“The research, farming and education taking place at the Spring Valley farm are a model for the changing face of southeastern agriculture. The efforts are collaborative with local farmers and address their real-world issues. The result is ecologically-sound farming practices that restore agricultural ecosystems and reconnects communities to food production. The environment is a unique site-specific teaching lab where students are challenged to think critically about their role as consumers and engaged citizens.” Krista Jacobsen

Krista attended Virginia Tech for her undergraduate work and was an AmeriCorps volunteer near Portland, Oregon. She returned to graduate school in 2003 to join the UGA Agroecology Lab and work under Dr. Carl Jordan, studying restorative techniques in agricultural systems. She will finish her doctoral work in spring 2008.

Project Overview

Farmers in the Georgia Piedmont face a myriad of challenges, from the heat and humidity of a subtropical climate, intense pest and weed pressures, and perhaps the most challenging, highly degraded soils which are legacies of previous land uses. In the southeast, where topsoil has largely eroded into lakes and streams, all that remains is heavily weathered red clay subsoil, devoid of available nutrients and the organic matter that feeds soil and plant communities.

Organic farming methods focus on feeding the soil, not only the plant. As such, organic farmers must restore these degraded soils as they farm them, requiring labor-intensive techniques and sometimes expensive amendments. Research at the Spring Valley Farm focuses on making organic farming more efficient, both ecologically and economically, largely through rebuilding soil organic matter. This experiment attempts to create an “ecologically ideal” organic production system for the southeast, and examines the ecological and economic trade-offs of certain practices on soil quality.

Project Details

This project combines a number of common organic farming techniques, agroforestry practices and conservation agriculture approaches to create an “ecologically ideal” system. Reducing tillage is at the heart of the study, with the use of a diverse mix of winter cover crops covering the soil and tightening nutrient cycles throughout the winter. In the spring, these winter cover crops are “roller crimped,” using a commercial grass roller that flattens the plants and bends the stalks, killing the cover crops and creating thick mulch on-site that suppresses weeds and slowly releases nutrients to the summer vegetable crops. All organic treatments are in strip-till cultivation, a technique where the only tillage that occurs each year is a 6” wide furrow being ripped into the soil. The rest of the soil remains undisturbed.

The project is also evaluating the use of alley cropping, or hedgerow intercropping, as a perennial green manure in this annual cropping system. In this technique, hedgerows of leguminous shrubs are planted 5 m apart, with the alley between the hedgerows alternating between cover crops in the winter and strip-till summer vegetables. The shrubs (*Albizia julibrissin*) are pruned 2-3x’s per year and the prunings applied as mulch to the adjacent crop plants. As the prunings decompose, nitrogen and other nutrients are released to the crop plant.

Additional treatments evaluate the use of compost in annual and semi-annual applications, as well as the use of additional straw mulch to suppress weeds.

The effects of these techniques on soil quality (see Table 1 below) are being measured over the course of the 3 year experiment, and over the long-term using soil organic matter modeling to predict the effects on soil organic matter on a decadal time scale.

Table 1. Soil quality, nutrient cycling and economic variables measured in experimental system.

Indicators of Soil Quality	Soil Bulk Density
	Water Infiltration
	Soil Aggregate Stability
	Total soil carbon and Nitrogen
	Soil microbial biomass
Nitrogen Budgeting	Soil Ammonium and Nitrate
	Plant Nitrogen
Economic Indices	Production Labor
	Production Costs
	Crop Yield

Project Progress and Preliminary Results

This study is entering its third and final year in 2007. Preliminary results show highest crop yields in alley cropped, organic strip-till treatments, followed by only strip-till treatments (no alley cropping), and followed by a conventional treatment consisting of tillage and chemical fertilizer. Analysis are as yet incomplete on other variables, but exploratory data analysis has shown that in the first two years of the experiment, applications of compost did not significantly increase yields or affect soil organic matter content above that of reducing tillage and incorporating alley cropping into the production system. Look for more results at the end of the final field season, in Fall 2007.

For further information about this project, the production practices employed here or upcoming results, please contact Krista Jacobsen (krjacobs@uga.edu).