ORGANIC FARMING RESEARCH FOUNDATION

INFORMATION BULLETIN

FALL 2008 NUMBER 16

Organic and Sustainable Up for Review ... Again

by Deborah Rich

Eldon, Wendell, Harlan and Homer Lundberg of Lundberg Family Farms. The brothers' innovative rice production systems are among the many case studies reviewed for reports by the U.S. Department of Agriculture and the National Research Council.

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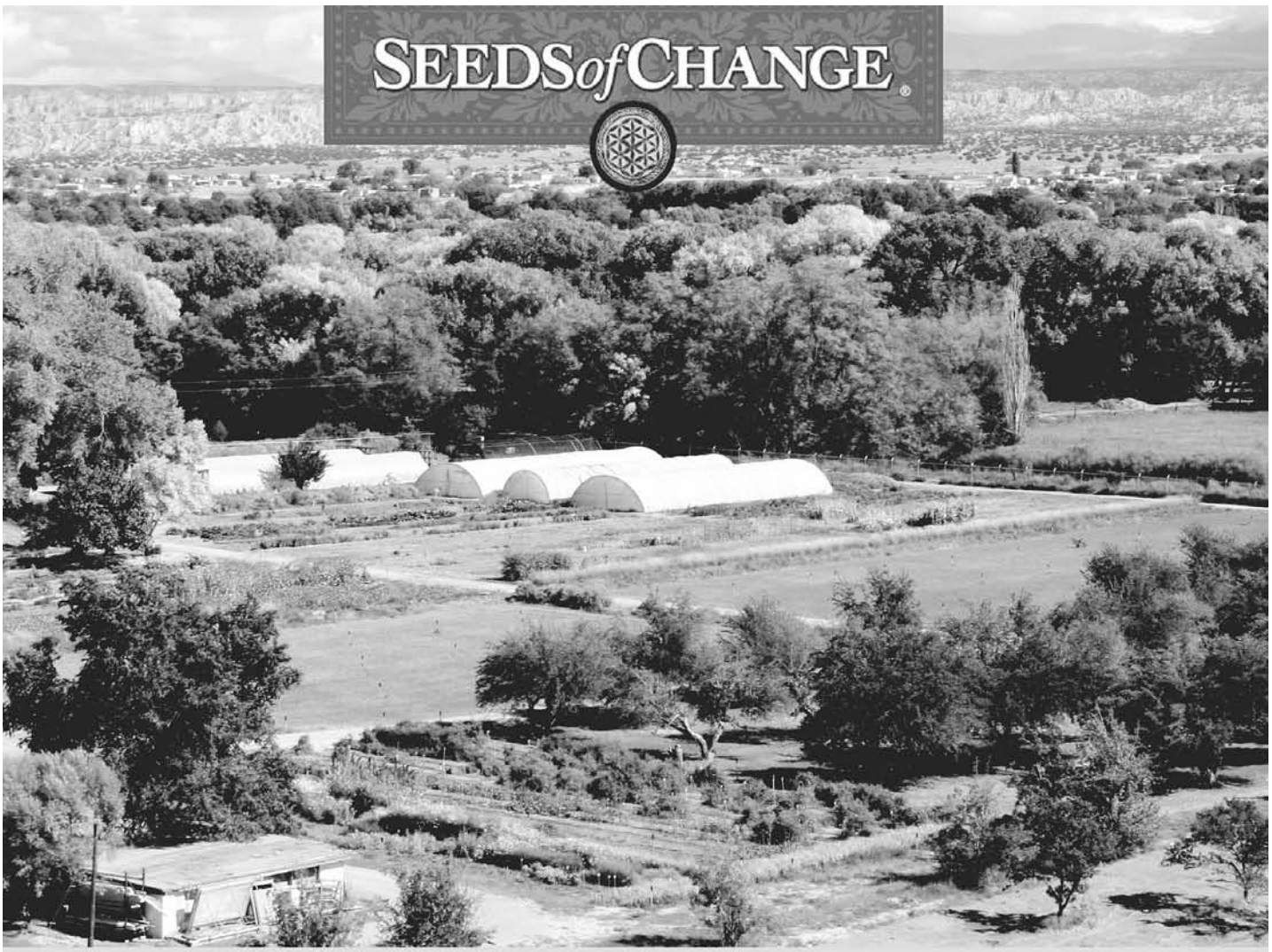
On-farm testing of organic weed control strategies in Indiana

Screening for horizontal resistance to late blight in tomato

Evaluation of glandular-haired, potato leafhopper resistant alfalfa for organic farming systems

Development of wheat varieties for organic farmers

INSIDE OFRF



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OFRF INFORMATION BULLETIN

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OUR MISSION • To sponsor research related to organic farming systems • To disseminate research results to organic farmers and to growers interested in adopting organic production systems • To educate the public and decision-makers about organic farming issues

From the Director

Greetings Organic Producers and Supporters,

The issues surrounding "scale of organic operations" ebb and flow like the tides on the shore. Every once in a while a provocateur makes press with dire claims of social disaster if organic goes global via chain stores. Interestingly enough it's usually about the same time that utopian visions of local off-the-grid food production emerge as well. While I think it is an important and significant topic for us and our allies to address, "simplified" talking points like the above are the easy way out. It is of course so much more complicated than that.

The question then (again) is how do we move this conversation forward? Recently an interesting report, *Farm Labor Conditions on Organic Farms in California,* by Ron Strochlic, Cathy Wirth, Ana Fernandez Besada and Christy Getz was published by the California Institute for Rural Studies. It not only sheds some light on a particular thread of the "size matters" dialog but just might offer an academic approach for others to follow. In a recent conversation with Ron he identified several key points: land under organic production is associated with higher entry level wages; organic production is also associated with greater opportunities for permanent employment; and, the data indicate associations between positive farm labor conditions and increased five and ten year retention rates.

Of course the report raises a number of challenges organic family farmers face, too. Organic family farms require 0.84 workers per acre (conventional is 0.58 workers per acre) which leads to significantly greater expenses and eventually a higher price for their product to meet both the producer's and workers' needs. You can find the full 39 page paper at: www.cirsinc.org.

The key point I want to make is first we need to identify the greater field of organic "benefits"—or perhaps the term "traits" works better—that will lead to the improvement of organic farming systems and the communities that surround them. Then we need to collect data from each organic benefit/trait and frame it within a multiple-benefit objective. If the sole goal is to raise wages for farm laborers, then (some would argue) larger producers selling into the chain store marketplace would be the most advantageous way to go. If rural vitality is the first order of our objectives, then expanding the number of family farms and sole proprietors should be prioritized. (Note: more workers needed!) Europe is already asking and studying the questions associated with the multifunctionality of organic farming systems. Patience is needed. These systems take time to develop. They evolve under the weight of, and in response to, current market and regional conditions. For example, carbon sequestration and water conservation are getting more attention than renewing the rural labor pool and finding new markets in some "action plans" supported by activists. Other parts of the world have different priorities.

Unfortunately, and maybe tragically, rather than move "beyond organic" based on peer reviewed research, what we've seen emerge more recently is three major (different) initiatives to codify, standardize and eventually certify the term "sustainable agriculture." It is argued that not all producers can meet organic standards, and that there should be other tools to measure "sustainability" in agriculture. I think it's like watching a slow-motion train wreck. Rather, the multiple benefits of organic systems, the synchronicity of these benefits, and the value that these systems could bring to family farmers and ranchers and for the causes of our associated allies in the environmental, labor and consumer communities must be identified, analyzed and eventually translated into policy initiatives that really do support organic farming systems that are socially just, economically viable and environmentally sound.

If we don't invest in the hard work of organic research and analysis, we're destined to be so "90's" in our overly simplified debates on size, scale, and sustainability. Who ever thinks that the consumer will want to hear that yet again, raise your hands!

—Bob Scowcroft, Executive Director

THE NEWS AT OFRF

OFRF HAS DEEPENED ITS (ORGANIC) ROOTS since the publication of our last newsletter. Our core activities of grant making and policy advocacy not only expanded dramatically but enjoyed some notable success while doing so.

Thanks to a new multi-year agreement with Stretch Island Fruit Company and the support of nearly a thousand contributors, OFRF awarded a record amount of organic research and education funds in March ($221,000) and expects to exceed that amount later this fall. (Please see page 30 for a list of our recently funded projects.) Stretch Island's grant allows us to support organic fruit research and education projects. More importantly, because this was a multi-year grant award we were (and will be) able to make multi-year organic fruit grants over the next two years. We have never been able to make two- or three-year commitments to research projects before and it's an exciting new development for OFRF. Our Development Director Don Burgett worked with Stretch Island to develop our funding agreement. Soon thereafter, Jane Sooby saw her grant management workload almost double thanks to the newly available funding. It's so much fun to see Jane's office fill with overnight express packages around grant submittal time!

Not only did OFRF double our grant awards, but in addition, OFRF's policy program played a leading role in legislating a dramatic increase in mandatory organic research, education and marketing funds in the 2008 Farm Bill (see our Policy Program Notes on page 15 for details). While just about everyone we know was not satisfied with the final Farm Bill legislation, most agreed that some significant victories were included in an otherwise agro-industrial "business as usual" bill. Mark Lipson led the OFRF team in developing legislative language, while Zach Baker and Tracy Lerman worked with the OFRF Board and members of our farmer grassroots network to see our legislative objectives move from theory to law through almost two years of advocacy, media releases, farmer-fly-ins, and occasionally, direct face-to-face lobbying. Never underestimate the power of a family farmer's voice!

Like any successful office, ours only really works well when there's paper for the printer, the database is de-bugged and the server never breaks down. OFRF is well served by two individuals who maintain the details of our day to day operations. Brenda Carey-Winser joined OFRF in November 2006 as our office Administrator. Jose Torres serves as OFRF's Information Technology Manager, overseeing internal technology functions of the organization as well as OFRF's email communications and database management activities.

Jose Torres

OFRF summer policy intern Ed Nelson and Administrator Brenda Carey-Winser open the doors to our 2008 Organic Community Concert in Santa Cruz, California.

In acknowledging the talents of our staff, we want give special thanks to Jonathon Landeck, OFRF's former Deputy Director. He recently left his position here for a position "up the hill" at the University of California, Santa Cruz Center for Agroecology and Sustainable Agrifood Systems. Jonathon contributed a great deal of his expertise and knowledge to OFRF's growth and success during his five year involvement with OFRF. We all wish him well in his new position. We expect to refill this position towards the end of this year.

Since most of you reside in areas across the country, only a relatively small number of you are able to attend our benefit events, which are now so skillfully organized by our development assistant Amy Van Scoik. These include dinners in Northern California and Boulder, Colorado, a luncheon at the Organic Products Expo-West, and now our Organic Community Concert series here in Santa Cruz. If you are ever able to join us, you should know that we host great parties!

It is gratifying to meet our supporters in person, but for those of you whom we are unable to meet directly, we want to assure you that every donation that we receive via the mail and the Web are invested wisely. Later this year most of you will receive our year-end appeal, and we hope you will respond as generously as you can. We need and value your financial support! In addition, we give special recognition (see page 31) to two of our supporters, Origins Organics and Working Assets / CREDO, who are able to support OFRF's work through your patronage of their products and services.

As for me, all I can say is that I have the most productive, inquisitive and forward thinking group of coworkers that one could ask for. When we work together—and are firing on all cylinders—our accomplishments are greater than the sum of the whole! Can it get any better than that? With your on-going support we're ready to try! *—Bob Scowcroft*

SPECIAL FEATURE

Organic and Sustainable Up for Review ... Again

by Deborah Rich

Harlan and Homer Lundberg apologize for not remembering either of the two groups of researchers from Washington, D.C. who visited their California rice farm in the late 1970s and the mid-1980s to see what organic farming was all about. By then organic farming was no longer new to the Lundbergs, nor was it uncommon for people to stop by to see what they were up to. Moreover, neither of the reports that the researchers wrote helped the Lundbergs' figure out how to control the build-up of aquatic weeds in fields that had been under organic management for several years: a problem so troublesome that at one point the Lundbergs had scaled their organic production back to 100 experimental acres.

The first group of researchers came to the farm at the behest of Agricultural Secretary Bob Bergland who, in 1979, at the end of a decade marked by two oil crises and amidst growing concern about the side effects of agricultural chemicals, decided it was time the United States Department of Agriculture (USDA) took a serious look at organic farming. The researchers compiled case studies on 69 farms including the Lundbergs' and recommended in their 1980 *Report and Recommendations on Organic Farming* that the USDA begin comprehensive research into organic practices.

In 1985, with the USDA slow to act on the recommendations of the 1980 report—despite the nation's deepening dissatisfaction with the environmental and economic repercussions of high input conventional farming—the National Research Council (NRC) commissioned a second group of researchers to study organic and other forms of sustainable farming. The group examined the science and policies that influence whether farmers adopt sustainable farming practices and the economic impacts of doing so. In their 1989 NRC report *Alternative Agriculture*, the researchers concluded that the nation should direct significant research and education efforts towards sustainable farming and dismantle the barriers to alternative agriculture built into U.S. agricultural policy.

Today, nearly 20 years after the second report was published, a third report is in the works. The NRC has commissioned a group of scientists to revisit the 1989 *Alternative Agriculture* report and to provide an updated review of the science behind sustainable farming practices, the economics of sustainable farming, and the government programs and policies that impede or promote the adoption of sustainable farming practices. The group will also consider how sustainable farming contributes to national economic, environmental, social, and human health goals.

This new NRC study—due out in June or July of 2009—is particularly timely; organic and sustainable agriculture remains only a sideline issue for the USDA despite the fact that the high input farming model that has dominated U.S. agriculture for the past 70 years has grown embarrassingly and dangerously outdated. Cracks in the façade of cheap food policy are widening as scientists continue to elucidate the threats to environmental and human health posed by synthetic fertilizers and agrichemicals, and diminishing oil supplies expose the inherent weaknesses of a food system built on fossil-fuel intensive fertilizer and pesticides. American agriculture may be approaching a tipping point.

A new NRC report on the progress and potential of organic and sustainable farming systems may give consumers, farmers, and politicians the rationale, the blueprint, and the inspiration to reset the course of American agriculture.

Eldon, Wendell, Harlan and Homer Lundberg.

Deborah Rich grows olives near Monterey, Calif. She writes about agriculture for the San Francisco Chronicle and other publications.

Despite limited USDA support or interest over the past decades, leading farmers have continued crafting a new model of agriculture that recognizes the interdependence of productivity and sustainability. In the 1990s, after much experimenting, the Lundberg brothers hit upon a combination of no-till drilling and alternately deep-water flooding and drying-out rice fields that keeps them one step ahead of watergrass, sedge, and other aquatic weeds. The Lundberg family now has 3,000 acres in organic rice production and contracts with other farmers who grow an additional 11,000 acres of organic rice each year for the Lundberg mill.

Whether the new NRC report can serve to redirect American agriculture towards sustainability will ultimately come down to politics and personal courage and conviction. The conventional farming lobby has proven itself extremely adept at using its political heft and claim on the status quo to marginalize sustainable farming. Judging from the aftermath of the 1980 USDA organic farming report and the 1989 NRC report on alternative agriculture, how the nation responds to yet another review of sustainable farming will depend more upon political agendas writ large and small, lobbyists' coffers, and who happens to be in the right (or wrong) place as on the science and evidence the report puts forth.

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Something Revolutionary

Bob Bergland, U.S. Secretary of Agriculture from 1977 to 1981 under President Jimmy Carter, had good reason to look into organic farming even though the academics, crop associations, and agri-chemical companies intent on industrializing U.S. agriculture preferred to dismiss it as the practice of hippies, back-to-landers, and obstinate farmers. The nation had spent much of the 1970's idling in line at gas stations during back-to-back oil crises, nitrogen fertilizer prices were surging, and it was becoming increasingly difficult to ignore that the country was simultaneously polluting its surface water and depleting its groundwater. "Non-renewables were a big issue. A lot of people were beginning to ask whether we could find less energy-intensive ways of farming," says Garth Youngberg, a member of the committee Bergland assembled to investigate organic farming.

Then there was that neighbor of Bergland's back in Minnesota who farmed 1,000 acres organically. Bergland got to wondering how many other farmers could do, or were already doing, the same.

"I've been told that Bergland was having a staff meeting one day, and the topic came up of organic agriculture, and Bergland asked, 'What do we know about this?'" says Youngberg. "Apparently, everybody looked either at the ceiling or the floor because nobody knew."

So it was that Youngberg, then political science department chair at Southeast Missouri State University, got a phone call early in 1979 from the USDA asking him to be part of a study team being assembled to take a look at organic farming. The year prior Youngberg had published a paper in the *Policy Studies Journal* about what he termed, "the alternative agricultural movement." "They [the USDA] probably came to me because I was about the only social scientist who had written on organic farming at the time, and they wanted the group to be interdisciplinary," says Youngberg.

Top USDA and land grant university agricultural scientists made up the rest of the ten-member committee. Not knowing any of them, Youngberg asked to attend a meeting with key members of the committee before he committed. "I didn't want to go out there and be part of a whitewash," said Youngberg. "Within 15 minutes of meeting with the core of the team and talking about objectives and methods, I knew I was fine with the process. It was clear to me that the study would be done objectively, and that was all I needed to hear."

The committee reviewed the scant scientific literature on organic agriculture; polled 1,000 farmer subscribers to Rodale Press's *New Farm* magazine; visited organic farmers across the United States and in Germany, Switzerland, England, and Japan; and spoke with Cooperative Extension Service agents across the country about local organic farming and research activities.

Their findings impressed the scientists. Rather than the love beads and drumming circles they half-expected to find on their visits, they found modern machinery, certified seed, and sophisticated water and soil conservation practices like grassed waterways, stripcropping, and contour farming. They found the Lundberg brothers' state-of-the-art rice mill.

Just as surprising to the committee was the scale of organic farming they encountered. "Back in those days, the standard view was that you could only do this on a half-acre in your backyard," says Youngberg. "One of the most important findings was that farmers were organically farming large acreage. Just to put out the bare facts—that there was a farmer in Minnesota with 1,000 acres, and a farmer in Texas with 2,000 acres—was mind-boggling to people; they had no clue

that anything like this was going on. It was really like uncovering something revolutionary." Nothing in the scientific literature at the time gave any indication of the breadth and depth of organic agriculture, says Youngberg.

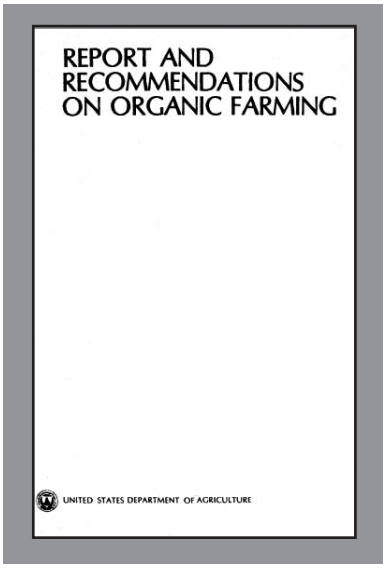
Bolstered by their findings, the committee had little trouble drafting its report. The researchers described organic agriculture as they saw it, detailed common organic farming practices, and concluded with a list of recommendations, the first and foremost being for more research into organic farming.

Research was needed, the committee wrote, to better understand the potential for improving soils with organic wastes, the chemical and microbiological interactions at play in organic systems, why farmers experience a yield reduction when first transitioning to organic, the long term-effects of chemical fertilizers and pesticides on soil, biological nitrogen fixation, the economics of organic farming, and the human health effects of agrichemical residues on foods. Additional research was needed to develop crop varieties adapted to organic farming systems; non-chemical methods of controlling weeds, insects, and plant diseases; and ways to raise livestock without the use of antibiotics. The committee called for university courses on self-sustaining farm systems, Cooperative Extension materials on organic farming, and organic production and labeling standards. Finally, it recommended that the USDA establish a permanent organic resources coordinator to foster and oversee organic research and policy.

A Bombshell

The report hit the farming world like a bombshell, says Youngberg. The oil crises had brought the nation up short, but conventional agriculture wasn't flinching. "The dominant view still was that there would be high-tech ways to solve these problems," says Youngberg. "Biotechnology was coming into view, and there were people in that camp who thought any effort to look at something as simple as crop rotations was ridiculous and represented a step back rather than forward. They felt the more viable approach was to find ways to continue with monocultures and heavy chemical approaches."

From anyone else, the report would likely have been ignored by all but the converted. The USDA seal-of-approval and the reputations of the authors, however, made the report hard to dismiss. "This was new information, new data, written up by some highly credible USDA and land grant university scientists," says Youngberg. "People like Bob Papendick, Jim Parr, and other scientists on the committee had enormous scientific credibility. They were fellows in their societies and had published hundreds of papers," says Youngberg.



For many months following the report's release in July 1980, Youngberg, who by that time had been appointed to fill the new role of organic resources coordinator at the USDA, spent much of his time responding to requests for copies of the report. Tens of thousands of copies were distributed, and the report was translated into seven languages. The agricultural press gave the report widespread coverage, and farm and university groups from all over the country asked Youngberg to speak to them. "People just really wanted to meet me, to see who the USDA had put in charge of organics. They wanted to ask where this was going to go, and whether I had real support or if this was just a symbolic thing," says Youngberg.

Dead End

The question was prescient. By September 1982, Youngberg would be fired and the organic resources coordinator position eliminated as part of a USDA "reduction in force." Organic farmers and advocates wrote letters of protest to the Congress and USDA, and several congressmen spoke up in favor of retaining Youngberg and his office, but to no avail. "It was a good lesson for me as a political scientist in just how impotent a handful of congressman is when up against that kind of decision influenced from the top," says Youngberg. "You can wave your hands and holler all you want and nothing happens."

It was probably all over for Youngberg from the minute that Ronald Reagan entered the oval office in 1981 and appointed John Block as the new Secretary of Agriculture. A 3,000-acre corn and soybean farmer and owner of a 6,000-hog operation, Block was a star member of the emerging industrial farming elite and had little use for organic farming. In a June 10, 1984, article for the *Des Moines Register*, journalist James Risser reported that upon becoming

Plain package. The 1980 *Report and Recommendations on Organic Farming* represents the first instance of the USDA putting its logo on a public text related to organic agriculture. (Copies of the report are available for free on mini cd or in pdf format from the National Agricultural Library nal.usda.gov/afsic/pubs/USDAOrgFarmRpt.pdf)

Secretary of Agriculture, Block had said that there would be no follow-up to outgoing Secretary Bergland's "dead end" research into organics.

Block's attitude matched that of the conventional farming contingent, which didn't like to see the USDA flirting with organic agriculture. The Fertilizer Institute, pesticide companies, and crop associations demanded to know why the USDA was looking into organic farming. With enviable speed, the Council for Agricultural Science and Technology (CAST)—whose list of "sustaining members" includes a full line-up of fertilizer and agrichemical companies and commodity crop associations[1]—released a counter-report in October, 1980, titled "Organic and Conventional Farming Compared," positing organic farming as economically justified only when off-farm inputs are not readily available. The CAST report also argued that widespread adoption of organic farming would raise food prices and require marginal lands to be brought into cultivation.

"You began to see arguments like, 'Well, maybe you can farm this way, but you can't feed the world this way,'" says Youngberg. "That feeding the world argument really became a big part of the debate. Think tanks like the Hudson Institute, agrichemical industry spokesmen, and some university researchers started to write papers and make speeches about how organic farming was really kind of unpatriotic, if not immoral, because Americans should want to feed the world and had a responsibility to feed the world."

Many in the scientific community, meanwhile, honestly disagreed with the report. "There were scientists at the USDA Beltsville research center who had been involved heavily in developing 2,4-D, for example," says Youngberg. "They didn't take kindly to what I was doing there." Once Block came on as Secretary of Agriculture, the dissenters within the USDA found their voice.

Something Pretty Special

The lines at the gas pump had shortened by 1985, but the farm economy was deteriorating. Nitrogen prices were still climbing, and, with agricultural capacity overseas expanding at the same time that a rising dollar made U.S. crops more expensive, exports were declining. Storage silos bulged with excess grain, and federal farm support payments had increased from $3.5 billion in 1978 to $25.8 billion in 1986[2]. Commodity prices fell, and so did the price of farmland. Debt that had seemed smart when commodity and land prices were on the rise could no longer be serviced. More than 200,000 farms went bankrupt in the first half of the 1980's.

There was more bad news on the farm. The Environmental Protection Agency (EPA) had singled out agriculture as the largest non-point source of water pollution, and soil erosion continued at a rapid rate despite 50 years of state and federal efforts to control it. Studies linked pesticide exposure to the occurrence of cancer among farmers and farmworkers, and scientists reported that more than 440 insect and mite species and more than 70 fungus species had developed resistance to one or more pesticides.

In the midst of this agricultural depression, the NRC's Board on Agriculture, under the leadership of Charles Benbrook, decided the nation needed to take another look at sustainable farming. (Following the uproar over the USDA 1980 report on organic farming, "sustainable" became the more politically palatable term.)

Garth Youngberg. Courtesy of the National Agricultural Library.

Even though the Board knew the project would be controversial, it felt it important and necessary to get the conventional agriculture community thinking about the direction that U.S. agricultural was headed. "The National Academy of Sciences [the umbrella scientific organization that includes the NRC] is a quasi-independent organization outside of government that depends on government for most of its money," says Benbrook. "So obviously this sets up an ongoing tension between giving government good scientific advice which is not welcomed politically, versus maintaining a good ongoing relationship with government such that it will continue to fund the Academy's activities."

While there still hadn't been many studies done on organic farming by the time the 17-member NRC committee began to meet in 1985, an increasingly robust body of science about the detrimental effects of conventional farming and about on-farm biological and ecological interactions was emerging. "There was a lot of work being done on nitrogen at Iowa State," says Benbrook. "In the pest management sciences literature, there was a lot of discussion on resistance to pesticides and the collapse of chemical-intensive management systems. The important science that we depended on was science addressing the breakdown in conventional systems, and this was science compiled without any concern for organic or sustainable agriculture."

In addition to conducting a literature review, the NRC researchers looked closely at how sustainable farming worked on 11 farms, one of which was the Lundberg rice farm. For each case study, the committee conducted an on-site visit and gathered extensive data regarding the farms' production practices, marketing strategies, yields, and finances. The committee also sought out data on local climate conditions, county production data, and pest problems.

Again the case-study farms hugely impressed the researchers. "There was just no way to look at the detailed information that we compiled on those farms and not come to the conclusion that there was something going on that was pretty special and that conventional agriculture ought to pay attention to," says Benbrook.

The NRC committee's message to the nation was clear-cut: sustainable farming could improve the economics of many farms while simultaneously lessening the negative environmental impacts of agriculture, and it behooved the government to remove the policy barriers that deterred farmers from switching to sustainable farming methods.

The committee's 448-page-long *Alternative Agriculture* report laid-out four central findings: that some farmers in nearly all sectors of U.S. agriculture were employing sustainable farming methods and deriving "significant sustained economic and environmental benefits" while doing so; that a host of federal policies deterred farmers from adopting sustainable farming practices; that a systems approach to research was necessary to understand and capitalize upon biological and environmental interactions; and that the widespread adoption of sustainable farming practices would require significant outreach to farmers and technical assistance[3].

The resolve of the committee to convey its message was to be thoroughly tested. Though the committee finished the report in less than 24 months, it spent the next two-and-a-half years answering challenges from academics and industry representatives during the rigorous peer review process required by the NAS. "We had multiple 20-30 page reviews to deal with," says Benbrook, "and multiple rounds of them. There was a whole other report written in the rebuttals that the committee wrote each time we received a negative review." Time and again the committee responded to the critiques until finally the National Academy of Sciences was satisfied that the report findings and recommendations were scientifically valid.

For Every One Inspired, Ten Threatened

Interest in *Alternative Farming* was intense. "These were hot issues," says Benbrook. "The farm sector was still in turmoil, and there was a palatable sense that agriculture on its current path was unsustainable."

The NRC decided to print forty thousand copies after receiving pre-orders for at least twenty thousand (*Alternative Farming* would be reprinted five additional times over the following ten years). Newspapers and television cameras carried news of the report's release into nearly every home in the country.

"The study by the nation's pre-eminent body of scientists is perhaps the most important confirmation of the success of agricultural practices that use biological interactions instead of chemicals. Such farming methods have been developed by farmers over the last two decades almost entirely outside the Department of Agriculture, agricultural universities and other institutions in American farming," wrote Keith Schneider for the *New York Times* in a front-page above-the-fold article (only the second time that a report from the Academy had occupied those coveted column inches).

"There was just no way to look at the detailed information that we compiled on those farms and not come to the conclusion that there was something going on that was pretty special and that conventional agriculture ought to pay attention to."

Such public and positive coverage of sustainable farming was bound to upset those with vested interests—academic, financial and emotional—in the practices and products integral to conventional farming. "There were 10 people threatened by *Alternative Agriculture* for every one inspired," says Benbrook. "The report had such a big impact on public dialogue and understanding of these issues that it triggered the immune system of conventional agriculture because they correctly realized that if that kind of report kept coming, it would inevitably build support for more fundamental changes in how agricultural policy is conducted in the United States."

Pushback was swift. The Cotton Council, the Farm Bureau, the Fertilizer Institute, and the pesticide and industry associations began making calls to top USDA officials. In turn, the USDA made its calls to the president of the NAS. "I don't think that the USDA instigated or was even terribly sympathetic to the complaints that they heard," says Benbrook. "But as a practical reality, the commodity and agribusiness organizations control the budget of the Department, and the Department knew that, and they did what they were asked to do."

By July, 1990, CAST had assembled another counter-report, which, while carefully avoiding disagreeing with most of the conclusions of *Alternative Agriculture*, resurrected the specter of food shortages. "*Alternative Agriculture* recommends agricultural practices that may significantly reduce food supplies, thus placing a severe financial burden upon low income consumers and intensifying world food shortages," wrote Lowell Jordan, president-elect of CAST[4].

In the fall of 1990, Benbrook was fired from his position as executive director of the NRC Board of Agriculture.

Progress, But No Sea Change

When heads had rolled, and the press had gone home; when the Lundberg brothers and the other case study farmers had turned their attention back to weeds and water systems, what had changed as a result of the USDA and NRC reports? The answer is both a lot and not much at all. On the one hand, the reports established organic and sustainable farming as worthy of scientific investigation and secured them toeholds in agricultural policy debates. On the other hand, the reports failed to promote the sea change in U.S. agriculture that their conclusions warranted. Nearly thirty years out from the 1980 report, the number of certified organic farmers and certified organic acres—two of the most trackable data points on the penetration of sustainable agriculture—still only total about one-half of one percent of total U.S. farmers and acres[5].

Youngberg and his USDA colleagues had found that a fair number of agricultural scientists were quietly conducting small organic research projects, even before release of the 1980 report. "When I would speak at land grant universities, there was almost always a group of scientists, sometimes half a dozen, sometimes more, that would come to me afterwards and tell me, 'We have this little project over here that we want you to know about,'" says Youngberg. "'It's sort of *sub rosa,* we're not making a big deal about it, but we share your views.'"

With two high-level reports within 10 years concluding that the nation had much to learn from organic and sustainable farming practices, alternative agriculture researchers could and did come out of the closet. "The reports asked a whole series of scientific questions, legitimizing research," says Richard Harwood, former director of Rodale's research center. "When I went to Rodale in the 1970's, my colleagues all said I was throwing my career away because then it was neither fashionable nor acceptable within the scientific community to look at this." By 1990, Harwood would become the first C.S. Mott Chair for Sustainable Agriculture at Michigan State University.

"If you look around, there are pretty strong clusters of sustainable and organic research going on at probably 20 land grant universities now. In the late 1980's, you could probably say that about maybe two of them," says Benbrook.

In addition to empowering scientists, the reports armed politicians inclined to support organic and sustainable farming and helped them achieve a series of legislative gains. Representative Jim Weaver introduced the Organic Farming Act of 1982 which would have initiated USDA research into organic agriculture on several pilot farms and permitted knowledgeable volunteers to staff Cooperative Extension offices to respond to inquiries from parties interested in organic agriculture. Weaver's legislation didn't pass, but three years later Senator Patrick Leahy gained congressional approval for a USDA competitive grants program, which evolved into the Sustainable Agriculture Research and Education program (SARE).

1985 also saw the founding of the Alternative Farming Systems Information Center (AFSIC) at the National Agricultural Library in Beltsville, Maryland. Two years later, the National Sustainable Agriculture Information Service (known as ATTRA) was started, its mission to respond to requests for information on sustainable farming from farmers, Extension agents, and educators.

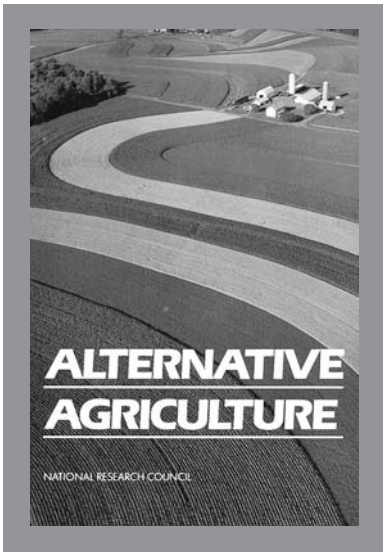
In 1990, the landmark Organic Foods Production Act authorized the national organic certification and labeling program. During the late 1990's, the Agriculture Management Assistance Act included the provision that organic farming would be considered a "good farming practice" for crop insurance purposes.

Funding for "Organic Transitions Research" within the Cooperative State Research, Education and Extension Service's competitive grants program came in 2001, and, in 2002, for the Organic Agriculture Research and Extension Initiative.

These gains are precious and trace directly or indirectly back to the bold positions staked out by the USDA and NRC report committees. Despite these advances, however, conventional farming maintains a tight hold on agricultural research, policy-making, and funding.

"We're accumulating more science, but still at a pretty slow rate," says Mark Lipson, policy program director at the Organic Farming Research Foundation (OFRF). "There is just a trickle coming through the pipeline. Percentage-wise, yes, there have been significant leaps. But relative to the big scheme of things, it's still just a dribble."

Similarly, while organic and sustainable farming has garnered some funding in the



The 1989 Report, *Alternative Agriculture,* published by the National Research Council. (Copies are availalbe for purchase from the National Academies press at nap.edu/catalog.php?record_id=1208)

farm bills, the amount remains relatively insignificant. "Our total cumulative serious ask – not only for research and education, but also for things like assistance with certification and transition costs - for organic agriculture in the current farm bill is in the range of $150-$180 million over five years," says Lipson. Many billions, meanwhile, will be funneled to conventional farming.

Benbrook feels that little has changed on the policy front since he spearheaded *Alternative Agriculture*. "From a policy perspective, I don't think there's any support for organic or sustainable," says Benbrook. "There wasn't much in 1989, and there's not much now. It's just not there. We can all think it is, but show me the money. Show me the changes in policy that really make a difference other than the 1985 Conservation Title. The vast majority of the agriculture sector is involved in building more CAFO's, using more GM crops and more fertilizer, and buying $400,000 GPS-guided combines, not in diversifying rotations and building soil microbial communities."

Good Reports Aren't Enough

There are a lot of reasons why conventional farming has been hard to uproot and why good reports and good science have gone only so far in resetting the agricultural agenda. Near the top of the list is the amount of money that conventional farming has doled out for decades to politicians, farm bureaus, university research programs, and industry groups. So far, the organic and sustainable farming constituency has largely steered clear of or been unable to afford much in the way of campaign contributions, limiting its influence. "When the big decisions are made behind closed doors, there's only so much political capital that we have as righteous populous forces," says Lipson.

Money buys a lot, but there are other reasons why the USDA and NRC reports did not have a larger impact on American agriculture. Though the reports opened the door for research into organic farming, translating that research into workable widely used farm practices has been slow. "We always hear from Cooperative Extension about their limited budgets," says Lipson, "But there's a lot of Extension money being spent. It's just going in the wrong direction. There is a ton of resources, for example, going into extending no-till systems using co-pesticidal genetically modified crops, and has been for decades."

Meanwhile, growers wanting to learn about organic no-till systems generally have to tap into sources of information outside of establishment agriculture. "Despite the fact that there's more research, and that we know organic farming can be done, if you're a 50-year-old conventional farmer—you've got 1,000 acres in corn and soybeans in central Illinois and you belong to the Illinois Farm Bureau, and you get most of your information from the University of Illinois—it's still easiest to continue doing more or less what you've been doing," says Youngberg. "It's very difficult to be motivated enough to say I'm going to stop this corn and soybean rotation and throw legumes and other cover crops into the mix too. If you're going to do that, it means that you've got to think about your machinery line-up and what the costs are going to be to buy the equipment to plant and harvest the alfalfa. And then what do you do with the hay? You haven't raised a hog or steer in 25 years."

Chuck Benbrook.

Another constraint is that improvements in sustainable farming systems often entail greater management complexity and ever-greater diversity. "As Miguel Altieri says, this is 'agroecosystem redesign'," says Lori Ann Thrupp, manager of sustainability and organic development at Fetzer Vineyards, an Organic Farming Research Foundation board member, and member of the NRC committee. "You're not just manipulating the vegetation, or the grasses, or the water for one crop, you're also integrating other crops and all of their own interactions with the surroundings.

And while it's fairly easy to co-opt the private sector into educating farmers about spray programs and genetically modified seed protocol, corporations haven't much to gain by discussing site-specific ecosystem interactions. "The system is hard-wired against the very types of science and technology that organic and sustainable farming requires," says Lipson.

Some may fear for their jobs should the nation shift away from conventional agriculture – perhaps especially at the agencies that regulate its trespasses. Thrupp, who worked for the Environmental Protection Agency (EPA) for three years prior to joining Fetzer, saw good support for organic and sustainable projects at regional EPA offices, but little at EPA headquarters where the pesticide department holds sway. "That office was in the business of reviewing pesticides. They hire dozens of people for reviewing new chemicals. So for them to talk about eliminating pesticides is to talk about eliminating a lot of jobs, about eliminating their very own source of income," says Thrupp.

Disinformation campaigns, even those seemingly crude and patronizing, have been and continue to be highly effective in raising doubts about the viability of sustainable and organic farming. "It always comes back to people making these statements: we can't feed the world unless we do it in the old way and unless we get subsidies to make sure that farmers continue to survive," says Thrupp.

Finally, like any news, timing influenced the impact the reports had. When *Alternative Agriculture* was published in 1989, Congress was simultaneously massaging the conservation titles introduced in the 1985 farm bill and drafting the 1990 farm bill. Agricultural policy-makers already had a full plate, and the emerging organic community was focused on securing passage of the 1990 Organic Foods Production Act legislating organic labeling and processing standards.

Timing too in the sense that the organization at the elite and grassroots levels and the funding necessary to capitalize on watershed events like the USDA and NRC reports weren't in place in the 1980s. "By themselves, these reports are just kind of outliers and, in some ways, ahead of their time," says Lipson. "The other collaborating forces that would be necessary to leverage that kind of statement into policy just weren't there." The OFRF didn't exist yet, and the organic network was loose, more potluck than political, and poorly funded.

Third Time's a Charm?

The Lundberg brothers keep on experimenting. They're taking a look at using Global Positioning System-guided (GPS) tractors to be able to control aquatic weeds in varieties that have poor seedling vigor and aren't suited for deep water. They hope GPS will allow them to cultivate between the rows of rice seeded just six inches apart, including one round of "blind tillage" before the rice even emerges. Most of their learning comes from trial and error. "We've had to learn organic farming mostly on our own," says Homer. "There's just not many people, even now, thinking that we're going the right way."

There is good reason to hope that the Lundbergs will find more support for their efforts following the release of the NRC's report next year. The convergence of many factors may enable the nation to leverage the findings of the new NRC report into a paradigm shift that resets the course of American agriculture: Organic food enjoys huge popular support and accounted for $17 billion, or nearly 3%, of total U.S. food and beverage retail sales in 2006[6]; Internet-based communication webs now connect and mobilize sustainable farmers and advocates; big box retailers lend new heft and resources to the organic lobby; OFRF has formulated a national organic research agenda; and the House Committee on Agriculture now includes a Subcommittee on Horticulture and Organic Agriculture. Perhaps most importantly, the general public demonstrated considerable interest in the farm bill fine print during the recently ended funding negotiations.

But the forces financially and philosophically committed to conventional agriculture haven't gone away. Instead, they've gained in strength with the takeover and consolidation of the seed business by the chemical industry and the rollout of genetically engineered crops.

Eldon Lundberg in a photo taken for the 1989 Alternative Agriculture *report. Courtesy of Chuck Benbrook.*

"There is this whole new constellation of political and economic interests that has been created by biotechnology," says Benbrook. "Things are different now, the companies are making much more money than in the early '90s, and as a result the companies are much more powerful both politically and economically. They can wage campaigns and political efforts on a scale that dwarfs what was possible in 1989 when *Alternative Agriculture* came out. There's also this whole new layer of ideological competition for who gets to craft a vision of a productive, safe, sustainable future agriculture towards which we design and implement public policies and public expenditures. Clearly the biotech vision has dominated over the last 10 to 20 years."

And while the rising price of oil is pushing up the cost of high-input farming, for now the revenues of conventional farmers, especially grain and oilseed farmers, are setting records. A larger, wealthier world population is demanding more food even as ethanol refineries court growers with lucrative contracts. The call to grow healthier food, to increase crop rotations, to leave room for hedgerows and filter strips, and to transition acres to organic could be hard to hear over the scream of the commodities market. ❧

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[1] CAST 2007 Annual Report, page 15-16

[2] *Alternative Agriculture*, page 89

[3] National Research Council, Alternative Agriculture, National Academy Press, Washington, D.C., 1989,

[4] *Alternative Agriculture: Scientists' Review*, Special Publication, No. 16 summary, July 1990 page 7

[5] Lipson, Mark, personal interview 3/20/08, and http://www.ers.usda.gov/Data/Organic/Data/Certified%20and%20total%20US%20acreage%20selected%20crops%20livestock%2095-05.xls

[6] http://www.organicnewsroom.com/2007/05/us_organic_sales_show_substant_1.html

Back to the Future?

Robin Schoen, Director of the National Research Council's current study.

Robin Schoen serves as the director of the Board on Agriculture and Natural Resources at the National Research Council (NRC), the same post that Chuck Benbrook occupied when the NRC's 1989 *Alternative Agriculture* report came out. We spoke with Robin in April about the Board's current project: *21st Century Systems Agriculture: An Update of the 1989 NRC Report 'Alternative Agriculture'.*

OFRF: What led to the Board taking on this project now?

Schoen: We probably would not have done this study if the Gates Foundation and the Kellogg Foundation hadn't initiated it. The question of whether our agriculture system is improving on many different scales of measure should probably be asked all the time, but finding funding for such projects is another story. I don't think the USDA [a frequent sponsor of Board projects] would have said, 'We need some strategic thinking about where we're going and whether we're farming better than we were 20 years ago.'

OFRF: What is the interplay with the USDA given that the USDA did not ask for or fund the 21st Century Systems Agriculture study?

Schoen: Right away when the project was announced, a national program leader at the USDA-ARS asked me to come over to talk with him at Beltsville. He was ecstatic about the project. There's a group over there that works on the natural resources side that's really very happy about us doing this. The scientific community within the USDA knows that our agricultural system has a significant environmental footprint. They would like more attention paid to how we can be doing a better job. They said to me, 'We have all these practices and systems that we think are working, but only 10% of farmers are adopting them.' That whole adoption problem is beyond the national program leader's mandate: how to provide the incentives and environment for the other 90% of farmers to move away from their current practices. Part of the study is to explore the things that set a farmer on a path that may not be his preferred path but that, because of economic reasons, he sees as the only path he can take.

But at a high level, the USDA is subject to the political pressures of large commodity growers and the same forces that support certain economic incentives that probably cause damage to the environment. The USDA is responsive to political pressures, and it doesn't set the research agenda necessarily, a lot of that is determined by Congress.

OFRF: Are you involving the USDA in the report process?

Schoen: We've had two meetings, and at both we've asked people in from the USDA to brief the committee. As we begin the scientific review, we'll be drawing on more USDA scientists.

But what I'd like to do between now and when the study comes out is to engage the USDA at the administrator level about the implications of the study and about how we prepare the USDA to respond in a way that shows it will be responsive. The only problem with having two private foundations fund the study is that the USDA could say, we didn't ask for the study so we don't have to listen to anything you say. There's no way, politically, that the USDA could have asked for the study. But since these foundations have taken the initiative, the USDA ought to get ahead of the game and use the report to lever its independence from what hamstrings it from doing the more strategic and progressive things that we all know the USDA needs to do.

We're going to try to make a big splash with this report, and I hope that it can be a win-win situation. I hope the NRC has the credibility such that the report gives the USDA and ARS a hook for change.

OFRF: Given that Chuck Benbrook was fired in the wake of the 1989 *Alternative Agriculture* report, are you worried at all about your own job security?

Schoen: I don't think about it much. Hey, if the report got so much attention that it became the subject of much debate and passion but moved things forward, then what the hell. ❧

2008 FARM BILL: After Long Haul, Big Wins for Organic

by Mark Lipson, Tracy Lerman, and Zach Baker

Jared Zyskowski

OFRF's policy team stalks the perfect Farm Bill. Staff members Mark Lipson, Tracy Lerman, Zach Baker, and board member Francis Thicke, chair of OFRF's Policy Committee, at a tour of Martin and Atina Diffley's Gardens of Eagan farm in Farmington, Minnesota.

The colossal, twelve-dimensional chess game known as the 2008 Farm Bill finally wound to a conclusion this summer, containing some very significant wins for organic producers. The 673 pages of small print, technically called the "Food, Conservation and Energy Act of 2008" (HR 6124), was vetoed (twice) by Pres. Bush, the veto overridden (twice) by Congress, and finally became law on June 18.

OFRF staff have worked directly on this Farm Bill since early in 2006. More than that, it is the culmination of 12 years of OFRF's work on federal policy for organic research. After countless hours, tens of thousands of miles, hundreds of conference calls with more than fifty organizations, dozens of action alerts and about 5 zillion emails, how did we do? Here is a run down of the highlights—our goals, our wins and our losses. All the details are available on the Web at ofrf.org.

Overall we did very well, even turning an historic corner or two. The many specific provisions for organic agriculture, community food systems, hunger assistance, and conservation add up to the potential for really significant change. Yet the long-term supports for industrial-chemical agriculture remain in place along with all the distortions and disincentives for good stewardship that they cause. Many people have asked if the incremental gains for organic and sustainable agriculture are worth the price of perpetuating the many large-scale flaws that are also embodied in the bill. Fresh from being inside the process, it's not possible for us to see it as a black-or-white proposition. While wholesale change in federal policy did not occur in this round, the groundwork has been laid for future change.

Early in 2007, a key Congressional staffer asked us, "What do you really want? Do you want to get a better share of the pie? Or do you want to blow up the whole process?" It was a tough question, in part because the prospect of the process blowing up seemed almost plausible at that point. But what if it had blown up? There was no assurance that we could engineer a better outcome. Many of the issues we've nurtured for years would have gone down the drain with the rest of the bathwater instead of coming to fruition now. Our approach was to fight for a fairer share while tunneling under some of the policy structures that hold back bigger changes, opening some cracks and undermining those structures for future dismantling.

It's not possible in this space to do justice to the political complexities that we had to deal with, but "twelve-dimensional chess" does not really begin to cover it. The single most important thing to note is that the active engagement of organic farmers truly made a difference. The credibility of our arguments on Capitol Hill always rested on the calls and letters and visits from working farmers and ranchers and other members of OFRF's Organic Farmers Action Network (OFAN). Those who took the time to do that are the real heroes of this story, and we salute them gratefully.

It is clear that this process will be a continuous one. We're not going to wait a couple of years before starting on the next Farm Bill. We're starting on it now, even while scrambling furiously to get the 2008 law implemented and funded the way it's supposed to be. We will continue to build OFAN, as well as our wider coalitions, to keep changing national agricultural policy for a more organic world.

continued...

Summary of OFRF Farm Bill Goals and Highlights of our Wins and Losses

1. Organic Agricultural Research

The lack of production and market information is a crucial limiting factor for growth and improvement of U.S. organic agriculture. Therefore, our primary goal in the Farm Bill was to increase mandatory funding for USDA research, education and data collection. Our policy arguments were anchored by a call for a "fair share" of USDA research funding and supported with specific evidence about the environmental, economic and health benefits of organic agriculture.

Specific program goals and outcomes were:

Organic Agricultural Research and Extension Initiative (OREI) - We recommended $125 million in mandatory funding for competitive grants (increased from $15 million in the 2002 law). **WIN:** $78 million in mandatory funding for OREI over four years, plus additional authority for appropriations up to $25 million per year.

Agricultural Research Service - We sought language directing USDA to provide a "fair share" of its intramural research funding for organic objectives. **LOSS:** Although both House and Senate bills were completed with language encouraging USDA to allocate a fair share of in-house Agricultural Research Service funding for organic objectives, this language was not included in the final bill. Though it would have been helpful in our appropriations work, it would have been non-binding in any case.

Organic Production and Market Data Initiatives - We recommended $5 million in mandatory funding (2002 provision had no mandatory funding). **WIN:** $5 million in mandatory funding for Organic Data Initiatives, plus additional authority for appropriations up to $5 million per year.

Support for classical plant and animal breeding within USDA's main research grant programs (the "Seeds and Breeds Initiative"). **WIN:** Inclusion of classical animal breeding as a purpose of USDA's primary competitive grants divison, the Agriculture and Food Research Initiative (formerly the National Research Initiative).

2. Conservation Programs and Organic Conversion Assistance

Under the "Conservation Title" of the Farm Bill are a number of programs that provide producers and landowners with financial incentives, cost-sharing and technical assistance for maintaining and improving water, soil, and air quality. A core advantage of organic agriculture is its beneficial effects on natural resources. Yet organic agriculture has received very little attention from the USDA conservation programs. A key goal for this Farm Bill was integration of organic farming and ranching into the purposes of USDA conservation programs and streamlining the administrative "crosswalk" between organic certification and qualifying for conservation payments. The Conservation Stewardship Program (CSP), formerly known as the Conservation Security program, appeared to hold the most promise for rewarding the benefits generated by organic practices. Since its inception in 2002, however, the CSP program has been crippled by funding issues, so expansion of CSP funding was also a primary goal in this Farm Bill.

Because of the environmental benefits expected from organic agriculture, the conservation programs were also identified as the logical place to create a specific program to support conversion of conventional operations to organic. The rate of conversion of conventional U.S. farms and ranches to organic practices is lagging well behind the demand for most organic products (dairy farms may be an exception). Although there are numerous obstacles for producers who wish to make the transition, from unfair crop insurance policies to the ongoing dearth of research, providing financial and technical support within the conservation programs could at least offset some of the increased production costs during the conversion period. In addition, OFRF's emphasis has been on training and technical support for transitional producers in order to ensure that conversions actually succeed. Without this, much of the financial assistance funds for conversion will be ineffective.

Specific program goals and outcomes were:

Conservation Security Program (CSP) - Goal: To Integrate organic practices into the program and provide full funding for a national program, open to all producers. **WINS:** Funding for the (renamed) Conservation Stewardship Program was increased by $1.1 billion, projected to be sufficient for stewardship payments on 13 million acres per year. Also, the CSP application process is now specifically required to be coordinated with organic certification.

Organic Conversion Supports - Goal: To establish a new program primarily investing in technical assistance and education for transitioning farmers, secondarily providing modest financial support to offset conversion costs which have conservation benefits. **WIN:** Payments for organic conversion authorized under the Environmental Quality Incentives Program (EQIP). **LOSS:** Specific funds were not allocated to organic conversion support.

3. Organic Certification Cost-Share

The 2002 Farm Bill created a new program to help offset the costs of organic certification for producers and processors. Only $5 million was allocated to the national program for 2002-2008. That funding was slow to get out through the states to the users and once the system was in place, the money was used up quickly. By 2006 most states had exhausted their funding for this program.

Our goal in the new Farm Bill was to increase the national funding to $25 million over five years, and increase the amount of annual support from $500 to $750. **WINS:** National Organic Certification Cost-Share was renewed with $22 million in mandatory funding to provide annual support of up to $750 for up to 75% of certification costs per operation. As well, additional funding for Certification Cost-Share in 16 states is provided as part of the Agricultural Management Assistance program.

4. Crop Insurance Equity for Organic Producers

Organic farmers have gotten a raw deal on both ends (premiums and payouts) of crop insurance. We have had an automatic 5% surcharge on premiums due to the perception of increased risk. We have not been able to insure organic crops for their actual organic market value but instead have received payouts based on conventional prices. Our goals in the Farm Bill were to eliminate these disparities. **WINS:** USDA is required to develop improvements in crop insurance policies for organic producers, including a review of the necessity for the premium surcharge. The burden of proof is on USDA to show that there is clear and systemic evidence of a need for any surcharge. USDA is required to develop and implement options for organic payouts with the goal of offering the payout for all organic crops within five years as sufficient data become available. **LOSSES:** Inequities are not immediately eliminated.

So, Now What?

Securing these Farm Bill gains was just the beginning. We now need to ensure these provisions are implemented properly and that our funding gains are protected in the annual appropriations process. Implementation of a Farm Bill straddling two administrations presents unique and unprecedented challenges, but with your continued help, we're prepared to work to steer rulemaking and appropriations in the proper direction. For the absolute latest updates on implementation, appropriations, and Farm Bill programs, and how to get involved in helping us fully realize our gains, subscribe to our OFAN information services. ❧

Farm Bill Gains Threatened in Appropriations Process

...what we know as of late summer, 2008

Before we could even recycle our celebratory champagne bottle, we found ourselves defending our hard-won Farm Bill gains. Every year, prompted by the release of the President's budget in February, Congress is charged with deciding how much money, if any, programs will get. During this appropriations process, Congress can take away money from programs authorized with mandatory funding in what is called a Change in Mandatory Programs or CHIMP.

Unfortunately, this is exactly what Congress and the President have proposed to do to the Organic Agriculture Research and Extension Initiative (OREI) for fiscal year 2009.

George Bush set the stage for this approach back in February before the Farm Bill passed, proposing to cut all funding for OREI in his 2009 Budget. After the big win in the 2008 Farm Bill in May we thought this request would fall on deaf ears, but in July the Senate, although not zeroing out all OREI funding, did include a $2 million cut to the $18 million figure provided for OREI in the 2008 Farm Bill. A month later, informed by the Farm Bill and the actions of the Senate, the President submitted a revised budget amendment, proposing to cut OREI by $8 million, almost half of OREI's new funding for fiscal year 2009.

The appropriations process is technically supposed to wrap up this fall, but with an impending change in Administration and the inability of the House of Representatives to move a bill due to partisan politics, the appropriations battle will likely carry on into early next year. OFRF has submitted a letter to USDA, the White House, and Congress to protest the proposed cut, but we'll need your help throughout the coming months to ensure OREI and our other Farm Bill gains are not cut. At the same time, we'll need to continue working to make sure many of our priorities *without* mandatory Farm Bill money receive the funding they deserve. These include the Organic Transitions Research Program (for which the President has proposed zero funding in his budget) and the Agricultural Research Service research stations with specific organic research projects marked for elimination in the President's proposal, including the Pasture Systems and Watershed Management Research at University Park, PA; the Invasive Weed Management Research at Urbana, IL, the Land Management and Water Conservation Research at Pullman, WA, and the New England Plant Soil and Water Research at Orono, ME.

What You Can Do

For updates on where our priorities stand in the appropriations process please visit our website and/or sign-up for our Organic Farmers Action Network (OFAN). You may fill out and send in the pull-out card, or subscribe on our website at ofrf.org

OFRF will continue to work to affect rulemaking and appropriations, and to make organic farmers aware of program opportunities. OFRF needs YOU to help advocate for funding and support for organic farming programs! By joining OFAN you will receive free updates and action alerts on policies that impact organic farmers. ❧

Methods to breed field corn that competes better with weeds on organic farms

On organic farms weeds can be a major problem in growing field corn, especially in cool wet springs when weeds in the row are not controlled on time. When weeds get out of hand they can reduce corn yields and their seed bank can assure higher weed pressure in subsequent years. Surveys of organic farmers in the Upper Midwest suggest a need to develop corn varieties that compete better with weeds. There is little evidence in the scientific literature that it is possible to breed corn with that capability. However, it is commonly thought that corn varieties that develop a tall, dense canopy shade the most and should be the most competitive. In the season of 2002 researchers at Michael Fields Agricultural Institute (MFAI) gained some evidence that by breeding under organic farming conditions, we may have unintentionally selected corn with an enhanced ability to suppress weeds. We also hypothesize that this competitive ability may be caused more by what is going on in the soil than by the canopy, and that the ability to suppress weeds can be inherited.

Objectives

In 2006 researchers at MFAI tested methods for evaluating corn for its ability to compete with weeds. Specific project objectives were to:

1) Develop practical ways to select corn both for the ability to suppress weeds and for resisting the yield reduction associated with the presence of weeds;

2) Select corn for these abilities from populations that yield well when crossed together.

Methods

We carried out two side-by-side experiments. The first experiment evaluated 181 different varieties we have been developing and their hybrids. These populations were classified on the basis of their pedigrees into two groups, a "stiff stalk" and a "non-stiff stalk" group. We made crosses between these two groups because they are regarded as complementary, resulting in hybrid vigor and yield increase over parental yields.

We conducted crosses between varieties (varietal hybrids), crosses between our MFAI varieties and commercial inbreds (topcrosses), and hybrids bred under conventional conditions. The varieties listed were mostly bred at MFAI for four to six years. Many crosses were with Nokomis Gold (NG) which has been under selection at MFAI for 16 years.

The second experiment tested the competitiveness of hybrids by selecting the lines of each variety that do best in combination with a bulk combination of the other lines. Experiment 2 contained 104 entries and three replications. This included four conventionally bred hybrids and varietal hybrids made by crossing numerous lines.

To facilitate the test for weed competitiveness, sunflowers were planted into the growing corn, to create an even "weed" pressure and a more uniform response variable to measure corn competitiveness. Customary weed control practices were applied on the organic sites: harrow, rotary hoe and inter-row cultivation. In addition, three additional treatments were applied to each plot:

1) Hand weeding a meter-long strip in the plot when the corn was about 6 in. tall;

2) Hand weeding a 2nd meter-long strip and planting sunflowers between corn plants; and

3) Allowing whatever weeds were there to grow on the rest of the plot without additional control measures.

Weeds were visually scored in September as percent of total green in the lower 1m of the canopy in the unweeded portions of the plot. Dry matter of the sunflowers was also measured in the fall. Grain yield was deter-

Corn stand demonstrating growth type we are seeking—vigorous, lax leaved, and leafy.

Project Notes

Principal investigator: Walter Goldstein, Michael Fields Agricultural Institute (MFAI), W2493 County Road ES, East Troy, WI tel. 262-642-3303 email wgoldstein@michaelfieldsaginst.org

Co-investigators: Alan Wood and Bill Barber, MFAI

OFRF support for project: $12,000 awarded in spring 2006. Funded in partnership with EPA Region 5.

Full project report: 11 pages, submitted July 2007. Available at ofrf.org. Follow links to: Funded Projects/Weed Management.

mined by hand harvesting meter-long subplots and by harvesting the rest of the plot afterwards with a plot combine.

Key Results

- The visual scoring and utilization of sunflowers as a test weed both appeared to be practical methods for assessing the competitiveness of corn entries. The sunflowers provided a uniform "weed" in areas where native weeds produced patchy irregular stands.
- The ability of the populations that were bred at MFAI under organic conditions to compete with weeds appeared to be superior to commercial organic hybrids. Weed foliage density scores were 2-3 times higher for commercial organic hybrids than for MFAI hybrids. Sunflowers grew twice as heavy in mixture with the commercial hybrids than with the MFAI hybrids.
- Yield performance among hybrids differed strongly according to whether the corn was grown under conventional conditions, organic conditions without weeds, or organic with weeds. Therefore, it is probably best to test varieties for organic production in organic fields where there are moderate populations of weeds because those are conditions that are most realistic.
- Crosses between populations (varietal hybrids) generally averaged somewhat lower yields than the topcrosses or commercial hybrids. However, some varietal hybrids produced similar yields to the highest yielding commercial hybrids.

Discussion

In general there was a substantial decrease in yield associated with the presence of weeds. However, some high yielding hybrids responded very negatively to the presence of weeds whereas some of our hybrids did not.

The study was useful and applicable to other organic farms. Our project identified which corn varieties compete best with weeds, and developed new methods for assessing competition. Next steps would include:

1) Looking at a small set of cultivars and attempting to understand the nature of the competitive mechanism;

2) Refining our methods for selecting corn so as to improve its ability to compete with weeds; and

3) Applying such methods to breed corn with high yield potential that is very competitive with weeds and is little affected by them in terms of yield. ❧

Many commercial hybrids, as shown here, have upright leaves and allow more light to reach weeds. Organic farmers must depend more on high populations for weed control.

Table 1. Results of weed trial in Experiment 1, 2006.

	No. of crosses tested	weed score %	weight grams/ sunflower	grain yield hand weeded bu/a	grain yield with weeds bu/a
Cross conventionally bred inbreds (single cross hybrids)					
Blue River hybrids	4	24	2.2	168	130
Ohio State Univ. test hybrids	20	17	1.7	203	145
average		**20**	**1.9**	**185**	**138**
Cross conventionally bred inbred with MF populations (topcrosses)					
LH185 x MF	3	4	1.6	196	137
LH198 x MF	4	16	0.6	184	138
FR1064 x MF	8	22	1.1	166	128
FR2108 x MF	4	12	1.0	182	136
FR3911 x MF	7	10	0.6	171	131
FR6943 x MF	3	13	0.8	152	107
average		**13**	**0.9**	**175**	**129**
Cross conventionally bred population x MF populations (varietal hybrids)					
CGSS x MF	8	11	1.4	138	106
HPALC x MF	7	10	1.8	155	121
average		**11**	**1.6**	**146**	**113**
Cross of MF population x MF populations (varietal hybrids)					
BS28 x MF	9	10	0.8	142	118
AR1635 x MF	8	10	1.5	155	122
AR21 x MF	7	8	1.7	155	112
FS97 x MF	9	9	0.3	136	116
AR21B x MF	11	7	1.0	148	121
AR35B x MF	9	7	1.3	166	115
FS x MF	8	12	1.1	142	120
UR05B x MF	9	9	1.5	156	123
NG x MF	18	8	0.9	149	113
average		**9**	**1.1**	**150**	**118**

Notes: Blue River hybrids are a commercially bred organic line. Ohio State test hybrids are a conventional line. MF refers to varieties developed at the Michael Fields Agricultural Institute.

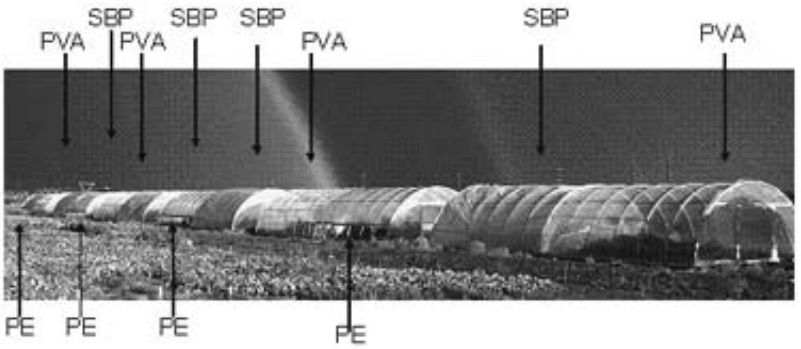
Evaluation of screened high tunnels for production of organic vegetables in Colorado

During the summers of 2006 and 2007, we evaluated four different high tunnel coverings to see if we could reduce the incidence of insect-vectored diseases by excluding insects from the crops. We were also interested in how these different coverings would hold up under our weather conditions, and if there would be differences in the microclimate within the tunnels that would impact commonly grown vegetable crops.

In Colorado, the most common and problematic disease vectors on organic crops include:

- **Western flower thrips**, which vectors tomato spotted wilt on tomatoes (as well as a number of other diseases to other crops);
- **Potato psyllid**, which is responsible for psyllid yellows on solanaceous crops;
- **Beet leaf hopper**, which vectors curly top virus; and
- **Striped cucumber beetle**, which causes direct damage and also vectors bacterial wilt to cucurbit crops.

High tunnels are commonly covered with polyethylene (PE) glazing which requires ventilation—generally side walls are rolled up and end walls are opened or removed, which allows free entry of insect pests. Exclusion of insects in high tunnels has not been adopted because of the relatively high cost of greenhouse insect screening. Floating row cover materials (breathable spun-bonded polypropylene) may offer an inexpensive alternative (approximately $30 for a 6 x 15m tunnel) which would offer insect exclusion and environmental protection with the added advantage of not requiring the daily if not hourly ventilation adjustment required of poly-covered high tunnels.



High tunnel treatments in 2006. Each treatment consisted of a ½ tunnel covered with either polyvinyl alcohol (PVA), spunbonded polyester (SBP), or polyethylene (PE).

Objectives

In this project we proposed to evaluate the utility and performance of two types of floating row cover materials when applied to high tunnels, and compare these to a conventional PE-covered high tunnel.

We had intended to complete this project in one year, but the migrations of psyllids failed to materialize in 2006, and beet leaf hopper numbers were also very low, so we were unable to compare the severity of insect-vectored disease of unprotected crops with those in the screened tunnels. However, the lack of insect pressure allowed us to make crop growth comparisons under the different treatments without having to factor in possible insect impact, which was an unexpected benefit. Another useful event was the occurrence of a microburst of very high wind, which put the different covering materials to the test of extreme weather conditions.

Materials and Methods

In 2006, "Frost Guard" tunnels (manufactured by Nexus Greenhouse Corp.), measuring 48 ft. long, 20 ft. wide and

Project Notes

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Co-investigator: Whitney Cranshaw, Dept. of Bioagricultural Sciences and Pest Management, CSU

Project location: CSU Horticulture Field Research Center, Ft. Collins, CO (certified organic since 2002)

OFRF support: $12,428 awarded in spring 2006. Funded in partnership with EPA Region 8.

Full project report: 25 pages, submitted February 2008. Available at ofrf.org. Follow links to: Funded Projects/Disease Management.

9 ft. tall were covered with one of the following:

- **Polyvinyl alcoho**l (PVA) (Tufbel);
- **Spun-bonded polypropylene** (SBP) (Agribon19); or
- **8 mil polyethylene greenhouse** (PE) film (Klerk K50) with a conventional roll up side ventilation system.

Each covering represented a treatment, and was replicated four times. Each tunnel was split in half, providing two treatments per tunnel, with a vertical plastic wall between the treatments. Two varieties each of tomato and melon and one variety of spinach were grown.

In 2007 much of this same work was repeated. Materials which failed to withstand high wind in 2006 were replaced with more durable **LS Econet** insect screening in spite of its higher cost. Each treatment consisted of an entire tunnel covered with either insect screening or PE. Cropping treatments consisted of tomato, cucumber and salad mix (lettuce, arugula and mizuna).

Key Results 2006

Covering performance; durability and tunnel climate:

- SBP performed well until extremely high winds ripped the material.
- PVA performed well until stitched seams broke down, presumably from UV degradation of the thread used for sewing the seams.
- Tunnel microclimates were hotter and more humid than ambient conditions and resulted in comparable or better production than in the field, but there was very similar production between the treatments.
- Vegetative growth was greatest in the SBP treatment.

Crop production:

- Tunnel production results were all comparable or better than field production of the same cultivars; better product quality was especially evident in the greens and spinach due to reduced pressure from flea beetles.
- Even with high daytime temperatures, spinach performed well in all of the treatments.
- Relatively low melon production was surmised to be a result of reduced pollinator presence in the SBP and PVA treatments, however pollinators managed to find their way into these tunnels even though they appeared to be well enclosed.

Key Results 2007

Insect exclusion:

- Successful exclusion of psyllids from the screened houses, and very rapid population increases and subsequent crop decline from psyllid yellows in the open ventilated PE covered tunnels, proved the efficacy of the screened tunnels in excluding psyllids.
- Beet leaf hoppers and thrips failed to present problems in any of the treatments, but were not especially abundant in 2007.
- Flea beetle damage to the salad crops was low in the screened tunnels and high in the PE tunnels.

Covering performance; durability and tunnel climate:

- Microclimatic differences between the screened and PE treatments were measurable but did not result in yield or quality differences.
- The durability of the LS Econet screen was excellent, holding up well to high wind and light hail.

Crop production:

- Crop production between treatments was not different, however the quality and earliness of peppers and tomatoes was enhanced in tunnels over field production at the same site.

Melons and tomatoes in spun-bonded polypropylene (SBP) covered tunnel.

Discussion

Amortized costs of tunnels with any of the coverings are very similar, and so performance of the material should be the guide for determining which cover to use. The marginal yield advantages and lower amortized costs of PE suggest that PE coverings will offer the grower a marginally better return, however this should be weighed against potential disease mitigation insurance offered by insect screening. In areas with predictable infestations of disease vectoring insects, the marginal cost advantage of PE would quickly be lost. Consideration of labor requirements for installation or replacement of short lived covering materials should also be considered, suggesting that LS Econet or PVA, both of which are presumed to last several years, may be better choices. ❧

Amortized cost of tunnels with PE, PVA, SBP or LS Econet coverings.

	Cost of covering materials			Cost of structure			
Covering material	Initial cost ft/sq	expected life, years	amortized cost/yr	structural cost	expected life, years	amortized cost/yr	total cost of tunnel yr/sq ft
4-yr greenhouse PE	$0.15	4	$0.04	$1.78	10	$0.18	$0.22
PVA	$0.23	3	$0.08	$1.78	10	$0.18	$0.25
SBP	$0.02	1	$0.02	$1.78	10	$0.18	$0.20
LS Econet	$0.50	5	$0.10	$1.78	10	$0.18	$0.28

On-farm testing of organic weed control strategies in Indiana

The purpose of this project was to substantiate and measure the effectiveness of various organic strategies for creating a weed free 'stale seedbed'.

At Rhoads farm we grow specialty lettuces, salad greens, other leafy greens, herbs and tomatoes. Weeding of salad green beds has been our most time consuming and least desirable farm task. Typically we deal with four weeds, having over the years virtually eliminated commonly seen weeds such as lambsquarters, pigweed, and smartweed. Our problem weeds are **chickweed, hairy galinsoga, purslane** and **various grasses**. While we have not identified the specific grass that we have the most of, it is a very short season grass being able to produce seed from seedling to maturity in two months.

Objectives

The primary objective of our project was to compare in replicated field trials the effectiveness and cost of a number of organic weeding strategies—several different organic herbicides and flaming. The herbicides used were Matran 5, vinegar solution at two different dilution rates, flaming with an LP hand-held flamer, and the herbicide Burnout II. (We later discovered that Burnout II is not certifiable for organic production due to a mineral carrier—the data for this material are nevertheless included in this report for comparison.)

A stale seedbed for planting salad greens was prepared three times in the year. The seed beds were tilled, leveled, watered and allowed to sit for one to two weeks to germinate weed seeds. Each bed was 3' feet wide and 90' long. Each of these beds had 18 equal 3'x 5' sized sections that received the different treatments to be tested, with three replications of each treatment, assigned randomly to each section. Treatments were made on May 18th, June 15th and August 28th. Weed counts to determine effectiveness were made about one week after treatment. Several days after weed kill the areas were hand weeded to determine the extent of weed kill—some weeds like grass and purslane can be defoliated but not killed by some of these treatments and will re-grow about 5 days after application.

Planting and treatment areas at time of harvest. Note (center of photo) weeds on untreated paths that someone was hoeing as pictures were taken.

Methods

The different treaments were:

1. No treatment.
2. **The organic herbicide Matran 5** applied at a 3% dilution.
3. A **vinegar solution** applied as an organic herbicide at a **10% dilution**.
4. A **vinegar solution at a 13% dilution rate.**
5. **A hand held 'flaming unit'** that burns germinated weeds to the ground.
6. **The organic herbicide Burnout II** at a 33% dilution.

At the time of the the first application (May 18), the plots were very weedy, having had uncomposted manure put on the year before. The area was covered with a sheet of clear plastic for two weeks before application of materials to germinate weeds. Plastic was removed 10 days before application and a light frost had damaged some of the leafy annuals. There were 700 weeds counted in one of the untreated plots. Materials were applied at stated treatment rates, at ½ gallon per 3'x5' area. Flaming took approximately 45 seconds per plot and used 15 ounces of LP gas for each of the flaming plots.

During the second application (June 15), plots differed from the springtime trials in terms of different kinds of weeds. There was not nearly as much hairy galinsoga, more grass, considerable purslane and small amounts of pigweed, lambsquarters and ragweed. Weeds were allowed to get a little bigger in this set of trials to demonstrate killing power with larger weeds. Here weeds were 4"-8" tall. As the purslane and grass is much harder to kill, all sprayed applications had 1 gallon of mix applied

Project Notes

Principal investigator and project location: Dale Rhoads, Eschatia Farm, Nashville, IN (certified organic)

Project advisor: Liz Maynard, Ph.D., Regional Extension Specialist of Horticulture and Landscape Architecture, Purdue University

OFRF support for project: $6,825 awarded in fall 2004

Full project report: 21 pages, submitted December 2006. Available at ofrf.org. Follow links to: Funded Projects/Weed Management.

per 3'x 5' area (as opposed to ½ gallon used in trials #1 and #3) and 2 lbs of LP gas was used in flaming the plots. Dilution rate of all spray materials was the same as in trial #1.

For the third trial on August 28, there were fewer weeds than in any of the other two trials, particularly Trial #1. The majority of the weeds were hairy galinsoga, with fewer numbers of purslane and some grass. These beds had been tilled, prepared for planting and let sit for two weeks to germinate weeds. There were 250-400 weeds per plot in the untreated plots.

Because of the lower weed populations before application and less of the hard-to-kill purslane in these trials, ½ gallon of each liquid spray material was used to cover each of the three replications. One pound three ounces of LP gas was used to the flaming plots in this trial.

Results & Discussion

Results averaged over the three trials are shown in Table 1. From using these products and methods in these trials and in the field outside of these trials, we think in order of efficiency LP Flaming does the most complete job, Burnout II was next, Matran, Vinegar 13% and then Vinegar 10%. All of the methods dramatically reduced weeding time. In the trials Vinegar at 13% appeared to perform better than Vinegar at 10%. While we did not notice much difference between Vinegar 10% and 13%, at times it appeared to us that the 13% killed a few more weeds and common sense would support that. In future trials we are going to try Vinegar at 15% instead of 13%.

All of the test materials and methods reduce weeding time by at least 32% when used to create a stale seedbed. In many situations these methods and materials will reduce weeding time by 75% or more (in the August trials weeding time was reduced by 200%).

Flaming is the only organically approved option that dealt with young grasses. (Note: Matran EC in a higher dilution rate than used in these trials is thought to kill young grasses.)

The LP flaming is the most convenient to use, but the least favorite due to it being a non-renewable resource. We have had some problems with the herbicides eating sprayer seals and gaskets. Care must be used to add all the water before adding the herbicides and a good washing afterwards. Vinegar was the second easiest to use and seemed less hard on the gaskets. Also on our backpack sprayers we started off using a diaphragm sprayer only to experience multiple diaphragm failure. After switching to a piston sprayer we did not experience sprayer failure.

At Rhoads Farm we will use all these materials and methods in our stale seedbed arsenal. Basically our current strategy looks something like this:

1. Areas with grasses or purslane we use the LP flaming.
2. Moderate weed pressures we use Matran 5.
3. Moderate to slight weed pressures we use 10% or 13% vinegar.

The timing of application of these products can be played with and adjusted for different crops to increase their effectiveness. Variables that can be played with include length of time of letting seedbed set before application, and doing planting before application of herbicides and timing treatment to 1-2 days before crop germination.

In figuring costs from these trials several factors need to be considered. These include weed density, type of weeds, and weed size. Higher weed concentrations and larger weeds require more material, as do difficult weeds such as purslane and grasses. [Estimated cost data is provided in the full report.]

It cannot be stated enough that these herbicides in our opinion work best in setting up a stale seedbed for closely grown crops that will not outcompete weeds by themselves. This is for crops like salad greens, carrots, beets, cilantro, etc. The weeds should be under 4" in height to get good kill. And the herbicide used and the concentration it is used in must be matched up to the type, density and size of weed to be killed.

After initially being leery of the benefits to be gained from these products we have seen that not only is there the easy-to-see benefit of labor saved, but also this labor savings allows crops to be grown profitably in harder to grow seasons or makes less profitable crops profitable due to a reduction in weeding time. ❧

Table 1. Weed management results averaged over the three trials.

Product used, in order farmer thinks is most effective	Average weeding time in minutes for Trial # 1	Adjusted average weeding time in minutes for Trial # 2	Average weeding time in minutes for Trial # 3	Average weeding time in minutes for all trials
L.P. Flaming	19 ^	1	0.4	6.8
Burnout II #	10	4	0	4.6
Matran 5 *	22	11	0.8	11.2
Vinegar 13%	23	17	1	13.6
Vinegar 10%	27	11	1	13
Untreated $	40	40	22	34

^ - In Trial #1 flaming was applied at too short of an interval for best weed control.
# - Burnout II is not approved for USDA certified organic use due to a mineral carrier.
* - Matran 5 was used at 3% dilution rate and now newly formulated Matran EC is recommended by manufacturer to be used at 5-8%, which would greatly increase its effectiveness.
$ - Untreated areas weeding time was stopped at 40 minutes.

Public breeding for organic agriculture: Screening horizontal resistance to late blight in tomatoes

Late blight (LB) of tomato and potato, caused by the fungal pathogen *Phytophthera infestans*, is currently the most destructive disease of tomato in the Pacific Northwest. Tomato researchers have reported an increase in both the virulence and prevalence of many new genotypes of the pathogen.

The importance of this disease increased substantially in the early 1990s when new clonal lineages of the A2 mating type migrated from the Toluca Valley of Mexico. Previous to this only genotypes of the A1 mating type had been detected outside of the Toluca Valley. The migration of the A2 genotypes (which are able to sexually mate with A1 genotypes, thereby creating new genetically recombinant genotypes) brought a sharp increase in the number of *P. infestans* genotypes in many environments where late blight is a problem.

In the Willamette Valley of Oregon, Western Washington, and Western British Columbia, most organic farmers will not attempt to grow a tomato crop in the field due to expectations of heavy losses from this disease. Growers either abandon tomatoes as a viable crop or grow the crop in high tunnels with much added expense.

A number of plant breeders improving crop varieties for the challenges of organic cropping systems consider polygenic, quantitatively inherited disease resistance or "horizontal resistance" (HR) to be appropriate for issues of sustainability in agriculture. Growing HR varieties establishes a more effective ecological balance in the field between the pathogen and host; the disease is able to survive but is present at manageable levels.

Previous work by John Navazio has identified several tomato populations known as Bellingham Late Blight Populations (BLBP) with moderate levels of blight resistance. The BLBP have gone through 3 cycles of selection for late blight resistance under heavy disease pressure. They also have early maturity, superior culinary quality and appropriate fresh market fruit type, all of which, coupled with late blight resistance, are important for organic fresh markets in the Northwest.

Cull pile of unmarketable fruits with late blight symptoms 7-10 days after the initial disease outbreak.

Objectives

Our research goal is to quantify resistance to late blight by screening BLBP varieties under conditions conducive to the spread of the fungus *P. infestans*, and by collecting data in these field trial evaluations. We will use this data to make selections within the BLBP with the goal of developing open-pollinated varieties that will be publicly available to organic farmers and other tomato breeders.

Materials and Methods

This experiment was planted at Old Tarboo Farm (OTF) in Quilcene, Washington and The Evergreen State College Farm (TESCF) in Olympia, Washington. The field plot layout was a randomized complete block design with three replications using twelve tomato accessions (six cultivars and six breeding populations) as treatments. Accessions include five cultivars and six populations that had previously demonstrated some level of resistance to late blight.

The commercial tomato cultivars with purported resistance to late blight included 'Legend', Juliette', 'Slava', 'Stupice', and 'NC03220'.

Results and Discussion

By 2 August the first disease lesions were discovered on several accessions in the TESCF plot. Samples were taken and subsequently confirmed to be early blight (EB) (*Alternaria solani*). Although we had not intended to evaluate the progression of EB, we observed considerable variation between accessions in these plots for disease symptoms to this malady and decided to score for levels of resistance until LB appeared.

Late blight results: At OTF the disease did not spread through the field in an even fashion, thereby eliminating any chance of recording accurate data on the relative resistance to disease. At TESCF the spread of the disease was even but the rate at which LB spread through the

Project Notes

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Co-investigators: John Navazio, Organic Seed Alliance; Kate Dean, Old Tarboo Farm, Quilcene, WA; Martha Rosemeyer, The Evergreen State College, Olympia, WA

Project locations: Old Tarboo Farm, Quilcene, WA and The Evergreen State College

OFRF support: $10,068, awarded spring 2004

Full project report: 12 pages, submitted December 2005. Available at ofrf.org. Follow links to: Funded Projects/Disease Management.

experimental plot was too rapid to allow for more than two weekly readings. This outbreak at TESCF was the most rapid and severe sweep of this disease in a tomato field that Dr. Navazio has ever witnessed.

From the Kruskal-Wallis test for non-parametric data we get a clear indication that 'NC 03220' (11), 'Juliet' (7), and 'Stupice' (10) are more resistant to LB than other accessions in the test.

The disappointing showing from Bellingham Late Blight Population (BLBP) accessions for LB resistance in this experiment might be explained by the extreme aggressiveness of the pathogen in comparison to the *P. infestans* isolates that these accessions had been selected for resistance to in Bellingham.

However, there was variation in resistance to LB that is not revealed in the data means as reported. Individual plants of 'BLBP-1' (1) and 'Legend' that had considerably more resistance to LB in this test than the population mean were used to make hand-pollinated crosses with these "more resistant" individuals (within and between populations). Individual plants were marked and seed was saved from these resistant plants (tomatoes are primarily naturally self-pollinated) as new breeding stock.

Early blight results: The appearance of EB in our plots was unexpected and initially viewed as a potential hindrance to our work with LB. Three standout accessions scored highest for resistance in both tests, 'BLBP-1', 'Juliet', and 'NC 03220'.

Conclusions

This experiment was successful in demonstrating that there exists tomato germplasm that has levels of resistance to a very pathogenic genotype of LB under field conditions. Resistance to the US-11 genotype of late blight was found in both 'NC 03220' and in 'Stupice' which has a significant level of HR to LB. 'Juliet' was also resistant. 'NC 03220' and 'Juliet' were extremely late maturing in western Washington, which is a serious hindrance to their use as breeding stock for the Northwest. 'Stupice', however, is well adapted to the Northwest's short growing season and has a consistent and early yield of 2 to 3 ounce fruits. It exhibited considerable genetic variation for HR, fruit shape, and flavor and would be an excellent population to select within for increased HR and superior quality attributes.

Above left: Experimental hybrid from North Carolina State University showing early stages of symptoms. This hybrid had the greatest measurable resistance, but was very late in maturing compared to other accessions. **Above right:** Stupice, although showing resistance in a number of plants was not uniform in its resistance response. These susceptible segregants show disease stages in different stages of fruit development.

In evaluating for HR, it is very important to monitor how the purportedly resistant plant holds up to disease pressure and if the resistance is able to significantly slow the progress of the disease over time. Therefore in future LB work in the field we will collect data on a much more frequent schedule to assure a more accurate appraisal of the progression of disease which will translate into a more robust statistical analysis.

This experiment also successfully identified a range of materials that are resistant to EB. Among the most resistant were 'NC 03220' and 'Juliet' which were also at the top for LB resistance. 'NC 03220' showed little or no EB symptoms through the duration of the experiment. But both 'NC 03220' and 'Juliet' were much too late maturing in the coastal Northwest. Several BLBP accessions did have significant resistance to EB, notably 'BLBP-1', which also has HR for LB and will be selected for resistance to both diseases in future experiments.

Through identifying the most resistant segregants for HR to LB from among the best parental stock that we have identified it is certainly possible to increase the quantitative levels of this resistance among the subsequent generations of the tomato germplasm we are breeding. If we can indeed couple this resistance with HR for EB in suitable fresh market tomatoes in subsequent experiments then we will be on task in supplying organic farmers in the Northwest with tomato varieties that can be produced in the field. ❧

Kruskal-Wallis test for mean late blight at TESCF. Treatments 11, 7 and 10 were significantly resistant to late blight compared to the population.

Treatment	N	Median	Mean Rank	Z
11	3	8	33.8	2.63
7	3	5.5	23.8	0.92
10	3	6	21.5	0.52
8	3	4.5	20.3	0.31
9	3	5	18.8	0.06
4	3	5	17.5	-0.17
5	3	5	16.7	-0.31
2	3	4.5	15.8	-0.46
1	3	4.5	15.5	-0.52
3	3	4	13.8	-0.8
6	3	2	12.3	-1.06
12	3	3	12	-1.12
H = 11.85, DF = 11, P = 0.456 (when adjusted for ties)				

Evaluation of glandular-haired, potato leafhopper resistant alfalfa for organic farming systems

In the northern and eastern portions of the U.S., the primary insect problem in alfalfa is the potato leafhopper (PLH). A piercing-sucking insect, the leafhopper secretes toxic saliva into the plant which interferes with phloem transfer. This injury results in leaves that are yellowed (known as "hopperburn") and plants that are often greatly stunted.

PLH is a yearly pest on alfalfa, mostly during the second and third cuttings and usually ranging from a moderate to a severe problem. Using well-established economic thresholds, conventional farmers take action when PLH densities reach prescribed levels—when the number of adult and immature PLH in a 10-sweep sample is equal or greater than the height of the alfalfa. For example, on 8-inch alfalfa, the threshold is 8 or more leafhoppers. There are no known organic insecticides that offer acceptable control and organic producers often suffer significant crop loss during either of the growth cycles if leafhopper populations are high.

This study evaluated the potential of glandular-haired, PLH resistant alfalfa varieties in an organic system. Varieties with resistance to PLH were initially released in 1997. Early released varieties were not sufficiently resistant, only containing about 30% resistant plants. At that time, their performance was considered poor and few growers took to using them. Since then, newer, more advanced varieties have been released that have much higher levels of resistance, between 70-80% resistant plants. In studies from conventional systems, the most recent advanced generation alfalfa lines have shown outstanding resistance and yield compared with non-resistant varieties. Indeed, we have been able to raise the PLH thresholds on the resistant varieties at least 3 times the level of non-resistant lines. Again, using 8-inch alfalfa as an example, the threshold on these new resistant lines would be 24 leafhoppers per 10-sweep sample.

Although numerous researchers continue to examine the exact mechanism of PLH resistance in alfalfa, the reason is still unclear. We know it is because of the glandular hairs that these lines possess, but no one is sure if it's antixenosis, a behavioral effect, or antibiosis, a mortality factor.

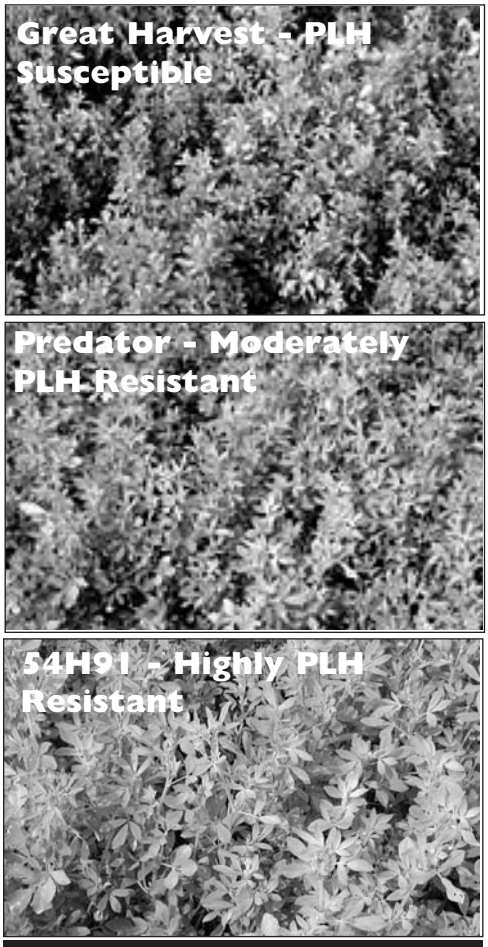
Objectives

Objectives of this study were to determine whether glandular-haired, PLH resistant alfalfa can be produced organically in areas with significant PLH pressure; whether PLH resistant alfalfa can reduce PLH density; and to demonstrate the ability of glandular-haired, PLH resistant alfalfa to produce a higher yield of alfalfa with less PLH injury to organic growers.

Materials and Methods

Three varieties of alfalfa were planted in fall 2004, in 20 x 150 ft plots on certified organic research land operated by the Ohio Agricultural Research and Development Center near Wooster, Ohio:

- **Great Harvest** (an organically produced, non-PLH resistant variety);



The above photos show the condition of alfalfa varieties on July 20, 2006. The PLH susceptible variety Great Harvest shows considerable "hopperburn" while the resistant varieties, particularly Pioneer 54H91, show little PLH damage.

Project Notes

Principal investigator: Dr. Ronald B. Hammond, Dept. of Entomology, Ohio Agricultural Research and Development Center (OARDC),The Ohio State University, Wooster, OH tel. 330-263-3727, email hammond.5@osu.edu

Co-investigators: Dr. Deborah Stinner, Organic Food and Farming Education and Research Program (OFFER), OARDC, The Ohio State University, Wooster, OH and Dr. Mark Sulc, Dept. of Horticulture and Crop Science, The Ohio State University, Columbus, OH

Project location: OARDC, Wooster, OH (certified organic)

OFRF support: $9,418, awarded fall 2004. Funded in partnership with EPA Region 5.

Full project report: 7 pages, submitted November 2006. Available at ofrf.org. Follow links to: Funded Projects/Pest Management.

- **Doebler Predator**, a third generation resistant variety referred to as a moderately resistant line (Res-M); and
- **Pioneer 54H91**, a recently released, fourth generation line considered highly resistant (Res-H).

Pioneer 54H91 was planted with and without Bio-Seed-Gard (BSG), an OMRI -certified seed treatment. The organic producer who supplied us with Doebler Predator seed asked us to treat half the 54H91 (the more resistant line) to see if it provided an additional advantage. BSG is a dry blend of microorganisms including *Mycorrhiza* and *Trichoderma* to support soil life for nutrient cycling in the root rhizosphere.

A number of problems occurred at the beginning of this study that affected the research. Because of insufficient leafhopper densities during 2005 to obtain meaningful results the first year of the study, a non-funded extension was obtained to continue the experiment the following year. In addition, the number of replications was reduced from four to two due to insufficient seed, and thus no data analyses were done.

In 2006, alfalfa was sampled weekly for potato leafhopper following the first alfalfa cutting when PLH are known to occur.

Key Results

During the second cutting in July 2006, extremely high leafhopper populations developed. Sampling from 5 July through 25 July showed the development of the population:

July 5: Adults collected were similar in all treatments with an average around 38 PLH per 10-sweep sample in 8-inch alfalfa. All treatments were considered above threshold, including the resistant alfalfa. Few nymphs were collected on this date.

July 14: Populations were similar to those on the first sampling date. Yellowing began to be seen in the susceptible alfalfa but not the resistant.

July 19: Adult populations on the resistant alfalfa varieties began to fall, ranging from about 19 PLH on 54H91 with BSG, to 25 PLH on the other two resistant treatments, to 40 on the susceptible line. The populations on resistant varieties by this time were below the threshold of 3 times normal, which on 15-inch alfalfa would be 45 PLH per sample. The numbers on the susceptible were well above threshold.

July 25: When the alfalfa was about 25 inches tall (at least on the resistant alfalfa), the number of adult PLH was similar on all varieties, ranging between 21 and 31 per sample. However, nymph densities rose dramatically, with a low of 10 nymphs per sample on 54H91 with BSG and 37 nymphs on the susceptible. Adding adults and nymphs, the susceptible averaged about 62 total PLH while the highest resistant treatment was 32 total PLH. Again, with the differences in thresholds, the susceptible alfalfa was well over threshold while the resistant alfalfa was below threshold.

The presence of more PLH on the susceptible variety corresponded to higher injury ratings and plant stunting (Table 1). The susceptible variety had levels of injury exemplified by extreme yellowing (80-90% yellow) and stunting. The plant height for the susceptible was only 15 inches on July 26. This compared to both 54H91 treatments with only slight yellowing (5-10% yellow). This amount of yellowing was most likely from the 10-20% of the non-resistant individual plants present in the mixture. The two 54H91 treatments were about 25 inches in height. Predator, the less resistant variety, had some yellowing (30-40%), with an average height of 21 inches, a few inches less than 54H91. (It should be noted that a more advanced generation variety of Predator has since come on the market with higher levels of resistance.) There appeared to be no differences between 54H91 with and without BSG.

These were very high potato leafhopper populations, much higher than normal during this second cutting. All samples were over threshold for non-PLH resistant alfalfa, and on July 5, probably higher than the 3 times threshold for glandular-haired alfalfa. However, note that while susceptible alfalfa was greatly stunted and yellow, we still had good height and less injury with resistant alfalfa. There were fewer adults by July 19 on resistant alfalfa, and fewer nymphs on the resistant material.

Following harvest of this growth cycle, leafhoppers did not reach high levels again, remaining < 8 PLH per sample.

Discussion and Conclusions

We were able to show the ability of advanced generation, glandular-haired potato leafhopper resistant alfalfa to produce a much better crop than regular, non-resistant alfalfa. This improvement was demonstrated by the near total lack of leafhopper injury (yellowing) and plants attaining between 25 and 30 inches in height (the normal height at harvest), while the non-resistant alfalfa was very stunted, at best 15 inches in height, and nearly entirely yellowed. The literature indicates that quality is much lower in PLH damaged alfalfa, and past experience has been that most growers, conventional or organic, would not have bothered to harvest this yellow, stunted alfalfa. This is evidence that PLH resistant alfalfa has a use in organic alfalfa production. ❧

Table 1. Potato leafhopper (PLH) injury ratings (on two dates) and plant height near harvest maturity on organically grown alfalfa during the second cutting 2006.

Variety	PLH	Injury Ratings*		Plant Height July 26
		July 17	Aug 3	
Great Harvest	Sus	6.5	9.0	15"
54H91 w BSG	Res-H	0.5	1.0	26"
54H91 w/o BSG	Res-H	1.0	1.5	25"
Doebler Predator	Res-M	2.5	3.5	21"

* Injury rating: 0 = no injury observed to 10 = completely yellowed and stunted
Sus = susceptible variety, Res-H = highly resistant variety, Res-M = moderately resistant variety

Development of wheat varieties for organic farmers

From the mid-1950's on, most wheat in the U.S. has been selected and bred for high-input agricultural conditions. These conditions include the common use of artificial fertilizers and chemical herbicides and fungicides, practices that are not allowed under certified organic standards. Traits specifically adapted to and useful for organic wheat production may have been lost from the gene pool of modern wheat varieties due to the intensive chemical management common in current wheat-breeding programs. In response, we have initiated a breeding program that focuses on selection under certified organic production systems and incorporates parental material from historical wheat varieties grown before the widespread use of modern day chemicals.

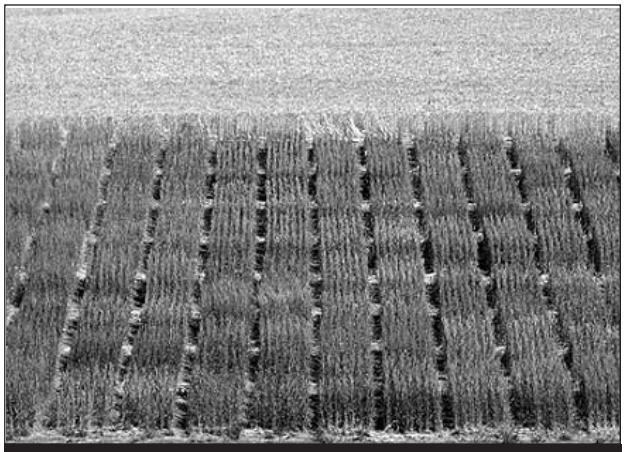
Field crops such as wheat present organic growers with unique challenges in managing weeds, pests and fertility. Successful cereal production requires varieties that are highly adapted to local climatic conditions and disease pressures. This is true for both conventional and organic production systems, but there are aspects of organic production that may make the ideotype required different from conventional systems.

There is great potential for improving the characteristics of cereals that will make them superior for use in organic production. In spite of the fact that organic wheat production is increasing rapidly, there has to date been little attention paid by public wheat breeders to evaluate and develop cultivars adapted specifically to organic production systems.

Objectives

The primary objectives we would like to answer with this research are:

- Are the best varieties in conventional farming systems the best varieties in organic farming systems?
- Do varieties grown pre-1950's contain genes that could prove beneficial to organic wheat farmers? and;
- Will wheat lines bred under a low-input organic environment be better adapted to these conditions and result in varieties particularly well suited to organic farming systems?



Organic spring wheat nursery at Spillman Farm, July 2006

Methods

Comparison of wheat variety performance in organic and conventional systems: Trials were developed to test differences in yield and test weight between organic and conventional systems. Randomized complete block designs with four replicates of 35 soft white winter wheat genotypes were grown in paired organic and conventional systems at five locations, and evaluated in 2002-03 and 2004-05. The 35 genotypes represent the most promising lines in the WSU winter wheat breeding program each year and have been selected entirely in conventional systems. The organic and conventional nurseries were located in similar microclimatic conditions with comparable soil properties. The conventional nurseries were treated according to standard agricultural practice, including the use of crop-protection chemicals and inorganic fertilizer. The organic nurseries were located on certified organic ground and treated according to the regulations set by the USDA National Organic Program.

Mineral content studies of historical and modern wheats and evaluation of wheats under low-input conditions: A randomized complete block design nursery of 63 spring wheat varieties (56 historical, 7 modern) was grown in Pullman, Washington in 2004 and

Project Notes

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Co-investigators: Kevin Murphy, Dept. of Crop & Soil Sciences, Washington State University; Tim D. Murray, Dept. of Plant Pathology, Washington State University; Keith and Owen Jorgensen, Jorgensen Brothers Joint Venture, Coulee City, WA; Allen Jorgensen, Coulee City, WA; Jim Moore, Kahlotus, WA; Joe and Sara Delong, St. John, WA.

Project locations: Spillman Agronomy Farm, Pullman, WA; Lind Dryland Research Station, Lind, WA; DeLong Farm, St. John, WA; Jorgensen Brothers Ranch, St. Andrews, WA (all locations farmed under certified organic conditions)

OFRF support: $33,472, awarded over three separate grants in fall 2001, spring 2003 and spring 2004

Full project report: 28 pages, submitted August 2006. Available at ofrf.org. Follow links to: Funded Projects/Organic Farming Systems

2005. The historical varieties were selected randomly from a larger group of spring wheat varieties that were widely grown in the Pacific Northwest region of the U.S. from 1842 to 1965. The seven modern varieties were among the most widely grown spring wheat cultivars in Washington State in 2003. Thirty-seven varieties were in the soft white market class, twenty varieties were in the hard red market class, four varieties were in the hard white market class and two varieties were in the soft red market class. There were three replicates of each variety in 2004 and four replicates of each variety in 2005. The nurseries were fertilized with PerfectBlend® fertilizer at the rate of 6.05 kg/ha each of N, P, and K, drilled with the seed at planting. No fungicidal or insecticidal seed treatments were used. This management practice was intended to reflect low-input wheat production in the Pacific Northwest.

Key Results

- Our most important result was that the highest yielding varieties in conventional systems were not the highest yielding varieties in organic systems. There were highly significant genotype and system interactions for yield between systems in four of five locations.
- Results showed robust genetic independence for yield and moderate genetic independence for test weight in 35 genotypes between organic and conventional systems, indicating a need for separate breeding programs for the distinct crop management systems.
- We found significant variation in weed suppression ability among 63 spring wheat cultivars tested. We found particular cultivars that are better adapted to weed competition than to repeated harrowing and vice versa.
- Assessment of historical and modern spring wheat varieties under "low input" conditions demonstrated that while the highest yielding varieties are modern varieties, some varieties from the 1930s and 1940s are high yielding under these conditions and might contain potential for improvement. For example, two varieties, Canus and Spinkota--ranked 3 and 4, respectively, out of 63—may contain traits that are particularly suited to organic conditions.
- Under low-input agronomic conditions, highly significant differences among the 63 wheat varieties were found for yield and for mineral content of eight nutrients (Table 1). Modern varieties had significantly higher yields than the historical varieties. (Mean yield for historical varieties was 1090 ± 79 kg/ha, while mean yield for the modern varieties was 1915 ± 242 kg/ha.) For seven of the eight minerals tested, the historical varieties had significantly higher grain mineral content than the modern varieties. Only Ca showed no significant difference between the historical and modern era wheats. The significant variation for mineral content indicates the potential for genetic improvement.

Other data of interest include results of tests for dwarf bunt resistance in our wheat cultivars and breeding lines. Dwarf bunt is of particular concern to organic farmers as currently the pathogen is controlled using fungicidal seed treatments that are not available for use by organic farmers. Three breeding lines of particular interest show genetic resistance to dwarf bunt.

Additionally, our population selection for superior emergence properties has received strong natural selection over the past three years in the form of significant soil crusting and low soil moisture. We had the "good" fortune to have severe soil crusting at the Lind Experiment Station. Even the farm manager of the Lind station was sure that "nothing will emerge through that crust." But some breeding lines had as high as 80% emergence through a thick crust. Not all breeding lines emerged as well, but we definitely will advance the seed from the plants that survived such harsh natural selection.

Conclusions

With crop varieties bred in and adapted to the unique conditions inherent in organic systems, organic agriculture will be better able to realize its full potential as a high-yielding alternative to conventional agriculture. These results tell us that breeding for organic agriculture should be conducted in certified organic fields. It also illustrates the point that yield in organic systems has not been optimized and will not be fully optimized until breeding and selection occurs within these organic systems. ❧

Table 1. Mineral content in historical and modern wheat varieties. Mineral content is given in mg/kg dry weight ± standard error for all minerals except Se, which is given in ug/kg. Data are means from 2004-2005 trials at Spillman Farm in Pullman, WA. A significant negative value in the grain yield/mineral content correlation column indicates that increased yield was correlated with decreased concentration of that mineral.

Mineral	Mineral Content			Grain Yield/ Mineral Content Correlation
	Historical 1842 - 1965)	Modern (2003)	% Change	
Ca	421.98 ± 10.90	398.49 ± 16.12	- 6	- 0.41 ***
Cu	4.76 ± 0.13	4.10 ± 0.23	- 16 ***	- 0.17 ***
Fe	35.73 ± 1.00	32.31 ± 1.75	- 11 **	0.05 ns
Mg	1402.62 ± 21.01	1307.6 ± 25.63	- 7 ***	- 0.35 ***
Mn	49.98 ± 1.22	46.75 ± 3.14	- 7 *	- 0.17 **
P	3797 ± 55.65	3492 ± 119.25	- 9 ***	- 0.25 ***
Se	16.17 ± 1.74	10.75 ± 2.73	- 50 *	- 0.38 ***
Zn	33.85 ± 0.92	27.18 ± 1.88	- 25 ***	- 0.06 ns

*, **, ***: P = <0.05, 0.01 and 0.0001, respectively
NS = not significant

PROJECTS FUNDED

OFRF is happy to note that in its spring 2008 funding cycle, total grant funds disbursed since 1990 surpassed the $2 million mark. In fall 2007, OFRF grantmaking added a new program area that funds education/outreach projects. All OFRF grants are made possible by gifts from our many contributors large and small. Here are OFRF's latest investments in new organic knowledge:

OFRF PROJECTS FUNDED SPRING 2008
Total in competitive grants awarded: $211,805

Education/outreach projects

Michaela Colley
Organic Seed Alliance, Port Townsend, WA
Production guides for organic carrot, lettuce, and beet/chard seed. $13,614

Meg Moynihan
Minnesota Dept. of Agriculture, St. Paul, MN
2007 Organic Farm Performance in Minnesota Report. $6,725

Brent McCown
Center for Integrated Agricultural Systems, University of Wisconsin, Madison, WI
Organic apple conference calls: providing expert organic production advice for Upper Midwest growers. In partnership with Stretch Island Fruit Company. $9,978

Bridget Cooke
Adelante Mujeres, Forest Grove, OR
Sustainable Organic Farming and Marketing Project. $8,000

Nancy Allen
Tilth Producers of Washington, Seattle, WA
Tilth Producers of Washington Farm Walk Program. $6,100

Research projects

Eric Nelson
Cornell University, Ithaca, NY
Suppression of *Pythium* damping off with compost and vermicompost, year 2. $10,180

Miguel Altieri
University of California, Berkeley, CA
Effectiveness of agroecological management in improving soil quality in California vineyards. $14,980

Sean Swezey
University of California, Santa Cruz, CA
Integrating biological control with trap crop management in California organic strawberries, year 2. In partnership with Stretch Island Fruit Company. $14,471

Margaret Skinner
University of Vermont, Burlington, VT
Fungi, predatory mites and guardian plants for thrips IPM in organic greenhouse ornamentals. $14,968

Amy Charkowski
University of Wisconsin, Madison, WI
Organic certified seed potato production in the Midwest, year 2. $14,884

Deborah Henderson
E.S. Cropconsult, Vancouver, BC, Canada
Insect management tools for organic cranberry production in the Pacific Northwest. In partnership with Stretch Island Fruit Company. (2-year award) $27,475

Susan Fleugel
Grey Duck Garlic, Moscow, ID
Effectiveness and economic impact of weed control systems in organic garlic production. $10,362

Curt Rom
University of Arkansas, Fayetteville, AR
Off-season organic blackberry and raspberry production to expand markets and sustain farm profitability. In partnership with Stretch Island Fruit Company. (2-year award) $38,209

Lindsay Fernandez-Salvador
University of Florida, Gainesville, FL
Persistence of Florida's small-scale organic farms in the face of growing demand for organic products. $7,304

Dave Christensen
Seed We Need, Big Timber, MT
Development of corn borer-resistant corn for organic farming systems, year 3. $14,555

OFRF PROJECTS FUNDED FALL 2007
Total in competitive grants awarded: $116,020

Education/outreach projects

Matthew Harbur
Alfred State College, Alfred, NY
Weeds your way: strategies for organically managing weeds in central New York state. $11,664

George Kuepper
Kerr Center for Sustainable Agriculture, Poteau, OK
An organic farmers' guide to value-added production. $8,800

Jennifer Miller
Northwest Coalition for Alternatives to Pesticides, Boise, ID
Prioritizing research, education and regulatory pest management needs of organic potato farmers through participatory strategic planning. $12,240

Gary Peterson
ALBA Organics, Salinas, CA
Updating and translating ALBA's Small Farmer Education Program. $12,758

Alice Rolls
Georgia Organics, Atlanta, GA
Organic farming curriculum $13,400

Research projects

Robert Hadad
Cornell Regional Vegetable Program, Lockport, NY
Investigating the use of buckwheat strips for the management of Colorado potato beetle in potato production and as an attractant of native pollinators for vine crops. $5,547

James Kotcon
West Virginia University, Morgantown, WV
Biological control of root lesion nematodes with *Pasteuria spp.* $13,937

Jeffrey Moyer
Rodale Institute Experimental Farm, Kutztown, PA
On-farm management of cutworms in organic no-till corn. $15,000

Kevin Murphy
Washington State University, Pullman, WA
Integrating cultivar, soil and environment to develop regional value-added wheat crops with enhanced nutrient value. $11,500

Suzanne O'Connell
North Carolina State University, Raleigh, NC
Grafting tomatoes on disease resistant rootstocks for small-scale organic production systems. $11,174

Thank You! to OFRF's Supporters

Origins Organics Supports OFRF Grantmaking

With the launch last fall of Origins Organics, the first U.S.-based line of premium skin and hair care products to be certified to the USDA National Organic Standards, Origins also introduced the "I Don't Get Wasted" organic cotton tote at its retail locations across the country. Having chosen OFRF as a nonprofit partner earlier in 2007, Origins devoted all of the profits from tote sales to OFRF's general grantmaking program.

"Origins is committed to the preservation of earth, animal and environment," said Jenny Belknap, Origins vice president for global marketing. "This reusable, organic cotton tote will help customers reduce waste while raising funds for the important work of OFRF. The tote encourages our customer to send a message that caring for the environment is serious business, but activism can be fun."

With $65,000 donated to OFRF from the sale of the bags and a final quarter of sales still to come, this generous contribution has significantly expanded our ability to support organic research and education projects through grants.

We are happy to report that Origins has just renewed the partnership for 2009, with plans to produce and sell an additional 13,000 totes in the coming year.

Vote for OFRF on Your Working Assets / CREDO Donation Ballot!

Since 1985, Working Assets / CREDO has provided long distance, mobile phone and credit card services and donated 1% of the charges and 10 cents per purchase to progressive nonprofit groups. To date, they have raised more than $60 million for causes spanning the environment, social and economic justice, civil and human rights, and peace and international freedom.

Each year they combine the proceeds from their programs with additional, voluntary contributions from their members to create a multi-million dollar Donation Pool to be shared by up to 60 nonprofits. Customers vote on how to divvy up the Pool, and these contributions really add up. OFRF has been part of the Donation Pool every other year for the past decade, receiving over $500,000 since 1998!

We are honored to be on the ballot again this year, and want you to know that you can vote for organic farming in 2008! Many of you have already cast your vote for us—thank you! With your help, OFRF will continue to translate millions of phone calls into real change on the ground for organic farmers.

If you are a current Working Assets / CREDO member and haven't voted yet, cast your ballot online today at www.workingassets.com/Voting. If you're not a current customer you can check out the services they offer at workingassets.com. If you join in 2008, you'll be eligible to vote this year, too!

YES, I want to support the improvement and widespread adoption of organic farming systems!

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APPLYING FOR GRANTS

Jerry DeWitt

OFRF SOLICITS PROPOSALS for research to improve organic production systems and for education/outreach projects targeted primarily at organic farmers and ranchers.

In addition to its general grantmaking, OFRF currently has special funding for organic fruit research and education/outreach projects thanks to a multi-year partnership with Stretch Island Fruit Company. These resources are intended to support the improvement of organic fruit production systems and to encourage more fruit growers to transition to organic practices.

OFRF encourages farmers, ranchers, researchers, and extension personnel to consider applying for funding. We particularly encourage partnerships between farmers and ranchers and professional researchers.

Proposals are considered twice a year. Deadlines for the next two granting cycles are Nov. 17, 2008 and May 15, 2009.

Details on applying for grants are available through the OFRF website at www.ofrf.org, or contact Jane Sooby, OFRF's organic research specialist, at phone (831) 426-6606, email jane@ofrf.org.

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