

# Carbon in forest soils: lessons from Arenosols

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## 1. Lithuanian forest soil monitoring (16x16 km) data: 1992 and 1998

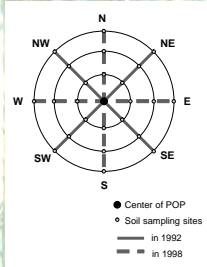


Fig. 1. Allocation of soil sampling sites (n=12) for composite samples in permanent observation plot of Lithuanian forest soil monitoring in 1992 and 1998

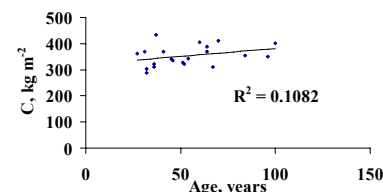
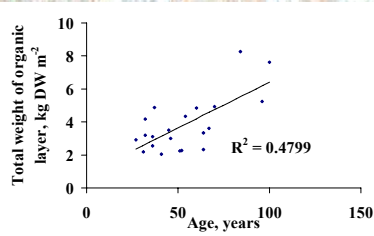


Fig. 2. Total weight of organic layer and C pools in organic layer of Arenosols in Scots pine stands of different age (Lithuanian forest soil monitoring, 16x16 km, 1992)

According to the forest soil monitoring data total weight of the organic layers increase with increasing age in the 30-100-year-old Scots pine stands. However such increase for the carbon (C) was not found even in the upper 5 cm mineral layer of Arenosols.

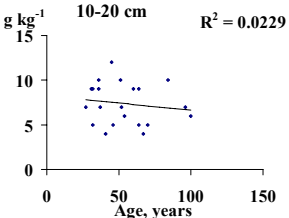
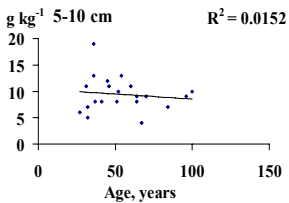
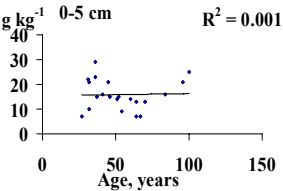


Fig. 3. Soil organic carbon concentrations in mineral topsoil of Arenosols in Scots pine stands of different age (Lithuanian forest soil monitoring, 16x16 km, 1992)

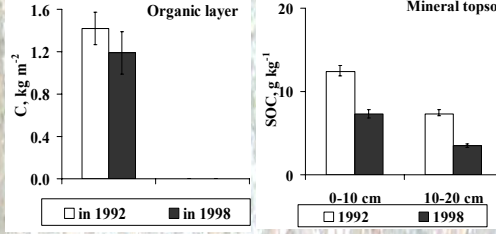


Fig. 4. Mean soil organic carbon pools in organic layer and the concentrations in mineral topsoil of Arenosols in Scots pine stands (n=19) in 1992 and 1998 (Lithuanian forest soil monitoring, 16x16 km)

Mean concentration of C decreased significantly in mineral topsoil (0-20 cm) in 1998 when compare to 1992. Hypothetically, this could be explained by the leaching of C due to the excessive precipitation during vegetative period of 1998 that occasionally exceeded 30-80 mm per day.

## 2. Detailed study of Arenosols

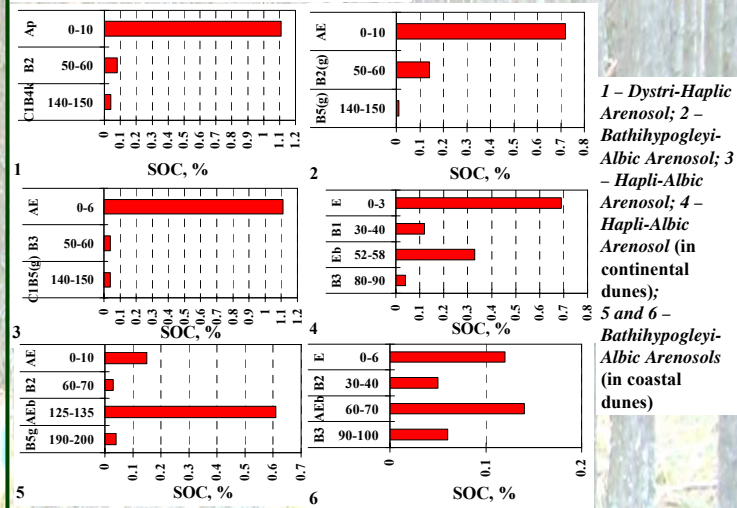


Fig. 5. The concentrations of soil organic carbon (SOC) in mineral horizons of Lithuanian Arenosols (data of Ričardas Beniušis, Lithuanian Forest Inventory and Management Institute)

The estimation of C sequestration should be focused not only on C storage in organic layers and mineral topsoil (root zone) but also on depth at least as deep as 100 cm.

## 3. Carbon sequestration in Arenosols: a comparative case study in abandoned arable farmland and Scots pine plantations

(2) Scots pine plantation (3) naturally regenerated Scots pine stand



(1) abandoned arable land the outbreak of *Heterobasidion annosum* (Fr.) Bref.

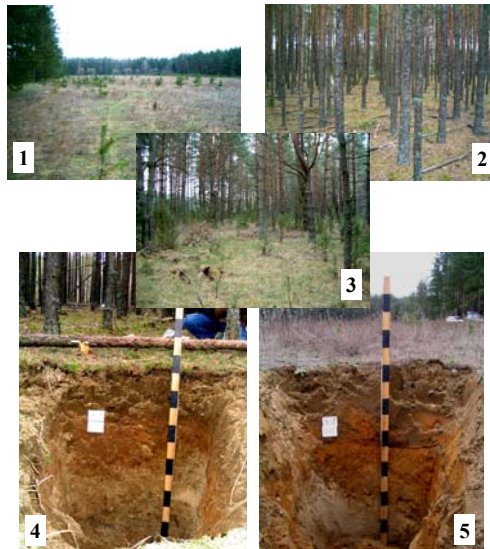


Fig. 6. Diminished ortho-photo map of Perloja experiment (24°25'N, 54°10'E; total area – 40 ha; 4 bloks with abandoned for 10 years arable land (1), planted (2) and naturally regenerated (3) Scots pine stands; (4 and 5) Haplic Arenosols: coarse sand with a high silect volume (10-20%) and low clay+fine silt content (less than 5%)

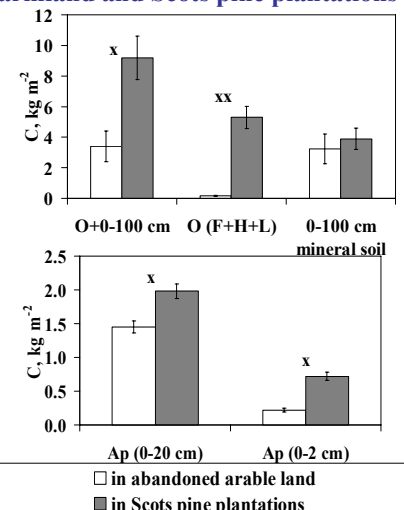


Fig. 7. Distribution of soil C pools in Scots pine plantations and abandoned arable land in Perloja experiment (\*p<0.05, \*\*p<0.01)

The highest carbon concentrations were detected in thin (0-2 cm) Ah-horizon that is under the development below organic O layer.

