www.emu.ee

Eesti Maaülikool
Estonian University of Life Sciences

Effect of conventional and organic cropping systems on SOC dynamics

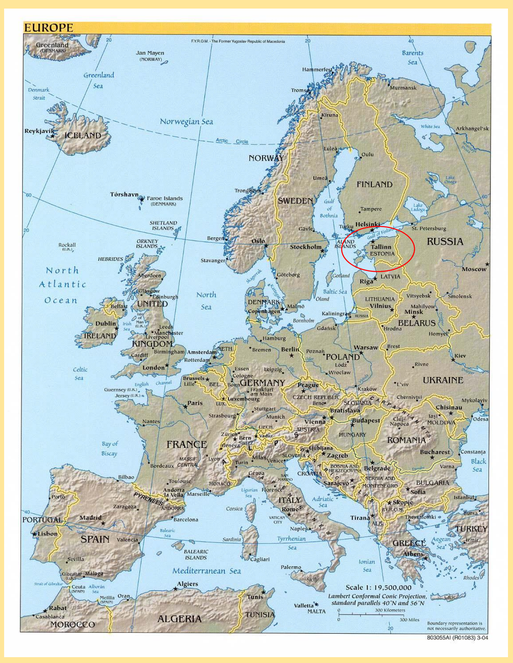
Berit Tein*, Karin Kauer, Viacheslav Eremeev, Anne Luik, Evelin Loit

*Department of Field Crops and Grassland Husbandry, Estonian University of Life Sciences, Kreutzwaldi 5, Tartu 51014, Estonia, *e-mail: btein@emu.ee*

Study aim

To investigate soil organic carbon (SOC) content and dynamics in six different cropping systems under five-field crop rotation during first rotation.

Experimental place and design



Description

5-years crop rotation (**winter wheat, pea, potato, barley us. red clover, red clover**) experiment in 6 cropping systems.

Conventional cropping systems:

* **N0 –** control
* **N_{low} –** $N_{40\text{-}50}P_{25}K_{95}$
* **$N_{average}$ –** $N_{80\text{-}100}P_{25}K_{95}$
* **N_{high} –** $N_{120\text{-}150}P_{25}K_{95}$

Organic cropping systems:

* **Org I –** green manure catch crops (before pea, potato and barley);
* **Org II –** green manure catch crops combined with composted cattle manure

Each system in 4 replications = 120 plots
Each plot = 60 m^2
Site: Eerika experimental field (58°22'N, 26°40'E) near to Tartu, Estonia
Climate: Precipitation 591 mm/y
Mean annual temperature 4.4 (-30…+30) °C
Soil: sandy loam *Albic Stagnic Luvisol*

Results

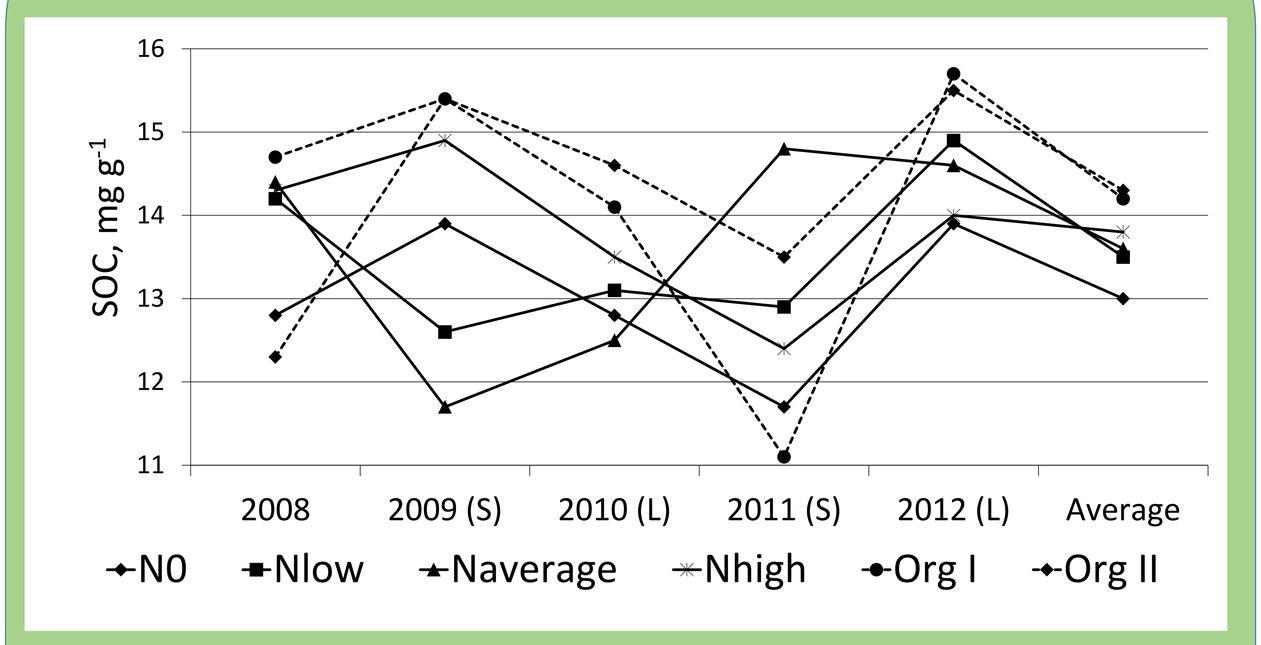


Figure 1. Soil organic carbon content (mg g^{-1}). (S) after-effect of straw; (L) after-effect of legume.

Results and discussion

- The SOC concentrations increased in cropping systems with low nitrogen rate;
- No significant change was detected in systems with higher nitrogen rate;
- The SOC content was significantly higher in organic systems compared to conventional systems indicating that in organic systems the organic matter mineralization did not exceed the amount of organic matter input into soil;
- SOC content variability in cropping systems was higher when the straw material was incorporated into soil;
- **To conclude:** SOC dynamics were dependent on differences in the chemical composition of organic matter.

Acknowledgements
The authors gratefully acknowledge the financial support for this research provided by the Estonian Science Foundation project SF0170057s09 and the CORE Organic II funding bodies, being partners of the FP7 ERA-Net project, CORE Organic II.

TILMAN-ORG
A European Network

CORE organic II