

INFLUENCE OF SEDIMENTATION ON ALLUVIAL SOIL QUALITY IN THE OKA RIVER FLOODPLAIN

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The paper discusses the role of flood sedimentation in increasing fertility and contamination of alluvial soils with heavy metals. In the process of long-term field studies, systematic and comparative analysis, sedimentogenesis was studied and the value of the sedimentary load on the floodplain agricultural landscape in the middle reaches of the Oka River was established. The value of sedimentation was zero in the years without floods and increased to 12.9 t ha^{-1} in the conditions of medium-to-high floods, and to $20\text{--}32 \text{ t ha}^{-1}$ at the maximum level of flooding in the central part of the floodplain. The agrochemical and agrophysical properties of sediments and soils, which were characterized by a slightly acidic or neutral reaction, the medium loamy texture and high soil fertility, have been determined. The potassium content in sediments was 4–12 times higher, while phosphorus content was 2–3 times higher than in the underlying soil. Field and laboratory studies have shown that with an increase in the sediment load, the content of organic matter in the sediments and their fertilizing value were decreasing due to an increase in the proportion of the sand fraction in their texture. With an increase in the anthropogenic load of industrial and agricultural production, there was episodic pollution of the alluvial soil with especially toxic zinc up to 1.13 MPC, and sediments – with toxic nickel up to 1.26 MPC. There was a close relationship between the content of the heavy metals in sediments and in the upper humus horizon of the soil with a thickness of up to 0.5 m; the concentration of the heavy metals in sediments was 20–25% higher than in the underlying soil. The concentration of the heavy metals in the soil decreases with depth. The greatest excess in the content was typical for nickel, chromium and copper. An ecological assessment of the level of anthropogenic pollution of the Oka floodplain alluvial soils was carried out. The pollution level corresponds to the class of «ecological risk».

Key words: floodplain agricultural landscapes, sediments, heavy metals, pollution of alluvial soils.