CHANGE IN AGROECOLOGICAL PARAMETERS OF SOIL ROOT LAYER UNDER VARIOUS CROPS

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The paper describes changes in agroecological parameters of the root layer of the gray forest and dark-colored soils under various crops.

The arable layer of a gray forest residual carbonate soil and of a dark-colored soil with a second humus horizon were studied. The crop rotation of the experimental sites consisted of oats, perennial grasses (timothy grass) of first year, perennial grasses of second year, potato, barley, legumes (clover). Nitrogen fertilizers were applied to the soil for potato, barley and legumes. The following values were calculated: the structural factor according to A. F. Vadyunina (P_c), the dispersity factor according to N. A. Kachinskyi (K_k), the structure factor (K_c), the aggregation numbers according to V. N. Dimo (K_d) and N. D. Pustovoitov (K_n), the coefficient of polydispersity (K_{pol}). The soil pH, content of the water-soluble forms of nitrogen, as well as the total organic carbon content, were defined. As a result, it was found that soils under perennial grasses have the best soil structure while soils under potato and legumes had poor structure. Soils under potato were characterized by the lowest aggregation coefficients.

Gray forest soil has more strong microstructure and greater water resistance than the soil with a second humus horizon. Under crops, compared to grasses and legumes, the values of K_{pol} for both soils were reduced, that indicated an increase in the content of coarsely dispersed material in the soil.

Cultivation of perennial grasses contributes to a decrease in the soils acidity. High level of water-soluble nitrogen in the soils was observed only in the treatments with nitrogen mineral fertilizers. Two-factor dispersive analysis has shown that the type of cultivated crop affects the values of the polydispersity coefficient ($F > F_{crit}$ ($17.58 > 5.99$, at $p < 0.005$)) and the accumulation of total organic carbon ($F > F_{crit}$ ($28.84 > 6.61$, with $p < 0.003$)).

Keywords: gray forest soil, dark-colored forest soil, agroecological parameters.