Florida Soil a patchwork Quilt for carbon Content, UF/IFAS Researchers Find

GAINESVILLE, Fla. — Florida is home to many types of soil and some of them lack carbon, meaning they could be used for carbon sequestration — but a new University of Florida study shows that variability in the state's existing soil carbon levels could make the task harder.

Carbon sequestration is the practice of storing carbon; one way to accomplish it is by adding carbon-rich material to soils. Carbon sequestration aims to slow the build-up of carbon-based gases in the atmosphere, a phenomenon believed to be a cause of global climate change. Some landowners may be able to make money by allowing their properties to be used as sites for carbon sequestration.

In a presentation today at the joint meeting of the American Society of Agronomy, Crop Science Society of America and Soil Science Society of America, researchers with UF's Institute of Food and Agricultural Sciences were to report early findings from a statewide study analyzing soil carbon content across areas the size of a football field.

The results confirm what researchers have suspected — that soil carbon content can vary widely on a small site, said Sabine Grunwald, a professor in UF's soil and water science department. That means efforts to amend soil with carbon-rich biomass will need to be tailored to local carbon levels.

The results also confirm that soil carbon variability has a lot to do with how the land is used and what material covers the land.

"Land use is highly correlated with soil carbon values," Grunwald said. "So if you know the land use for a particular area, you can predict the amount of soil carbon there."

The findings will help Grunwald and her colleagues develop new digital soil maps that offer greater resolution than past efforts, she said. The maps are needed for precision agriculture, the practice of growing crops using computer-assisted technology that compensates for variable growing conditions. Soil carbon content plays a major role in soil quality, fertility, crop yield and food production.

High-quality digital maps can also assist conservation efforts by giving an accurate assessment of subsurface conditions in an area, she said.

In the study, doctoral student Xiong Xiong took soil samples from five areas, each representing one of five types of land use and land cover commonly found in Florida. They are: pineland, dry prairie, improved pasture, mesic (moderately wet) mixed forest and xeric (dry) upland forest. Together, the five account for about 40 percent of Florida's surface area.

Three of the sites were located near Gainesville, one in the Panhandle and one in South Florida. At each, Xiong took 108 soil samples, starting with several at a home base. Then Xiong sampled at distances of about 2 yards, 8 yards, 25 yards and 75 yards from the home base.

The results showed that, in general, dry prairie and mesic mixed forest had the greatest capacity to store carbon, followed by improved pasture, while pineland and xeric upland forest had the least.

The statewide soil carbon assessment is one part of a three-year study funded by the U.S. Department of Agriculture, Grunwald said.

She and Xiong are already well into a nationwide assessment, made in conjunction with the National Soil Survey Center in Lincoln, Neb., and researchers in Sydney, Australia. More than 6,500 sites have been sampled.

“We should have some data next year,” Grunwald said. “The United States urgently needs new soil carbon assessments.”