

1525 Managing soil properties through dryland cropping system intensities

Dr. Veronica Acosta-Martinez , USDA-ARS, Lubbock, TX

Dr. Ted M. Zobeck , USDA-ARS, Lubbock, TX

Mrs. Jill Booker , Texas A&M University/Agricultural Experiment Station, Lubbock, TX

Dr. Dan R. Upchurch , USDA-ARS, College Station, TX

The transition from irrigated to dryland production is imminent for the Southern High Plains region due to the minimum recharge occurring to the Ogallala aquifer. Thus, a long-term dryland study was established on USDA-ARS farmland near Lubbock, Texas in 2003 to evaluate the ability of different cropping systems to modify the properties of semiarid soils including the potential of these soils as a water storage-reservoir for crop production. After 5 yrs, rotations with a winter cover crop such as cotton (*Gossypium hirsutum*)-rye (*Secale cereale*)-sorghum (*Sorghum bicolor*) and haygrazer (alfalfa-sorghum hybrid, *Sorghum bicolor* L.)-rye demonstrated higher soil microbial populations (1.7 times higher) and enzyme activities of C and P cycling (up to 2 times higher) compared to continuous cotton or cotton-sorghum. Soil organic mater was higher under hay-rye rotation compared to the other cropping systems. In 2005, water infiltration rates were higher among cropping systems under no-tillage compared to conventional tillage. Although there have been rapid improvements in soil properties, total weight and lint of cotton have been similar in continuous monoculture compared to the rotations