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RECLAMATION STATE OF HYDROMORPHIC SOILS OF CENTRAL FERGANA AND THEIR FERTILITY

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Abstract
The article discusses the reclamation status of meadow-sedge soils formed in the Central Fergana Steppe, changes in them, and the formation of soil fertility in connection with them.

Keywords: Collector, dry residue, re-salination, desalination, brine, seepage waters, easily soluble salts in water, fertility.

Introduction

Maintaining and increasing soil fertility are urgent tasks today, and in the conditions of the soils of Central Fergana, solving these tasks requires determining their land reclamation status.

These factors have their own specific manifestations in different soil-climatic regions, and also have specific indicators in the Central Fergana Desert region [1,2,6].

Hydromorphic soils have formed in the main part of the Central Fergana Desert, and in the use of these soils, unlike other automorphic soils in the region, it is necessary to address the issues of increasing productivity in conjunction with the current agricultural measures being used, as well as improving their land reclamation status. These issues are among the urgent issues that have not yet been fully resolved.

The Central Fergana Steppe has been intensively developed since the second half of the last century, and all the areas suitable for use have now been brought under irrigated agriculture. The development work was carried out against the background of collector-drainage works, taking into account the high salinity of the soil of the region and the proximity of mineralized groundwater, and the expected results were achieved. These structures still serve as a key factor in improving and maintaining the reclamation condition of the soil.

Materials and styles

A number of researchers [1,2,3,5,6,7] have conducted scientific studies on the reclamation status and fertility of the soils of the Central Fergana Desert, and it has been noted that the soil cover of

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the region has high levels of salinity due to natural factors such as the richness of the soil-forming parent rocks in easily soluble salts, the proximity of mineralized seepage waters, and that the soils have been desalinated under the influence of development and irrigated agriculture. It has also been highlighted that the process of soil desalination is related to the functioning of the collector ditch system and the cross-sectional structure of the soils, and it has been shown that fertility indicators are also formed depending on these natural conditions.

The research was devoted to the same issues, and the research was carried out according to the methods specified in the "Methodological Recommendations" of the VVDokuchayev Institute of Soil Science, general manuals developed by EVArinushkina and UzPITI, as well as the textbooks "Practical exercises in soil chemistry" (2017) and "Laboratory and practical exercises in soil chemistry" (2019) by G. Yuldashev and U. Mirzayev.

Discussion of the research results

In our research area, in the part where typical regional hydromorphic soils are developed, the soil profile is practically desalinated and the soil is developing towards an increase in the level of soil cultivation. However, the subsoil layer is much denser. A small salt maximum is accumulated in the subsoil and subsoil layers. The amount of salts in the soil profile varies within 0.3-0.5% of the dry residue. The chemistry of salinity is sulfate.

The amount and composition (in %) of easily soluble salts in water in the soils of the study area.

Cut No.	Depth , cm.	Dry residue	$HCO3^-$	CI^-	SO_4^{2-}	Ca2 +	Mg^{2+}	$Na^+ + K^+$
Irrigated weakly saline meadow-sedge soils								
1	0-30	0.522	0.008	0.010	0.3 3 0	0.08 0	0.024	0.023
	30-44	0.640	0.008	0.010	0.425	0.105	0.022	0.050
	44-65	0.782	0.010	0.012	0.534	0.172	0.028	0.016
	65-97	1,044	0.012	0.015	0.722	0.225	0.042	0.023
	97-124	1,163	0.012	0.015	0.804	0.245	0.050	0.023
	124-160	1,033	0.012	0.012	0.714	0.224	0.039	0.021
	150-171	0.800	0.010	0.010	0.697	0.220	0.038	0.021
Irrigated meadow-sedge soils.								
2	0-34	0.297	0.010	0.012	0.193	0.046	0.022	0.009
	34-48	0.354	0.012	0.013	0.230	0.053	0.027	0.011
	48-76	0.653	0.010	0.010	0.450	0.114	0.028	0.041
	76-112	0.542	0.007	0.010	0.362	0.105	0.024	0.017
	112-156	0.652	0.012	0.012	0.438	0.092	0.035	0.041
	156-164	0.788	0.010	0.010	0.546	0.156	0.037	0.023

The accumulation, amount, composition and distribution of easily soluble salts in gypsum-rich, gypsum-rich and rich-saline irrigated meadow sedge soils formed in the middle and peripheral parts of the cones depend on the specific layers of these soils, their depth and interlayer. If the gypsum and rich layers have a loose interlayer and good water permeability, then the soil section is desalinated or salts have moved to the inner, lower parts of the section. Irrigated gypsum-rich meadow sedge soils developed in the eastern part of the Isfayramsay cone, as well as in relatively low-lying areas in the central part of the adjacent cones. They are saline, and the main amount of salts is concentrated in the gypsum layers in the section. The sedimentary and subsoil layers, which

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contain a large amount of gypsum, contain 0.8-1.1% easily soluble salts, and the content of toxic salts is 0.11-0.18%. The salinity chemistry is sulfate. The lower part of the section is sandy, and the content of easily soluble salts varies in the range of 0.08-0.27% (Fig. 1).

In our studies, even slightly saline soil fractions contain about 0.5-0.8% dry matter. According to the ionic composition, the amount of sulfates predominates, reaching 0.2-0.4% in the layers.

Our research has shown that, due to the above-mentioned property indicators, soils with different levels of salinity exhibit different agrochemical properties.

Depending on the degree of salinity, the humus content in soils varies from 1-1.5% to 0.8-1%, and the amount of nutrients is distributed proportionally to the amount of humus, with nitrogen reaching 0.1% and phosphorus reaching 0.12%. As the degree of salinity increases, these indicators decrease in direct proportion to the amount of humus, as mentioned above.

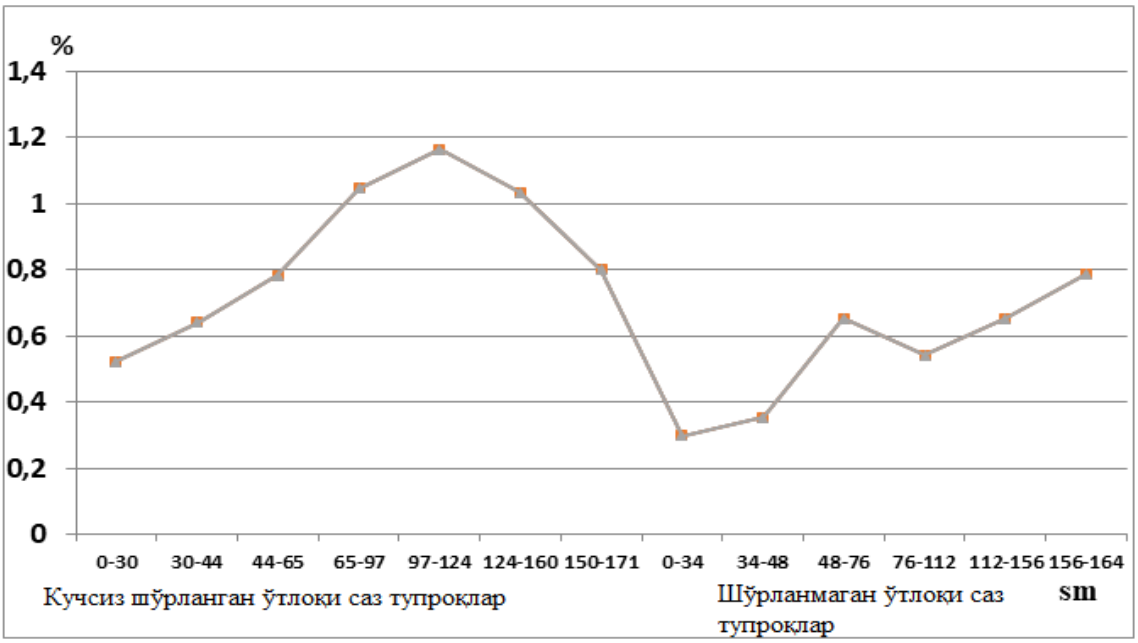

Figure 1. Dry matter content in soils, %

In the cross-section of non-saline, relatively positive cross-section regional hydromorphic soils, the plant nutrition area is wide (100 cm), and nutrients are distributed in a gradually decreasing order towards the lower layers of the cross-section. In their topsoil layers, the total amount of humus is 1.750-1.000%, total nitrogen is 0.170-0.100%, mobile phosphorus is 28-15 mg/kg, and exchangeable potassium is around 166-100 mg/kg, and accordingly, the productivity reaches an average of 35 t/ha.

Conclusion

According to the above, in the process of desalination of soils, the correct direction of the movement of irrigation, leaching and leachate waters in it, their total flow from top to bottom and then, depending on the slope of the area, to the collector-drainage channels, ensuring the activity of this process, is the main factor activating the desalination process. Considering that even with a weak degree of soil salinization, the yield of cultivated crops is lost by about 10-20%, it is clear how important the improvement of the land reclamation condition of soils is in their fertility.

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