USDA United States Department of Agriculture

Soil Science Division

Soil Survey Region 7

Greenwood Soil Survey Office

Field Tour of Cover Crop Impact on Soil Health

Purpose

Mississippi State University and Delta F.A.R.M (Farmers Advocating Resource Management) have a paired-field scale research project on working farms to evaluate cover crops in the Mississippi Delta. The researchers planned a cover crop field tour on one set of paired fields for local farmers, landowners, extension agents, and NRCS conservationists and technicians. They asked the Greenwood project leader to lead an in-field discussion and onsite evaluation of covered versus non-covered soils in conjunction with another researcher's discussion of planting and management aspects and a farmer's perspective and experience.

When explaining to people how land management practices affect crop roots and create restrictive features, such as a plow pan, in the root zone, it is always helpful to be standing in the field. We dug small shovel pits (no more than 12 inches deep) in each field on a row bed and in the furrow to evaluate rooting depths, root structures, soil structure, and soil compaction. We removed spade slices to examine and use for demonstration to the group.

Soil with plow pan, taken from row bed after first year of conventional control with plow pan.

Soil with plow pan, taken from furrow after first year of limited tillage with cover crop.

Soil with plow pan, taken from row bed after first year in limited tillage with cover crop.

Key Outcomes

Using the soil slices, we showed the group:

- Where the plow pan is located and where it typically occurs in Delta soils
- Why and how the plow pan results from intensive yearly tillage (soil disturbance)
- How to recognize a plow plan/compacted zone with massive or platy structure
- How the plow plan restricts rooting depth and plant growth
- How the plow pan restricts the movement of irrigation water into the soil profile
- How the fine grass roots of the cover crop can penetrate the plow pan during the winter months
- How limiting soil disturbance (tillage) increases the ability of the cover crop to break down the plow pan

We discussed with the group how shallow rooting depths and poor percolation of irrigation water result in lower crop yields and wasted money.

The onsite farmer explained how he had not understood that his fields had a plow plan until we showed him the year before, after which he decided to participate in the research study.

Using the soil slices and referencing the field scale study, we explained the basic principles of soil health. The researchers explained how the data collection and measurements they took will be used to evaluate the use and management of cover crops on a working farm in the Delta.