Agricultural Management Impacts (1962-1998) on Soil Carbon and Nitrogen Content in Ohio. (S05-martens131811-Poster)

Authors:

- J.Durkalski* - *The Ohio State University*
- W.Dick - *The Ohio State University*
- D.Martens - *USDA-ARS, Tucson, AZ*

Abstract:

Tillage management such as no-tillage (NT) has been suggested to improve soil C content compared to chisel (CT) or plowing (PT). Rotations of continuous corn (Zea mays) (CC), corn-soybean (Glycine max) (CS) and corn-oats-meadow (Avena sativa) (COM) were maintained on two soils - a Hoytville clay loam and a Wooster silty loam for 30 to 35 year using NT, CT and PT. Organic C and N and bulk density for most of the sites were determined in 1962, 1971, 1980, 1993 and 1998. Soil C in the Wooster to a 20 cm depth after 30 yr of CC initiated after 6 yr of alfalfa was increased 4.2% by NT, but decreased by PT (21.6%) and CT (24.0%). Rotation and tillage also interacted to affect C content. In the Wooster, C decreased 1.9% with NT CS and 15.9% with PT CS, but increased 12% with NT COM. Soil C in the Hoytville to a 20 cm depth after 30 yr of CC initiated after 6 yr of CS PT was increased 4.1% by NT, but decreased by PT (3.7%). In the Hoytville, C decreased 8.8% with NT CS and 21.5% with PT CS, but increased 9.5% with NT COM. A greater percentage of soil C in the coarser-textured Wooster was lost with tillage and a rotation that included soybean compared with the same treatments in the fine-textured Hoytville. In the Wooster CC, CT was the most destructive to soil C content in the 20 cm soil layer as compared with NT and PT. This suggests that even one pass of conservation tillage degrades more soil C than PT with additional tillage.

Corresponding Author Information:

Dean Martens
USDA-ARS, Tucson, AZ
2000 E. Allen Road
Tucson, AZ 85719

phone: 520 670-6380 ext. 156
fax: 520 670-5550
e-mail: dmartens@tucson.ars.ag.gov

Presentation Information:

Presentation Date: Wednesday, November 13, 2002
Presentation Time: 4:00-6:00 pm
Poster Board Number: 1514

Keywords:
carbon sequestration, tillage management, crop rotations, carbon management