

Geometrical and functional structures transformation of the pore space in soil of constructions with different structures in four years-long experiment

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Greening of cities is developing very strong nowadays. Quality and durability of plantings depend on soil's properties. In the conditions of the city, the creating of target soil constructions with assigned properties is one of the most popular ways of soil's formation. Their feature is minimization of spatial heterogeneity of soils in each horizon. However, soil's properties, including structure of the pore space, are transformed during soil's functioning. This leads to other distribution of water conduction and water retention pores, possibility of moisture and substances migration, availability of moisture to plants. The aim of this work was to investigate the structure of the pore space of bulk soil constructions with different compositions and their transformation in the process of functioning. In this regard model soil constructions with different structure were created on the territory of Lomonosov Moscow State University in 2012. They were: 1) control variant, (urbanozem), 2) layered variant (horizon A arable-peat-sand), 3) mixed variant (the same components, as in the layered). The geometrical structures of the pore space of the construction's soil were studied by method of scanning electron microscopy (SEM). Also such soil properties as the density of the solid phase, soil density, specific surface area, porosity, water retention curve were defined. All determinations were carried out on samples of 2012, 2014, 2016 years. Changes of water retention ability for various horizon were different in the process of functioning. Decrease of water retention was observed in mixed construction. The most transformation was occurred in horizon A arable, where the layer of peat was under horizon A arable. Water retention of this horizon increased. The least moisture capacity increased almost twice (from 22% to 40%). The SEM method allowed to find visual changes of pore space and forms of soil particles at small increases. Noticeable changes of thin structures were not revealed.