

## Soil chemical properties under different nutrient managements in Estonia

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A five years research run at the experimental station of the Estonian University of Life Sciences in Eerika, Tartu, Estonia since 2008 on *Albic Stagnic Luvisol* soil, compared the evolution of different elements ( $C_{org}$ , N, P, K) in soil with time, on the basis of conventional and organic farming. For this aim, 80 plots under the same crop rotation (pea, potato, barley, red clover and winter wheat) were divided as follows: 40 cultivated under conventional farming system with different concentrations of mineral fertilizers (20 without addition of chemical fertilizers:  $N_0P_0K_0$ ; and 20 with a final concentration equals to  $N_{125}P_{25}K_{95}$ ) and the remaining 40 plots cultivated under organic farming conditions with winter oil-rape after pea, winter rye after potato and ryegrass after winter wheat as cover crops. In addition, 20 of them (ORG. II) received yearly  $40 \text{ t ha}^{-1}$ .

Results showed that after five years the concentration of organic carbon ( $C_{org}$ ) in the soil decreased for all the treatments except for the ORG. II which slightly increased. In the case of total nitrogen (N) and plant available phosphorus (P) the conventional plots with addition of fertilizers ( $N_{125}P_{25}K_{95}$ ) showed a better respond, with lower year-to-year losses of N, and a slightly increase in the concentration of P. Finally, plant available potassium (K) in the soil, decreased significantly ( $P < 0,05$ ) with time for all the treatments, being less pronounced in the case of the  $N_{125}P_{25}K_{95}$  and the ORG. II plots.

According with the results, the addition of cattle manure may help to improve the  $C_{org}$  in the soil, but it is not enough for maintaining a positive nutrient balance in the soil. In conclusion mineral nutrient amendments combined with organic farming practices like the incorporation of manure, may help to maintain and improve in some cases the nutrient levels in the soil with time.

Keywords: organic farming, conventional farming, cattle manure, green manure, crop rotation