

Biological characteristics of anthropogenically affected soils of opencast mine in Republic of Bashkortostan, Russian Federation

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The Republic of Bashkortostan is the site of local extraction of copper pyrites by an open cast method. In addition to contamination of soils and terrestrial ecosystems by gas-dust emissions, in the vicinity of the mining industry objects there is a direct violation of soil and vegetation cover by mining. Soil restoration on former mines is not affected by any reclamation practice and implemented by spontaneous way.

Biological indicators of soils react most sensitively to anthropogenic impacts during mining. The samples of dumps of quarries and zonal soils were studied in terms of basic biological characteristics: carbon of microbial biomass, basal respiration values and the metabolic coefficient calculated, which allows an additional assessment of the state of microbial complexes of anthropogenically disturbed soils.

In the topsoils control samples of zonal soils the basal respiration and microbial biomass values were 1.3 and 1.5 times greater than in the upper horizons of anthropogenically disturbed soil.

In it necessary to emphasize the heterogeneous distribution of basal respiration and microbial biomass down the profile of the soils of the pits of quarries. So, in the underlying horizon, the basal respiration and microbial biomass are 1.2 and 2.0 times greater than in the topsoil, which is associated with a violation of the genetic integrity of the profile as a result of anthropogenic influences.

In anthropogenically disturbed soils, the magnitude of the metabolic coefficient is increased by a factor of 2.4, as compared with background soils, which indicates a more favorable and stable state of the microbial community in background soils, and the lowest intensity of microbiological processes is observed in technogenically disturbed soils.

The biological activity of anthropogenically disturbed soils in pits of quarries in the Republic of Bashkortostan is very low, due to the underdevelopment of the microbial community.

When soil is formed after anthropogenic load, soil factors play a leading role in changing the ecological situation, in particular, activation and inhibition of biological processes. To activate biological processes it is necessary to carry out reclamation of disturbed lands.

This work was supported by Russian Scientific Foundation, project № 17-16-01030 “Soil biota dynamics in chronoseries of posttechnogenic landscapes: analyses of soil-ecological effectiveness of ecosystems restoration”.