Welcome to the spring issue of Organic Reduced Tillage Times, our newsletter associated with our new USDA Organic Research and Education Initiative (OREI) cropping systems project. You received our first newsletter back in October and we have made some progress since then. The research team assembled in person and/or via teleconference on a number of dates and discussed a number of topic areas. As some of you know, we are planning a farmer–collaborator meeting at the USDA in Beltsville, MD on March 10. This meeting will follow the 5th Organic Grain and Hay Workshop at the Queen Anne’s County, MD 4-H Park on March 9, 2010. Ms. Jenny Rhodes, Queen Anne’s County Extension Educator is organizing the workshop which is targeted to run from 8:30 am to 3:30 pm. More information can be obtained from Jenny at jrhodes@umd.edu.

What we’ve accomplished thus far:
We’ve had a lot of meetings over the past 8 months! Here’s a quick summary:

July 16, 2009 – In our first meeting, the group discussed project timelines, deliverables, reviewed the systems experiment, on-farm research, and set some ground rules.

August 25, 2009 – In our second meeting, we discussed gathering the farmer advisory board, agreed to start the project newsletter, discussed the on-farm protocol, and reviewed team guidelines.

September 17, 2009 – This meeting continued to discuss the design of the systems experiment including plot size and layout, variety selection, project team roles, the decision support tool, etc.

October 8, 2009 – This meeting focused on establishment and sampling of the synthetic weed seed bank.
October 14, 2009 - This meeting focused on insect monitoring, sampling for black cutworm, armyworm and other noctuids, caterpillars, wireworms, seed corn maggot, plant injury sampling, pitfalls, sentinel pest larvae, soil-dwelling insect pathogens, etc.

October 22, 2009 - This meeting discussed soil fertility management in hairy vetch and cereal rye cover crops and soil fertility management in the cash crops. A long discussion about manure application timing ensued.

December 4, 2009 - The December meeting continued to discuss the weed seed bank, planting dates, crop cultivars, and other issues associated with the systems experiment.

February 3, 2010 – The group gathered at Penn State for a day-long face to face to help finalize systems experiments. Chris Reberg-Horton joined the group by phone in the afternoon for a discussion about the on-farm work.

**Here’s where we are** - Much of our discussion has focused on the systems experiments being conducted at Penn State, the USDA Beltsville, and the University of Delaware. Over the last several months we have discussed a number of issues and look forward to discussing more with our farmers and other advisors. In particular, we could use some guidance on variety selection and maturity group as well as fertility and manure management and hear your opinion about our specific treatments. **We will be visiting with some of you in Maryland on March 10 about these issues.** Just as a reminder and because we have spent so much time discussing the systems experiment, the following diagram is from the Penn State Rock Springs location showing the 1st replication. Remember that we are going to examine a corn-soybean-wheat rotation with various management treatments overlaid within this design. The main plots are crop (corn, soybean or wheat), the subplots are crop maturity and planting date and the sub-sub plots are cultivate vs. not. In addition, we will examine some other shallow tillage options (false seed bedding and tine-weeding at various times in the rotation). Only the corn and soybean will be no-tilled.

**Meet some more of the team.** In the first issue of this newsletter you were introduced to several of the team members - Mary Barbercheck, Bill Curran, Christy Mullen, Del Voight, and one of our farmers Kirby Reichert. Although we haven’t collected all of our farmer cooperator information, we’ll finish that in our next newsletter. Here’s more of the team.

**Jay Harper** is a Professor of Agricultural Economics with an extension and research appointment in the Department of Agricultural Economics and Rural Sociology. Dr. Harper’s research and extension programs address farm management and crop production economics, principally in the areas of integrated crop management, IPM, alternative crops and production systems, and farm management for small-scale and part-time farmers. He is currently involved in studies assessing crop insurance programs, environmental consequences of agricultural production activities, replacement/renovation of perennial crops, and alternative production systems. Jay will conduct the economic analyses and participate in extension activities associated with this project.

**Ron Hoover** is the coordinator of the On-Farm Research (OFR) program in Penn State’s College of Agricultural Sciences.
During the past thirteen years, he has interacted extensively with farmers, conducting on-farm research as an agribusiness employee and with Penn State. The OFR program engages farmers directly through applied research and outreach activities. Mr. Hoover works closely with state and county-based extension members of the Crop Management Extension Group. Recent projects include evaluations of pasture improvement techniques, reducing grain crop seedling diseases, reducing corn crop nitrogen loss, and opportunities to intensify farmer utilization of annual cover crops. Mr. Hoover is coordinating the on-farm research component of this project.

**Greg Hostetter** is a graduate of Penn State and has worked for Penn State Extension out of the Juniata County Extension Office since 1994. Prior to that he worked as a crop consultant for the Juniata Valley Crop Management Association and before that he was a part-time supervisor for the Pa Dairy Improvement Association and worked on his parent's dairy farm. For 20 years he owned and operated Hostetter's Poultry Farm growing broiler chickens, Cornish hens and started pullets. Currently, Greg grows a few dairy replacement heifers plus enjoys repairing and operating all types’ tractors and farm equipment, old and new. Greg will work with Elvin Ranck in conducting some of the on-farm research and extension activities associated with this project.

**Steven Mirsky** is a Research Ecologist for the USDA-ARS in the Sustainable Agricultural Systems Laboratory in Beltsville, MD. Dr. Mirsky has a research background in evaluating the multifunctional role of cover crops and their integration into agroecosystems for soil, crop, and weed management. He has been investigating cover crop-based, reduced-tillage organic field crop production and weed management strategies in organic field crops including high residue cultivation, stale seed-bedding, and till weeding for the past five years. Dr. Mirsky is responsible for the weed, soil, and crop management activities at Beltsville Agricultural Research Center and on-farm experiments in Maryland.

**Chris Reberg-Horton** is an Assistant Professor of Organic Cropping Systems in the Dept. of Crop Sciences at North Carolina State University. Dr. Reberg-Horton has an extension and research appointment focused on weed management in organic soybeans, introducing legume cover crops into corn, soybean, wheat rotations, reducing tillage in organic systems, and allelopathic cover crops. He will conduct on-farm trials at three organic farms in North Carolina to examine weed and insect management impacts of the roller-kill cover crop systems.

**Elvin Ranck** started farming organically in 1986 in Chester County. In 1992 the family moved to Juniata County where they continued to grow the operation and include his children in the business. The Ranck's grow crops primarily to feed their dairy herd and also for some grain sales. The dairy herd consists of 180 milk cows plus replacements. Cows are milked three times per day in a swing milking parlor. Elvin has been very involved in missionary work in Ghana, West Africa since 2001 working with the Living Hope International Ministry conducting programs in the area of nutrition, education, health care. The
Ranck’s will be conducting some component research focused on organic rotational no-till.

Matt Ryan is finishing up his PhD Dissertation at Penn State in weed ecology and will be starting a Post Doctoral program working on the OREI project. In fact, Matt was a lot of the energy behind writing the OREI proposal last year and is integral in its success. Matt worked at the Rodale Institute from 2001 to 2008 conducting research on cover crops and compost and participated in outreach education activities focused in organic agriculture. Matt came to Penn State in 2004 as a graduate student while still working at Rodale and completed his MS degree in 2007. Matt is very interested in applied and theoretical agroecological research to overcome environmental challenges, regenerate natural resources, and improve overall agroecosystem function. Matt will be managing many of the field and data collection activities associated with the systems experiment working closely with graduate students, staff, and others involved in the project.

Alex Stone is an Associate Professor of Vegetable Cropping Systems in the Dept. of Horticulture at Oregon State University. Dr. Stone’s work is focused on integrated vegetable production systems emphasizing soil quality and disease suppression as well as the beneficial use of organic wastes. Alex will be facilitating some of the e-organic outreach activities associated with this project.

Mark VanGessel is a Professor and Extension Specialist for Weed/Crop Management for the University of Delaware, in the Plant and Soil Science Department. Dr. VanGessel has an extension and research appointment and is stationed at the Research and Education Center located near Georgetown, DE. He has statewide responsibility as extension specialist for weed science focusing on agronomic and commercial vegetable crops. He provides extension programming for Rutgers Cooperative Extension in the area of agronomic crops. Dr. VanGessel will oversee the research and outreach activities in Delaware.

Perennial Weed Management in Organic. Since our project is focused on rotational no-till in organic grain production, I thought the following article written by Dr. Richard Smith here at Penn State was very relevant. Rich is working with a team that includes Dr. Mary Barbercheck on an organic systems study that is focused on weed management as well as building soil quality and identifying potential ecosystem services. This project has evolved over the last 5 years and most recently has investigated perennial weed management. The following article summarizes some recent findings with Canada thistle.

The perennial challenge of managing perennial weeds in certified organic feed and forage production systems. Richard Smith, David Mortensen, David Sandy, and Mary Barbercheck. An organic systems trial was established at Rock Springs back in 2004. The original study was forage and grain production transitioning to certified organic and investigated a number of tactics for pest management in the transi-
Over the three-year project, some treatments received full tillage that included the moldboard plow, while others tried to incorporate reduced tillage. Over the three-years, the reduced tillage regime allowed for the development of large populations of perennial weeds including Canada thistle and hedge bindweed compared to the full-tillage systems. In fact, this result spurred the next phase of the study which is currently looking at perennial weed management in the certified organic cropping system. One objective of the new study that started in 2007 was to assess how the newly certified organic land could be managed to reduce perennial weeds without diminishing or perhaps even improving soil quality. In the new study, the treatments that had perennial weed problems were managed more intensively using tillage and cover crops. These tactics rapidly reduced the perennial weed problem in 1-2 years in the previous problem areas. At the same time, the plots that were previously managed with full-tillage were modified with a reduced and no-till regime aimed at improving soil quality. The perennial weeds responded quickly to the changes in tillage and increased under the reduced tillage regime (Figure 1). This study really shows how quickly weeds can adapt to different management systems continuing to emphasize the need for diversity in the cropping system. This experiment continues and the researchers have concluded thus far that because of the rapid shift in weeds life history (i.e. perennials) that can occur with modifications in tillage, continuous no-till is not viable for this study system. Rotational no-till may be a more realistic strategy for reducing tillage in certified organic feed and forage production systems.

![Box plots showing the spread in the data in four organic cropping systems in July 2009.](image)

**Figure 1.** The abundance of perennial weeds represented here by box plots showing the spread in the data in four organic cropping systems in July 2009. During the 3-year transition period (2004-2006), systems 2 and 4 were managed with full tillage that including moldboard plowing, while systems 1 and 3 had high perennial densities because they were managed with reduced tillage. Starting in 2007, Systems 2 and 4 have been managed with reduced-till to build soil quality while systems 1 and 3 have been aggressively cultivated. Lines within bars are medians.

No-till organic soybean at Bill Mason’s farm in MD in 2008.

High residue interrow cultivator in no-till soybean in cereal rye at Penn State.