

AGRONOMIC AND NUTRIENT CYCLING RESPONSES IN A ROTATION STUDY

Howard J. Woodard and Ron Gelderman
South Dakota State University, Brookings SD

Abstract

A twelve-year rotation study was established in the Divide soil near Brookings SD in 2000. Treatments of crop rotations (corn-soybean, soybean-spring wheat, and corn-soybean-spring wheat), tillage (conservation till vs. no-till), and residue management (post-harvest residue removed vs. residue returned) were established. Grain yield, residue crop residue production, nutrient cycling, and carbon storage responses were documented. Mean grain yield for various crops was not significantly influenced by rotational sequence over the 2005-2009 time period. However, calculated mean corn grain yield was about 8 bu/a lower in the no-till/residue applied combination than for other tillage/residue management combinations. Soybean and spring wheat grain yields were not influenced by any tillage/residue management combination. Mean crop residue/straw weights averaged about 3.8 tons/a for corn, 2.1 tons/a for soybean, and 1.9 tons/a for spring wheat for the 2004-2006 time period. The nutrient value of this residue was 45 lbs. N/a, 16 lbs. P₂O₅/a, 93 lbs. K/a, and 6 lbs. S/a for corn and about half of that for soybean and wheat residue. Mean total soil C decreased in all treatment combinations in the 0-3" and 3-6" depth increments from 2000-2007. However, the rate of soil C decrease was somewhat lower for the no-till/residue returned treatment combination compared to other tillage/residue management combinations.

PROCEEDINGS OF THE

40th

NORTH CENTRAL

EXTENSION-INDUSTRY

SOIL FERTILITY CONFERENCE

Volume 26

November 17-18, 2010
Holiday Inn Airport
Des Moines, IA

Program Chair:

Richard Ferguson
University of Nebraska - Lincoln
Lincoln, NE 68583
(402) 472-1144
rferguson@unl.edu

Published by:

International Plant Nutrition Institute
2301 Research Park Way, Suite 126
Brookings, SD 57006
(605) 692-6280
Web page: www.IPNI.net