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Effects of changes in land use on soil properties in Estonia

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One important factor influencing the soil properties is the human activity and especially the agricultural activity. Effects of changes in land use and human activities on soil properties are remarkable on the topsoil, the lower soil layers are less affected. During the last century the land use in Estonia has considerably changed. In Estonia the area of abandoned agricultural land has been rapidly increasing during the last decades. The purpose of our study was to estimate the effects of changes in land use on soil properties in Estonia. The field experiment has been established on the experimental station of Estonian University of Life Sciences in Rõhu. The experimental area was used during the years 1960-2006 as an apple garden, 2006-2007 it was ploughed and since 2008 the experimental area has been used as grassland. In our trial we compared the changes in soil properties before and after the experimental area was used as grassland (2007 and 2008). The two grassland species in the trial were *Phalaris arundinacea* L. and *Dactylis glomerata* L. The soil of experimental area was a sandy loam *Haplic Luvisol* (siltic). Soil properties like the soil bulk density, soil porosity and the water permeability were studied in 30 cm soil column in every 5 cm soil layer. The results indicated changes in the soil properties. Before the grassland management the soil bulk density was in the upper layer (0-5 cm) approximately 19 % and in deeper layer (15-20 cm) 10 % higher as under the grassland. Changes of soil porosity were not so considerable before and after the grassland management. The highest alteration occurred in the values of soil air capacity were the change was from low to high in upper layer (0-5 cm) and from medium to high in the deeper layer (15-20 cm). The water permeability before the grassland management was medium and under *Dactylis glomerata* in the upper layer (0-5 cm) low and in the deeper layer (15-20 cm) high. Our results showed that the vegetation provided stability for the soil, the plant roots loosen the soil but at the same time they are altering soil porosity and water permeability (decrease in macropores). Comparing *Dactylis glomerata* with *Phalaris arundinacea*, the *Dactylis glomerata* had more effects of changes on soil properties (i.e. smaller soil bulk density, lower water permeability in the upper layer and higher in the deeper layer).