

# MANAGEMENT IMPACTS ON GHG EMISSIONS AND YIELD FOR AN ORGANIC SOYBEAN CROP

Steven Easterby

Dr. Newell Kitchen, Thesis Supervisor

## ABSTRACT

As demand for organically grown food increases, growing organic soybean can be profitable and also improve soil ecosystem services through sustainable agronomic practices. The purpose of this investigation was to determine the effects of tillage, cover crop, and compost rate on yield and the soil release of two greenhouse gases (GHG), nitrous oxide (N<sub>2</sub>O) and carbon dioxide (CO<sub>2</sub>), under an organic soybean cropping system grown on a Missouri claypan soil. Each crop was investigated independently with tillage/cover crop combinations as the main plot treatment and compost rate for the split-plot treatment.

Neither tillage/cover practice nor compost was found to affect either N<sub>2</sub>O or CO<sub>2</sub> emissions during 2012 or 2013. Low levels of gas flux were found. Low emissions may be linked to the drought which occurred during 2012, and below average summer precipitation in 2013. The failure to find a relationship between GHG emission and some organic management practices is not without precedent.

In 2012 organic soybean grown with tillage and without cover crop out-yielded tilled and no-till with cover crop by 0.88 Mg ha<sup>-1</sup>, while compost rate had no effect on yield. Although tillage did not have an effect on yield for 2013, the RR and 1.5RR compost rates led to the highest yields. These results suggest that tillage, cover crop practice, and compost rate can have an effect on organic soybean yield.