

# Inside CEFS

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## Our Mission:

**The Center for Environmental Farming Systems develops and promotes food and farming systems that protect the environment, strengthen local communities, and provide economic opportunities in North Carolina and beyond.**

## CEFS to Host Slow Food Founder Carlo Petrini

On May 23, 2007, the Center for Environmental Farming Systems will host a lecture by Carlo Petrini, founder of the International Slow Food Movement. Petrini will offer the Inaugural CEFS Sustainable Agriculture Lecture.

The mission of Slow Food is “to defend biodiversity in our food supply, spread taste education and connect producers of excellent foods with co-producers through events



Author and activist Carlo Petrini will speak at the NCSU McKimmon Center at 7 PM on May 23, 2007.

and initiatives.” Slow Food prefers the term ‘co-producer’ to emphasize that we are not simply food consumers, but part of the food production process. Slow Food was founded in 1989 as a response to the rapid industrialization of the food system Petrini observed in his home country of Italy.

Today, the organization has more than 80,000 members in 50 countries around the globe.

Petrini is an internationally renowned author, lecturer, and advocate for local food and sustainable agriculture. His efforts recently earned him recognition as a Time Magazine “European Hero.” His lecture will discuss the Slow Food philosophy of “good, clean, and fair food”: that the food we eat should taste good; that it should be produced in a clean way that does not harm the environment, animal welfare or our health; and that food producers should receive fair compensation for their work. This is also the subject of his latest book written with Gigi Padovani, Slow Food Revolution: A

New Culture for Eating and Living (2006).

CEFS is working closely with the Triangle Slow Food Convivium (or chapter) to plan Petrini’s visit and highlight local food and sustainable agriculture activities in the Triangle. His CEFS lecture is expected to draw attendees from throughout the Mid-Atlantic region.

The purpose of the CEFS Sustainable Agriculture Lecture is to initiate new dialogue among faculty and students of local universities on sustainability within the food system and to inform the general public about sustainable agriculture and related topics. This annual event is the kick-off to the *Seasons of Sustainable Agriculture* extension and outreach program offered each year by CEFS.

Carlo Petrini will speak at the McKimmon Center on the campus of NC State University at 7:00 PM on May 23, 2007.

Reserved seating is available to all Friends of CEFS members. Learn how to join Friends of CEFS at [www.cefs.ncsu.edu](http://www.cefs.ncsu.edu) or email [FriendsofCEFS@ncsu.edu](mailto:FriendsofCEFS@ncsu.edu) for more information.

If you would like to learn about opportunities to sponsor this event, please contact Denise Finney at [denise\\_finney@ncsu.edu](mailto:denise_finney@ncsu.edu).



## From the Director

There are several personnel transitions and a lot of great new endeavors at CEFS as you'll read about in this newsletter.

We want to wish Bryan Green and Megan Riley all the best as they move on from the Small Farm Unit. They have both been incredible visionaries and implementers over the last three years and not only initiated the small farm focus, but created a lasting vision for its future. We also say farewell and good luck to Joel Gruver, our first on-site internship coordinator at CEFS, who has just finished his Ph.D. in Soil Science at NC State. Dr. Gruver has taken a new faculty position in Illinois. Finally, we'd like to express our gratitude and well wishes to two recent retirees. Drs. Mike Linker and Jim Green have been involved in CEFS from the beginning, and their insights and contributions will truly be missed.

We are also happy to welcome new staff, as Lisa Forehand has joined us as the CEFS Outreach and Extension Coordinator. Lisa has a long history with CEFS as one of our first interns followed by becoming a graduate student and then a technician in Dr. David Orr's IPM program. She has already made significant contributions in her new role, and we look

forward to having her energy and organizational skills for years to come.

And we look forward to working with our new Board of Advisors. Their new ideas and strategic thinking will help guide us forward. The first targeted board task is strategic planning. A sub-committee comprised of board members and CEFS staff will develop a strategic plan to propose to the CEFS Coordinators, the CEFS Board of Advisors, and CEFS stakeholders. From there, Friends of CEFS committees will be formed to begin work on our strategic initiatives. The committees will include a cross-section of CEFS stakeholders and farmers in addition to CEFS board members and staff.

Planning is almost complete the Seasons of Sustainable Agriculture, which will include the inaugural CEFS Sustainable Agriculture lecture, a workshop series, and the 2<sup>nd</sup> Annual Fall Festival. It's going to be a great year and we hope you'll join us for many of these events and educational activities.

- Dr. Nancy Creamer, CEFS Director

## On the Farm

In 2007, we recorded some of our highest crop yields of recent years—corn yields up to 190 bushel per acre and soybean yields up to 60 bushels per acre. The Farming Systems Research Unit also had good yields of organic cabbage, much of which was distributed to several local service agencies. The Society of St Andrews alone received 90,000 lbs. We'd like to express a special thanks to the Neuse Correctional Facility staff and inmates for harvesting the cabbage that was distributed.

The Swine Unit continues to increase in sow numbers. We sold the first group of finished hogs, keeping the gilts for herd replacement. These gilts and another group of sows were bred and are expected to farrow in late May. As our sow numbers increase, we plan to develop a pasture system for gestating sows. Construction on the Swine Office/Lab is expected to begin this year, following approval by the State Property Office.

In other construction news, Wayne County contracted with Solutions For Local Government, Inc. of Charlotte to develop a Facility Program planning document for a new Regional Agriculture Center to replace the Wayne Center in Goldsboro. Permanent occupants of the new center will include the Wayne County Cooperative Extension Service, Cherry Research Farm (NCDA&CS), Center for Environmental Farming Systems (CEFS), Farm Service Agency (USDA) and Natural Resource Conservation Service. The facility will include classrooms, meeting rooms, labs, and auditorium space for a variety of agriculture events. Each agency had the opportunity to provide input on their program and review detailed



The Food Bank of Central & Eastern North Carolina (shown above), Society of St Andrews and the NC Department of Corrections all received organic cabbage harvested from the Farming Systems Research Unit. Above, farm staff help load a Food Bank truck.

space lists. The "green concept" will incorporate environmentally friendly, energy efficient, sustainable systems in and throughout the building. The final draft has been presented to the County Manager for approval by the County Commissioners.

The NCDA&CS Research Station Division received a grant to convert to bio-diesel on all research stations. Funds from that grant have been used to purchase some of the components we will need to construct a bio-fuel processor at the farm. We have been in discussion with the NCSU Solar Center about working with us to convert waste cooking oil into bio-diesel.

- Eddie Pitzer, Superintendent

## CEFS Welcomes New Board of Advisors

On November 28, 2006, the Center for Environmental Farming Systems (CEFS) installed 11 founding members onto the Friends of CEFS Board of Advisors.

The CEFS Coordinators and administrators at the three partner institutions approved creation of the Board of Advisors as part of new plan to enhance stakeholder involvement in CEFS. The Board will consist of agricultural, business, and community leaders from within and outside North Carolina who serve on a voluntary basis.

The mission of the Board of Advisors is three-fold:

To provide recommendations to CEFS regarding strategic direction, goals, annual objectives, problems, and opportunities relevant to the operation of CEFS.

To assist in achieving fundraising goals to support research and teaching programs and projects, and extension and outreach activities.

To be knowledgeable of the implementation of research and outreach programs and activities and demonstrate endorsement of CEFS to the larger community.

The advisory capacity of the Board will be carried out through committees that will evolve out of the strategic planning process currently underway. The standing committees will consist of Board members, representatives from the CEFS Coordinators and CEFS stakeholders.

Friends of CEFS is a new membership organization that will launch this spring for those who share CEFS commitment to a sustainable future for agriculture. Friends support the CEFS mission by sharing their time, expertise, and financial resources to support research, education, and outreach



Pictured above (l-r): Row 1: Steve Washburn, Denise Finney; Row 2: Sandy Maddox, Lisa Forehand, Jane Rogers, Debbie Worley, Andrea Reusing, Debbie Roos, Betsy Hitt, Chris Reberg-Horton, Catherine Maxwell, Simon Rich, Nancy Creamer; Row 3: Paul Mueller, Morgan Morrow, Michael Tiemann, Alex Hitt, John O'Sullivan, Craig Watson, Steve Troxler, John Hart, Matt Poore, Eddie Pitzer, Johnny Wynne, Ed Jones.

Photo by Julia Kornegay

programs at CEFS. Membership is open to anyone.

CEFS is happy to welcome the following members to the Friends of CEFS Board of Advisors:

- John Hart – owner/operator of Hartland Farm (Bolton, NC)
- Alex & Betsy Hitt – owner/operators of Peregrine Farm (Graham, NC)
- Andrea Reusing – chef/owner of Lantern Restaurant (Chapel Hill, NC)
- Simon Rich, Board Chair – farmer and private investor (Edenton, NC)
- Jane Rogers, Board Vice Chair – former managing director of NC Beautiful (Raleigh, NC)
- Michael Tiemann – VP of Open Source Affairs at Red Hat (Raleigh, NC)
- Craig Watson – VP of Quality Assurance and Agricultural Sustainability at Sysco Foods (Houston, TX)
- Larry Wooten – President of NC Farm Bureau (Raleigh, NC)
- Bryant & Debbie Worley – owner/operators of Bryant Worley Farms (Princeton, NC)

In addition to these regular members, the Board also consists of several ex-officio members including:

- Debbie Roos – Field faculty, NCCES
- Alton Thompson – Dean, NCA&T SEAS
- Steve Troxler – Dean, NCDA & CS
- Johnny Wynne – Dean, NCSU CALS

The Board is currently scheduled to meet twice a year, with additional committee meetings scheduled as needed. The Board anticipates inviting additional members until it has 20 to 25 members. Board members can serve for a maximum of three consecutive two-year terms.

The CEFS Community looks forward to developing a strong relationship with the Board of Advisors. They will provide valuable leadership and expertise as CEFS continues to pursue its mission to develop and promote food and farming systems that protect the environment, strengthen local communities, and provide economic opportunities in North Carolina and beyond.

-Denise Finney, CEFS Research Associate

## CEFS Team Shares Agroecology Research in Mexico

Faculty and staff from the Center for Environmental Farming Systems (CEFS) and The Rodale Institute's research director, Dr. Paul Hepperly, presented exceptionally well-received lectures at a recent international symposium at Mexico's leading undergraduate agricultural university.

The Fourth International Agroecology Symposium at the Autonomous University of Chapingo, Texcoco, Mexico, provided a forum for CEFS researchers and those from agricultural universities in Mexico, Brazil, Germany and Cuba to discuss interdisciplinary agroecological and sustainable agriculture research design and strategies. More than 200 Mexican students and educators participated in the mid-October week of information exchange sessions at UACH.



CEFS presenters included Dr. Paul Mueller and Dr. Michelle Schroeder, both of the Department of Crop Science; Dr. Jean-Marie Luginbuhl, a member of the animal and crop science departments; and Bryan Green, CEFS small farm unit manager. All delivered their

talks in Spanish, as did Rodale's Hepperly. The NCSU delegation also included CEFS research associate Melissa Bell and Megan Riley, assistant manager of the CEFS small farm.

Mueller, who led the group, is CALS sustainable agriculture and CEFS Farming Systems Research Unit coordinator. He is also Field System Coordinator for the Sustainable Agriculture and Natural Resources Management Collaborative Research Support Program (SANREM CRSP), a program of the U.S. Agency for International Development (USAID). CRSPs focus U.S. land grant universities' capabilities to carry out the U.S. government's international food and agricultural research mandate, according to a U.S. AID Web site. SANREM-CRSP sponsored the NCSU/Rodale delegation's participation in the UACH Agroecology Symposium.

Mueller and Dr. Mike Linker developed the College's initial agroecology course, first offered in 1999. In 2004-5, the Crop Science Department hired Schroeder and added several courses as part of a newly established agroecology concentration within the crop science major, as well as a new agroecology minor. Schroeder notes that while few agroecology programs exist at U.S. universities, the University of Chapingo's program houses more than 300 students. "We were privileged to interact with the dedicated faculty and students and help them celebrate their 15th anniversary as an agroecology program," she says.

In fact, says Hepperly, UACH is a birthplace of agroecology and is increasing its research, education and outreach to communities in need. "Mexico," he says, "has assumed world leadership in organic, free trade and shade-grown



Above: NCSU and Rodale representatives on the steps of UACH's School of Forestry, From left, back to front: Dr. Jean-Marie Luginbuhl (NCSU), Dr. Paul Hepperly (Rodale Institute), Bryan Green, Dr. Paul Mueller, Melissa Bell, Megan Riley, Dr. Michelle Schroeder, (all of NCSU) and conference coordinator and host M.C. Juan Antonio Cruz Rodríguez (UACH). Far left: A sign welcomes conference participants just outside of Auditorio Emiliano Zapata.

coffee, and has more organic farmers than any other country. Increasingly, re-invigorating traditional mixed farming as practiced in Mexico is seen as the remedy to declining rural revenue and the flight of rural Mexicans to the north."

The CEFS-UACH partnership is growing its own history. "During the last few years," says Green, "CEFS has hosted five interns from Chapingo's agroecology department, with Mexican students living, working and studying with U.S. students from all over the country. All students deepened their understanding of sustainable agriculture from a more profound international perspective, learning about its political, economic and social aspects."

Chapingo students, who work with community-based development programs throughout Mexico and at two on-campus field research sites – in agroecology and organic production – also experienced activities such as the management of organic production of vegetables and small fruits, small animal husbandry, and outreach programs into immigrant communities and nearby Goldsboro, Green says.

"Mexico and the United States are intrinsically linked," Hepperly adds, "and we discussed the need for formalizing a collaborative relationship between our research, educational and outreach programs to permit a strong mutually beneficial development between us."

Mueller agrees. "We look forward," he says, "to strengthening our relationship with scientists and students from the University of Chapingo's Agroecology Department."

- Art Latham, NCSU Communications  
- Photos by Art Latham

## Dairy Unit Provides Unique Backdrop for Dairy Grazing Conference

Approximately 130 people including dairy graziers, research and extension personnel, dairy industry leaders, and students participated in the 6th Mid-Atlantic Dairy Grazing Conference at the Center for Environmental Farming Systems (CEFS) and at the Wayne County Center on October 31 and November 1, 2006. Mr. Gary Zimmer, an organic dairy farmer from Wisconsin, was the conference keynote speaker and offered energetic talks on becoming a "Biological Farmer." The conference also included a unique opportunity for dairy graziers and dairy geneticists from several land grant universities to share their thoughts on genetics in dairy grazing systems. The second day of the conference featured presentations and a round table discussion by organic producers and other dairy graziers from Oregon, Pennsylvania, New York, Indiana, and Wisconsin.

The distinctive nature of the CEFS Dairy Unit made it an optimal location for the conference. Participants had the opportunity to see the dairy herd and facilities at CEFS, discuss management approaches used here, and learn about our current and future research efforts. Many CEFS-based studies are highlighted in the Mid-Atlantic Dairy Conference Proceedings available at the dairy unit section of the CEFS web site: [www.cefs.ncsu.edu](http://www.cefs.ncsu.edu).

The Dairy Unit at CEFS in Goldsboro, NC was established in 1998 to examine pasture-based dairy production and other alternative management strategies. The CEFS dairy is different from most dairy farms in NC and the US for several reasons:

- 1.) The CEFS dairy is **pasture-based**. Unlike many dairy farms in which forages and other feedstuffs are harvested, stored, and brought to the cows in total mixed rations, cows at CEFS do most of the work in harvesting fresh forages as pasture. Pasture species include a variety of warm season and cool season annuals and perennials so that pasture is potentially available throughout most of the year. Supplemental feed and concentrates are provided as needed.
- 2.) The pasture-based system requires **minimal manure storage**, relying on cows to recycle nutrients from urine and feces back to the fields. The dairy herd is managed so that cows spend most of the time out on pasture areas so that approximately 85% of manure nutrients are recycled by the cows and only about 15% of manure plus milking facility waste has to be handled mechanically.
- 3.) The **"swing-type" milking facilities** have 14 units that allow for the herd to be milked efficiently in 2 to 2.5 hours, as opposed to milking for long shifts of 5 to 7 hours typical of many large confinement dairy farms. New milking equip-



Dr. Jim Green, Professor Emeritus in the NCSU Department of Crop Science, describes the rotational grazing system at the CEFS Dairy Unit to Dairy Grazing Conference attendees.

ment installed in 2006 includes automatic cow identification and the capability to record milk weights at each milking for herd management and research data collection.

- 4.) The CEFS herd is **seasonally calved** so that animals can be managed efficiently in groups. In our situation fall calving (Oct-Dec) is used so that rebreeding is at a cool time of the year (Jan-Mar) and cows will either be in late lactation or dry when the weather is the hottest.
- 5.) CEFS is examining **crossbreeding** in comparison to both pure Jerseys and pure Holsteins. Although crossbreeding is receiving more interest around the country and world, it is still not widely practiced on dairy farms. Our preliminary data indicate advantages of crossbreeding in calf survival, production, and reproduction.
- 6.) New-born calves are **started on pasture within 2 weeks**. Calves are taught to drink milk from a pail within a few days after birth and put on pasture in small groups at about 10-14 days of age. Calves are fed a gallon of milk per head once a day in a trough until weaning at about 8 weeks. This system allows calves to become grazers at a very young age.
- 7.) Unlike most dairy farms, we have **no free stalls or housing** in which cows can lounge; however, we do use "tree stalls" in shaded paddocks during hot summer days and have winter lounging areas with good drainage where supplemental forage is fed as needed.

- Dr. Steve Washburn, Dairy Unit Coordinator

## Small Farm Unit Update

There are many things brewing at the CEFS Small Farm Unit (SFU) as we begin 2007. First, Bryan ‘Busha’ Green has decided to move on from his position as Small Farm Manager. Busha has done a tremendous job of managing the Small Farm as it morphed from its previous existence as the “Student Farm” into its present configuration. For the past few seasons, he was ably assisted by apprentice Megan Riley, who is also moving on from CEFS. Many of us recognized that the Small Farm has a lot of potential as a teaching and demonstration site for a broad range of audiences; Busha and Megan helped set the course to expand the farm’s offerings. They also helped streamline the planting rotations while maintaining the organic model. We thank both Busha and Megan for their contributions to CEFS.

Having reviewed and made adjustments to the job description for the Small Farm manager position, we are beginning the process of finding and hiring a new farm manager. As that process proceeds, Steve Moore and Ken Fager are leading preparations for the 2007 season at the SFU.

We held a meeting in early December to develop the SFU “strategic plan” of mission and vision statements, as well as a clear agreement on our core values. We endorsed the fit with the CEFS strategic plan and the CEFS program overall - especially the *Seasons of Sustainable Agriculture* outreach program, our Discover Agriculture program with the Wayne

County Department of Education, and the educational programs for apprentices and interns.

We also clarified the development of research at the SFU so that research can be nested into our farm rotation system. We are currently building several high tunnels for research. We will also be assisting researchers as they explore topics related to cover crops, field border ecology, varieties of tomatoes and energy uses in production.

The SFU has plans to move forward on several different fronts. We plan to put in place our organic certification this year for the approximately seven acres that have been managed organically. This will require paper work as well as a serious commitment to recordkeeping and documentation. Those efforts will strengthen our program overall as we build the research base at the SFU. We also hope to develop a Small Farm Computer Center so that farmers can work through farm marketing and business plans while they are able to discuss production and marketing costs and income with knowledgeable and experienced farmers.

Other plans include expansion of ‘Discover Agriculture,’ a program that works in partnership with local schools, teachers and students, from being a program that occurs in the spring to one that happens in both spring and fall. In addition, we expect to host a number of *Seasons of Sustainable Agriculture* workshops focused on issues of interest to the small farm audience, farmers, Extension agents and collaborators and to develop a website that serves the purpose in information dissemination.

We also look forward to having apprentices around the farm this season, helping us with the daily tasks while learning important farm management skills. In keeping with our roots as a student farm, the SFU will also participate in the student intern program again this year.

-Dr. John O’Sullivan, Small Farm Unit Coordinator

### Congratulations to Recent CEFS Graduates!

Joel Gruver: PhD, Soil Science

George Place: Master of Science, Crop Science

Cary Rivard: Master of Science, Plant Pathology

## Internship Opportunities

The CEFS sustainable agriculture internship, launched in 2000, has traditionally been an 8-week residential program focusing on hands-on and classroom learning primarily about production systems. This year, as we continue to re-structure and improve the internship program, interns will be offered a more specialized research-based program, where they will be working closely with faculty and researchers at CEFS in a hands-on environment.

Summer Research Interns will work closely with a CEFS faculty member for variable length times depending on the project and needs of the student and faculty member. There will be a core 8-week period (June 4-July 27) where all interns will participate in a more formal learning program in addition to their association with the particular faculty mentor. During this 8 week period, research interns will work in

their selected field of study, focusing on mentoring with research faculty on a targeted project(s) and possibly undertaking a carefully supervised research project of their own four days per week.

One day a week, all CEFS interns will meet as a group with a CEFS research leader and associated faculty members to learn about various aspects of sustainable agriculture. Activities during this focus day may include discussion of particular subject matter, current research projects, assigned readings, laboratory exercises, field trips visiting local farms and markets and/or other CEFS activities.

Additional information is available on the CEFS website: [www.cefs.ncsu.edu/internship2007.htm](http://www.cefs.ncsu.edu/internship2007.htm). Interested parties can also contact Lisa Forehand at 919-513-0954.

## Conservation Tillage Research at CEFS

Conservation tillage, or "no-till" farming, has become increasingly popular as a way to reduce soil erosion, increase organic matter, and enhance soil physical properties. The effect of no-till versus conventional production practices on soil ecology was studied as the initial experiment on the CEFS Conservation Tillage Unit. This experiment ran from 1996 to 2001 and included many major North Carolina crops in the rotation (corn, soybeans, cotton, peanuts, wheat) under the direction of Dr. George Naderman, retired professor of Soil Science at NCSU. Scientists monitored yield and economics, soil quality, nutrients and pesticides in ground water and run-off, and the effect on wildlife. Though the Conservation Tillage Unit does not currently have an active research program, conservation tillage remains an important research topic at CEFS.

In a recent issue of Inside CEFS (Vol. 3, Iss. 2, Summer 2006) we featured a research report on conservation tillage research within the Farming Systems Research Unit ([www.cefs.ncsu.edu/farmingsys.htm](http://www.cefs.ncsu.edu/farmingsys.htm)). In this edition, we look at several other research projects related to conservation tillage currently underway at CEFS.

### Sustainable Soil Management

#### Department of Natural Resources, NCA&TSU

A study now underway at the CEFS Small Farm Unit (SFU) is assessing the use of compost, cover crops and no tillage, as well as various combinations of these practices, on the improvement in soil quality. Various soil quality measurements will be collected to see which practice or combination of practices results in improvements to soil and increased yields of cucurbit crops relative to conventional soil management practices. This study is led by NCA&T researchers Charlie Raczkowski, Keith Baldwin, Stephen Moore, G.B. Reddy, & Marsha McGraw.

Treatments in this study differ in the amount of carbon (organic matter) added to the soil through soil management practices. Half of the plots receive tillage, and the other half are no-till. In the no-till plots, half receive a rye/crimson clover bi-culture planted in the fall as a winter cover crop, and the other half of the no-till plots are left fallow all winter. The cover crop plots and the fallow plots are split in half, and half of each plot receives hatchery waste and poultry litter applied at a rate of 5 tons per acre. The tillage plots are treated in the same way, but both the cover crop residue and the compost are tilled in. Cucurbits (pumpkins or squash) are planted as summer crops.

This experiment has been repeated for three years at the North Carolina A&T University Farm. The use of cover crops, particularly in no-tillage treatments, has resulted in better water infiltration, fewer weeds, more water storage, and increased yields of crops. There may be even larger returns from the use of organic matter at the SFU, because the soils there are much sandier, and soil water-holding capacity is much lower under conventional practices.

### Graduate Student Research

#### Department of Horticultural Science, NCSU

Conservation tillage has been the subject of several recent graduate student research projects at CEFS including that of Danielle Treadwell, PhD (organic sweet potato production), Denise Finney, MS (organic cabbage production), and current student Emily Vollmer.

Vollmer's study will evaluate the impact on crop yield by in-situ mulches of foxtail millet and cowpea, grown separately or as mixtures, for fall planted onions. In-situ mulch can be used for weed management both before (as a smother crop) and after planting a cash crop. Grass mulches can provide greater weed suppression than legumes, in part because they do not decompose as quickly. However, legumes can supply the subsequent crop with biologically fixed nitrogen. Potentially, less weed control and fertilizer inputs would be necessary in a system that utilized a mixture of grass and legume species.

Effective management of the cover crop at kill is one of the major challenges of an organic conservation tillage approach. Mowing, rolling/crimping and undercutting are some of the methods used to mechanically kill a cover crop, but with varying levels of success. An intriguing alternative is to let a summer cover crop kill naturally via frost, in a system with a fall planted vegetable crop.

Of particular interest in Vollmer's study is how the ratio of grass:legume in a mixture affects weed control and N-fertility contributions to the onion crop. Soybean meal will be used as an organic supplemental N source at zero, 1X and 2X rates, and monitored with bi-weekly soil sampling to track the rate of N mineralization.



*Left:* Onions freshly transplanted into cowpea residue; transplants were set in November 2006 using the sub-surface tiller transplanter.



*Right:* Cover crop mixture of cowpea and foxtail millet in August 2006, one month after seeding.

## Organic Grains: An Opportunity for NC Farmers

The demand for organic grain in North Carolina is continually on the rise. Currently, there are 4 major buyers of organic grains in the state. Unfortunately, their demand is not being met by NC farms.

Approximately \$8 million of organic grain is transported to NC from the Midwest. Farmers in NC can take advantage of this market to enhance profitability. Buyers are paying nearly double (and often more) for organic grains over conventional grains. Farmers across the state have expressed more interest in transitioning to organic grain production in the last year. There are currently about 450 certified acres in organic grain and about 250 acres in transition.

### Organic Grain Farmer Panel workshop

A farmer panel was held at CEFS in December 2006 that had great attendance (over 55 farmers, crop consultants, Extension agents, and University professionals) and shared a lot of first-hand production experience with attendees.

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## Conservation Tillage (con't)

### Soil Management Research Group Department of Soil Science, NCSU

The autumn 2005 issue of *Inside CEFS* featured a glimpse of some initial experiences of the Soil Management Research Group with using the mechanical roller for residue management in cotton and soybean. These studies were initiated in 2003 and continued for two growing seasons. Our objectives were aimed at evaluating weed suppression, residue management, and cotton lint and soybean yield response in a high-residue conservation tillage system to determine:

- (1) the physical effect of surface pressed, intact residue and residue orientation on early-season weed suppression using different weed control programs;
- (2) the relationship between residue decomposition and incident weed pressure; and
- (3) the effect of residue management on soybean and cotton stand establishment, growth, and yield.

Additionally, work was done in 2005 to assess the effect of tillage and residue management on early season soil moisture in selected systems. This work has been led by Robert Walters of the NCSU Department of Soil Science.

Two reports on this research are now available on the CEFS website at:

[www.cefs.ncsu.edu/conservationtillageunderground.htm](http://www.cefs.ncsu.edu/conservationtillageunderground.htm).

Ed Fry, an organic grain farmer from Maryland, opened the workshop, speaking about his organic grain operation. He farms about 400 acres of organic corn and soybeans. Fry spoke about fertility and weed management, marketing strategies, and his own organic philosophy ("you get in it for the money, but stay in it for the lifestyle"). Fry's wife, Marian, also spoke briefly about their personal organic philosophy and lifestyle: being an organic producer is better for yourself, your community, and the earth.

After the Fry's talk, Gary Bullen (NCSU Dept of Agricultural and Resource Economics) shared organic corn budgets he has recently developed for NC that take the transition cost and risk into account.

Following lunch, a panel of three North Carolina farmers and one crop consultant talked briefly about their organic grain operations and then fielded questions for an hour from the audience about organic grain production techniques, marketing strategies, and certification. The panel agreed that organic grain production is more challenging than conventional grain production, and that it takes more time and learning. They also agreed that the extra time, effort, and education were worth the trouble—in terms of economic return, improvements in their soil quality, and lifestyle benefits.

### Golden Leaf Grant

The Organic Farm Panel, a coalition of university specialists, county agents, farmers, the Carolina Farm Stewardship Association and the Center for Agricultural Partnerships, applied for a Golden Leaf grant this year to expand organic grain production in the state. The grant will give us the opportunity to reach more farmers in the state with information on certification, marketing, and production of organic grains, and help farmers already producing organic grains improve their management. On-farm research trials are being planned for implementation in 2007, as well as two farm field days and quarterly production meetings.

-Dr. Chris Reberg-Horton, Organic Research Unit Coordinator, and Molly Hamilton, Organic Grain Project Coordinator

**There is a new resource available from CEFS!**

**The CEFS Field Notes for Farmers Series features practical information on production practices that have been the subject of research at CEFS. There are currently two notes available on our website, with more to come!**

**Field Notes are available for download at:**

**[www.cefs.ncsu.edu/resources.htm](http://www.cefs.ncsu.edu/resources.htm)**



## Research Report: Tomato Grafting for Organic Heirloom Production

Grafting vegetables for soilborne disease resistance is an inherently simple process. Particular lines or cultivars are chosen for their genetic ability to resist, or tolerate, soilborne disease. This line is used as the rootstock. The scion represents the above-ground portion of the plant, and it is chosen based upon fruit quality. For heirloom tomato growers, popular scion choices include “German Johnson”, “Cherokee Purple”, “Kellogg’s Breakfast”, etc. Shortly after germination, the rootstock and scion are grafted together as seedlings. This takes place by severing each of the seedlings just above the cotyledon (first leaves), and reattaching them so that the above-ground portion of the scion is secured to the root system of the rootstock. Once the grafted transplants are allowed to heal, they can be planted in the field, and managed similar to standard production systems.

Although the utilization of grafting in heirloom tomato production systems is relatively new, its foundation lies in an old principle. The first evidence for soilborne disease management using vegetable grafts appeared in the early 20<sup>th</sup> century to diminish *Fusarium oxysporum* on watermelons. More recently, grafted tomatoes have been used to reduce bacterial wilt (*Ralstonia solanacearum*). This disease complex is particularly difficult to manage due to its wide host range and ability to persevere through long crop rotations. Breeders have had limited success developing cultivars that have both good disease resistance and large, marketable fruit. The worldwide implementation of grafting has significantly reduced the occurrence of bacterial wilt incidence, while keeping fruit quality high. Furthermore, these challenges have resulted in a management practice that can be used wherever growers need to increase disease resistance, while keeping fruit quality at a maximum in order to compete in fresh-produce markets.

Because most heirlooms do not have good genetic resistance, field production is challenging as disease epidemics may lead to total crop failures. Additionally, growers interested in this niche market are not willing to compromise the high quality fruit production of heirloom cultivars for the improved disease resistance of modern hybrids. This unique

situation has given rise to the idea that grafting may be able to increase disease resistance in heirloom production systems, without the use of chemical fumigants or other conventional methods.

German Johnson tomatoes grafted onto maxifort rootstock (left) demonstrated more vigorous growth than non-graft German Johnson tomatoes (right).



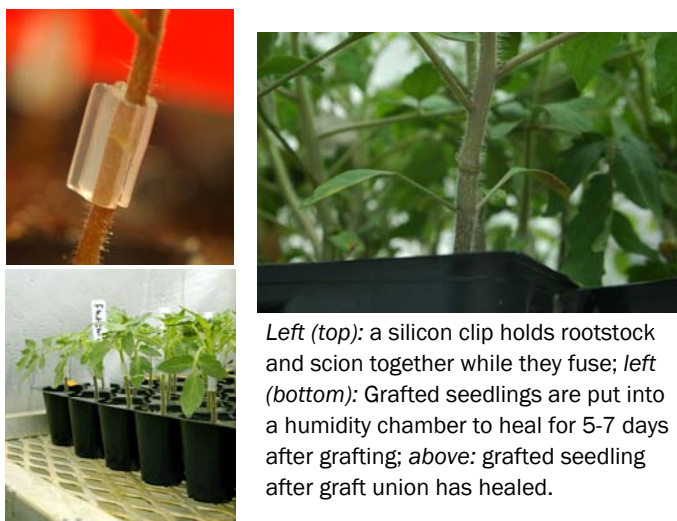
Tomato grafting research at NCSU has shown that resistant rootstock genotypes can be used to eliminate bacterial wilt and fusarium wilt incidence in heirloom tomatoes typically susceptible to these diseases. Several studies at the CEFS Small Farm Unit have also indicated that crop productivity can be increased with the use of highly vigorous rootstock cultivars. Grafting to vigorous rootstock can increase fruit yields even under little disease pressure by providing a better conduit for water and nutrient uptake as compared to non-grafted plants. Furthermore, the integrated use of alternative training systems with grafting can dramatically increase yields by interacting synergistically.

Further collaborative research with Mary Peet, Chris Harlow, and Suzanne O’Connell (Dept of Horticulture) has been initiated to monitor the performance of grafted and non-grafted heirloom tomatoes in field and high-tunnel production. High tunnels are currently under construction at CEFS, and this research will aid local growers by evaluating the integrated utilization of grafting and tunnel production for disease management. High tunnels are used by many organic growers as a way to increase fruit quality and decrease foliar pathogens such as early and late blight. Although this production method is highly effective at overcoming these obstacles, crop rotation is difficult, and soilborne disease can be a significant problem in these structures.

Grafting is a valuable management tactic for organic heirloom tomato growers. This practice originated as a way to ensure fruit quality, while keeping soilborne disease resistance high for tomato and cucurbit production systems. This same principle lends itself well to local organic heirloom production, and as southeastern growers realize the potential and relative ease of this process, it will certainly become more popular as a disease management technique in the United States.

For more information on tomato grafting technique see the recently published extension article at: [www.ces.ncsu.edu/depts/hort/greenhouse\\_veg/pdf/Grafting.Rivard.pdf](http://www.ces.ncsu.edu/depts/hort/greenhouse_veg/pdf/Grafting.Rivard.pdf)

- Cary Rivard & Frank Louws, NCSU Dep’t of Plant Pathology



Left (top): a silicon clip holds rootstock and scion together while they fuse; left (bottom): Grafted seedlings are put into a humidity chamber to heal for 5-7 days after grafting; above: grafted seedling after graft union has healed.

## 2007 Seasons Sustainable Agriculture

Building on the success of last year's program, the 2007 Season of Sustainable Agriculture (SOSA) looks like it will be full of exciting opportunities to get involved with CEFS. We look forward to the inaugural Sustainable Agriculture Lecture with Carlo Petrini as well another great workshop series and the 2nd Annual Fall Festival.

The Workshop committee has created a great schedule of workshops. We will offer 14 workshops this year as well as several special events from March through October this year. See the listing below for workshop dates, times, and topics—and mark your calendars! Please remember that registration is required for all workshops.

Our first workshop, 'Blueberry Pruning, Propagation and Economics', will be held March 7 from 2-4pm. Please check the CEFS website (<http://www.cefs.ncsu.edu/calendar.htm>) for further updates!

Another highlight of the Seasons series will be a full-day, on-farm energy usage conference focusing on alternative and renewable energy sources, which will be hosted by Steve Moore on July 12.

Although 7 months away, plans are already in the works for the Fall Festival in September. As you know this event was a huge success for CEFS in 2006. The Festival helped us make many significant connections with members of the Goldsboro and other eastern NC communities. We look forward to building on that energy as we begin planning this year and will continue to focus our vendors and activities on sustainable agriculture and local food.

If you are interested in volunteering for the Fall Festival Planning Committee, please contact Lisa Forehand ([lisa\\_forehand@ncsu.edu](mailto:lisa_forehand@ncsu.edu) or 919-513-0954).

*-Lisa Forehand, CEFS Outreach & Extension Coordinator*

## 2007 Seasons of Sustainable Agriculture Workshops & Events

Wednesday, March 7, 2:00-4:00 pm  
Blueberry Pruning, Propagation and Economics  
Led by Bill Kline & Ken Fager (NCSU)

Wednesday, April 4, 7:00 pm  
CEFS Author Series Lecture by Anna Lappé at the JC Raulston Arboretum

Wednesday, April 11, 1:00-4:00 pm  
How to Raise Goats Successfully  
Led by Jean-Marie Luginbuhl & Paul Mueller (NCSU)

Monday, April 16, 6:00-8:00 pm  
Backyard Organic Gardening Workshop  
Led by Ken Fager & Carol Moore (NCSU)

Thursday, May 10, 2:00-4:30 pm  
Organic No-Till Vegetable Production  
Led by Ken Fager (NCSU) & Steve Moore (NC A&T SU)

Wednesday, May 23, 7:00 pm  
CEFS Inaugural Spring Sustainable Agriculture Lecture by Carlo Petrini at the NCSU McKimmon Center

Tuesday, June 19, 9:00 a.m.-5:00 pm  
Selecting and Using Rare Breeds for Pasture Poultry with the American Livestock Breeds Conservancy & Heifer Int'l  
Led by Steve Moore (NC A&T SU)

Saturday, June 30, 8:30 am-12:00 pm  
Best Management Practices for Coastal Plain Beef Production  
Led by Eileen Coite (NCCES)

July date & time TBA  
Organic Corn and Soybeans in Wayne and Duplin Counties  
Led by Chris Reberg-Horton & Molly Hamilton (NCSU)

Monday, July 9, 9:00 am-3:00 pm  
Making Use of Beneficial Insects for Crop Pest Management and Pollination  
Led by David Orr (NCSU) & Debbie Roos (NCCES)

Thursday, July 12  
Fueling the Farm Conference: Managing Energy Risks, Reducing Energy Costs & Exploring Alternative Energy Sources  
Led by Steve Moore (NC A&T SU)

August date & time TBA  
Organic Research and Farm Tour  
Led by Chris Reberg-Horton & Molly Hamilton (NCSU)

Wednesday, August 1, 6:00-8:00 pm  
Planting a Fall Garden  
Led by Ken Fager (NCSU) & Steve Moore (NC A&T SU)

Registration information available on-line at [www.cefs.ncsu.edu](http://www.cefs.ncsu.edu)

Wednesday, August 22, 10 am-3 pm  
Organic Certification Short Course  
Led by Tony Kleese, Eastern Carolina Organics

Thursday, August 23, 2:00-5:00 pm  
Diagnosis and Management of Vegetable Diseases  
Led by Frank Louws (NCSU)

Saturday, September 15  
2nd Annual CEFS Fall Festival  
CEFS Small Farm

Wednesday, October 3, 1:00-5:00 pm  
Tomato Grafting: Techniques, Benefits and Management  
Led by Frank Louws & Cary Rivard (NCSU)

Thursday, October 11, 2:00-5:00 pm  
High Tunnel Summer and Winter Production  
Led by Steve Moore (NC A&T SU)

## Small Farm Unit Job Opportunities

### Small Farm Unit Manager

The role of the Farm Manager is to plan and manage the implementation of production, research, education, demonstrations and extension outreach activities at the Small Farm Unit of CEFS.

Primary responsibilities of the SFU Farm Manager are to:

- Plan and prepare fields, equipment, and facilities for successful research, outreach and education
- Demonstrate various production techniques for field demonstrations and evaluations
- Facilitate ongoing research
- Provide the educational leadership for at least one workshop per year
- Assure that all farm activities provide educational and outreach benefits to farms and communities in eastern North Carolina
- Maintain adequate communication between farm staff, apprentices, graduate students, extension personnel, and faculty
- Provide leadership of the SFU such that SFU activities and programs are consistent with and support the overall CEFS mission

BS in Crop Science, Soil Science, Horticulture, or related field of study. MS degree and formal training in the agricultural, biological, or environmental sciences preferred. Experience in sustainable and organic production including horticultural crops, grains, cover crops, greenhouses, and livestock, as all are components on the Small Farm Unit.

Applicants should apply online at <https://jobs.ncsu.edu/> for position number 01-06-0620.

### Small Farm Apprentice

Apprentices participate fully in the production, education and research/demonstration activities of the Small Farm Unit as learners and partners.

Apprentices come to learn the basics of running a small farm in eastern North Carolina in a practical hands-on manner by working with the Farm Manager, Extension Personnel and University Researchers at the Small Farm Unit on a daily basis. They assist with the daily tasks associated with a small farm and additionally help with educational outreach and assist research scientists in a variety of work assignments.

The apprenticeship is designed to allow participation for an entire growing season, March-October. Shorter durations can be explored. Some weekend and holiday work is required.

Housing and a modest stipend of one hundred dollars a week are provided. All CEFS workshops are free to apprentices and attendance/participation is highly encouraged.

For further information or to apply, contact:

John M. O'Sullivan  
Small Farm Unit Coordinator  
[johno@ncat.edu](mailto:johno@ncat.edu)  
336.334.7957

Steve Moore  
On-site SFU Contact  
[srmoore2@ncat.edu](mailto:srmoore2@ncat.edu)  
336.549.9525

### CEFS Launches New Membership Organization

Friends of CEFS is a membership organization for those who share CEFS commitment to a sustainable future for agriculture. Friends support the CEFS mission by sharing their time, expertise, and financial resources to support CEFS research, education, and outreach programs throughout North Carolina.

Learn about membership benefits and how to join at [www.cefs.ncsu.edu/friends.htm](http://www.cefs.ncsu.edu/friends.htm).

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*Inside CEFS is edited by Denise Finney, [denise\\_finney@ncsu.edu](mailto:denise_finney@ncsu.edu). The next edition will be published in May 2007; the submission deadline is April 13.*

[www.cefs.ncsu.edu](http://www.cefs.ncsu.edu)

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