

SOIL CARBON CONTENT AFTER A HALF CENTURY OF MANAGEMENT

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ABSTRACT

Management effects on soil physical properties can be difficult to determine because there is often no fixed starting point. Soil organic carbon was determined for central Texas Vertisols (Udic Pellusterts) on archived samples from 1949 and samples taken in 2004. Management records were used to interpret the data. Five fields were sampled, representing an untilled native pasture, two previously tilled soils which had been planted to Bermuda grass (*Cynodon dactylon* (L.) Pers.) for 55 and 39 years before the 2004 sampling period, and two fields which had been continuously cropped for nearly the entire 55 year time interval. Soil organic carbon was determined for depth increments of 0 to 6, 6 to 12, 12 to 24, 24 to 36 and 36 to 42 inches. The tilled soils had been seriously degraded of organic carbon by agricultural activities prior to 1949 compared to the native pasture soil. Agricultural practices since 1949 have increased soil carbon concentration in the surface 6 inches. Returning the soils to grass production increased soil surface carbon contents at a faster rate than the conventional agricultural practices. Having archived samples greatly aided in interpreting the effects on management on the soil. It appears that previous estimates of carbon sequestration rates for the Vertisols may have been underestimated by comparative studies of no-till and conventional tillage practices.