million (mandatory) annually for grants.

EQIP (Environmental Quality Incentives Program) Issues surrounding this program were not included on our list of issues created back in February because the battle to maintain its integrity and keep it from becoming a major subsidy for the biggest factory livestock production operations was lost in the House and Senate. In the end, hard work throughout the movement kept the program from becoming a complete giveaway with no effective limitation on payments. EQIP now has a $450,000 per producer payment limit over life of the bill (6 years). This is obscenely high, but the movement fought an attempt by the conferees to effectively remove limits whereby some large operations would be able to capture more than $1 million

in EQIP dollars to subsidize their waste management costs. Our position is that if big industry insists on further concentrating livestock production and producing animals in massive confinement operations, they, not the taxpayer, should pick up the tab for meeting environmental standards.

Since there is no consensus among dairy farmers from the various regions of the country, the National Campaign did not take a position on dairy price supports. Northeast congressional delegations worked together to revive the Dairy compact. In vain. The compact went down to defeat in both House and Senate. In its place, Senator Leahy of Vermont devised a compromise solution: a floor price of $16.94 per hundredweight on fluid milk (approximately $1.46 a gallon). Whenever the price dips below $16.94, the government will pay dairy farmers the difference between $16.94 and the lower price. The payments will be retroactive to December 2001. Leahy and the House conferees disagreed over the maximum annual payment any one dairy farmer could receive, and compromised on payments for 2.4 million pounds of milk (the annual production from130 cows). For the dairy farmers, the effect will be support similar to the compact, but the taxpayer picks up the bill instead of the processors.

The rhetoric that spews from our political leaders might lead you to think that the subsidies for milk and grains support family farmers. Think again - the big winners in the Farm Bill game are the milk processors and the five remaining grain dealers who handle over 80% of the grain trade for the entire world.

So What Kinds of Questions are Farmers Researching on Their Farms? - Summer 2002
Special Supplement on On-Farm Research

By Jack Kittredge

From my experience, farmers are a curious lot. They study the world around them with a questioning eye and are always trying to figure out how to do something better. This supplement honors organic farmers who have put in a little extra time and effort to formalize their curiosity into a research project. Many have been encouraged to do so by getting a small grant from a farming research support group, primarily SARE (The USDA's Sustainable Agriculture Research & Education program) or OFRF (the Organic Farming Research Foundation).

Leafing through farmers' recent reports on research they did in cooperation with these groups is very interesting. To get the full project report you may have to contact OFRF (11 are available online as .pdf files, but for the rest send a suggested $2 donation) or the appropriate regional SARE office (tax-payer supported and thus free). But anyone online can easily get summaries of these reports from OFRF (www.ofrf.org) or SARE (www.sare.org/projects/ – although the database is currently under construction and you may need to refer to www.sare.org/reporting/report_viewer.asp). I will try here to give you a bit of the flavor of many of them, which I perused for this issue.

Since 1990, OFRF has funded almost a million dollars to over 150 organic farming research projects. The foundation was set up by the California Certified Organic Farmers, the NOFA equivalent in California. Grants usually range between $5000 and $10,000, and run the range of issues plaguing organic farming systems. Although most of the money seems to go to academics or extension researchers in university settings, some farmers get direct grants. Some of the recent projects OFRF has supported in the northeast include:

- $9000 to Cornell University for nutrient budgeting in organic cropping
- $2000 to Maine Cooperative Extension for weed management in organic apple orchards
- $5000 to Cornell University for organic apple production
- $9000 to University of Massachusetts for caterpillar control in organic sweet corn
- $9000 to Cornell University for studying antibiotic susceptibility in organic and conventional dairy herds
- $3000 to Spring Meadow Farm in Massachusetts for cranberry fruitworm control
- $10,000 to Cornell University for organic apple production
- $8000 to Connecticut Cooperative Extension for biological control of the Mexican been beetle
- $6000 to Cornell University for natural controls of honey bee mites
- $10,000 to University of Massachusetts for non-chemical strategies for caterpillars in sweet corn

SARE, which succeeded to the older LISA (Low Input Sustainable Agriculture) program, has much deeper pockets. It essentially diverts a portion of USDA research moneys from chemical to non-chemical farming approaches. Although it still primarily funds the established Land Grant university and extension network, it does force them to seek out organic or near-organic solutions to farming problems. What follows is a recent selection from the small proportion of SARE farmer-research reports.

For simple honesty, it's hard to beat Jason Teets' summary of his work to control eastern red cedar and multi-flora roses by using intensive grazing [FNE99-279]: Fertility management and intensive grazing with goats were used in an attempt to control the invasion of Easter Red Cedar and Multi-flora Rose. Turkey litter and limestone were applied to 30 acres and goats were rotationally grazed using portable electric fence. The project was discontinued without conclusive results due to management problems such as cattle disrupting the fence and local dog predation. Goats were gone by June 2001 and fence was removed in August 2001.

I was somewhat surprised how many SARE grants went to projects involving synthetic chemical use. For instance 2 New Hampshire farms got a grant [FNE01-295] to test intercropping winter rye with corn silage. First they sprayed the corn with an herbicide, then spread winter rye mixed with a synthetic urea fertilizer. (The experiment was a failure as the winter rye did not germinate.)

In another example [FNE99-263], a Maryland grower transplanted watermelons into soil where a rye cover had been 1) plowed under followed by conventional tillage, or 2) killed with herbicides and not plowed up. In the no-till case, the mass of rye straw is hoped to prevent weed competition. In fact the no-till system worked, but the whole project required lots of synthetic fertilizers: 20-20-20 and 16-14-16, herbicides: 2 pints per acre of Roundup, 1.25 pints per acre of Gramoxone, 7 oz. per acre of Command, 2 oz. per acre of Sinbar, and fungicides: Ridomil Gold, Benlate, Poast, ManKocide, and Quadris. Was that a success?

Projects geared to better weed control were popular. In one 3-year project [FNE01-387], beds of broccoli, onions and beets were 1) planted and covered with wood chips, 2) covered with IRT plastic mulch early in the spring until planting time, then planted and covered with wood chips, and 3) planted without chips as a control. Preliminary first year data indicated the time spent weeding the control was 6 hours, the chipped bed 5 hours, and the first IRT then chipped bed 2.5 hours. But record-keeping was so spotty that the farmer felt the data was not really very useful. He hopes to do a better job the next two years.

In another mulching study, this time on asparagus [FNE01-382], 24 plots were divided among 6 treatments: a thick mulch of rye straw, a control with no cover and only occasional cultivation, and plantings of four different cover crops: buckwheat, dutch white clover, crimson clover and rape. The study concluded that cultivation is the best method to reduce weeds in asparagus, but is expensive. Next was the straw mulch, but it too was costly. Among the cover crops, buckwheat offered the best weed suppression and asparagus growth, followed by rape.

Another mulch and cover crop study [FNE01-388] focused on pumpkins. A field was disked twice,then plastic mulch was laid on 10 foot centers. In mid-May it was planted to pumpkins 18 to 24 inches on center. Between the plastic was planted buckwheat or red clover or white clover or nothing. Despite poor germination and cucumber beetle problems, the yield was good. It was best in the buckwheat, which grew over three feet in height. Weed suppression was lower in the clover, where not much nitrogen seemed added to the crop, but better than the control where nothing was planted as a cover.

A different cover crop study [FNE01-392] looked at planting strawberries and blueberries into oats and white clover to reduce weed problems. In an honest (and somewhat humorous) listing of the events of that experiment, the farmer describes how the solution to one unexpected set-back usually leads to a new problem (something you, dear reader, are all too familiar with). In conclusion, however, he finds that the clover out-competed the strawberries, whereas the blueberries, which could grow over the clover, benefited from its mulching effect.

One farmer looked at various designs for rabbit cages [FNE01-354]. She hooped a 16' by 4' welded wire cattle panel, covered it with 1" by 2" welded wire and rubberized canvas to shed water, and affixed it to a 10' by 5' wooden foundation, using 2" by 4" wire as a floor. This provided room for 4 rabbit apartments and,

mounted on wheels, enabled her to pasture the critters in a new spot every day. For individual housing, she found 1" by 2" welded wire for sides and 2" by 4" for bottom works well.

In an ill-fated New York study of cover crops [FNE00-322], the intent was to look at operations that rotate vegetables with wheat. During the early spring, clover was seeded in with the wheat, to serve as a cover crop once the wheat is harvested until the following spring. Of 9 plots, 4 were seeded to early clover. But then in late April herbicide was mistakenly applied to these plots (apparently early herbicide applications to wheat are common practice.) A fifth plot was left fallow and grew up to weeds. In the four remaining plots, clover was planted later and grew well the first summer. Drought in the following year, however, prevented regrowth and the hoped-for data on biomass yields from various cover crops based on variety and time of planting were inconclusive.

A Vermont effort to get rid of the need for tillage equipment [FNE01-368] put down 3' wide strips of black ground cloth on tilled and untilled beds (the latter in various just-mowed grasses) and planted each bed with tomatoes, peppers, eggplant and watermelon. Rather than tilling, every 7 to 10 days the farmer mowed between and around the perimeter of the beds. She found no significant difference in yield between the two beds. Calculating the labor of mowing compared to tillage, she believes they are roughly comparable.

One successful project [FNE99-242] looked at using a pryethrum/rotenone/soap spray mixture on a Finger Lakes vineyard. Nine sprays were applied between June 9 and August 27. Examination of leaves throughout the summer showed consistently higher dead leafhopper counts in the sprayed areas by large margins – always below 10% of dead nymphs in untreated areas, always above 50% in treated ones. Lacewing eggs were also released for parasitic biocontrol, but no lacewing nymphs were recovered. A local wasp, however, seemed to have parasitized a large number of lacewing eggs without ill effects from the sprayings.

In another pest control project [FNE00-294] fava beans and kale were grown in Connecticut to see if lady beetles could be collected in the spring from overwintering plants and the beetles transferred to the greenhouse for aphid control. It turned out that the beans and kale did not overwinter well there. But beetles collected in the fall could be kept over the winter and worked well for aphid control in the late winter and early spring. The beetles were collected by knocking them into jars dusted with flour (to prevent them climbing out again right away), then transferred to clean jars with paper towels to walk on and clean their feet, and banana slices for food and moisture. After a few days of feeding, they were stored in an old refrigerator (not a frost free one) at a steady 39½ F. and 50% humidity. Survival until placed in the greenhouse in February was excellent.

In an interesting proposal by a Philadelphia urban gardening project [FNE01-359], SARE supported the construction of raised beds designed to be used at former industrial sites where the growing areas must be separated from an impermeable and potentially contaminated substrate. Additionally, such sites are inherently temporary and the costs of construction must be low enough that they can be recouped immediately. This system used crushed rock for drainage and soil created from construction company donated clean fill, compost created by the City Park Commission, and horse manure provided by local stables. They ended up with well-drained, productive beds at a cost (materials and labor) of approximately $3800 for a 1500 square foot bed, or about $2.50 per square foot. This does not include the soil, but in their case the components were donated.

Another interesting proposal [FNE01-358] was to help a West Virginia grower create a network of herb growers with good markets. After growing organic vegetables for years and losing her fight against deer, she focused on growing lavender and lemon balm, took a course in France on distillation of essential oils, installed an essential oil distillery in her shop, and organized workshops on herb propagation and distillation. Despite the withdrawal from the project of the state Herb Association and several key collaborators, the farmer was hopeful: "…this project is going to take longer to put into place than first

thought. Lavender takes 3 years to mature enough to make a good amount for distillation…not enough farmers are growing the herbs needed for even a small sized distillery such as mine." As a result instead of essential oils she is researching hydrosols, for which less product is necessary, although the formulation needs sanitary bottling and refrigeration to remain stable for a year.

One project aimed at developing a new agricultural product [FNE00-327] is growing a variety of black locust to replace pressure-treated posts. Shipmast black locust has black locust's renowned ability to resist rot but also has a straight grain. They have been collecting rootstock, propagating seedlings, and establishing forest plantings. The project has also involved a good deal of community education through workshops and youth planting and horse-logging sessions.

A simple West Virginia project [FNE99-246] explored improving fertility and water availability on dairy pasture in order to go to rotational grazing from confinement feeding. They opened up three springs and installed two cisterns to collect barn roof runoff, all of which was fed to troughs, as well as fencing 35 acres to make 6 paddocks, and stabilizing walkways with gravel to allow movement between barn and paddocks. The net result was an increase of over 5% in milk production, while maintaining consistent levels of fat and protein.

Another dairy project [FNE99-231] involved management of milkhouse waste water. Often this water, high in fat, clogs disposal systems using traditional leach fields. In this new system the water goes into a settling basin, then overflows into a bed of bark, and finally flows into a bed of cattails planted in sand. Material in the first two deposits can be occasionally removed and composted, and the cattail seedheads can be sold to the floral market. One concern was that the seasonal nature of the water flow (the whole herd is dry in the winter) might not suit the cattails, but their own seasonal fluctuation in need for water seems to be within the overall range of the milkhouse production system.

One dairy, concerned about a phosphorus build-up, decided to first process manure in a methane digester, then ship it to a facility where it could be molded into planting pots [FNE01-373]. Because of the high fiber content of manure, it forms relatively easily. The pots are being tested and work has begun to seek out markets and obtain patents.

A simple New York project involved comparison of quality and yield of 3 grass species (Timothy, Tall Fescue and Ryegrass) used for dry hay, cut twice a year. During the year in question (2000) Tall Fescue gave the best total digestible nutrients per acre, because of a high yield despite a somewhat lower feed value per ton. Timothy was in the middle of yield and quality, while Ryegrass gave the lowest feed value per acre because its lower yield per acre more than offset its higher quality.

A rather specialized grant [FNE01-356] was given to a New York grape grower to evaluate various pruning methods — full hand pruning, minimal hand pruning, tractor-mounted machine pruning with hand follow-up (the Betts system), and just machine pruning — on single-wire cordon trained vines. Although full hand pruning gives a higher quality grape (more sugars) than straight machine work or minimal pruning, the combination of machine work followed by hand pruning delivers the highest quality. And despite about 7% smaller yields per acre with the Betts system, savings are so significant (over 50% of pruning costs are saved) that the machine can be paid for in less than 2 years on 100 acres of Concord grapes.

In an interesting heirloom tomato study [FNE01-355] a number of varieties of black, pink, yellow, green, orange and striped tomatoes were grown at two different Massachusetts locations. Heirloom growers might want to look up the report to get fuller comments on the over 3 dozen varieties. But Green Pineapple, Cherokee Purple, Black Prince, Tasty Evergreen, Green Zebra, and Eva's Purple Ball were all well regarded.

One enterprising woodsman got a SARE grant [FNE01-375] to design a kiln to turn waste softwood into charcoal. Given that charcoal is about 80% lighter than wood, but retains 80-90% of it's fuel value, it is much easier to handle. It is also readily marketable to blacksmiths, barbecuers, and some who cook on wood stoves. This project converted a 500 gallon oil drum into a kiln holding about 1/3 of a cord of wood. The design had a couple of flaws, however, noted in the final report:

1. The lid of the kiln weighs about 150 pounds and has to be raised to head-height for every firing. Some people have done this with hoists. I welded handles on the lid but that did not make it any lighter. Solutions to this problem escape me.
2. The charge of wood carbonizes into charcoal in a hot, smoky, dark environment. I have not figured out a way to be able to observe the progress of the batch and so know when to regulate the drafts. As a result I rarely achieved the rate of charcoal production predicted. More often I completed the firing only to find a full barrel of blackened wood, or worse, a shovelful of gray ash.

In a fascinating report about oyster farming [FNE01-39] a Cape Cod company describes testing a new "Oyster Cylinder" for growing the mollusks from seed. Traditional operations use a mesh bag, but crowding in it often causes irregular growth. The cylinders are suspended from a floating pipe so that the tides roll and tumble the oysters inside the drum. Despite a higher initial cost, the faster growth and better shapes achieved with the cylinder make it a very attractive option.

A simple but encouraging project [FNE01-393] was an economic assessment of growing cherry tomatoes in high polytunnels (hoop houses) in Massachusetts. Sweet 100, Gold Nugget, and Sweet Olive varieties were tested, and produced 590 pints in a 588 sq. ft. polytunnel during a harvest extending from June 30 to October 4. These pints sold for $2.50 at the farmers market, grossing $1475. Production costs of $336 for seedlings, plastic, mulch, stakes, fertilizer, packaging, etc. plus labor costs of $756 for 94.5 hours at $8 an hour raising, harvesting and selling the tomatoes totaled $1092, leaving a profit of $383. Not bad!

Another simple project [FNE01-370] evaluated the usefulness of kaolin clay (Surround®) on apples. After a detailed orchard cleanup in the fall, a New Hampshire orchard conducted weekly sprayings at a rate of 50 pounds per 100 gallons, starting in early May. After a two week break, they concluded with two more sprayings at half rate in late July. Problems encountered were the need for heavy applications in the early spring because of wet conditions, difficulty in adequately covering trees over 10 feet tall without a handgun attachment, and the cost of the material and the applications. Even with these problems, however, the orchard plans to continue with the clay because they feel it was just as effective as previous treatments with Imidan (4 scarred apples in 100) and it also was effective against pear psylla. Despite being more costly than chemical treatments, the orchard feels the long term costs of chemicals is too great.

A very innovative project [FNE01-363] involved several Vermont farmstead cheesemakers in an effort to formalize a food safety/quality control program. Such a program could serve as a model throughout New England and generate data to form standards for raw milk cheesemakers to use in lieu of pasteurization. The research was able to collapse an elaborate 11-point control and testing protocol into 3 steps – assuring sanitary raw milk, assuring proper cheesemaking by monitoring ingredients plus fermentation and salt, and sampling one batch of aging cheese every two weeks until point of sale. The participating cheesemakers improved several-fold the results of their bacterial tests over a similar program last year, and are now well within the results of the current state regulatory expectations. They hope to make this a model for other farm scale cheese operations.

Louis Lego's apple study [FNE01-384] compared fruit produced by a baseline 1998 IPM program to that grown in a certified organic program in 2001 and also to the harvest in a 2001 program using the EPA's new "reduced risk" sprays. Lego's standards called for at least 70% fruit of a quality that the customer will self-select (very nearly perfect appearance), a guarantee of no pesticide residues, and orchards safe to work in

and for water to runoff from. It is hard to summarize this excellent 17-page report which goes into detail about different controls for various pests and diseases, but his bottom line was that under 1998 IPM conditions using a fungicide (NOVA), Imidan, and dormant oil, he rejected 17% of apples for direct sales. In 2001, using the low risk program of dormant oil, a fungicide (Flint), kaolin clay (Surround), permethrin combined with a pheromone, dipel, a neem product and traps, he achieved a 26% rejection rate. With the 2001 certified organic program of dormant oil, sulfur, Surround, neem, dipel and traps, he achieved a 35% rate of rejection. Although the IPM rate was considerably better than the organic one (with the "reduced risk" IPM in between), I was very impressed that with wholly organic management a northeastern apple orchard can get a 65% rate of "firsts". This is good news for organic apples and Lego's detailed work is to be lauded.

A number of very interesting projects are underway right now. To mention just a few:

- Matthew Freund of Connecticut [FNE02-412] is looking into creating manure/fiber based materials which can replace polyethylene in such products as weed barrier mats and mulches.
- Ed Stockman of Massachusetts [FNE02-443] will explore cold-climate greeenhouse-based vermiculture to produce composts and compost teas.
- Jeff Cunningham of Vermont [FNE02-408] will breed honey bee queens for mite-resistance, hygenic behavior, high brood viability, good temperament, honey production and winter hardiness.
- Eric Wells, of Vermont's Ocean Arks International, will work to develop organic feed sources and production techniques for certified organic Tilapia fish production in recirculating aquaculture systems.

To end with a note of realism with which most of us are all too familiar, I cite the findings of a project [FNE01-364] to determine if pasture-quality Italian Ryegrass can be established without herbicides by no-tilling into existing sod. From April 30 through mid May, 2001, the rye was seeded onto six farms.

The report says:
Unfortunately, weather conditions couldn't have been much worse than what we had this spring and summer. After record snowfall that stayed on the ground until late April, we had a sudden warm spell with rapid snow melt followed by almost no rain for the month of May. Also the no-till seeder bought new this spring by one of the farms came with no coulters so much of the seed did not make good contact with the soil. These factors resulted in very poor germination of the seed. The few plants that did grow were eaten by an infestation of Armyworms that hit all six of the project farms in early July. To top it off, our area has had almost no rain since early July.

In the spirit that keeps northeastern farming alive, however, most of the participating farms are interested in trying it again next year!

What is SARE? - Summer 2002
Special Supplement on On-Farm Research

By Jack Kittredge

SARE is the Sustainable Agriculture Research and Education program of the United States Department of Agriculture. It is funded by US tax dollars and is designed to divert a small portion of the huge federal ag research effort into sustainable and organic agricultural research.

Administratively, SARE is divided into regions, and the relevant one for NOFA is the Northeast Region. Although it is run out of the University of Vermont, the region is composed of 12 northeastern states, south as far as Maryland and west as far as Pennsylvania and West Virginia.

SARE runs three main programs. The primary one, the Research and Education grant program, gives money to Cooperative Extension and other scientists for interdisciplinary projects. In the last year Northeast SARE awarded $1,654,457 to 16 researchers to explore topics as diverse as alternative crop development, grazing, marketing, nutrient management, and training for farmers in machinery selection and maintenance. Grants ranged from $32,680 to strengthen a local food development and distribution network to $164,882 to see if gooseberries, currents, elderberries, and other native fruits are suitable for adding value.

The second program, the Professional Development grant program, allows extension educators and other agriculture professionals to take advantage of various learning opportunities to spread knowledge about sustainable concepts and practices. Northeast SARE this year awarded $673,453 under this program to nine funded projects including training in national organic standards, community agriculture, marketing, and farmland conservation. Northeast SARE has funded 73 training projects since the professional development program was begun in 1994. The overall goal of the SARE Professional Development Program is to give Cooperative Extension, USDA-NRCS, and other agricultural professionals the training they need to serve growers and advance sustainable practices in the northeast region.

The final program, the Farmer/Grower grant program, is the one most NOFA growers might be interested in. It supports much of the work by farmers covered in this issue to test new crops, practices and systems through on-site experiments and share the results with other farmers. This year Northeast SARE has awarded $262,402 in grants to farmers to explore innovative production techniques that are profitable, environmentally sound, and beneficial to communities. This year, grants ranged from $763 to design an affordable silage wrapper in Maine to $9,927 to explore the production of late-season and winter strawberries in Maryland. In all, fifty grants were made; the average award was about $5,250.

Although farmer grants barely make up 10% of total SARE projects, in individual cases the money can be significant enough to make a farmer sit down and carry out a research project concerning some idea he or she has always wondered about. The stated goal of this program is “to develop, refine, and demonstrate new sustainable techniques and to explore innovative ideas developed by farmers across the region. Information gained from these farm-based projects may be used to redirect research priorities.”

To apply, you must be a farmer in the Northeast SARE region. You need not be farming full time, but your operation should have an established crop or animal product that you sell on a regular basis. Nonprofit farms may apply, but the primary activity of the farm must be to produce and sell food under the kinds of economic constraints that affect commercial growers. Many community-supported farms qualify, but farms

where the primary mission is educational normally do not. The 2003 Farmer Grant Applications will be available in June 2002.

To learn more about this program or past Farmer/Grower projects, go to the Northeast SARE website at www.uvm.edu/~nesare/. The national project database allows you to sort by grant type, region, interest area, and a variety of other criteria. To request printed materials and general background about SARE, call (802) 656-0471, fax (802) 656-4656 or send e-mail to nesare@zoo.uvm.edu.

The mailing address is:

Northeast Region SARE
10 Hills Building
105 Carrigan Drive
University of Vermont
Burlington, VT
05405-0082

The Northeast SARE has made a change in the grant application process for the 2003 funding cycle. This change does not affect the Farmer/Grower grant program, but does affect the Professional Development and the Research and Education grant programs.

For these latter programs, SARE will require a preproposal-a one-page description of performance targets and project design-for early review. Projects consistent with the SARE outcome statement will be identified. From these, SARE reviewers will select preproposals to proceed with a full application. Preproposals for 2003 grants must be postmarked on or before June 14, 2002. This new process allows applicants to have proposal concepts reviewed before developing a detailed application, and also gives reviewers an opportunity to focus on projects that most advance the SARE mission.

New Partnership Grants for Agricultural Professionals Working Directly with Farmers - Summer 2002
Special Supplement on On-Farm Research

By Helen Husher, Northeast SARE
10 Hill Bldg., UVM
Burlington, VT 05405

The Northeast Sustainable Agriculture Research and Education program (SARE) will now offer grants to Cooperative Extension, NRCS, and other agricultural professionals who work directly with farmers and who would like to conduct on-farm research or demonstrations in partnership with a producer.

The purpose of the Partnership Grant program is to build knowledge farmers can use, to encourage the adoption of sustainable agriculture techniques, to strengthen partnerships among growers and agricultural professionals and to explore how agriculture can be made more profitable through good stewardship.

Applicants must be affiliated with Cooperative Extension, NRCS, state departments of agriculture or private crop consulting firms, or represent an agriculturally oriented non-governmental organization that operates in the Northeast SARE region and works directly with farmers. The region is made up of Connecticut, Delaware, Massachusetts, Maryland, Maine, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, West Virginia and Washington, D.C.

Research and demonstration can be in any area that speaks to key themes in sustainability, and can include alternative crops or animals, practices that make use of biological cycles for improved soil, plant and pest management, marketing, adding value, grazing, tool or technology development, agroforestry and water quality. Proposals should be relevant to farming and sustainability issues in the region, and should offer both research and outreach components so that results will be available to the wider farm community. The Northeast SARE portion of the budget is capped at $10,000; matching funds are encouraged.

The first Partnership Grants will be awarded in March of 2003, and the postmark deadline for applications is December 2, 2002. Anyone interested in applying can request an application by calling 802/656-0471. These applications will be available in printed form in June, and will also be posted for downloading from the Northeast SARE web site at www.uvm.edu/~nesare/ at about the same time.

Sustainability Grant Pre-proposals Due June 14

The Northeast Region Sustainable Agriculture Research and Education (SARE) program, which funds research and education grants and professional development grants, has made a change in the grant application process. For the 2003 funding cycle, SARE will require a pre-proposal—a one-page description of performance targets and project design—for early review. Writers whose projects are both compelling and consistent with the SARE outcome statement will be invited to proceed with a full application. Pre-proposals for 2003 must be postmarked on or before June 14, 2002.

This new process allows applicants to have proposal concepts reviewed before developing a detailed application. It also gives reviewers an opportunity to focus on projects that most advance the SARE mission. This change does not affect the Northeast SARE Farmer/Grower grant program, but does affect the Professional Development and the Research and Education grant programs.

Pre-proposal materials are now posted to the Northeast SARE web site at www.uvm.edu/~nesare/ and can be requested in hard copy by calling (802) 656-0471.

Farmer Research Opportunities: Resources to test your ideas on your farms - Summer 2002
Special Supplement on On-Farm Research

By Sue Ellen Johnson and Tom Morris

The Southern New England Farmer Research Group Network:

Farmers in Massachusetts, Connecticut and Rhode Island, are working together to improve farm economic and environmental sustainability. Farmer Research Groups cultivate the exchange of ideas and perspectives among farmers and create a network of progressive innovative farmers. Farmer Research Group projects are conducted on farms by farmers, which increases the validity and meaningfulness of the research. The concept has been used to great advantage by farmers and scientists in Europe, the midwest, and in many developing countries. The Network's projects range along a continuum of nearly traditional on-farm research trials to a new paradigm of farmer-led and implemented research. Research projects and trials may be broad systems investigations, simple demonstrations, or comparisons. The farmers determine the research agenda and implement the research.

What are Farmer Research Groups currently investigating in Southern New England?

- An alternative low labor, low cost, grass silage system
- Better methods of manure stacking and composting
- Yield of corn fertilized with chicken manure or commercial fertilizer
- A new soil nitrogen test
- Feasibility of methane production for power generation on dairy farms

Farmers have proposed numerous other ideas and regularly call with new ideas- so the list of possible research group topics is growing all the time. When a critical mass of farmers is interested in a topic, we connect the interested individuals, form a group and start evaluating the idea and planning a project.

What benefits are provided by the Farmers' Research Group Network?

- Opportunity to make rapid and practical progress towards economic and environmental sustainability
- Limited risks and costs of evaluating new practices and technologies
- Better access to grants, equipment, and expertise for farmer research
- Another way for farmers to guide the research agenda and investments in research
- Facilitation of communication and logistics for research groups
- Research materials and laboratory costs
- Honorariums to farmers participating in a research group
- Scientific guidance and structure for systematic inquiry
- Credibility, validity, and legitimacy for farmer's own research

How does the Farmer Research Group Network define "Research"?

Farmer Research Groups can compare new practices with traditional practices, test new technologies, evaluate innovative, but financially risky ideas, adapt existing practices, or simple demonstrations. The research can be conducted in the field or the marketplace, in the library or on the Internet. The research does

not have to include an experiment on farms; some projects just gather and share information among a group of farmers.

Why work in groups?
Working in groups or teams makes it easy for farmers to learn from one another. It allows scientists to work with more farmers. It increases the overall efficiency of innovation. Multi-farm research is an effective way for researchers and farmers to allocate and develop their expertise, and increase support for farming and innovative agriculture in our region. Overall, this will result in more sustainable farms throughout southern New England.

Is the Farmer Research Group Network useful for organic farmers?
Two of the active groups currently include organic producers. The Network welcomes both organic and conventional producers. We work with all commercial farmers who want to increase the economic and environmental sustainability of their farms. Currently, there are no groups researching topics exclusively related to organic production.

What's is expected of me when I join a Farmer Research Group?
The extent of your commitment is up to you. Most projects involve talking with other farmers, either at face-to-face meetings or on conference calls (using a toll-free number). Depending on the topic, you may only share information or you may plan and implement a comparison, evaluation or test on your own farm. Most groups usually commit to some type of an experiment on their farm, (a comparison, a test or evaluation of some technique or practice), but some may only gather information and discuss ideas.

Why should I become active in a Farmer Research Group?

- Knowledge gained from a Group project will increase the efficiency of your farm
- Participation in a Group will increase the return on the time you spend testing new ideas
- Participation in a Group will provide objective facts which you can use to make fact-based decisions.
- A Group provides a systematic way for you to test new ideas on your farm, which is better than the traditional "trial and error" method of testing ideas.
- Data is power!
- A Group allows you to include the ideas and experiences of other farmers into your operation and decision-making
- Groups can influence the agricultural research agenda and investment in the region
- Testing new ideas in a Group limits your risk when evaluating new technology
- It's a fun, productive way to get to know and work with other farmers

How do I become involved with a Farmer Research Group?
Talk to us! Contact the Farmer Research Group Network by phone or email (see below), or complete an information form (available at the NOFA summer conference or other workshops). We will tell you if other farmers in Southern New England are already working on a topic that interests you, or a new group may start based on your idea.

How can I start a Farmer Research Group?
Talk to us! We'll start a group whenever we have a "critical mass" of farmers interested in a topic. The farmers in the groups may be people you know, - or they may be farmers you have never met, who live and farm in our region and have similar concerns and interests as you. The critical mass for a group is up to 10 farmers. Five to eight farmers seems to work best

What kind of research is performed by Farmer Research Groups?
Projects fall along a continuum from rigorous scientific investigation and comparisons to less formal

adaptations or demonstrations of well-known or recommended practices. Any idea, new or old, with a critical mass of interested farmers who are willing to commit to a research group can be supported by the Network.

Contact us with questions or ideas: Sue Ellen Johnson, 413-323-4531; Tom Morris, 860-486-0637; Steve Herbert, 413-545-2250. (or email: sejohnson@smallfarm.org)

The Southern New England Farmer Research Group Networks is supported by USDA-Sustainable Agriculture Research and Education program, the Natural Resources Conservation Service, the Universities of Connecticut and Massachusetts, the Massachusetts Department of Food and Agriculture, and the New England Small Farm Institute.

Long Term Soil Quality Trial at Beech Grove Farm - Summer 2002 Special Supplement on On-Farm Research

By Anne and Eric Nordell

In 1993 we initiated a long term trial to see if twice-yearly soil testing could address a major concern about our weed control system: does the use of a bare fallow period midsummer deplete soil organic matter? Our hope was that monitoring four fields in May and October for a number of years would register the effect on soil quality of our controversial weed management strategy for vegetable production, which is based on a six week bare fallow sandwiched between spring and fall cover crops the year before production. We also thought that this simple procedure would be a good way to compare our usual fallow year sequence with a full year of cover crops, or a much abbreviated bare fallow, now that weed pressure was no longer a problem.

Fortunately for us, the newly-formed Pennsylvania Association for Sustainable Agriculture (PASA), with financial support from the American Farmland Trust, was actively engaging farmers in on-farm demonstrations. PASA decided to fund our long term soil quality trial. One of the advantages of working with this organization is we pretty much had a free rein on designing the experiment. On the other hand, PASA did not have the expertise to provide much oversight on conducting this long term on-farm demonstration.

For out part, we did not have the training – or the patience – to set up the trial on a scientific basis, using randomized, replicated test plots and all the sampling and number crunching that goes with it. Instead, we wanted the trial to be farmer-friendly and to reflect what actually happens in the field – with all of the uncontrollable variables and changes in management inherent to farming.

We did employ one measure of objectivity. That was to hire a Brookside Laboratory consultant to pull and process the soil samples before sending them in for analysis. As a check against lab error (and to try out several of the new soil quality tests available at the time) we sent split samples to four different labs over the course of the first six years of the trial.

Organic Matter and Phosphorus levels in two fields in the Martens' organic grain rotation in Penn Yan, NY, 1999

Field #23A

1997	1998	1999		2/10/99	3/20/99	5/28/99	7/4/99	8/23/99	11/12/99
soybeans/	kidney	spelt/clover	**O.M.%**	3.3	2.6	3.2	3.9	4.1	4.0
mixed	beans/	(yield: 125	**P1 ppm**	10L	13L	23M	17L	13L	21L
grain	spelt	bu /acre	**P2 ppm**	30M	35M	54H	48H	49H	35M
cover		of spelt)							
crop									

Field #23B

oats/	wheat/	corn (yield:	**O.M.%**	3.1	3.0	3.1	3.8	3.9	3.3
wheat	clover/	180 bu/acre	**P1 ppm**	13L	14L	27H	22M	24M	18M
		of corn	**P2 ppm**	33M	38M	57H	65VH	69VH	39M
		Precipitation		**April**	**May**	**June**	**July**	**Aug**	**Sep**
		(inches)		1.05	1.05	1.84	1.82	2.19	5.02

Note: Soil samples analyzed by A&L Lab in Richmond, VA. A&L uses the Bray 1 extraction method for phosphorus. P1 refers to the easily extractable phosphorus and P2 refers to the phosphorus reserve in the soil. P levels measured in parts per million. Multiply by 2 for lbs/acre of P in the top six inches of the soil. Multiply by 4.6 for lbs/acre of P205. L=low M=medium H=high VH=very high levels of phosphorus.

Organic Matter and Phosphorus Fluctuations (measured by two different labs) in the Nordell's organic vegetable rotation in Trout Run, PA, 2000

1998	**1999**	**2000**	**Test**	**April**	**May**	**June**	**July**	**Aug**	**Sept**	**Oct**
Late	rye/buck-	Early crops	**O.M.%**	4.9*	3.7	3.7	4.4	5.5	4.5	3.5
crops/Rye	wheat/oats	(onions,	**P1 ppm**	44*	40	45	36	38	40	40
cover	& peas (5	potatoes,	**P2 ppm**	121*	140	146	119	127	171	158
	tons/acre	spinach,				**Brookside Labs**				
	compost plus	strawberries)	**O.M.%**	3.9	3.5	3.9	4.7	3.5	3.6	3.9
	500 lbs. lime)		**P1 ppm**	44	55	n.a.	53	73	82	67
			lbs/acre	235	294	529	243	334	438	307
* These samples taken with a shovel. All			**P2 ppm**	102	83	n.a.	153	124	125	141
others split samples taken with a probe.			lbs/acre	545	443	839	701	568	668	641
			rain (in.)	6.2	5.6	6.2	1.5	2.4	2.6	3.6

We replicated the Martens' SARE sponsored soil quality trial to see if monthly soil testing would give us a clearer picture of the seasonal influence of the weather on organic matter levels and nutrient availability. The preliminary results from both farms suggest that midseason might be the most appropriate time for sampling organically managed fields rather than testing in the spring and the fall when the soil biology is naturally less active.

After just a few years of testing, we realized we really could use some professional help! While the results for nutrient levels were pretty comparable between the different labs (and seemed to correspond with our management practices) the numbers for the other aspects of soil quality – such as organic matter, aggregate stability and respiration rate – were so variable from lab to lab, and between spring and fall testing periods, that we were not sure what to make of them. We simply could not see a rhyme or reason to some of these numbers, while other results seemed to correspond strongly with seasonal changes in soil moisture.

For instance, the Brookside Lab organic matter readings from all four fields followed more or less the same pattern regardless of whether the fields experienced a full year of clover, cultivated row crops, or our usual fallow year sequence of annual cover crops sandwiching a bare fallow mid-summer. Likewise, the dramatic changes in aggregate stability indicated by Woods End Lab followed pretty much the same curve for all of

the fields in the trial. Although we could see pronounced differences in soil structure and moisture holding capacity between these three different treatments, the lab numbers suggested that the weather, not our cropping practices, was the key short term determinant of soil quality.

Whenever we had the chance we asked soil scientists what they thought of the results. Their conflicting conclusions made us ever more unsure of how to proceed with the trial. Some researchers suggested that the large seasonal fluctuations in organic matter were just what you would expect in a biologically active system. Others were adamant that these wide swings in organic matter were due to sampling or laboratory error.

To complicate things further, several soil scientists suggested that it is necessary to make sure that the same lab technician processes all of the samples over the entire course of the trial in order to get consistent results. Others recommended that testing of certain types of organic matter, or specific stages in its decomposition, such as particulate organic matter, would lead to more accurate and meaningful results.

There was also considerable disagreement about the validity and usefulness of the soil quality tests we had tried, like using the respiration rate of the soil as a measure of biological activity. But the researchers who claimed to have developed more accurate or meaningful soil quality analysis lacked the funding for on-farm research.

Needless to say, by 1999 we had mixed feelings about continuing the trial. On the one hand, we were not sure if our casual approach to conducting the experiment was producing results that were useful. But putting into place some of the researchers' recommendations for improving the trial was way beyond our means, especially since PASA's funding sources and priorities had changed over the years and we were paying for most of the soil analysis out of our pockets by the end of the '90s.

On the other hand, the connections between soil moisture and soil quality indicated by a couple of the tests encouraged us to change the emphasis of our cropping system from weed control to moisture conservation. With this new goal in mind, we experimented with reducing the depth of tillage in both the fallow and cash crops years of the rotation. The mulch effect created by working the cover crop residues into the surface of the soil helped the crops and the soil to survive the weather extremes we have experienced in recent years in much better condition.

We were also encouraged to continue the trial after talking with Klaas and Mary-Howell Martens, who raise organic field crops on 1300 acres in Penn Yan, NY. They had just completed the first year of their SARE-sponsored soil quality trial, tracking the seasonal influence of soil temperature and moisture on organic matter levels and nutrient availability. Testing the soil every five weeks from February through November in six of their fields indicated a substantial increase in both organic matter and phosphorus during the peak of the growing season, in synch with the nutrient needs of their high-yielding crops.

We replicated their trial on a couple of fields in 2000, pulling samples every month of the growing season and splitting the samples between two labs. Like the Martens, we saw a correlation between the weather and organic matter, although this had little effect on our already high phosphorus levels. If nothing else, the preliminary results from both farms suggest that the most appropriate, if hectic, time for soil sampling might be midseason — rather than testing in the spring or the fall, when the soil biology is naturally less active.

We have also been encouraged to continue the trial by the recent increase in funding and interest for on-farm soil quality research coming from public research institutions. For example, the Martens collaborated with researchers from the Geneva Experiment Station to design their soil quality trial and verify the results. Marianne Sarrantonio, who developed much of the cover crop and soil quality testing methodology at the

Rodale Research Center in the ‘80s and early ‘90s, is now conducting a trial at the University of Maine, and on a nearby farm, comparing our fallow year approach to weed management with other cropping systems.

Closer to home, PASA is now working closely with Penn State to establish on-farm demonstrations of sustainable practices. Several new researchers at the university have expressed interest in developing various aspects of the trial. We may even get some definitive answers about the effect of our fallow year system on soil quality from Cornell scientists involved in SARE projects or part of the new NEON program.

For now, we are more comfortable and confident assessing soil quality based on crop health and visible changes in soil structure than relying on laboratory analysis. The past nine years of soil testing four fields twice a year, however, have indicated some surprising changes in nutrient levels that were not apparent simply by observing the crops and the soil. These findings have changed our approach to nutrient management.

For more details on this aspect of our long term trial, as well as the soil balancing philosophies of the labs involved in the testing, please see our Cultivating Questions column in The Small Farmers Journal. These articles are included in a booklet we put together this winter which also contains photo essays on cover cropping for weed control, moisture conservation and phosphorus availability as well as pieces on reducing purslane pressure, building portable hoophouses, and comparing intensive and extensive cropping systems. The cost of the 44-page booklet is $10 (postage included) from Ann and Eric Nordell, 3410 Rt. 184, Trout Tun, PA 17771.

Pay Attention! - Summer 2002
Special Supplement on On-Farm Research

By Bryan O'Hara

"Pay Attention!" Luckily these words were spoken frequently to me. Farming is an occupation fully involved with the constantly changing environment. Careful observation of this environment is essential to farm decisions. Farm efficiency is largely the result of these decisions. Economic conditions have created the need for more efficiency on many farms. The more time a farmer can use for careful observation, the more efficiency will increase. Yet, a person can engage in careful observation for only so long per day, and there needs to be time for dreaming, relaxation, and reflection. Unfortunately there are some other distractions which are not so worthy such as selfish desires and fears, lies, deceit, and meaningless narrative (as in television). These days a person who does not have a great degree of control over what their mind is engaged in, and therefore cannot commit to long periods of careful observation, may have a hard time making a living farming. Observation involves not only recognizing occurrences but also the ability to remember these occurrences. This is where writing and record keeping become important, for if records are available you can recall a greater amount of observations, which is very useful in decision making.

It is important that decisions be rational and based on as much observation as possible. Research is involved with increasing our observations so that we can make better decisions. Research is observation and interpretation of occurrences, revision and repetition of these interpretations. Research offers evidence on which to base decisions. Since research is valuable in decision making it makes sense to do your own. You know what research will most benefit you, and credible accessible research helps progress our occupations as well as our culture.

When setting up research first identify your "problem" or decision that could use more evidence. Then determine what research has already been done and how: up to date, relevant, consistent, representative, and sufficient it is in terms of your situation. Then determine where your research would most likely benefit you. Your research can be used in conjuction with previous research to provide more evidence for previous conclusions, or for entirely new conclusions. Appropriate methods and materials are of course essential to credible research, and this is where scientists are useful. Many scientists are very talented at setting up research projects on the farm. They often have access to previous research and rational, critical minds. It is wise to collaborate on large research projects with them, and they also often have access to funds for farm research. There is great potential for farmer - scientist research, to observe and work with natural systems, to share our knowledge to improve our land.

Farmer - Scientist collaborative research projects on our Tobacco Road Farm in Lebanon Connecticut, have included a project on squash vine borers with Rob Durgy of the Co-operative Extension, and a Brassica flea beetle project with Kim Stoner of the Connecticut Agricultural Experiment Station. With quite a bit of pumpkin growing on neighboring farms, squash vine borers had become a problem for our squash production. Yields were low. After consulting with Rob Durgy, he did a literature search to find relevant information as well as talked with other farmers. We learned much about these insects including that the adult moth does not emerge to lay eggs until relatively late in the season. This seemed consistent with our, and other farmers, observations.

Row covers had been used on farm to keep insects off other crops, but had to be removed from Cucurbit crops at flowering to allow for insect pollination. We wondered if early planting or row covers could improve yields. We applied to SARE (Sustainable Agriculture Research and Education) and set up a

research project. We used cotton row covers on hoops over squash planted in succession every two weeks from April 20 to July 15. Half the plants were covered and half left uncovered, and squash yields were measured. Squash vine borer adults were pheromone trapped to see when they were active. The yields clearly showed the earliest planting produced better by far, likely due to the fact that they were large and already fruiting by the time the first squash vine borer adults emerged and were captured. The covered plants produced better than the uncovered though all later plantings yielded little covered or uncovered. This was very useful research to our particular situation and may be useful to some degree in other situations.

Flea beetles had become a problem on our Brassica crops so after much on farm observation we consulted with Kim Stoner. She did a very thorough literature search and found a fair sized pile of research that was at least somewhat relevant. After reading this research we found much observation was lacking — observations that would be necessary to develop control strategies. We applied for SARE funding to set up a research project to observe flea beetles on a variety of Brassica crops through the season. We placed yellow sticky traps at a rate of two per plot per week. There were seven sites, 158 sticky traps, and 6,811 flea beetles. The beetles were identified by species, counted, and degree-days recorded. This gave us information on which species are active when, and relative population levels. This has proven useful in developing further on farm research, and has assisted us in control strategies. The full report on these research projects as well as many others is available through SARE. So get out there, do some research and remember to Pay Attention!

On-Farm Research Guide - Summer 2002
Special Supplement on On-Farm Research

By Jane Sooby,
Organic Farming Research Foundation Technical Program Coordinator

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"Farmers constantly experiment. We try new products, new methods, new management styles, all within the domain of an ever-changing mother nature."
—Mas Masumoto, Epitaph for a Peach: Four seasons on my family farm

You can answer many questions about your farm doing research using the scientific method. The scientific method has three basic steps: formulating a hypothesis, testing the hypothesis with experimentation, and drawing a conclusion based on the data.

Experimental basics

Experiments are done on portions of the farm, seldom on the entire farm. The mathematical techniques of statistics are used to calculate the odds that what you are measuring on one part of the farm will hold true for the whole farm. In order for this to work, measurements must be taken systematically. While not absolutely necessary, consulting with someone experienced in designing experiments for statistical evaluation—such as an extension agent, university researcher, or crop consultant—can help you avoid making mistakes that will render the data useless.

Reduce variation

Variety may be the spice of life but research demands rigid standardization. In doing an experiment, you want to control all external sources of variation as best you can. This helps to ensure that observed differences are more likely to have been caused by treatments you applied. It is impossible to have complete control of a project, especially one being done outdoors on a working farm, but it is possible to minimize variation in two ways: to establish research plots on relatively uniform ground, and to treat all plots exactly the same except for the treatments you are testing.

For example, to see how well a rye cover crop reduces weeds, cultivate the field that had rye exactly the same number of times you cultivate the field without rye and treat all plots exactly the same. Select fields for experiments that are similar and have comparable weed pressure or you will have trouble comparing the different treatments.

Establishing the experiment in the field

Field experiments are seldom carried to a conclusion if they aren't designed to be relatively easy to maintain. In the planning stages, decide what size your plots will be and where they will fit best. On-farm research typically uses plots that are field length and one or two tractor passes wide. This makes it easier to apply treatments along the entire strip without having to start or stop in the middle of the field.

When I was a research technician, I spent a lot of time in the field with a measuring tape marking the boundaries of plots. Flags or fenceposts are useful to mark where one treatment ends and the next one begins at planting, when applying treatments, and at harvest. Such markers can easily be knocked over or ripped out with machinery so be careful and immediately replace any that are moved.

To control external variation when you are comparing two treatments, make sure that each pair of plots runs across uniform areas of the field. If you are looking at more than two treatments, site each block in as uniform an area as possible. If there is a slope in the field, or a rocky area or any other feature that breaks up the uniformity of the field, locate plots so they all run across it and are affected equally by it. If it's a small outcropping or depression, avoid including it in a plot altogether if possible. Locate plots on either side of it and use the area over it as an alley or border.

Fields adjacent to your research fields may generate runoff or drift that can contaminate the research plots. Use plot borders or buffers to minimize this potential source of variation. In Nebraska, we planted 6-12 rows around each experiment to protect it from such influences.

The importance of taking notes

The devil is in the details, and when you break most field-level research down, it primarily consists of repetition and documentation. Documentation is singularly important for two reasons: it allows others to duplicate your experiment to verify it, and it gives you a record to look back on when you're trying to figure out what went wrong—or right.

Keep a notebook dedicated to the research project. Record any disease, insect, or weed problems that could affect growth of the crops. You may be able to see differences between the treatments in the way the crop responds to such problems. Make a note of it if you do. It's surprising how quickly differences that stand out in the spring may not be noticeable, or remembered, even a few days later, so make sure to write your observations down right away.

It is useful to draw out a plot map or plan to help visualize the project and to keep track of which treatment has been applied where. Make sure that any changes you make in the field are reflected on your map. Make at least one copy of the plot map and keep it somewhere safe so that you don't lose all your work if you lose your working copy of the map.

It is a good practice to document the weather, such as rainfall or any disasters such as hail, hurricanes, or freezes. A rain gauge is indispensable for documenting rainfall and can be more accurate than a local weather station.

Finally, compile a field history for the past 5 years that documents crops grown, tillage operations, inputs applied, and yields in the experimental fields. Past management can strongly influence present performance and provide valuable clues to why things turned out the way they did.

Making measurements

In research, part of the farm is controlled and measured in order to make projections about how the whole farm will respond. Similarly, in making measurements it would take a prohibitively long time to, for example, separately weigh all the millet heads in a plot, so you sample a certain number of them to represent the entire population of millet heads. Sample size should be determined using statistical methods if your experiment is for publication in a scientific journal. Otherwise, you can be guided by plot size and time constraints. You need to collect samples from each region in the plot in order to have representation from the entire area, but you don't want to spend days at the scale, either. You trade a degree of accuracy for pragmatic concerns, a trade-off that is made constantly in research.

Once you have an experiment established in the field, there is no limit to the kinds of data you can measure: date different growth stages are reached, plant height, leaf number, chlorophyll content (using a chlorophyll meter), weed counts, yield, quality parameters (protein or Brix levels, fruit size, insect damage, moisture,

test weight, etc.), and anything else you want to know about. Be sure that what you are measuring will be useful in answering your research question. Most agronomic research focuses on measuring yield and quality parameters.

Harvest

Planning harvest in advance can help you concentrate on bringing in the sheaves rather than shuffling paper. Line up your equipment and paperwork well before the harvest date so that you don't waste valuable time when it's time to bring the crop in. Most of what you harvest will become part of your total production, but until you've completed measurements on it, keep it separate. Make a data sheet on which you can record the information you gather. It may help to assign different numbers to plots, treatments, or blocks.

At harvest, measure yields from each plot. This can be done with a weigh wagon, yield monitor, or by bagging and labeling individual plot yields and carrying them to a scale for weighing. Local extension agents, university researchers, or seed dealers may have access to specialized equipment for harvesting plots and will usually work with you if you ask them in advance.

Keep track of which yields come from which plot. Make a note of the harvest area from each plot so that plot yields can be converted to pounds per acre. Never lump all the yields from one treatment together into one measurement and plan to get an average value—this defeats the purpose of replicating (explained below).

To avoid edge effects, select the center rows to harvest from each plot. Cut a couple of feet in from each side of the plot. If you have to stop for the day before the entire experiment is harvested, make sure to complete a pair or block of plots to keep variation out.

Replication, randomization, and use of a control

Replication, randomization, and use of a control are essential in designing an experiment because they help to separate out treatment effects from natural levels of background variation. Without these three factors, any data you gather will be just about worthless. In research, error refers to anything besides your treatment effects that is measured. Setting up the experiment in a structured way helps to reduce the amount of error in your experiment; replication, randomization, and use of a control allow you to use statistics to actually separate out error from treatment effects in your measurements.

Replication, randomization, and use of a control

replication: You know that yields vary from year to year due to different rainfall, temperature, and other factors. Yield also often varies from location to location within a field because of high and low spots, inherent fertility, variation in soil types, etc. This natural variation is why replication is essential in experiments. The more times a treatment is duplicated, the more likely it is that measurements will reflect the effect of the treatment rather than the effect of natural variation in the field. However, there is a point of diminishing returns after which increasing replications doesn't give increased accuracy. University-based small plot research often has four replications or "reps." Practical Farmers of Iowa use six replications in their long strip comparisons. There are statistical methods to calculate the exact number of replications necessary for any given experiment, but in most cases between four and six reps is adequate for on-farm experimentation.

There are different ways to replicate an experiment. One way is to have multiple plots at one location. Another way is to replicate the experiment on many farms. Another way is to replicate across time,

performing the experiment in multiple years. Each type of replication adds to the confidence you can have in the results.

randomization: To prevent unanticipated sources of bias from entering your data measurements, treatments must be randomized. This means that the order of treatments cannot be the same in every replication. Say your field is on a slight slope, and the amount of soil moisture decreases as the field slopes up.

downhill/moist > > > > > > > > > > > *uphill/dry*

Mulch	No Mulch	Mulch	No Mulch	Mulch	No Mulch	Mulch	No Mulch
Replication 1		Replication 2		Replication 3		Replication 4	

In every pair of treatments, the mulch treatment will perform better than the no-mulch simply because of its relative location on the moister ground. To avoid such problems, randomize the treatments within each replication:

downhill/moist > > > > > > > > > > > *uphill/dry*

No Mulch	Mulch	Mulch	No Mulch	Mulch	No Mulch	No Mulch	Mulch
Replication 1		Replication 2		Replication 3		Replication 4	

You can flip a coin to determine the placement of each treatment in a rep if there are only two, draw slips of paper from a hat, or use a random numbers table found in most statistics texts.

using a control: The treatment is the procedure or product whose effect is to be measured. Having control plots where the treatment is not applied gives you a basis for comparison. If you are researching a new practice or variety, the control would be a plot that receives your normal practice or variety. For example, in variety trials the control is usually the traditional, established variety whose performance is known. If you are researching the effects of a particular input, the control would be a plot that isn't treated with that input. In fertility studies, the control receives no fertilizer. In designing an experiment, it is essential to include a control so that the effects of your treatment can be measured against something not receiving that treatment.

Now that we've gone over the basics, let's dive into planning the experiment.

Forming a hypothesis

The first challenge in planning a research project is to focus your larger production question into a well-defined question or statement that can be answered with data. This is the hypothesis. A hypothesis is a testable statement that forms the basis of the experiment.

Often in on-farm experiments, the overall topic needs to be honed down to a more specific hypothesis. Here are some research topics written by farmers:

1. Wood chips as a mulch in organic vegetable production
2. Legume cover cropping in date gardens
3. Using turkeys to weed asparagus
4. The effects of soil tillage on soil quality, the effects of different soil amendments and cultural practices on soil fertility

Each of these topics contains a researchable question, but the challenge is to narrow the focus onto specific treatments whose effects can be measured. Keep in mind that the fundamental purpose of research is to measure a controlled part of the system in order to make generalizations or predictions about the whole.

For topic 1, we may want to focus the study on two or three of the farmer's vegetable crops to make it a manageable project. Keeping track of the mulch's effect on 20 crops may involve too many logistics and introduce that many more sources of error. What effect of the mulch are you interested in? Wood chip mulch can help suppress weeds and can increase the amount of carbon in the soil, perhaps affecting the microbial activity of the soil. Taking these considerations together, we make the hypothesis:

Wood chip mulch applied in a thin surface layer reduces weeds and increases soil microbial activity in organic pumpkin, corn, and turtle bean production.

Using a similar process, each of the other broad research questions shown can be whittled down to a testable hypothesis.

Testing the hypothesis

Making a hypothesis is the first step in research. Designing an experiment to test the hypothesis is the next step. Testing the hypothesis involves figuring out what treatment or treatments you will apply, deciding what you will measure, and planning how you will set it up in the field. Testing the hypothesis also involves gathering and analyzing the data.

Experimental designs

Experimental design is a way to arrange treatments so that error and bias are reduced and the data may be accurately analyzed using statistics. Design and analysis fit together to make a meaningful whole. If an experiment has a poor design, you can't have confidence in what the data are telling you.

Standard experimental formats or designs are usually used in on-farm research. The criteria used to select which design fits which experiment depends on the number of treatments under investigation. If you want to compare two levels of a treatment, you can use a design called a paired comparison. An easy statistical analysis, the t-test, can be performed on the data to detect any significant differences. If you want to add more levels of treatments, you can use a randomized complete block design. A split plot design allows you to see how different treatments interact. These designs can provide you with more information than the paired comparison but also require more sophisticated statistical analyses and more space in the field. Because each treatment must be replicated at least 4 times, each treatment increases the research area required.

1. The paired comparison

This classical on-farm design is characterized by having long strips side-by-side in the field, replicated up to six times. Each pair of strips should be located in an area that is fairly homogeneous or similar. Typically, strips are field length and one or two tractor passes wide. This makes it easy to apply treatments along the entire strip without having to start or stop in the middle of the field. A general principle is to avoid "edge effects" by taking measurements from the center of the plot.

The paired comparison is an excellent way to assess the effects of separate components on a crop. Growing corn with and without starter fertilizer or mulch, comparing two varieties, cover cropping compared with fallowing—in a homogeneous field, any pair of treatments can be effectively compared using this design. If

there is a large amount of variation in the terrain, some kind of blocked design is required to remove or "block out" the effect of this variation on the measurements.

No Mulch	Mulch	Mulch	No Mulch	No Mulch	Mulch	Mulch	No Mulch	No Mulch	Mulch	Mulch	No Mulch

Paired block comparison measuring the effect of mulch compared with no mulch using 6 replications. "No mulch" plots are the controls.

An excellent guide to analyzing the data from a paired block experiment with the t-test is presented in the Rodale Institute's "A Farmer's Guide to On-Farm Research" (see resources below).

2. The randomized complete block

The randomized complete block (RCB) design is used for experiments looking at three or more levels of a treatment in areas with topographic variation on a gradient, such as on a slope. It is similar to the paired comparison in that all treatments are grouped together in blocks that are replicated across the field. The purpose of "blocking" the treatments is to maintain as much uniformity as possible in each block and keep environmental variation outside of the blocks. Blocking doesn't help when variation in the field is random, but can reduce error when variation runs along a gradient such as a slope, irrigated field, changing soil texture, or other factor. Block borders ought to run perpendicular to the gradient (see figure). The treatments are randomized within each block to avoid bias. In this design, blocks are synomymous with replications because a complete set of treatments is replicated in each block.

The statistical test analysis of variance is used to analyze the data from an RCB. Analysis of variance can be calculated by hand but because of the large number of arithmetical steps it is usually done using a computer program. Statistics software is widely available, and your extension agent or cooperating researcher can assist in analyzing the data from an RCB or split plot experiment.

downhill/moist > > > > > > > > > > > *uphill/dry*

Pea	Vetch	None	Vetch	None	Pea	Vetch	Pea	None	None	Vetch	Pea
Replication 1			Replication 2			Replication 3			Replication 4		

Randomized complete block design on a topographical gradient (slope) with 3 treatments (pea, vetch, and none, the control) arranged in 4 replications.

3. The split plot

The split-plot design looks at how different levels of a treatment interact with another set of treatments by applying subtreatments over main treatments. Statistically speaking, you sacrifice precise information on the main treatment for more precise measurements of the subtreatments simply because the subtreatments are replicated more than the main treatments. Though fairly easy to set up in the field, analyzing the data can be

somewhat complex. Because of the greater number of treatments, adequately replicating a split-plot experiment can take much more space in the field. Work with someone knowledgeable in statistics to set up a split plot experiment.

**********Replication 1********** **********Replication 2**********

Compost	Fish	None	Fish	None	Compost	Compost	None	Fish	None	Compost	Fish
Fallow				Pea		Pea				Fallow	

Split plot experiment with 2 main treatments (pea and fallow) and 3 split treatments (compost, fish, and none) replicated 2 times. The fallow-none plots are the controls.

Drawing a conclusion based on the data

It can be difficult to tell just by looking at the data whether any differences are due to random variation or to treatment effects. Statistical analysis re-orders the data that were randomized in the field and performs mathematical computations to determine the probabilities that the differences were caused by normal variation or by the treatments. The results of the data analysis give you the basis for making conclusions on the effects of the treatments.

Analyses can be performed using different confidence levels. Professional researchers typically choose a 95% confidence level, which means that there is a 95% chance that the measured differences are due to the treatments rather than to random variation or error. There is a 5% chance that the analysis will lead you to conclude there were differences where there were none or vice versa. In scientific literature, this chance of wrongly interpreting the data is indicated as $p < 0.05$ (probability is less than 5% that the analysis is picking up on non-existent differences or not measuring real differences).

In reality, you will never be 100% sure that you have proved or disproved your hypothesis. Statistics are based on tendencies and likelihoods, never on certainties. If you ever come across a scientific study that claims to have 100% accuracy, be suspicious. 99%, 99.5%, 99.9% are achievable probability levels, but never 100%. There is always a 1%, 0.5%, 0.1%, or even 0.0001% chance of error and honest researchers will acknowledge this.

An example

Hypothesis: Wood chip mulch applied in a thin surface layer reduces weeds and increases soil microbial activity in organic bell pepper production.

Testing hypothesis: We'll set up this experiment on a vegetable farm using raised beds. The wood chip mulch will be the treatment and no mulch will be the control. We'll use 6 replications, which means 12 beds are needed. A block consists of two beds, one receiving wood chip mulch and one not. The treatments are randomized in each block.

Before planting and applying the mulch, take soil samples from each of the beds and have them analyzed for microbial biomass as indicated by CO_2 release. Establishing a baseline of microbial biomass will give you more to go on in making the treatment comparisons. Soil sampling procedures are critically important in obtaining useful information. To make sure that tests on soil samples are accurate, careful handling is necessary. This is particularly true for samples that are used to indicate biological activity. Keep samples in

an ice chest, and consult with your soil testing lab for proper sampling procedures. To get an accurate measurement of microbial biomass, make two composite soil samples for each bed consisting of ten soil cores. Sample each composite (10 cores mixed in a bucket) twice. Keep samples separate and carefully label them so you know where they came from. Subsampling in each plot creates mini-replication within the plot just in case there is variation in microbial activity within the plot.

Beds are all prepared and planted exactly the same except for the use of mulch on the treated plots. Plant two rows of bell peppers in each 30'-long bed. Record date of planting, sowing rate, and moisture status in the notebook and make notes throughout the growing season of anything that may affect bell pepper growth. Sketch a map of the experiment as shown below.

No Mulch	Mulch	Mulch	No Mulch	No Mulch	Mulch	Mulch	No Mulch	No Mulch	Mulch	Mulch	No Mulch
Replication 1		Replication 2		Replication 3		Replication 4		Replication 5		Replication 6	

To measure the mulch's effect on weeds, take weed counts on each plot three times throughout the growing season: at 3 weeks, at 5 weeks, and just before harvest. Subsampling in each plot is useful so that you don't have to count all the weeds in every bed. There are many ways to measure weed subsamples. The easiest is to make a foot-square template out of narrow PVC pipe to throw randomly on each bed a few times. Then count the weeds within the foot-square area and write it down. It is crucial to identify which plot each count came from. Making a data sheet can help keep track. Here's what the data for weed counts at 3 weeks might look like. Four subsamples were counted in each plot.

Date	Replication #	Treatment	count 1	count 2	count 3	count 4
	1	M	2	5	12	8
	1	NM	5	7	12	9
	2	NM	10	15	9	4
	2	M	3	6	9	12
	etc.					
	M = Mulch		NM = No Mulch		Area = 1 square foot	

If you use abbreviations, make a note of what they stand for! Also note the sample area size. What seems obvious one day may be only a vague memory later on.

You may as well look at the mulch's effect on yield, so hand harvest a 10' section of each bed separately. To avoid edge effects, harvest as close to the center of the plot as possible. Bag or box each of the plot yields in a labeled bag. You will have 12 bags or boxes of bell peppers. Besides yield, you can also take quality measurements on the fruit such as fruit size, color, insect damage, etc. Weigh the yields from each plot and record the yields on another data sheet. At some point you will need to convert the yields from pounds per harvest area to pounds or tons per acre. This involves some math. It's important that all comparisons be made between measurements in the same units, such as pounds/acre.

Finally, take another series of soil samples to test for microbial biomass to compare with those taken before the mulch was applied.

Drawing conclusions

Either analyze your data sets yourself or send copies of your data sheets to someone who will do the analysis for you. The t-test will end up giving an L.S.D. or least significant difference value for the two treatments. If the difference between the average values for each treatment is greater than the L.S.D., the treatment had a significant effect on the measured variable (yield, microbial biomass, or weed population). If the difference is smaller than the L.S.D., the treatment did not have a significant effect.
Bell pepper yields (lbs/plot)

Replication #	1	2	3	4	5	6	Average	L.S.D
Mulch	260	304	310	253	360	275	293.7	6.3
No Mulch	233	282	314	347	238	306	286.7	

** not actually calculated from the data set - for example purposes only*

Because the difference between the treatment averages, 7.0, is greater than the least significant difference, we can conclude that mulch had a significant effect on bell pepper yield.

Soil microbial biomass at harvest (mg C/kg dry weight soil)

Replication #	1	2	3	4	5	6	Average	L.S.D
Mulch	165	264	316	279	154	367	255.8	4.9
No Mulch	245	178	257	282	331	269	260.3	

** not actually calculated from the data set - for example purposes only*

Because the difference between the treatment averages, 4.5, is less than the least significant difference, we can conclude that mulch did not have a significant effect on soil microbial biomass. Close only counts in horseshoes, not in statistics, so it doesn't mean anything to have an L.S.D. that is very close to the difference between treatments. This conclusion is valid only if we assume there were no significant differences in microbial biomass between plots at planting.

Conclusion

On-farm research is a powerful decision-making tool for organic farmers. A lot of work goes into doing high-quality research, but the confidence you have in the results are worth it. Economic data can be included in the results and useful cost:benefit analyses of different farming practices may be generated. Groups of farmers can join together in research clubs and assist each other in investigating new varieties, practices, and inputs. Don't wait for your local land-grant university to finally study what you're interested in — go out and do it yourself.

Resources

Farmers have numerous resources available to them in planning, carrying out, and analyzing experiments. Here is a partial list:

Publications

- A Farmer's Guide to On-Farm Research, by Rhonda Janke, Dick Thompson, Craig Cramer, and Ken McNamara. Rodale Institute Research Center. $5. 1-800-832-6285.

- How to Conduct Research on Your Farm or Ranch, by Dan Anderson, Mark Honeyman, John Luna, and Valerie Berton. Sustainable Agriculture Network. Contains extremely valuable section on doing livestock research. Also lists many other resources. Free. 1-301-405-3186, www.sare.org/san/htdocs/pubs/

- The Paired-Comparison: A Good Design for Farmer-Managed Trials, by Rick Exner and Richard Thompson. Free. 515-294-5486, dnexner@iastate.edu

- On-farm Testing: A Grower's Guide, by Baird Miller, Ed Adams, Paul Peterson, and Russ Karow. Washington State University Cooperative Extension. Contains samples of data sheets. $1. 509-335-2857, drycrops.wsu.edu/crop_management/OFT/oftman.html

- On-farm Trials for Farmers Using the Randomized Complete Block Design, by Phil Rzewnicki. Nebraska Cooperative Extension. Gives details on analysis. $2. 402-472-2821.

Organizations

- Organic Farming Research Foundation, Jane Sooby, technical program coordinator, 831-426-6606, jane@ofrf.org

- Practical Farmers of Iowa, Executive Vice President Dick Thompson, 2035 190th St., Boone, IA 50036, phone 515-432-1560, website http://www.pfi.iastate.edu/PFIhomenew.htm

- The Leopold Center for Sustainable Agriculture, Iowa State University, 209 Curtiss Hall, Ames, Iowa 50011-1050, telephone: 515-294-3711, e-mail leocenter@iastate.edu, website http://www.ag.iastate.edu/centers/leopold/index.html

- The Rodale Institute, 611 Siegfriedale Rd., Kutztown, PA 19530-9320, phone 610-683-1400, e-mail info@rodaleinst.org, website www.rodaleinstitute.org

- Michael Fields Agricultural Institute, W2493 County Rd. ES, East Troy WI 53120, phone 262-642-3303, e-mail mfai@mfai.org; find more information at this website: http://members.aol.com/innseren/public/mfai.html

This article is a comprehensive overview of on-farm research. OFRF's technical program coordinator Jane Sooby is available to answer anyone's questions on doing on-farm research. OFRF Board members Ron Rosmann and Doug O'Brien reviewed the article and made many helpful suggestions.

Research on Pastured Poultry Breeds - Summer 2002 Special Supplement on On-Farm Research

By Don Franczyk

My wife Karen and I have been raising broiler and roaster chickens since 1998. In 2001, NOFA/Mass hired Jeremy Barker-Plotkin to assist growers in writing SARE grant proposals, and I decided to apply for a grant to study meat chicken breeds. We had been raising Cornish X and Kosher King birds in paddocks off of our barn. The birds were free range within an enclosure of electric fencing. I wanted to get them out on pasture, and I wanted to get some hard data on feed efficiency – how much feed does it take to get a bird to slaughter weight, and if there was any difference in feed efficiency between the two breeds. Feed efficiency data for Northeast organic poultry operations is hard to come by, and I wanted to develop a baseline that I could measure birds against in the future.

With Jeremy's help I applied for and received a Farmer/Grower Grant from Northeast SARE to do a comparison of broiler poultry breeds on pasture. This was the first grant of any kind that I had ever applied for. The application process was easy and consisted of a description of my farm, a summary of what I was trying to accomplish, and a summary of what the grant money was to be used for. Grant money was for both materials to be used in the project and some of my labor. The grant I applied for paid about 60% of the total cost of the project. I matched the other 40%, and got to keep any equipment purchased as well as all the chickens.

The goal of my project was to compare the two major chicken broiler breeds raised in our area in direct trials in an organic pastured poultry operation. Cornish X chickens are the standard for meat production because of their rapid rate of gain, superior feed efficiency, and high meat quality. However, the Cornish X breed is bred for traditional confinement operations and do not forage well. They also can develop debilitating leg problems. The Kosher King breed also has excellent meat quality, and tends to a better forager than the Cornish X, but has a slower growth rate. The goal of the project was to determine whether Kosher King chickens could achieve a better feed efficiency on pasture, in spite of their slow growth rate, by better utilization of the pasture.

Three trials were run sequentially on pasture. Each trial consisted of 28-31 Cornish X chickens and 28-31 Kosher King chickens. Trials began on May 2nd, June 7th and July 11th. Day old chicks of both breeds were bought from Clearview Hatchery in Pennsylvania. Chicks were kept in a special brooder area for 3-4 weeks and then moved to pasture. Chickens were kept in movable coops on pasture and moved daily to fresh pasture. Our coops were modeled after the coops popularized by Joel Salatin in his book Pastured Poultry Profits, but smaller. Our coops were designed to hold no more than 40 birds each. Water and food were kept in front of the chickens at all times. The pasture was mowed in advance of the chickens so grass length was at a stage that was palatable for the birds. Chickens were fed certified organic grain from Vermont Organic Grain. They were fed chick starter for the first 3 weeks than transitioned to 22% organic rangebird feed. We were unable to obtain a consistent supply of 22% rangebird feed throughout the season, so we used 18% rangebird feed or turkey pellets on occasion. Birds in the same trial were always fed identical feed. Slaughter dates were determined by size of the birds and the available dates for our local slaughterhouse.

My aim in running these trials was to get the birds out on pasture after 3 weeks, manage the birds for 8-10 weeks and then slaughter them. We expected to get chickens after 8 weeks that were around an average

carcass weight of at least 3.5 lbs and we expected that Kosher Kings were going to be more efficient than Cornish X chickens. Our target feed conversion was 3 to 1 for dressed birds.

Based upon these goals our results were very disappointing. Our data showed that in these trials the Kosher Kings were more efficient, but I don't feel that those results were valid. The Cornish X chicks we raised in 2001 did not match the quality of chicks we raised in previous years. Though they were absent of the leg problems we had observed in other Cornish X birds, they also seemed to lack the vigor of other birds we had raised. Before this trial I had never gotten Cornish X chicks from Clearview Hatchery. My Cornish X birds had always come from a local source. Clearview is the only source for Kosher Kings and birds I have gotten from them in the past have been of high quality. For purposes of the trial, I thought that it was important to get birds from the same source to eliminate any qualitative differences between hatchery sources. We have raised Cornish X birds before with access to the outdoors and they have achieved average weights over 4 lbs in 10 weeks and over 5 lbs in 12 weeks.

Furthermore, there was something seriously wrong with Trial 2. These chicks would not put on weight at all. I checked with other local producers that get Clearview Hatchery chicks and they reported that their chicks from around the same time were tiny as well. When we slaughtered these birds, I noticed that they were starting to put on fat even though they were nowhere near full size.

We did have a drought for much of July, August and September in our area. This drought affected the quality of the second cut hay in our area. We do not hay our pastures as we are still bringing them back into useful production but the drought may have impacted the quality of the forage available to Trial 2 and especially Trial 3.

I also believe that the feed we used from Vermont Organic Grain was not of high quality. I had problems getting a consistent supply of grain from Vermont Organic. I did get several 'webby' bags of grain throughout the season that seemed old or of very poor quality. Feed conversion for Kosher Kings for Trial 1 was still very high even though this was the best birds of the 3 trials. We had already decided to seek an alternative source of feed for next season even before Vermont Organic folded in November.

In looking over the findings I am still puzzled as to what went wrong. The first batch looked great. We slaughtered them a little earlier than we would have liked, and we were a little disappointed in their size, but we felt we were on the right track. Trial 2 was a giant step backwards and Trial 3 was only a slight improvement. In analyzing what went wrong, we took a look at everything we were doing, the source of the chicks, and the feed we were using. Unfortunately, nothing in our investigations gave us a clear idea of what had gone wrong. Our management of the birds, the birds themselves, or the feed could all have contributed to the poor growth of the birds. In fact, there probably wasn't one cause, but multiple causes for our growth problems.

Data Table of 2001 Chicken Trials

	1st CC	1st KK	2nd CC	2nd KK	3rd CC	3rd KK
Date Chicks Received	5/2	5/2	6/7	6/7	7/11	7/11
Date Chickens Moved to Pasture	5/25	6/1	7/5	7/5	8/17	8/17
Date Chickens Slaughtered	7/8	7/8	8/26	8/26	10/14	10/14
Days on Pasture	44	38	52	52	58	58
Days under Managements	67	67	81	81	96	96
Weeks under Managements	9.57	9.57	11.57	11.57	13.71	13.71

Number of Chickens Slaughtered	26	30	28	30	27	28
Average Dressed Weight at Slaughter	2.827	3.467	1.964	2.542	3.87	4.946
Total lbs. of Feed Consumed/Bird	19.43	17.5	28.44	26.77	34.18	33.12
Daily Consumption in lbs./Bird	0.29	0.26	0.34	0.33	0.36	0.35
Feed Conversion (lbs of feed /lbs of dressed weight	6.87	5.05	14.48	10.53	8.83	6.7

Despite the fact that the trials did not work out the way we wanted, and I still do not have any data on feed efficiency, I feel that it was valuable to participate in the SARE Grant Program. While doing the project, I learned a lot about evaluating my operation on the fly during the growing season, and I learned to question my assumptions about all aspects of my operation. It would have been interesting to replicate the trials this year, but change the source of feed and the source of Cornish X birds, to see if we could have gotten better results, but we decided not to. Working on the grant was time consuming and we felt that we couldn't afford the effort two years in a row. Though overall frustrating, my work on this grant has not been totally wasted. This year, our farm will be raising just Cornish X chickens. We will be going back to the source of birds we used in 2000, that we know we can raise in paddocks, and raise them on pasture. We have changed our feed source, and long term we are evaluating whether bagged fertilizer is appropriate for pastured poultry operations. By taking much of the economic risk out of trying something new, the SARE grant gave us the freedom to fail.

Overall I believe that my findings can be used as a starting point for continued experimentation on my farm but do not prove anything concerning the two breeds. There was obviously some problem in the trials especially with the Cornish X results as compared to past batches raised on farm. I have never had such small birds raised for so long. I suspect that both the feed and the stock source are to blame but can't prove my supposition. Other growers in my area have complained to both Clearview and Vermont Organic but both claim not to be responsible.

We are continuing to refine our poultry operation and will continue to raise poultry on pasture with mobile houses. At the local slaughterhouse our birds are always the most alert, the most healthy, and the cleanest. We are returning to using local sources for Cornish X birds but will probably order one batch of 30 Kosher Kings again in 2002. The Cornish X birds are great meat birds and make the best roasters, but we like the Kosher Kings as foragers and for chicken parts. Our entire approach to feed is changing in 2002. We have a new source of feed out of Pennsylvania and we are thinking of experimenting with mixing our own rangebird ration. I am convinced that Northeast organic growers have not been receiving consistent quality feed even though they were paying a premium price for the feed they were getting. We will be keeping data on our birds and will repeat the experiment. In a few years, we should have some good data comparing the two breeds on pasture.

Outreach

I didn't write any articles for publication because my results were so bad and need to be repeated. I have discussed the results with local pastured poultry producers and as a whole we are questioning the source and quality of our organic feed.

Inquiring Farmer, Louis Lego - Summer 2002 Special Supplement on On-Farm Research

By Jack Kittredge

The Finger Lakes region of central New York is still prime agricultural territory. Good soils, gently rolling terrain, and lack of development pressure from large cities have kept farming a viable land use here. The infrastructure of implement dealerships, farm supply distributors, and machine shops is still in existence. The presence of Cornell and the Geneva Experiment Station nearby gives farming some stature. Local markets for high-end, organic, and specialty foods are growing rapidly.

Into this world almost two decades ago moved Louis Lego with his wife and two sons. Lego was a researcher at General Dynamics, but he had a hankering for the rural life. So he bought a 100 acre farm in Auburn, later bringing his 89-year old mother to live in a separate house on a couple of acres next to the farm. For years after buying, Louis worked two jobs — staying with the day job to pay the bills while working to build up the farm. Finally, in 1997, he felt the farm was ready and quit his day job.

By then he had built a viable operation raising fruits and vegetables, including over 100 varieties of heirloom apples and 40 varieties of plums. The apples are planted in both an organically managed block and one using low risk — but not organic — methods. They all are primarily semi-dwarfs because Lego has found that dwarfs in his area can't grow fast enough to keep ahead of browsing by deer. He prunes them each year, preferring a central leader system. Some varieties, however, like the Winter Bananas, never get a central leader so he has to open them up. Lego also has Asian pears. Although they are usually grown in climates like California, he has had good success with the pears since having them grafted onto Russian pear rootstock. They have been there 7 or 8 years without winter kill. But the winters haven't been as severe as is possible in that region, he cautions.

Lego is a strong believer in building up the health of his land. Not having any animals, he has devleoped other ways to strengthen his soil. "We have 100 acres," he says, "but only farm on about 30. To build fertility we use green manures and rotations. A neighbor raises alfalfa without chemicals and we rotate — he'll plant on the land I take out of vegetables each year. In any given year I might have as many as 18 acres in production."

Lego uses only one small tractor in his operation, and thus does a lot of hand work. To help him he hires college kids. "We've been very lucky with our help," he confides. "They come back every year and get very good at what they do. Of course they all go back to school at the end of August."

Louis is trying to integrate his two sons into the business so they can eventually take it over and support their families there. "When they were in high school," he recalls, "They resisted all this. You couldn't get them to help here at all, unless they were sitting on the tractor! I thought: 'I just want them far away?' But now they're interested in it. They're nice people now! It changes when they grow up. They love you and appreciate you. And you have a little grandson around!"

His younger son, Jeff, has always been interested in the farm and would like to manage it someday. Now 26, he got a degree in photography and has worked at various jobs, but now wants to bring his wife and boy, Tai, back to the farm to live. "He's been an enormous help to me over the years," says Lego, thoughtfully, "and it would be great to have him here. His wife is from New Jersey, however, and doesn't really have a farm background. So we'll have to see if this works out for her, as well."

The older son, Chris, is 28 and a chef. One of Lego's dreams is to start a gourmet restaurant on the farm, which Chris could run. The farm would sell organic produce to the restaurant, so both boys could benefit. "I think it's possible to make a living farming," he asserts. "The whole vertical integration thing can make it work. You just need to figure out whatever it is in your sphere you need to do to make money. It ain't selling at farmers markets, at least for us!

"The Mennonites are an inspiration," he continues. "Their farms are maintained meticulously. They have money. Partly they don't consume a lot, but mainly they are very shrewd businessmen. And the whole family is involved. There's a Mennonite farm where we buy some of our equipment — our mulch layer and lifter. When I went there, a small blade was missing on a piece of equipment. A 12-year old girl came out and welded a new one on, and another 12-year old kid spray painted it. That business is the largest supplier of its type in the world. They have Chinese buyers!"

Although Louis' farm is certified by NOFA-NY, he doesn't think his certification pays for itself. "We send a survey out to our buyers every year to find out how everything is going," he recounts. "We ask them about certification and how important it is to them. They say they buy because we raise it. My wife says that means they know how demanding we are and they trust us. Every week we get calls from people telling us how excited they are about our food. I think it's a growing market. There are enough bad things happening to the environment that are getting publicity. It's even reaching the extension service and ag schools. The number of people there who are interested in alternatives to conventional ag is growing."

In Lego's part of New York there aren't a lot of other vegetable farmers and the organic movement is still young. But there is interest. He says he once did a little article in a farm paper on potato leafhoppers at a time when they were terrible, destroying everything. He suggested that it doesn't do a lot of good to use an insecticide and kill the leafhoppers. They're everywhere and will just come back in on your farm. The best thing you can do, he wrote, is to repel them. He had tried Neem, an organic repellant, and it worked pretty well. He got calls from three local farmers wanting to know all about his logic and results.

Louis is particularly upset about the new certification requirement that you have to write threatening letters to your neighbors warning them to let you know what they are spraying in their fields. "I tried to reword the letter and soften it a little," he sighs. "I understand the point the certification committee is making. But I can see how there is stuff I'm doing that affects my neighbors, too. If I don't spray for a pest in my orchard, I'm providing a refuge for pests that can damage their fruit. There is always a give and take in life. You can argue that if I don't use a herbicide my weeds will blow their seed on my neighbor's fields. It can go both ways and I think you have to be careful."

Not long after he bought the farm, Lego opened a store on it to be able to sell retail. Over the last 15 years he has had built a strong customer base selling jams, jellies, teas, and other items, as well as produce, to a regular, repeat clientele. Business has gone up 30% a year for the last 5 years, he says. It is currently open on Thursday, Friday and Saturday, but Louis and his wife try to take Sundays off. But so many people now want to come out on Sunday afternoons, he says, that they are reconsidering: "We could probably do another $800 in sales on Sunday. So we may open up then, especially in the fall. I hate to do it but from the customer's point of view it's one of the few days they have to enjoy a trip to the country."

Even more important than the store, now, is Lego's 50-family CSA. It has been going for 4 years. Louis and his wife deliver directly to the members' doors. "It's a great way to market," he says. "We like doing deliveries. When we had pick-ups people wouldn't show up, we'd have to call them, and it was a nightmare! Now we put every member's order in a bushel basket and deliver them to people's doors. We leave it off and they leave off the old basket and the jars on the doorstep when we deliver again. It looks nice to get your food in a basket. The members think it's wonderful! We think it's wonderful because it takes all the

uncertainty out of it. My wife and I both do it. We do it on two days and it takes maybe 4 hours. We take only people who are close!

"Here's our newsletter," he continues. "We have a paragraph on organic gardening in every issue. Then we have a paragraph on what we're delivering. They get one every week. Every week we include recipes. You can't believe the amount of time my wife puts into those recipes. All week we're eating them. She'll redo a little thing and we'll try it again!"

When I visited in early September, a large share was getting: a dozen ears of sweet corn, a bag of mixed apples and pears, red, green, and yellow heirloom tomatoes, (with a recipe for a wonderful Mexican festival salad to use them in), cherry tomatoes, leeks and potatoes (with a recipe for potato/leek soup), a big onion, cucumbers, and flowers. The Legos deliver on Tuesday and Wednesday , picking what they can on Monday for the CSA. Things like corn, however, they don't pick until the day of delivery.

Lego got the idea of opening a restaurant when he went to California and visited restaurants connected to farms in the Napa Valley. He figured there was no reason he couldn't make it work here, too. "Of course California is year round, farms have nuts and citrus and everything! It's a completely different things out there — farming. But right now people come to the farm from as far as Syracuse, which is 40 miles away. My dream is that it will become a Chez Panisse, a nationally known restaurant. It won't be gigantic — maybe seat 70. I think it will take years — five years, ten years — for the reputation to spread. If we do it well, it will happen.

"The idea of planting and growing for a restaurant is exciting. Chris is going to need smaller quantities of things, very fresh, more often. We're going to have to plant beans weekly for him. Smaller quantities. We're going to have to put in a tunnel to raise mesclun earlier in the season. In the winter we'll shut the restaurant down. We really want it to be seasonal, based on what we grow here. I don't know if we can keep doing the CSA then. Something is going to have to give. And the store makes sense if we're bringing people here for a restaurant. It might even increase our business there. I've thought about doing a hard cider to draw people. We've been working on that for several years, but it's still not very good! (laughs) I'd like to do one that isn't real hard, just naturally carbonated. The Geneva Ag center there has a food venture center which will help you develop food processing. They've said they would work with us on a cider because we have the apples."

Coming from a background of scientific research, Louis is naturally curious about farming practices. Someday he would like to do some research on growing organic versus conventional foods and checking their nutritional quality. "Whenever people ask about the value of organic food we all say: 'Oh, it's better for you!' But there's no hard evidence," he insists. "My wife is a nutritionist and her big thing is to look at the food by its effect on the health of whoever eats it. Many studies just burn the food, analyze the ash, and determine the nutrient content that way. But comparative animal studies would tell us so much more about the vitality of the food! This would be a wonderful opportunity to involve everyone — conventional growers, university personnel, and organic farmers — in a key research question."

Lego has already been awarded a couple of grants from SARE for on-farm research. He feels SARE provides a mechanism for a small, tiny farmer who has a good idea to influence the whole way farming is done. And he thinks the program is easy to work with. "They don't require too much detail in your planning, project description, budget, etc." he says. "You have to submit a financial report every month — whatever you've spent. The final reports you have to spend some time on, but they always seem to really read them and pay attention to them.

"I'd be very encouraging to other farmers about approaching SARE," he continues. "Just think about things you do and would like to do better. Don't be nervous. Call SARE and talk to them about what you want to do. David Holm will give you good advice. He's not the guy who's going to judge it — that's done by a

board. It's such a great way to improve your farming. Part of your proposal is your outreach, telling them how you are going to share your results with others — publishing a report somewhere, presenting the results at a conference — what are you going to do to get the word out? It's been a great experience. I would like to do more and more.

Louis' first SARE grant was into a system he calls 'hybrid mulching'. The idea is to take a well prepared field, seed it in the fall to rye grain, and then lay down a strong plastic mulch (he likes a 48 inch, 1.5 mil film). Where the plastic covers a seeded area, the grain fails to germinate or is smothered. By winter the rye has grown to several inches as a cover crop, holding the plastic in place and preventing erosion. In spring it greens up and grows rapidly, so that it is tall enough to protect the plastic from UV rays when the sun is high in the sky. By mid may the soil is warm, and tomatoes are transplanted into the plastic mulch. The tall rows of grain on each side of the transplants protects them from drying winds, they are warmed by the mulch and grow rapidly. In June or July the grain begins to form seed and is cut (he uses a walk-behind sickle bar mower.) It is important to make sure the rye near the edges of the plastic falls onto it to protect it from the UV rays and keep the soil under it from overheating. The result is a plastic mulch so thoroughly covered by cut grain that you can't even see the plastic. Ripening tomatoes will rest on the stalks rather than the plastic.

No further work is needed for that year's crop. The plant residue is removed either in the fall (when the field with the plastic still down is reseeded to rye) or in the spring (when the field is seeded with oats.) The same steps are taken the following spring, when the plastic mulch is planted with melons or squash. The third year it can be planted with the cabbage family. All these crops benefit from being planted in plastic, he reasons, and the rotation progresses from the most disease prone crop in the first year to the least in the final year. Lego has found that he can get mulch to last three years under this system, vastly reducing the work of laying and collecting the mulch each year. He likes red or brown-red mulch because it warms the soil faster than black or green infrared transmitting (IRT) mulch. Cutting the grain should be done as late as possible in the spring to provide the best weed control.

"It's a spectacular mulching system," he enthuses. "When we use the rye grain we cut the rye in June, right after we plant the tomatoes. You get this tunnel down through the rye which really protects the tomatoes from drying winds. It's like a special microclimate in there and they grow like crazy. As soon as they get going you cut the rye. The rye just covers the plastic. There's no erosion at all. You can't tell there's plastic down. I've seen guys who grow vegetables on hilly land and use plastic. There are gullies at the edges of the plastic, sometimes 2 or 3 feet deep! I think I'll go to this system with a lot of my vegetables. I love it. The field is all in cover crop. It holds the soil.

"I can get this plastic up after 3 years, no problem," he continues. "I have a mulch lifter, but you can do without that if you want. Originally the plastic would crumble in the field, but plastics now hold together. Plus, by covering it, you prevent ultraviolet light from breaking it down. I was mowing the swaths with a small cutter-bar mower, mounted on my Gravely walking tractor. But not everyone has such equipment. Maybe there is some tractor equipment you could find — you could drive right over the rye. Now I'm investigating growing clover in the pathway. And I want to try an annual ryegrass and clover mix that should all die out next summer. I never realized, until I started working with it, that an annual ryegrass starts up and lives through the spring, but dies in the early summer."

Louis had to talk to NOFA-NY about this mulching system because the standards require taking the plastic up every year. As long as he gets it all up with this system, they are letting him try it. One downside of this system, he admits, is that he has to lay down his plastic at the widest necessary spacing for three years. His rows are about 10 feet apart. It wouldn't have to be that wide for tomatoes, but the plastic is spaced for the widest drop, which will be melons. Also, the spring reseeding with oats doesn't get up far enough to make a

really thick stand to last through the summer. So he is currently investigating a reseeder that he could run right down the row of oats which had gotten thin, reseeding with clover.

Lego's most recent SARE project is researching new, less toxic chemicals for pest and disease control in apple orchards. They are very specific chemicals, such as a sterile inhibitor for scab. You spray it on trees when they're dormant. For about 12 weeks it stops the tree from producing a very specific sugar, which scab needs to live. After that period of time, which is when scab is a problem, it starts producing sugar again. According to the EPA the product is completely harmless and doesn't affect any insects or other life. But it is a synthetic.

"The EPA calls them low risk chemicals," he explains, "because they don't know of any risk to people or the environment. They are so specific to certain problems. The down side is that they are generally expensive. But you can use very small amounts — one spray a year. It doesn't completely eliminate scab, but does a very good job. Scab is our biggest disease problem. For codling moth there's a new product out: 'Last Call!' It dispenses pheromones. which attract the male moths and then a synthetic pyrethroid kills them. It's an excellent way to reduce the impact of sprays — only the subject pest is attracted. Of course it's still not allowed in organic systems because of the synthetic chemical involved."

Louis is not convinced that managing an orchard organically is a good thing. Before they used arsenic in orchards, he says, there was a pretty good balance. There were wormy apples, but not many. Apples had evolved with tough skins, apples that weren't attractive to pests. Natural evolution had protected orchards. But as soon as the insecticides arrived, and people started demanding redder apples, it all moved in the wrong way. The pesticides killed the beneficials and there was no more balance. The problem became terrible and you couldn't grow apples without chemicals. Now there are 'organic' products like rotenone or sulfur which aren't good for anyone, but are necessary if you want to get cosmetically saleable apples. One spray of Imidan can replace all those, he argues, and isn't that better for the environment?

"We don't use any rotenone in our organic block,' he says. "We use "Surround", which is kaolin clay, for curculio. It appears to work well, but it is horrible stuff to work with. It plugs everything up; it gets over everything — the ground, trees, and the tractor. It's a nightmare. It's very finely ground. It's very expensive, too. You put it on thick and the insects get gummed up trying to get through it. They say there is also some effect by making the tree less attractive because it looks so white."

Lego tries to grow as many old varieties as he can. The oldest apple he has is a Jefferis, a beautiful striped apple. It comes from a farm in Chester County, Pennsylvania where it was planted about 1812. Altogether he has about 110 varieties. It's a problem for marketing, though, he says. Each week people come to the store who want the apple they had last week. But he doesn't have it anymore!

Reflecting a little on his decision to give over the corporate world for a family farm, Louis says: "We're up and down about this. One morning we can't understand why we're doing it, all the work! The next morning, it all looks different. It helps when people come out and it all looks so wonderful to them! You think: 'Maybe they're right! Maybe it is!' I miss the excitement of proposals and people rushing around, but I don't miss it as much as I thought I might. I like it a lot better spending my time here than at airports! I think about that every single day!"

Write a Farmer-Grower Grant! - Summer 2002 Special Supplement on On-Farm Research

By Susan Sauter, Bruceton Mills, WV

Do you consider yourself a scientist? No, neither do I, but if you are a farmer or gardener, then you have what it takes—and you've probably been trying things out all along in your fields, in your gardens, or on your animals. Put that wherewithal together with the Sustainable Agriculture Research and Education (SARE) "Farmer-Grower" grants, and you just might be able to get some funding to try out your ideas—especially if they've never been tried before.

That's what I did last year—I wrote a grant called "Two approaches to farm-grown nitrogen" to try both using my own home-grown alfalfa/clover hay as a high-nitrogen dry mulch on my vegetables and my own in-garden grown alfalfa/ clover as a high-nitrogen wet mulch on my basil. This would be different from the usual scheme of legumes grown for their nitrogen fixation. Sure, I'd get some of that benefit as well, but I needed a quick organic, solution to correct nitrogen deficiencies throughout the active growing season—especially for basil of which I grow lots but which takes on a yellow pallor as the season stretches on. I also wanted a cheaper solution than buying any number of expensive off-farm organic supplements. So maybe I could grow my own. Yeah, grow my own! Others have tried that and been thrown in jail. This would be legal green leafy material.

Consulting with our grant's technical advisor, someone SARE insists you must have as a condition of the grant, we established a 2 acre legume hayfield this year for part of the experiment. Boy, did we learn a lot—if nothing else, this moved us into another dimension of farming, i.e., caring for and cultivating larger acreage. It also taught us about using the right equipment for a job. I don't know how many calls I made researching the kind of seeder needed to finely seed and seat that two acres or how many I made regarding the appropriate mower to use that wouldn't knock off the tiny but high-in-nitrogen legume leaves once it was time to make the hay. These difficulties were unforeseen when I wrote the grant.

We made the mistaken assumption that because we lived in a farming community, we'd just be able to borrow the right equipment from a knowledgeable and experienced neighboring farmer. We quickly learned that no one within close proximity had ever grown legume hay before. No one had the right fertilizer spreader. No one had the right seeding equipment. But we did find the right mower. We were still successful in establishing this field—we made do with a spreader intended for granulated not powdery fertilizer; I hand seeded the field with a broadcast spreader; my husband fabricated a roller out of a water-filled wine barrel for me to drag behind our all-terrain type vehicle to compress the seed into the soil. And in early September, 94 bales of our own legume hay was cut, baled and stacked. Because we only got this one cutting and fairly late in the season, we don't have results from this part of the grant, but I'll continue the project next year, using weekly tests to see how quickly the nitrogen from the dry mulch hay is released. I have great hopes for good results—not only will I be suppressing weeds, but I'll be feeding the vegetables a slow-release nitrogen—and adding organic matter.

I consider the other part of the experiment a great success. In the future, I will always grow alfalfa or clover around my basil as I did this year. Over the course of 10 weeks, I cut the legume strips 3 times with a side-discharge lawnmower when they reached a height of about 8-10 inches, but I found the clippings were better applied by hand after they were bagged instead of blowing them into the basil row. Otherwise the basil leaves developed a blemish where the wet material hit. The weekly soil and basil leaf nitrogen tests showed an increase fairly soon after the wet legumes were applied—2-7 days. My own observation noted that I only

had to apply fish emulsion once during the 10 weeks, something I would normally do 4-5 times over the season.

So why not try your hand at a SARE grant? Mine was only 6 pages long, and two of those were budget pages. The Northeast Region office of Sustainable Agriculture Research and Education is accepting applications from farmers in the Northeast for grants to support innovative, exploratory projects to enhance the sustainability of farms and farming. Applications and information are available at www.uvm.edu/~nesare/ or call 802-656-0471.

State of the States: Organic Farming Systems Research at Land Grant Institutions during 2000-2001 - Summer 2002
Special Supplement on On-Farm Research

Compiled by Jane Sooby
OFRF Technical Program Coordinator

Because public funds support the land grant system, we expect it to be responsive to the educational and research needs of its constituents, including organic farmers. This report describes organic farming research currently in the ground at land grant universities and provides information on Extension and other resources that may be of use to organic growers.

Over the past 138 years, the land grant system has invested billions of dollars in researching agricultural practices and inputs. While gaining recognition as the engine beneath the hood of modern U.S. agriculture's astonishing increases in productivity, the land grant system also has come under attack over the past 30 years for serving corporate agricultural input manufacturers and large-scale producers to the exclusion of small-scale and low-input producers. The land grant system's institutionalized focus on purchased chemical inputs and mammoth-scale production marginalized many other areas of inquiry, including smaller scale and more environmentally appropriate farming techniques.

In 1997 OFRF policy director Mark Lipson undertook an intensive review of USDA's Current Research Information System (CRIS) database, seeking out all organic relevant research being done at that point in time. What he found was sobering yet not unexpected: less than 0.1% of federal agricultural research dollars were funding organic farming research. This report is a follow-up to Lipson's groundbreaking report, Searching for the "O-Word."

The information-gathering process for this study was to search land grant university web sites, follow up on leads with phone calls and e-mails, and double-check against other lists of organic research projects. We examined the websites of all 67 land grants and searched for the word "organic" when a search engine was available. We searched hundreds of department homepages and waded through numerous lists of faculty research interests, current research projects, extension publications, and research and extension station activities. After "casting the first net" and compiling an initial list of activity at all the institutions, we called well over 100 researchers, deans, and SARE coordinators to get more details on organic research projects. A team of reviewers representing each region of the country looked over the information we had compiled and provided us with useful corrections and additions.

Three elements are fundamental to our search for organic farming systems research: farmer involvement, explicit organic content, and a systems approach. Ideally, farmers themselves participate in research from the very beginning, helping to identify research priorities, frame research questions, and plan methodology. On-farm studies generate data meaningful to farmers and help conserve scarce research funds.

It is difficult to separate explicit organic content and a systems approach, because with an awareness of organic production principles comes awareness of working with the entire agroecosystem. The success of organic farming systems to date has hinged on managing systems as wholes rather than relying on "silver bullet" solutions to problems.

We believe that the strength of such systems in building fertility, soil quality, and resistance to pests is an emergent property from the whole. Therefore, how the discrete elements of the whole interact is the most appropriate focus for organic farming systems research. Organic management at its most productive takes an ecological approach to the larger system, with equal attention paid to the system as to its parts.

Research efforts in North Carolina, Ohio, Iowa and West Virginia best exemplify our ideal of organic farming systems research. Farmers participate in advisory boards that set research priorities and make funding decisions. Research station land is being put through the three-year transition to certified organic status. Interdisciplinary teams of researchers are contributing expertise in soil nutrient dynamics, weeds, microbial ecology, soil micro- and macrofauna, plant pathology, horticulture, and agronomy. Economic viability of organic farming is also being assessed. Until as recently as 1998, certified organic cropland on research stations was an extraordinary rarity. Even now, efforts at doing long-term organic systems research can be counted on one hand. The land area devoted to organic farming research in the land grant system is small, but each acre is important. A wave of innovative research partnerships focused on organic farming is gathering strength in the U.S.

The good news is that land grants in 39 states have research and/or resources relevant to organic producers. Land grant institutions in 19 states reported research acreage being managed organically, 12 of which have research land that is certified organic or in transition to certification. The bad news is that, of the 885,863 available research acres in the land grant system, only 0.02%, or 151 acres, is being used for certified organic research. This is an order of magnitude less than the 0.2% of all U.S. farmland identified by USDA as certified organic in 1997.

Five states have research land that is certified organic, and seven states have organic research land in transitional status with an organic certifier. We applaud the researchers in Colorado, Iowa, Minnesota, New Jersey, and Washington for taking the important step of certifying their research land, and we hope that this acreage expands in coming years. We also recognize the commitment made by institutions currently transitioning research acreage to organic certification in Colorado, Georgia, Illinois, Kentucky, Michigan, North Carolina, Ohio, and West Virginia. We will monitor their progress and report on their certification status in the next edition of this report.

We strongly encourage researchers doing organic studies in Arizona, California, Connecticut, Hawai'i, Indiana, Kentucky, Maine, and Oregon to certify their research acres to bolster their credibility with organic growers. They should demonstrate that they are adhering to the same federally-mandated production practices that organic growers must follow in order to market their goods as organic. Though the federal organic standards allow a "temporary variance" for research purposes, the specific requirements from which exemption is allowed comprise the heart and soul of organic practices, such as soil fertility and crop nutrient management, crop rotation, origin of livestock, livestock health care practices, organic handling requirements, and facility pest management practices. To conduct research exempt from these standards would generate information irrelevant to organic producers.

Certification costs are also a significant part of organic operations, and the costs of certifying research acreage and abiding by the standards are crucial components of conducting realistic economic analyses of organic systems. We firmly believe that economic feasibility studies are essential components of organic farming systems research, because growers need cost estimates in order to assess the viability of new practices for their operation.

In compiling the numbers found in Table 1, we were disappointed to see that states such as Wisconsin, Pennsylvania, New York, and Florida —states that are among the top ten vegetable producers in the country according to the USDA's most recent survey of certified organic production —have no organic research acres at all. Moreover, California, which produces almost half of all the organic vegetables grown in the

U.S., has just nine acres of uncertified organic research land at its land grant institutions. Valuable on-farm research is being conducted in many, if not all, of these states; however, the land grants could significantly extend this work with their own certified organic acreage if researchers and administrators have the will to do so.

States in which there was "No Organic Found" are Alaska, Arkansas, Delaware, Louisiana, Maryland, Nevada, Oklahoma, Rhode Island, South Carolina, Tennessee, and Wyoming. We call on researchers and administrators in these states to note the significant and growing organic production activity around them and to begin addressing the unmet needs of organic producers in their states.

Table 1: Organic Research Acres at Land Grant Institutions, 2000 - 2001

State	Certifed	Transitional	Claimed, not Certified	Total
Arizona			9	9
California			9	9
Colorado	12	4		16
Connecticut			33	33
Georgia		9		9
Hawaii			2.5	2.5
Illinois		6		6
Indiana			0.2	0.2
Iowa	17			17
Kentucky		8	160	168
Maine			0.6	0.6
Michigan		17		17
Minnesota	120			120
New Jersey	0.2			0.2
North Carolina		100		100
Ohio		35		35
Oregon			1	1
Washington	2			2
West Virginia		60		60

**Does not include student organic farms, of which there are six, in CA, CO, ME, NJ NY and VT*

Table 1: Certified & Transitional Acres are Located in the Following States

(grouped by SARE region)

West	North Central	Southern	Northeast
Colorado	Iowa	Georgia	New Jersey
Washington	Minnesota	North Carolina	
	Illinois	Kentucky	
	Michigan	West Virginia	
	Ohio		

CONNECTICUT

Univ. of Connecticut, 1862, Storrs organic research acres: 33, not certified

Research, production:
The U. Conn. Plant Science Research Farm and Nursery conducts organic research. IPM technician Rob Durgy has managed a 0.9 acre field organically for the past 3 years, though it's not certified. He has been growing cover crops and clover to restore fertility to the soil. There are a few hay fields in reserve that haven't had any chemicals applied for 5 years that may be put into organic farming research. None of the fields are certified. Contact Steve Olsen, 860-486-2015, -0682 fax (which he prefers).

Education:

1. An organic farming and gardening class is taught through Univ. of Connecticut's "Personal Education and Enrichment Classes." The instructor is farmer Michael T. Keilty.
2. An organic and sustainable ag course was taught in the Dept. of Plant Science in 1997, but student enrollment the following semester wasn't adequate to repeat it.

Connecticut Agricultural Experiment Station, New Haven

Research, production:
Entomologist Kimberly Stoner is involved in 3 on-farm organic farming trials:

1. Biological control of Mexican bean beetle on 12 organic farms (funded by OFRF);
2. A SARE-funded farmer project to overwinter and raise field-collected lady beetles for use in the greenhouse in early spring. The experiment is testing different supplemental feeding regimes;
3. A farmer project to test cole crops as a trap crop for flea beetles to restrict them to one area of the farm. Kimberly Stoner, 203-974-8480, kimberly.stoner@po.state.ct.us

Extension:
Kimberly Stoner, Connecticut Agricultural Experiment Station, organized a SARE-funded farmer/scientist conference, Alternatives to Insecticides for Managing Vegetable Insects, in New Haven, 1998. The proceedings are a valuable resource for organic insect control. To order, contact NRAES, Cooperative Extension, 152 Riley-Robb Hall, Ithaca, NY 14853-5701, phone 607-255-7654, fax 607-254-8770, e-mail NRAES@cornell.edu. This publication will soon be posted on the web and will be accessible at http://www.caes.state.ct.us/AlternativestoInsecticides/alternatives.htm

MAINE

Univ. of Maine, 1862, Orono. Organic research acres: 0.6 acre not certified; 3-acre student farm, certified

Research, production:
An organic small grain demonstration/research project started this year at Rogers Farm (the Maine Agriculture and Forest Experiment Station site in Orono) in response to the rapid increase in certified organic dairy farms in Maine and the resulting demand for certified organic grain. Tim Griffin, associate extension professor, Sustainable Agriculture; associate professor, Sustainable Cropping Systems, 207-581-2942.

Research, economic/consumer:
Ag economist Stewart Smith, well known for showing how farmers' share of the ag economy has decreased while the input providers' share has increased, is co-author with five others of a 43-page report, "The Feasibility of an Organic Grain Milling and Handling Facility in Central Maine." The report concludes that, due to increased demand by organic dairy and poultry producers, such a facility could benefit organic grain growers and provide an attractive return to investors. The report is available free from the Maine Agricultural Center, 1-800-648-0597 (in Maine) or 207-581-3204.

Education:
The Black Bear Food Guild is a student-run, organically certified CSA operated on 3 acres of the Rogers Farm. For details, contact Marianne Sarrantonio, Sustainable Agriculture Program director, phone 207-581-2913, e-mail mariann2@maine.edu

Extension:

1. The year 2000 was the second year in which a series of herb production short courses focused on organic production was offered by the Hancock County Cooperative Extension Office. This five-month course features information and hands-on activities on organic herb marketing and production. Contact Marjorie Hundhammer, 207-667-8212.
2. An Organic Farming Short Course sponsored by University of Maine Cooperative Extension and the Maine Organic Farmers and Gardeners was presented February 22, 25 and March 1, 4, 1999. Maine Organic Farmers and Gardeners Assoc., 207-568-4142.

MASSACHUSETTS

Univ. of Massachusetts, 1862, Amherst organic research acres: 0

Research, production:
Ruth Hazzard, team leader of the U. Mass Extension Vegetable and Small Fruit Program, tested commercial Bt products in 1994–1996 in 34 on-farm trials. This research has continued and Hazzard has found that applying Bt mixed with vegetable oil directly to the corn silk is very effective at controlling late-season corn earworm and European corn borer. Hazzard has also developed a hand-held oil applicator that reduces wear on the operator. OFRF funded part of the work in 1999. Hazzard has published a fact sheet on biointensive insect management in sweet corn. A report on the 1999 trials and a summary of Bt on-farm trials from 1994–1996 are on-line along with a list of Bt products. To access them, go to http://www.umass.edu/umext/programs/agro/vegsmfr/Articles/Sweetcorn/SweetCorntopic.htm Ruth Hazzard, phone 413-545-3696, e-mail rhazzard@umext.umass.edu

Education:
A freshman-level class offered through the Plant and Soil Sciences Dept., Organic Farming and Gardening, has been taught by Allen Barker for nearly 30 years.

NEW HAMPSHIRE

Univ. of New Hampshire, 1862, Durham organic research acres: 0

Research, production:
William MacHardy in the Dept. of Plant Biology received SARE funds in 1997 to study earth-worms as biocontrol agents of scab and leafminers in New England apple orchards. The project was done on-farm and on-station. Some of the orchards sampled were organic. MacHardy found no relationship between orchard management practices and the amount of leaf litter removed by earthworms. MacHardy, Univ. of New Hampshire, 246 Spaulding Hall, Durham, NH 03824, phone 603-862-3846.

NEW JERSEY

Rutgers Univ., 1862, New Brunswick organic research acres: 0.2 certified plus part of a greenhouse; 3-acre student farm, not certified

Research, production:
The 390-acre Snyder Research and Extension Farm near Pittstown has a 0.2-acre field certified organic by the Northeast Organic Farming Association–New Jersey (NOFA-NJ). * A portion of the greenhouse is also certified organic. The Snyder Farm is Rutgers's center for sustainable agriculture and cooperates with NOFA-NJ to organize organic farming meetings and conferences. Current organic research projects include evaluations of kaolin clay spray for insect and disease control on peppers, onions, and summer squash; kaolin clay spray for flea beetle control in egg-plant; and weed control in the perennial crop Echinacea purpurea (this project includes chemical treatments for comparison). Contact John Grande, director, phone 908-730-9419, e-mail grande@aesop.rutgers.edu

Research, economic/consumer:

1. Organic crop budgets prepared by Robin G. Brumfield and Margaret F. Brennan and published by Rutgers Cooperative Extension. Partially SARE-funded. http://aesop.rutgers.edu/~farmmgmt/ne-budgets/organic.html Robin Brumfield, phone 732-932-9171ext. 253, e-mail brumfield@aesop.rutgers.edu
2. An analysis of costs associated with conventional, integrated, and organic management production systems was published: Brumfield, R.G., A. Rimal, and S. Reiners. 2000. Comparative cost analyses of conventional, integrated crop management, and organic methods. HortTechnology 10:785–793.

* Northeast Organic Farming Association—New Jersey, P.O. Box 886, Pennington, NJ 08534-0886, phone 609-737-6848, e-mail nofanj@aol.com, website http://nj.nofa.org/

Education:
The Cook College Student Organic Farm is an organic farm managed by university students. In its sixth year, the 3-acre farm is operated as a Community Supported Agriculture (CSA) project. Part of each week's harvest is donated to a local soup kitchen. Contact faculty advisor Dr. Ralph Coolman, 732-932-8406, coolman@aesop.rutgers.edu

Extension:

1. Rutgers is unique in producing a separate organic edition of the extension publication Plant and Pest Advisory Newsletter. It may be found on the web at http://www.rce.rutgers.edu/pubs/plantandpestadvisory/2000/organic.html Newsletter production, Jack Rabin, phone 732-932-1000 ext. 610
2. Publications: Organic Foods: What Do We Mean? by Daniel Kluchinski. http://www.rce.rutgers.edu/pubs/ag/plantscience/pdfs/fs682.pdf Organic Certification of Agricultural Products by Daniel Kluchinski. http://www.rce.rutgers.edu/pubs/ag/plantscience/pdfs/fs683.pdf Consumer Perceptions of Organic Produce by Ramu Govindasamy. http://www.rce.rutgers.edu/pubs/ag/agecon/pdfs/fs899.pdf

NEW YORK

Cornell Univ., 1862, Ithaca organic research acres: 0; 10-acre student farm, certified

Research, production:

1. Nick Calderone in the Dept. of Entomology received an OFRF grant in 1999 to investigate use of essential oils to control varroa mites in European honey bees. Nicholas Calderone, phone 607-254-7417, e-mail nwc4@cornell.edu

2. Three organic and four conventional on-farm trials and two research station trials were conducted in 1997 and 1998 to study the impact of composts on soil microbial activity and disease suppression in vegetables. Anusuya Rangarajan, assistant professor in the Dept. of Horticulture, headed the project, which received partial funding from OFRF. Compost affected soil fertility, plant emergence and stand, and tissue composition; however, suppression of Rhizoctonia in beets was associated with improved crop fertility rather than a suppressive effect of the compost. Anusuya Rangarajan, phone 607-255-1780, e-mail ar47@cornell.edu
3. Terence Robinson of the Agricultural Experiment Station in Geneva received an OFRF grant in spring 2000 to initiate an on-farm research project to develop organic apple production systems in NY. Specific objectives include developing integrated insect and weed management systems that will produce healthy trees and high quality fruit; developing alternatives to chemical fruit thinning; and comparing the economics of organic and conventional apple production systems. Terence Robinson, phone 315-787-2227, e-mail tlr1@cornell.edu
4. Horticulturist Thomas Bjorkman studied the fungus Trichoderma harzianum 1295-22's (T-22) effectiveness at protecting sweet corn roots from fungal infection and found that it works in conventional and organic systems. Bjorkman, phone 315-787-2218, e-mail tnb1@cornell.edu
5. Entomologists Art Agnello and Harvey Reissig of the Geneva Experiment Station are cooperating with organic apple grower Jim Bittner to study three pest control methods in apples. They are using an alternative spray program, pheromone sprays released by a microsprayer, and "whole-tree screen cages" in which each tree is covered by a mesh bag. Art Agnello, phone 315-787-2341, e-mail ama4@cornell.edu; Harvey Reissig, phone 315-787-2355, e-mail whr1@cornell.edu

Extension:
Organic farmer and Tioga County Cooperative Extension Agent Brian Caldwell contributed an article to the Spring 2000 Northeast Organic Farming Association—New York newsletter, "How can organic vegetable growers increase soil organic matter without overloading the soil with nutrients?" Though he doesn't have his own research program, he has just completed work on stale seedbed weed control that is relevant to organic growers. Brian Caldwell, phone 607-687-4020, e-mail bac11@cornell.edu

Education:
The Dilmun Hill student farm occupies 10 acres and is certified by the Northeast Organic Farming Association–New York (NOFA–NY).* Dilmun Hill is a research and educational site. Ian Merwin, faculty member in charge, phone 607-255-1777, e-mail Im13@cornell.edu

Resources:
Erick C.M. Fernandes in Cornell's Soil, Crop & Atmospheric Sciences Dept. maintains a website on Tropical Agroforestry and Organic Agriculture at http://wwwscas.cit.cornell.edu/ecf3/Web/AF/AF%26OI.html. Fernandes is group leader of MOIST, the Management of Organic Inputs in Soils of the Tropics group of the Cornell International Institute for Food, Agriculture, and Development (CIIFAD). Through MOIST, subscribers have access to three international list-servs that exchange information on cover crops in tropical and subtropical agriculture. MULCH-L is an open, unmoderated electronic mailing list for the interdisciplinary exchange of information on cover crops, green manures, managed fallows, and other woody/non-woody mulch-based agricultural systems in tropical and sub-tropical areas on issues related to organic inputs in agriculture. COBERAGRI-L is a Spanish language cover crops mailing list maintained by the International Cover Crops Clearinghouse (CIDICCO). EVECS-L is a French language cover crops mailing list maintained by the Center for Cover Crops Information and Seed Exchange in Africa (CIEPCA). For information on subscribing to these go to http://ppathw3.cals.cornell.edu/mba_project/moist/mailist2.html Erick C.M. Fernandes, phone 607-255-1712, e-mail ecf3@cornell.edu

* Northeast Organic Farming Association—New York, Pat Kane, Administrator, Organic Certification Program, 840 Upper Front Street, Binghamton, NY 13905, phone 607-724-9851, e-mail nofany@aol.com, website http://ny.nofa.org/

RHODE ISLAND

Univ. of Rhode Island, 1862, Kingston No Organic Found

VERMONT

Univ. of Vermont, 1862, Burlington organic research acres: 0; 2-acre student farm, not certified

Research, production:
Crop and Soils Science Dept. researcher Bill Murphy is researching how to control parasites of grazing livestock on organic farms. A summary may be found at http://pss.uvm.edu/vtcrops/Articles/Pastureressum.html Scroll down to Managing Parasites of Grazing Livestock on Organic Farms and click. Bill Murphy, Department of Plant and Soil Science, phone 802-656-0485, e-mail wmurphy@zoo.uvm.edu

Education:
Common Ground Farm, 2 acres at UVM's Horticulture Research Center in South Burlington, where students grow organic vegetables and market them through a CSA. It's not certified organic because chemicals are used other places on the horticulture farm. Contact Dr. Wendy Sue Harper, phone 802-656-0482, e-mail wharper@zoo.uvm.edu

Extension:

1. A guide to pesticides for organic gardeners by Dr. Vern Grubinger, 1999, http://ctr.uvm.edu/ctr/press/99pesticideguide.htm Guidelines for organic fertilization by David Allyn Heleba, Agricultural and Environmental Testing Lab, http://pss.uvm.edu/pss161/problem/handout.html
2. Vermont Agriculture/Fruits and Vegetables at a Glance Extension fact sheets have organic acres listed in them. http://ctr.uvm.edu/ext/factsheets/agfs3/fruitveg.htm

Of Note:
The Northeast Organic Farming Association of Vermont (NOFA–VT) has utilized SARE funding to study organic dairy production practices, making the transition to organic, and homeopathic treatments in organic dairy. Enid Wonnacott and Lisa McCrory have been the primary investigators on these projects. The research summaries to SARE contain useful information on organic dairy practices. They are on the web at http://www.uvm.edu/%7enesare/LNE93-39.html http://www.uvm.edu/%7enesare/LNE97-86.html http://www.uvm.edu/%7enesare/LNE97-97.html The investigators are writing a "detailed publication on organic dairy farming." NOFA-Vermont, P.O. Box 697, Richmond, VT 05477, phone 802-434-4122, e-mail info@nofavt.org, website http://www.nofavt.org/

On-Farm Research - Summer 2002
Special Supplement on On-Farm Research

By Brian Caldwell
NOFA-NY Farm Education Coordinator

Farmers are always fiddling with things, trying to improve the performance of their crops, animals, and farms. The best are sharp observers who have a strong streak of persistence.

Trying out new varieties, improving pest control, and doing a better job of caring for their soil are typical subjects for such informal research. How can we test these things in ways that give us the clearest answers?

Conventional agricultural science has cut through the rich complexity of the farm, simplifying things at research facilities to the point where specific questions can be answered. But because of the simplified conditions under which they were obtained, the answers sometimes don't translate exactly to the farm environment. Particularly on organic farms, there may be systems at work that change the answers, at least somewhat.

So, how can we find answers that hold up under farm conditions? The answer is to frame good, clear questions and investigate them on the farm itself. There are various levels of rigor with which we can test our questions and obtain answers. The simplest is to lay out strips or other partial areas in an otherwise uniform field, and change only one aspect of the crop in those strips. For instance, one could ask, "Does this new micronutrient product increase crop yield under my conditions?" Apply at least four strips of the product down the field, mark their locations, and carefully examine the crop at harvest for differences in yield or quality at several locations in treated and untreated areas. Just doing this simple comparative "with and without" trial can give you key insights. It would make sense to repeat it in different fields and in different seasons.

Oddly enough, many times farmers convince themselves that "product x" is beneficial, even though they did not leave an untreated "check plot" when they tried it. Who knows, maybe the crop would have been just as good without "product x"!

For comparing several varieties or different treatments, it is best to work with a trained researcher, perhaps a cooperative extension educator or university researcher. They can help you design your trial, and also often help collect data. Taking data can be very time-consuming, including such things as counting tiny weeds or insect eggs, or measuring yields from specific plants, depending on what question is being asked. In the rush of harvest season, you may not have time to do it well without outside help. Researchers are also very good at helping interpret the results.

My Experiences with On-Farm Research

In the early 1980's, Tracy Frisch (a Cornell grad student at the time, but now with the Albany-based Regional Farm and Food Project) organized several central NY organic growers to see whether beneficial nematodes were an effective control of cabbage root maggots on our farms' brassica crops. Working with this group was my first exposure to doing research on my farm. While the results of the research were not promising, it greatly encouraged an enquiring frame of mind in me. My next project was a test of a product called "Spray-n-Gro" which was supposed to increase yields. When I sprayed it on alternating groups of

cherry tomato plants, the sprayed ones actually yielded a bit less than the others. Next, I tried three treatments on a half-acre field of broccoli: seaweed spray, fish emulsion, and unsprayed control. The whole field was unsalable due to bacterial head rot (so much for monoculture!), but I took yields on the trial plots anyway. There was no heavier yield from any treatment. Around this time I studied for my Masters degree at Cornell, and learned more about agricultural experimentation.

In 1994, I applied for a USDA Sustainable Agriculture Research and Education (SARE) Farmer grant to look at whether beneficial nematodes could help to control the plum curculio in my apple orchard. At that time, this pest could not be reasonably controlled with organic methods. This was an experience that deepened my orchard knowledge and skills, even though once again the overall results were negative! However, I was successful in trapping the insects that lived in and beneath the trees and learning more about the orchard ecosystem.

During the time I worked for Cornell Cooperative Extension, I was pleased to be an advisor for a few SARE Farmer grant projects. One very interesting one was undertaken by Michael and Karma Glos. They did an intensive study of the tarnished plant bug populations on their farm. Another farmer in central NY who has had great success in his SARE Farmer research is Lou Lego, who is interviewed in this issue.

One problem with farmer-initiated research is sharing, indexing, and building on the results. Farmers are not professional researchers, so they may not be able to follow up on their studies. (Almost every research project brings up many more questions than it answers.) After an article or two in a farmer newsletter, the results may drop out of sight and be forgotten. This is different from the situation in academia, where journal articles are well-catalogued and archived. SARE projects require final reports, some of which are posted at: www.sare.org. Somebody needs to figure out a good way to combine farmer research into the overall body of agricultural knowledge.

The SARE program has done wonderful things to increase research in sustainable agriculture, and also empower farmers to do their own research. If you have an interest, I strongly encourage you to submit a project to them.

On-Farm Research: General Concepts - Summer 2002 Special Supplement on On-Farm Research

By Sue Ellen Johnson & Tom Morris

This is an overview of useful concepts for designing and executing a credible research project. Working with a Farmer Research Group and a scientist will help assure that your efforts and results are meaningful to you and to others. You should ask yourself who will be interested in your results; and what level of understanding and certainty do you want from your research or experiment? These considerations will guide you in designing your research. Designing an effective study takes time! Allow several months to think and plan!

Research Topics and Treatments

The first step is for the farmers to decide on a general topic or question for investigation. The next step is to identify the specific questions you wish to answer or practices you want to compare, test or evaluate. The question should guide you in selecting one or two particular treatments that will help you to answer your question. More than two test treatments can be difficult to manage. Select treatment(s) you can implement with precision.

Three Key Concepts for Valid Research: Replication, Randomization and Documentation

Three key concepts of field research are replication, randomization and documentation. You can be confident that your results will be both credible and valid to other farmers and to scientists if you understand and use these concepts. These concepts allow you to draw accurate conclusions from your research. Your results can be presented to any audience with confidence.

Replication is the repetition of your comparison or test in space and time. Repeating your experiment and treatments at several places and times allows you to be sure your results are due to your treatments, not just chance. Production naturally varies between individual plants, beds, animals; a replicated study lets you determine if the differences you measure are due to your treatment or just chance natural variation. The effect of a treatment on animals or plants has to be greater than the natural variation for you to know that your treatment made a real difference. Replication is needed to determine if differences between the treatments you are evaluating are large enough to be meaningful. A minimum of three replications is usually recommended. Replication on each farm assures valid conclusions for that farm. Whenever possible, replicate side-by-side within fields, and work with other farmers to have the same experiment and treatments across several farms. Repeat the experiment for more than one year. This makes your results and conclusions more valuable because they've been tested under a wide variety of conditions and managements.

Randomization is used to avoid any bias that might influence or skew the outcome of your inquiry. Bias can occur because of natural factors. Bias can also be introduced by the farmer or scientist. Assigning and implementing treatments randomly to replicates in a field or animals in the herd is the only objective way to make a fair comparison or evaluation.

Documentation is recording how you implemented your experiment and what happened during the experiment. In a research project, you need to record your measurements and observations, in addition to "just seeing what happens" (which may be interesting, but is not conclusive!). Preparing a map or plan for

your research will reduce errors and increase the likelihood of a successful experiment. Preparing a record sheet will help you prioritize what you really want to learn and measure. Record your field actions, your measurements and observations as you make them. There are no uncorrectable errors or mistaken interpretations if there is an accurate record of what happened in the field during the experiment.

Replication and randomization are the prerequisites of any systematic inquiry. Documenting your research-both the implementation of your experiment, and your results is essential. If you don't record your measurements, they don't exist. Without replication, randomization, and documentation making measurements isn't worthwhile.

More concepts that will affect your research results and their interpretation

Measurements versus Observations
As you plan your experiment, you need to decide what you need to measure. The actual measurements and observations you make are determined by your topic and the questions you are trying to answer. You will want to measure -physically and numerically quantify —certain responses or qualities; other responses you may only observe (for instance color of the fruit, soil drainage, insect damage, feed palatability). Measurements are different from observations. Measurements add certainty and validity to your observations; so plan measurements carefully. A measurement is the weight of tomatoes from a plot; an observation is that there are a lot of weeds in the mulched treatments. Both measurements and observations provide information that help you interpret the outcome of your study. Observations give you cues about what you need to measure in the future. Both measurements and observations take time. Of course, everything of interest in your study may not be measurable. Although it is not practical or possible to measure everything, measurements are critical in order to draw conclusions from your research. Some things can't be measured cost-effectively. Avoid taking measurements you won't use, but remember that observations only provide clues, while measurements lead to conclusions.

You can choose to make measurements and observations only at the start and finish of an experiment or you can make them periodically during the experiment. Some of the observations you make will be incidental, but you should have a systematic plan for making both measurements and observations. Planned, systematic measurements and observations will keep your research interesting, help you manage your time commitment and make it easier to follow-through. **Example** Your thoughtful, systematic measurements and observations — whether they are biological or economic — will be of keen interest to other farmers and scientists.

Baseline Measurements
Baseline measurements are taken at the outset of an experiment, before you implement your different treatments. Baseline measurements enable you to track changes through time. Good baselines define the status of each of your replicates at the start of the experiment. Baseline measurements taken from every replicate indicate whether conditions were the same or different across the study sites when you began the experiment. A lot of variation among the baseline measurements taken from each of your replicates indicates it may be difficult to prove changes were caused by a treatment. On the other hand, any differences that show up consistently across highly variable replicates are usually important differences. Baseline measurements may not be required in your study, but they can be useful.

Controls
A control treatment is critical for most studies. Control treatments are replicated side-by-side in the field or barn with the new practice. The control treatment often is your typical or standard practice. The control helps you to interpret your results by comparing the performance of a new practice relative to your usual practice. For example, you might compare your own standard compost with another compost including poultry manure. Sometimes the control is where no treatment is applied whatsoever. For example, you

might compare your own compost at your usual rate of application with no compost at all, or at twice the rate you usually apply. You may not need a control treatment in your research, but most on-farm experiments are improved by a control treatment.

Simple Replicated Field Research Design

For a study that is comparing a mulch and compost in tomatoes (bird's eye view)

Two Treatments
x Three Replicates for each treatment

= Six Plots

Each plot should be of equal size, but the actual size and shape will depend on the situation, the farmer and the research question.

Compost
Mulch
Compost
Mulch
Compost
Mulch

Confounding
Unless you plan and execute your research carefully, you face the prospect of confounding your results. Confounding is when one factor interacts with another factor and influences the interpretation of the results. (You may think your treatment made a difference when the difference was actually caused by another factor entirely). Confounding can be caused by trying to test too many factors at once or poorly delineated treatments, which is why it is usually more straightforward to only test a specific practice or idea in a particular experiment.

Consistency and Variability
It's important to be consistent as you implement your study. The entire experimental area or all the animals in an experiment need to be managed the same way. The only thing that should be implemented differently within your study area is your treatments. And, you must implement each of your treatments the same way in each of the replicates. A lack of consistency, or too much variability, can obscure differences between treatments. You may think a treatment makes no difference when it does. The more variable the conditions within your experimental site, the more difficult it is to detect small differences between your treatments. Sometimes small differences can be economically and environmentally significant for your farm. Obviously, you can't standardize everything in an on-farm research project, but you want to avoid adding to the farm's natural variation. Managing "experimental" variability in an on-farm system may seem difficult, but it is possible. Managing variability is where a Farmer Research Group and a scientific, statistical approach can be helpful.

Selecting an on-farm research site
The area (or animals) you use for your study depends on what you're investigating. Choose a study site that represents your farm's environment, soils and situation. The site should not have too much variability. Use an area (or number of animals) big enough that you will believe your results, but not so big that you are

taking a great risk if the experiment fails. You need room to replicate and randomize your treatments at your study site, in the same field. It helps if the site is accessible and visible.

Remember

The goal in designing a research project is to define questions and select practices for systematic, organized inquiry. A poorly defined question or poorly designed study makes it difficult to obtain understandable results that answer your question. (the "maybe it was just the weather" phenomenon). You want your research design to account for the complexities of your farm ecosystem, and the farm's logistical and labor constraints. Work with other farmers and a scientist to design an effective on-farm research project that is meaningful to you, farmers and scientists.

Guest Editorial by David Stern

Editorial, Summer 2002

I started farming in 1970 and working on standards for NYS organic certification in 1984. I've spent hundreds of hours at my desk reading and studying. I've spent hundreds of hours around kitchen tables in dialog and formulation. I've spent hundreds of hours on the road. All unpaid. These were exciting times of high energy when a small group of farmers and friends would debate for hours on the great questions of the day: black plastic, percent organic grain for livestock, hydrogen peroxide, transitions and the 36 month rule, raw manure, sulfites, and costs. The program reached out to all who wanted to participate. We tried to capture an ethic and spirit, - to put it on paper, in black and white: applying organic principles to an administrative program. Looking for the balance between production and the consumer…and reality. Robert Perry recently referred to us as a "some-what intractable group of farmer-philosophers" Yup.

After reviewing domestic and international programs we stole what we liked, we changed what we needed to, and we filled in the gaps to hold it together. This was a process not all New York organic farmers supported, but we listened and tried to meet as many concerns as we could. The NOFA program grew from seeds planted by the farmer, not the consumer. It was not easy. Other states had Government/Ag and Markets support. We had none. Other states had Land Grant/Ag School support. We had none. What we did, we did on our own. We have been blessed with a skilled administrator and incredibly dedicated volunteer board members who took the pages of black and white and made it real. We can all be proud of our labors. We gave life to a program and breath to a very small industry.

I share this introduction with you as a way of saying that I've paid my dues (and certification fees for 15 years), and now feel the time has come to express my opinions as a matter of obligation to this industry, and to encourager debate and comment. I do not speak for the others who sat at the table in this or other states and programs, or for my cooperative. I speak from the tradition of independent rural populism and I speak from my heart. I am tired of listening to people who preach "local/regional food systems", "small is beautiful", and "sustainable communities" on Sunday morning and who are on the phone to the USDA Monday afternoon. Maybe it is time for a new perspective to this issue: that instead of capitulation and submission to the USDA, we rise from our knees, we stand up, and we say "NO" to this federalization which has become feudalization; "No" to the USDA agricrats who have bastardized the organic principles and sucked away the energy from local decision making; and "No" we will no longer cooperate. We always have a choice in all that we do. The only time you can't change direction is when you're dead.

The Feds have stolen the word "organic" and unless we play by their rules, we can't use it. O.K. How about "organik", "cinagro", "orgreen", or better yet, "orgasmic"! They have stolen a word; let's not give them our spirit. Let's not be distracted by the non-issues of irradiation and sewage sludge. Let's be thankful for the financial help from Ag and Markets with the understanding it's only to lessen the shock of increased fees. Look through the smoke at the realities that we are facing. Let's support the 5% or 10% of us who sell to processors on interstate/international markets, but not to the detriment of the entire industry. Let's educate the consumers who support us, but don't understand our reality, that this feudalization is not in the best interest of the organic farming community and will only further depress our already fragile economy. Let's not allow our strengths of "independence, stubbornness and fortitude" to remain our weaknesses.

Some of us have never been in support of the federal legislation and understood when the USDA appointed the very first National Organic Standards Board that a real monster had been created. Initiated in 1990 by our brothers and sisters who work those beautiful Vermont farms, it was a monster we could not control or

even influence. The snowball of bureaucracy was rolling downhill through the corridors of the USDA, soon to be an avalanche upon us. We hadn't the time, money, influence or lobbyists to do anything but watch and wait. We are only small hardworking farmers wanting to carve out a small space in the marketplace. Some of us don't have computers or ease of words to express our thoughts, or even have clear organized thoughts on the 500 pages of regulation we never read! Some of us need to concentrate on increased productivity, better land stewardship, CSA's, processing, cooperatives, making a living at work off the farm, community work, and even time with our families. We will never read those 500 pages.

However, the legal staffs of the Mega-Capital/Industrial/Agricultural Complex read them and watched as that shelf space grew 3...4…5 percent. They used their lobbyists and influence to formulate the rules and procedures and their money to buy farms, farmers and cheap labor. The big fish will eat the little fish. In the great spirit of Sam Walton, I refer you all to "Between The Furrows", The Natural Farmer, Spring, 2001. The USDA National Organic Program is a long, long way from those kitchen tables. As Jim Hightower said, "The water won't run clean 'till we get the pigs out of the creek!" We will soon hear about the number of farms and number of acres in the Federal program (as if the USDA should take credit). These are the values that are important to the Mega-Capital/Industrial/Agricultural Complex. I propose we look at the farms who drop away from certification, who stop their organic transition, or who will never consider it an option for their operation; let these be the "measure" of the success of feudalization.

It's been over ten years ago now since the members of the NOFA Organic Standard Board walked to the upper fields at Hemlock Grove Farm in West Danby and talked about the "worst possible scenario". The USDA hadn't put any money into the National Organic Program (and didn't want to), so our fingers were still crossed. But we asked "How bad could it get?" and that's about what we got. We knew then that the issues of compost, fees, role of farmers, material approval, inspectors, seeds, state relations, decision-making, etc. would not be decided in the best interest of the small farmer.

City folks have these events: "TAKE BACK THE STREETS", and "TAKE BACK THE NIGHT" when they stand together and face the evils of their communities. When those responsible have failed to act in their best interest and for the good of their neighbors, they say: "Enough! No more." I suggest we rise and stand together, as caretakers of the earth and those blessed to grow life-giving food, shed our fear of the monster and the unknown, and say, "NO!"

David Stern, Rose Valley Farm, Spring, 2002

News Notes, Summer 2002

Compiled by Jack Kittredge

New members named to NOSB. The United States Department of Agriculture announced the appointment of five new members to the National Organic Standards Board (NOSB). The board was established by the Organic Foods Production Act of 1990 to assist in the development of standards for substances to be used in organic production and to advise the Secretary of Agriculture on any other aspects of the implementation of the Act. The NOSB includes four organic producers, two handlers, one retailer, three environmentalists, three consumers, one scientist, and one certifying agent. The following appointees will serve terms beginning immediately and ending Jan. 24, 2007:

- Organic Producer, **Dennis L. Holbrook**; Texas organic citrus grower
- Organic Handler, **Kevin R. O'Rell**; food scientist at Horizon Dairy
- Consumer/ Public Interest, **Ann L. Cooper**; ex-chef at the Putney Inn (VT), now at Long Island restaurant, into local foods
- Scientist, **Michael P. Lacy**; University of Georgia Cooperative Extension, specialist in broiler production and management
- Environmentalist, **Nancy M. Ostiguy**; Penn State bee scientist, dedicated to organic food and member of her local CSA.

source: USDA press release, April 16, 2002 and personal Emails

Organic herb research funds available. In partnership with Frontier Natural Products Co-op, the Organic Farming Research Foundation is issuing a special call for proposals to do organic herb research in 2002. Herb research proposals will be considered along with other proposals for organic research. Growers and researchers are encouraged to submit applications in time for the July 15, 2002, deadlines. Contact the Organic Farming Research Foundation for application guidelines or for a list of project reports. A free guide to conducting on-farm research is also available. Organic Farming Research Foundation, www.ofrf.org, P.O. Box 440, Santa Cruz, CA 95061, phone 831-426-6606, research@ofrf.org. *source: OFRF press release*

IPM paradox. The USDA announced that, as of 2000, 70% of American crops are produced using Integrated Pest Management (IPM). Yet chemical pesticide use has increased, not decreased. A GAO investigation found that IPM lacks a requirement to significantly lower chemical pesticide usage. As a result, IPM can be considered "implemented" without farmers adopting biologically based alternatives or greatly reducing their chemical pesticide levels. *source: Rachel Carson Council News #92*

Surround useful against flea beetle. Rutgers Cooperative Extension researchers have shown that Surround, a kaolin clay product approved for certified organic crop production, may be useful in reducing flea beetle damage on eggplant. Flea beetle damage occurring late in the season was reduced by Surround treatments, but the researchers note that flea beetle pressure was low in both years. They also found, however, that Surround reduced marketable yield when applied throughout the season and so suggest it be used before fruit set. More details are available in the Rutgers Cooperative Extension Plant and Pest Advisory, Organic Edition, Jan. 31, 2002, at www.rce.rutgers.edu. A print copy of the newsletter is available by SASE from Martha Maletta, RCE Hunterdon County: P.O. Box 2900, Flemington, NJ, 08822; 908-788-1339. *source: personal Email*

Bt corn a money loser? A study by Dr. Charles Benbrook of the Institute for Agriculture and Trade Policy found that, from 1996-2001, farmers paid at least $659 million in price premiums for Bt corn, while gaining only $567 million from increased yields. Whether this $92 million loss is acceptable to farmers because of

their reduced need for spraying is an open question. *source: Stewardship News, March-April, 2002, and Oregon Tilth, April 15, 2002*

Monsanto seeks approval for GE wheat. Monsanto expects to apply to the Canadian and US governments for approval of Roundup Ready wheat this summer, said company spokesperson Trish Jordan. Actual US market introduction of the first wheat, a Roundup Ready spring wheat, would be in 2005. The Canadian Wheat Board says that two thirds of its foreign customers have said they don't want it and would be concerned if it was approved for use in Canada, for fear it would end up in the grain handling system. The Board has asked the Canadian government not to approve the registration of GE wheat or barley unless it is broadly accepted by customers. It also believes the government should hold off on approving GE varieties until a system is developed to segregate those strains throughout the production, handling and transportation supply chain. In another development, despite being under contract with Monsanto, two North Dakota research extension centers — in Carrington and Minot — refused to host transgenic nursery wheat trials. The Minot center's advisory board of farmers voted against the trials because of possible contamination of the center's Foundation Seedstock program. *source: Food Chemical News, May 6, 2002, Volume 44, Number 12, The Germinator, April, 2002, and Oregon Tilth, April 15, 2002*

Furor over "Nature" article on GE. In November 2001, the prestigious scientific journal Nature published an article by University of California scientists Ignacio Chapela and David Quist indicating that GE corn, despite a supposed government ban on planting, had polluted non-GE corn varieties in over a dozen communities in Southern Mexico. The article, widely publicized in the media, fueled global criticism of the "genetic pollution" or gene flow of GE crops and led to calls for banning the planting of GE crops in areas of genetic origin and high diversity (i.e. corn in Mexico and Meso-America, canola in Canada and Europe, soybeans in Asia). But after intense pressure by the biotech industry and pro-biotech scientists, Nature's editors issued a retraction, or rather a partial retraction, of Chapela's article on April 4, stating that the article "should not have been published." News media all over the world, encouraged by PR firms working for Monsanto and other companies, reported Nature's retraction as a "big public relations victory for the biotechnology industry" (Associated Press 4/18/02) and as, one pro-GE scientist stated, a "testament to the technical incompetence" of biotech critics (New York Times 4/5/02). The fundamental problem with most of these post-April 4 media reports, the biggest story of the year so far on a biotech, was that they were wrong. Most reporters and editors either didn't read the Nature "retraction" closely or else didn't understand what they were reading, since even the critics of Chapela and Quist did not contest their central research conclusions-that indeed widespread genetic pollution of traditional corn varieties has occurred in Mexico. Instead critics were simply contesting whether or not gene-altered DNA constructs, once they had polluted traditional corn varieties, were then "fragmenting and promiscuously scattering throughout genomes." On April 18, Chapela and Quist's findings were vindicated when the Mexican government announced at a biosafety convention in the Netherlands that massive GMO contamination of traditional varieties had indeed occurred, not only in Oaxaca, but also in the neighboring state of Puebla. According to Jorge Soberon, executive secretary of Mexico's biodiversity commission, the level of contamination "was far worse than initially reported." (London Guardian 4/19/02) Up to 95% of corn plots were contaminated by gene-altered DNA. In one field 35% of all plants were contaminated, and overall 8% of all kernels examined were contaminated, showing that genetic pollution or cross-pollination had occurred, according to Soberon, "at a speed never before predicted. This is the world's worst case of contamination by genetically modified material because it happened in the place of origin of a major crop. It is confirmed. There is no doubt about it." (Daily Telegraph, UK 4/19/02). *source: Emails and above journals*

Toxics: Australian for fertilizer? Businesses across Australia are legally disposing of their industrial waste by selling it as fertilizers for farms and home gardens. The fertilizers often contain such toxic metals as arsenic, mercury, chromium, and lead. In western Australia, radioactive material from aluminum refineries is being used at cattle ranches; in other parts of the country, waste from zinc smelters, power stations, and cement kilns is spread on farms and gardens. The country doesn't regulate the content of fertilizers, and

environmental and agricultural officials contend that the levels of the metals in the fertilizers are harmless. (Most states in the U.S. also do not regulate the levels of toxic metals in regular fertilizers.) *source: Sydney Morning Herald, Gerard Ryle, 06 May 2002*

Glasses enable you to "see" plant stress. "Hawkeye" glasses, based on the work of NASA scientist Len Haslim, are being marketed by Optical Sales Corporation. The glasses are said to block the green color reflected by normal chlorophyll, making it appear gray or black. The human eye, however, is highly sensitive to light in this range and can differentiate among many shades of green. Off-green colors, caused by disease, poor nutrition, or insects, will stand out to the viewer as red, coral, pink or other hues. By identifying unhealthy plants or parts of fields, the manufacturer reasons, a farmer can restrict his remedial energy to only those plants which need it. The glasses are marketed by Gemplers (800) 382-8473 or www.gemplers.com, and Spectrum Technologies, (800) 248-8873 or www.specmeters.com. *source: Acres, USA, March, 2002*

NOP staffer bounced for communicating to NOSB. In an ominous move, on April 11 Barbara Robinson, deputy administrator of the USDA's Agricultural Marketing Service, removed Mark Keating from his job with the National Organic Program (NOP) because he was "not willing to participate constructively as a team member". Keating, the only staffer who had any background in organics, had sent a routine clarification to the NOSB concerning a question on the NOP website. Organic advocates say the NOP has consistently left the NOSB out of the loop when answering inquiries from private manufacturers and that Keating had only been trying to keep communication between the program and the NOSB open. "I was really shocked by this," said Owusu Bandele, chair of the NOSB Crops Committee, speaking of Keating's removal. "Mark has always been straightforward and always been helpful on issues." *source: Organic Business News, April, 2002*

Europe tops global organic sales. With 46% of the world's organic food sales, or $12 billion in 2001, Europe is the single largest organic market. The United States, at 37% and $10 billion, is second. The Asian group, at 16%, is third — with Japan taking the lion's share of it. *source: Organic Business News, April, 2002*

Alabama jury: Monsanto "beyond decency". An Alabama jury has found Monsanto guilty of releasing tons of PCBs into the city of Anniston and covering it up for decades. The company was convicted on all 6 counts as charged, negligence, wantonness, suppression of the truth, nuisance, trespass and outrage. The last is defined as conduct "so outrageous in character and extreme in degree as to go beyond all possible bounds of decency so as to be regarded as atrocious and utterly intolerable in civilized society." *source: Acres, USA, May, 2002*

Terminator still alive. Terminator is a biotechnology that renders a plant's seed sterile unless treated with a certain proprietary chemical. After considerable public opposition, it's sponsor, biotech firm Syngenta (then called AstraZeneca), stated that Terminator was "one piece of technology we did not want to take forward". It appears now from a Syngenta patent application that the technology is being revived as a solution to the rampant problem of contamination from genetically engineered crops. According to the patent, the technology "would limit the risk of transgene escape to non-crop species, thus avoiding the spreading of plants with [genetically engineered] invasiveness or weediness." *source: Acres, USA, May, 2002*

Cuban trade embargo cracking under business pressure? Authorized by a little-known act of Congress, a joint venture between Archer Daniels Midland and Farmland Industries sold 66.1 million pounds of wheat, plus tons of corn, soybeans, soy meal, and rice to Cuba earlier this year. Slowing grain sales (due in part to resistance to GE food) has turned the eye of agribusiness to the 15% of the world's wheat market that is off limits to US producers because of sanctions. Tim Daugherty, regional vice president of Farmland, said "Our

hope is that this small transaction will cause a reassessment of the sanctions that limit our producers' ability to market". *source: Farmland System News, March-April, 2002*

Viable market exists for Bt sweet corn. A Penn State marketing study found that many consumers, given a choice between clearly labeled Bt sweet corn and non-Bt IPM sweet corn, expressed no preference. A brochure was available with the two kinds of (visually identical) corn explaining that Bt corn "is resistant to the worms that attack ears of corn…[so] usually no sprays are applied to Bt corn". IPM, it said, "is designed to reduce pesticide use by using a variety of methods to control pests." The 5 markets where the corn was sold applied their own prices, usually selling the Bt corn at a premium. Overall the Bt corn achieved 41% of market share, the IPM 59%. The Pennsylvania Vegetable Growers Association helped fund the study. *source: Vegetable Growers News, March, 2002*

Irradiation disguised as "Pasteurization"? The new farm bill contains a little-known provision that seems to allow irradiated food to be labeled "Pasteurized". Until now, such foods had to be labeled as "irradiated", and companies promoting this technology as a way to kill microbes in food have been frustrated by consumer reluctance to purchase them. The new provision in Public Law 107-171 (the 2002 Farm Bill) under the heading "Pasteurization", allows "for products that are irradiated in order to improve the food safety and food quality, the Act authorizes individuals to seek FDA approval of an alternative-labeling claim." *source: Acres, USA April, 2002*

Study finds gene escape from GM crops "inevitable". A report by the European Environmental Agency evaluating corn, sugar beets, rape, potatoes, wheat and barley found the first three pose "medium to high risk" of gene movement via pollen from crop to crop, while the latter three present a lower risk. But none, it concluded, "has pollen which can be completely contained". Environmentalists say the study justifies use of the EU Treaty's Precautionary Principle "in order to prevent irreversible damage to European agriculture and biodiversity." *source: Alternative Agriculture News, May, 2002*

Number of US farms and ranches still declining. In 2000 there were 2.17 million such establishments in the US, but in 2001 there were only 2.16 million, a 0.7% drop. This is the second largest decline since 1991. Overall, land in farming declined by 1.9 million acres to 941.2 million, but the average size of a farm increased from 434 to 436 acres. The North Central region lost the largest number of farms and ranches, 9500; while the West lost 2600; the South, 1600; and the Northeast, 800. In the 5 states of California, Colorado, Oklahoma, Tennessee and Texas the number of farms and ranches actually increased. *source: Alternative Agriculture News, April, 2002*

Poultry Industry Reduces Antibiotic Use. According to the New York Times (February 10, 2002) the US poultry industry has "begun to bow to the demands of public health and consumer groups by greatly reducing the antibiotics that are fed to healthy chickens." Antibiotics like fluoroquinolone have been fed routinely to increase animal growth, but opponents argue that the practice has led to growing resistance by disease-causing bacteria to antibiotics administered for human health. Four of the five largest chicken producers in the US, Tyson, Perdue, Gold Kist, and Foster Farms, have announced that they are reducing or eliminating the amount of antibiotics fed to healthy birds. In addition, McDonald's, Wendy's, and Popeye's have stopped buying chickens treated with Cipro, usually administered to sick birds, because of its importance in treating anthrax. *source: Alternative Agriculture News, March, 2002 and Acres, USA, April, 2002.*

Water woes. A survey of 139 streams in 30 states found that 80 percent had traces - mostly just a part per billion or less - of dozens of drugs, disinfectants, detergents, insect repellents and other compounds flushed down sewers and not completely captured by treatment plants. Water experts said that the two dozen antibiotics found, along with triclosan, the active ingredient in antimicrobial soaps, could lead to sturdier bacterial strains. The survey - performed by a unit slated to be closed by the Bush administration -also found

that many streams held traces of hormones from birth control pills and other sources that could harm fish. *source: the New York Times, Sunday 17 March 2002*

Anti-Corporate Farming Laws and Rural Communities. Walter Goldschmidt was an anthropologist who in the 1940s found that rural communities fared poorly on a number of social indicators when surrounded by large scale farms, compared to those surrounded by small to moderate sized farms. A number of follow-up studies have examined this phenomenon in detail, usually supporting Goldschmidt's hypothesis. Since 1974 nine states – Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, Oklahoma, South Dakota, and Wisconsin – have passed laws restricting corporate ownership of farms. Now a new study by New York researchers finds that ag counties in anti-corporate law states fare better looking at families in poverty, unemployment rates, farm profitability) than ag counties in states without anti-corporate laws. *source: Farming Alternatives, Winter, 2002*

Book Reviews, Summer 2002

Water Wars: Privatization, Pollution, and Profit
By Vandana Shiva
Published by South End Press, 7 Brookline St. #1, Cambridge, MA 02139-4146
www.southendpress.org
Paperback, 156 pages, $14.00, published in 2002
reviewed by Jack Kittredge

By now the name Vandana Shiva is familiar to most readers of this publication. She is a physicist, environmentalist, and leading thinker guiding resistance to globalization. In this book she breaks new ground discussing the most precious fluid of all – the one the vice president of the World Bank said would play the role in the 21st century which oil played in the 20th – water.

Water is key to the tragic confrontation between Israel and Palestine on the West Bank. But less known are other hot spots where water rights may precipitate major conflict. Turkey is planning a series of dams which, when completed, will divert 80% to 90% of the water now reaching Iraq along the Euphrates River. A series of completed and proposed dams along the Nile threaten stability between Egypt, Ethiopia, and the Sudan. Projects in India and China displacing hundreds of thousands of people and disrupting centuries-old water use systems are threatening domestic peace.

A country is said to face a serious water crisis when available water falls below 1000 cubic meters per person. In 1990 there were 131 million people in this situation. By 2025 that number will be 817 million. In Shiva's country of India, the water per person in 1951 was 3450 cubic meters. Now it is 1250, and it is expected to fall to 760 by the year 2050. Given the investment we have put into managing this resource, how can we be falling so short?

Shiva's basic contention is that the old indigenous cultural attitude about water, its value and management is clashing with a modern approach. In the older view, water is a gift of the heavens, to be shared among all life, and not a commodity to be sold. This is expressed in many traditions. According to the law of Justinian, water and natural resources are public goods: "By the law of nature these things are common to mankind – the air, running water, the sea and consequently the shore of the sea." Under Islam the Sharia or "path to water" establishes the right of all to it. In Urdu the word "ab" or water is the root of the word "abadi" or human settlement, suggesting that the natural right of dwellers along a river system to use that water predates any legal system. Even the jurist William Blackstone recognized that "Water is a moving, wandering thing, and must of necessity continue to be common by the law of nature, so that I can only have a temporary, transient, usufructuary property therein."

The modern view contrasts directly with this older attitude. Shiva traces it to the settlement of the American West, originating in the mining camps where diversion and use of water was directly associated with opportunity and wealth. This "cowboy" doctrine of "prior appropriation" held, essentially, that "he who is first in time is first in right" and allowed absolute property rights in water, including the right to transport and sell or pollute it.

"Water Wars" traces the impact of these diverse views through various aspects of water use and associated activity: forestry, paper and pulp making, mining, agriculture, dams, water pumping and extraction systems, climate change — floods, drought, and cyclones – and corporate efforts to privatize and profiteer from control of water.

Most of Shiva's experience, and thus examples, flow from the Indian subcontinent. and thus are not familiar to many western readers. But it is enlightening to hear her many stories of people struggling to retain traditions going back thousands of years, and how sensitive those traditions were to the basic ecological reality of the resource they evolved to manage.

Perhaps the most heartening thing to read about is the Indian tradition of local care. In the desert region of Rajasthan, for instance, there is little rainfall and it is quite hot. But human management has blessed Rajasthan with water abundance. A culture of conservation — born of careful observation of rainfall and water patterns – has led to a system of linked reservoirs, containment tanks, and irrigation systems which provide precious water to both people and crops. It was not until the British arrived, with their abject failure to understand dryland conditions, that this several thousand year-old system was allowed to deteriorate.

Similar pre-historic systems were developed throughout the subcontinent under local management. In South India, for instance, under a system of kudimaramath (self-repair) a peasant paid 300 out of every 1000 units of grain earned into a common fund. Two hundred and fifty of them stayed in the village for maintenance of commons and public works. When the British arrived they incrementally upped this tax until it was 650 units out of a thousand, with 590 going to the East India Company. Predictably, 300,000 water tanks were slowly allowed to fall into disrepair.

Anyone concerned about the state of world affairs and serious about anticipating problems would do well to read Water Wars. We in the northeastern U.S. are blessed with abundant rainfall, but we are likely in the years to come to be drawn into struggles in other parts of the world over control of this vital resource, just as we have been over oil in the century we are leaving behind.