THE ROCK SPRINGS ROTATION

A monthly newsletter from the Organic Cropping Systems Project team

December 2009

Meet the Team

Dave Mortensen

Dave Mortensen is a Professor of Weed Ecology in the Department of Crop and Soil Sciences at PSU. His research focuses on elucidating the ecological principles that underlie the temporal and spatial distributions of weedy plants and the development of ecologically-based weed and crop management practices. Dave is also at the forefront of research in sustainable agriculture nationally, and has served as Chair on a number of USDA competitive grants program panels. On our project, Dave's responsibilities include oversight of the weed monitoring and data collection operations.

Dave is a native of New York. He received his B.S. from Drew University, his Masters from Duke University and his Ph.D. from North Carolina State. Prior to coming to PSU in 2001, Dave was a Professor of Weed Science and Agroecology at the University of Nebraska.

Dave is a man of many talents and he has numerous passions outside of work—including photography and the button accordion! He and his family live in State College, PA.

Tianna DuPont

Tianna DuPont is an educator in sustainable agriculture for Penn State Cooperative Extension in Northampton and Lehigh Counties. Tianna's primary responsibilities include working with organics, cover crops and new farmers. Tianna became involved with the project earlier this year and serves on the project advisory board. Her main duties on the project are to help guide our extension and outreach efforts.

Prior to coming to Penn State, Tianna was involved in sustainable agriculture at the Rodale Institute and the Land Institute in Salina, Kansas. Tianna has a B.S. in Environmental Studies from Whitman College of Washington and an M.S. in Integrated Pest Management from the University of California at Davis. Her research at UC Davis involved using nematodes as indicators of soil health in organic cropping systems.

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We're on the Web!
http://agsci.psu.edu/organic/research-and-extension/Organic%20forage

Did you know?

PA's Farmland Preservation Program aims to preserve farmland and protect it from development.

The program recently set aside 3,332 acres on 31 farms.

Since its initiation 21 years ago, the program has secured 428,708 acres on 3,928 farms.

For more info visit:
www.agriculture.state.pa.us

Fertility Management Affects Soil Phosphorus in our Organic Cropping Systems

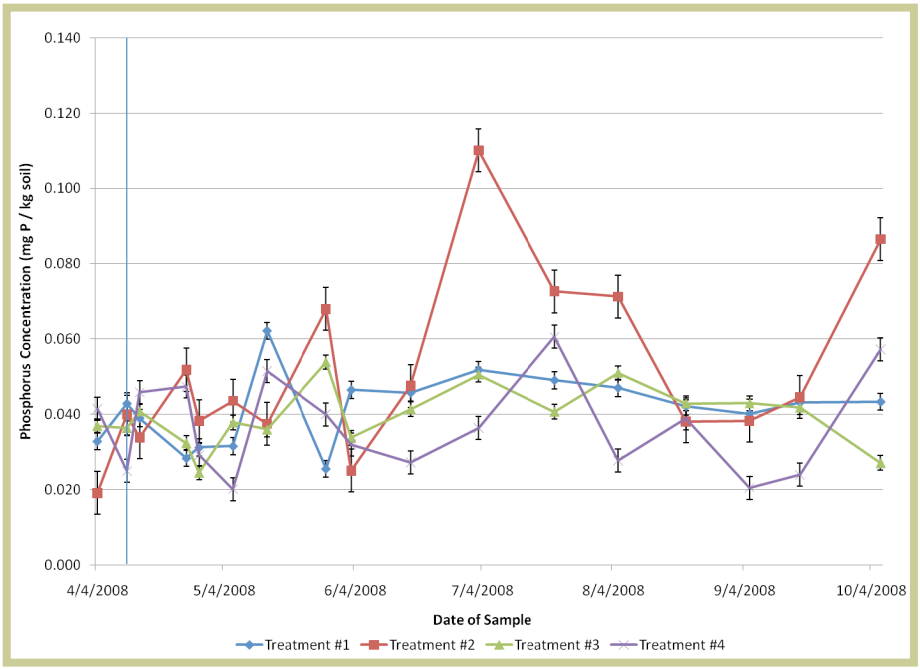
By Sara Eckert and Rich Smith

Soil nutrients, including nitrogen and phosphorus, can create serious environmental problems when they leave agricultural fields and end up in surface and ground waters. Therefore, an important question that we are trying to answer with our cropping systems experiment is "How can we manage organic feed and forage production systems to decrease the potential movement of nutrients off of the field?". A Penn State undergraduate student recently attempted to address part of this question using soil samples collected from our cropping systems study.

Lauren Seiler, a senior majoring in Environmental Resource Management and Agricultural and Extension Education, together with project co-leader Jason Kaye and project technician Sara Eckert, examined how phosphorus (P) levels were affected over time by the management practices implemented in the four cropping system treatments. Lauren focused on P because the use of manure as a fertilizer in organic systems can lead to the buildup of P in soils, which may then become subject to runoff. The three researchers expected that because the four organic forage systems differed in manure application rates, tillage, and other management practices, this would result in differences between the four systems in terms of the amount of P present in the soil that could be vulnerable to loss.

To determine soil P levels, they measured P in soil samples that were collected in August and November 2007 and approximately every two weeks from April to October 2008 in each of the four cropping system treatments.

When they examined their data, Lauren and Jason found that while P concentrations ranged from 0.019 mg/kg to 0.110 mg/kg, none of the treatments differed significantly in P vulnerable to subsurface drainage. Even after manure was applied to one of the treatments (system 2, red line on the graph) the eventual spike in P in that system was not high enough to generate environmental concerns. Additionally, none of the treatments differed in plant available P, which ranged in concentration from 21.00 to 64.00 mg/kg. Therefore, despite a variety of management practices and manure applications, none of the cropping system treatments exhibited a high degree of potential for P loss. These results are promising, and suggest that our four organic feed and forage production systems may represent sustainable strategies for P management that could help reduce the environmental footprint from agriculture in the mid-Atlantic region.



Mean $CaCl_2$ extractable phosphorus concentrations from April to October 2008 in our four organic feed and forage cropping system treatments (mean ± 1 standard error). The blue vertical line indicates when manure was applied to Treatment 2. **Major management practices in 2008**: Treatment 1 was conventionally-tilled and seeded to brassica in May, followed by buckwheat in June and alfalfa/oat in late August. Treatment 2 was conventionally-tilled and seeded to sorghum/sudan grass in June, followed by alfalfa/orchard grass in late August. Treatment 3 was conventionally-tilled in mid-July and left as a bare fallow until rye was seeded in mid September. In Treatment 4 we rolled the rye/vetch cover crop in June and then no-till planted buckwheat in late July, followed by no-till rye in mid September.