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Physicochemical and morphological features of unique example of agrosoil in Russian Arctic

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Agricultural practices beyond the Arctic Circle are currently being actively discussed both within the Circumpolar Agricultural Association. Arctic farming has a long history, for example, research on forage and vegetable growing, which were conducted at the Yamal zonal vegetable experimental station (which located in vicinities of Salekhad city, 66.5° North latitude). This station up to the collapse of the Soviet Union gave not only scientific results for agricultural science and give indirect results in the form of constructed unique soils with more than a century of history. At present, the field is a 2-year abandoned ground covered with meadow cereal-grass vegetation.

Long-term agricultural usage of this area resulted in the formation of a unique soil profile, fundamentally different from the common soils of the region. Over almost a century of agricultural activities, there was formed a powerful (up to 30 cm) humus-accumulative (Ap) horizon. The humus-accumulative horizon is underlain by a thick (45 cm) Iron-illuvial, with placic layers horizon (Bs), which changes into sandy horizons BCg and Cg with reductimorphic spots (Soil name: Plaggic Podzol (Turbic)).

Soils of tundra of Western Siberia are normally acidic, which caused measures to be taken to regulate the acidity/alkalinity regime of the soil when it was used in agriculture, but even at present the soil of Yamal experimental station is acidic (pH H_2O 4.8-5 in the topsoil). Acidity decreases down the profile to close to neutral (pH H_2O 6.6) in the Cg horizon. The soil organic carbon content in the humus-accumulative horizon is up to 2%, and its stock is 6912 g/m^2. In the middle and deep horizons, the carbon content highly decreases to 0.02 % in the Cg horizon.

That soil is enriched with basic nutrients; the content of mobile phosphorus in Ap horizon is up to 450 mg/kg, mobile potassium - 60 mg/kg, with peak values occurring at the lower border (20-30 cm) of the humus-accumulative horizon, indicating the presence of eluviation processes. The content of mineral forms of nitrogen is low: ammonium nitrogen - 6 mg/kg in topsoil, 2.6 mg/kg in deep horizons; nitrate nitrogen - 21.5 mg/kg in topsoil, 0.22 mg/kg in deep horizons.

Literally, a century history of science-based farming makes the soil of the Yamal experimental agricultural station unique, it deserves not only a detailed study, but perhaps even assignment of the status of a protected natural object. There are almost no such objects still left in the Arctic

zone of the Russian Federation and it is critical to prevent its loss due to the growing urbanization in the Arctic region.

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