Effect of Tillage and Cover Crop on Corn and Soybean Yields in a Silt Loam Soil

Nsalambi V. Nkongolo*a, Samuel I. Haruna*b

*aDepartment of Agriculture and Environmental Sciences, Lincoln University of Missouri, Jefferson City, MO 65102-0029, USA
bSoil, Environmental and Atmospheric Sciences Department, University of Missouri-Columbia, Columbia, MO 65201, USA

Abstract

Corn and soybean are among the major crops in the United States. Corn alone covers about 88 million acres, valued at $63 billion of which 20 percent is exported. Adapting corn and soybean production to a changing climate is a critical need as yields are affected by drought and excess water. We studied the effect of tillage, rotation and cover crop on corn (Zea mays L.) and soybean (Glycine max) yields from 2011 to 2013. The study was conducted on a Waldron silty-loam soil at Lincoln University of Missouri’s Freeman farm. Twenty four plots of each corn and soybean were established on a 4.05 ha field and arranged in a 3-factor factorial design with 3 replications. The 3 factors (treatments) were tillage at two levels (no-tillage vs conventional tillage), cover crop at two levels (no-rye vs rye) and rotation at four levels (continuous corn, continuous soybean, corn/soybean and soybean/corn rotations). Corn and soybean were planted each year in June and harvested in late October. Rye (Secale cereale) was planted in 12 plots of each corn and soybean immediately after harvest. All corn and soybean plots received 26 kg N, 67 kg P2O5, and 67 kg K2O/ha. However, the corn plots received an additional 202 kg N/ha from urea. Overall, corn yield was significantly affected by year (p=0.001), but not tillage or cover crop. Soybean yield, however, was significantly affected by year (p=0.0001), tillage (p=0.0218) and cover crop (p=0.0531). In addition, on year per year basis, corn yield was significantly affected by tillage in 2011 while soybean yield was significantly affected by tillage and cover crop in 2011 and 2012 (p<0.05). These results suggest that cover crop may have an impact on soybean yield. The study is still being conducted for two more years and will hopefully provide more light on the effects of soil/crop management practices on the yields of corn and soybean in this silt loam soil.
Keywords: Tillage, cover crop, corn, soybean, yield

References