

NITROGEN IN THE SOILS OF TECHNOGENETIC COAL DUMPS

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During coal mining, the open pit completely destroyed the natural landscape and the damaged area formed excavation heaps consisting of chaotic mix of enclosing and overburden rocks (Androkhanov, 2000). In such dumps, the natural processes of soil formation and circulation of substances are heavily disturbed (Shugaley, 2014). The accumulation of nitrogen can be a good indicator of the beginning of the pedogenesis process and measurement of the potential fertility of the soil formed.

Research is being conducted on the territory of the Borodino brown open cut of coal. It's located in the eastern part of the Kansk-Achinsk coal-basin. This is one of the largest open-pit of basin. As a part of these studies conducted, we aimed to study specifics of nitrogen accumulation and group composition of nitrogen-containing compounds under forest and meadow groups that are formed on excavation heaps.

The excavation heap was made in 2006. After two years its surface was without the restoration of the soil profile and the rows were planted with 2-3-year-old pine seedlings. Row spacing crops reaches 4-5 m. On the modern stage (2016), vegetation comprises two herbal complex: 1) artificial – culture *Pinus sylvestris* and 2) natural – spontaneous herbaceous plants.

It was detected that the gross reserves of nitrogen accumulated in the first 10 years of soil formation in the layer of 0-10 cm in the areas occupied by grassy vegetation make up 692 kg/ha, which is 24 % higher than in pine row. The majority of organic nitrogen compounds is resistant to hydrolysis. The total stock of easily and hard hydrolyzable compounds 60 and 37 kg/ha respectively is identified in the areas with grass and forest vegetation. The stock of mineral nitrogen is under herbaceous vegetation and 57 % higher than in the row of trees. More favorable combination of factors for the development of nitrogen mobilization processes formed under herbaceous vegetation - the relative exchange of mineral nitrogen is up to 3 % as opposed to 1.7 % for crops. Analysis of the results of laboratory experiments shows that the intensity of nitrification under herbaceous vegetation is 18 times higher than in rows. The incubation period in the soil between the rows is easily mobilized with 62 % of mineralized nitrogen in rows of -7 %.

References

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