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EVOLUTION OF MEADOW SAZ SOILS OF THE EASTERN PARTS OF THE FERGANA VALLEY UNDER THE INFLUENCE OF ANTHROPOGENIC FACTORS

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Abstract
The article highlights the role of anthropogenic factors in the process of modern evolutionary development of irrigated meadow-saz soils of Eastern Fergana.

Keywords: Anthropogenic factor, morphology, mechanical composition, coarse dust, silt, fine sand, evolutionary development, arzik, shoh, gypsum, carbonate, easily soluble salts.

Introduction

In conditions of irrigated farming, the natural course of the creation of the soil, the direction of which is disturbed. Agrotechnical and reclamation activities such as land leveling work, plowing, irrigation and salt washing, drainage, fertilizer release, carried out by the anthropogenic Factor, have a very strong impact on the structure and properties of the soil. As a result, new conditions of the creation of the soil arise, which are sharply different from the conditions of its natural course. The fate of soils in New conditions is formed depending on the correctness, quality and agricultural culture of the complex of activities in which it was applied. In the Fergana Valley, hydromorphous soils are naturally alluvial and saz regime according to the sizot water regime, which are almost complete in the central Fergana desert, being common in relatively swampy areas or riverine coastal areas in the semi-desert (Gray soils) regions surrounded by the desert region. It has its own characteristics and characteristics, depending on the place in which the soils are located, the natural and anthropogenic factors that affect them, such as the period of assimilation.

In studies on the Genesis, evolutionary development and properties of soils formed in the Eastern Fergana area, which we have conducted research over the past time, it was noted that these soils are developing under the influence of specific factors [1., 3., 4., 6., 9]. In these studies, changes under the influence of irrigation, land leveling, fertilizing and similar activities of the human factor, as well as fertility and reclamation of soils, are highlighted.

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It is known that the study of the process of evolutionary development of soils is important in determining the direction of changes taking place in their section, and through it in the development of a system of complex measures in solving many issues, such as preserving them in the future, increasing their productivity, improving their reclamation and rational use. Although in the above studies the issues in this regard are studied, it is not yet fully sufficient.

Object and methods of research. The object of study is the meadow saz soils, formed in Eastern Fergana. When performing field studies, a method of placing soil cuttings along a geochemical-geographical cross-section was used. Also, V.V.The "methodological recommendations"of the Dokuchaev Institute of Soil Science [7] were used.

Research results. The stage of maturity of soil formation and development for a particular area is characterized by the formation of its genetic layers within a certain soil type and its characteristic features and characteristics, as well as a stable level of fertility.

Changes in environmental conditions lead to changes in the geochemical properties of the soil, which in turn leads to a gradual development [5, 34-37 p.] and, as a result, the genetic layers of the soil cross-section, its natural properties and characteristics begin to change, and this leads to an increase in the level of natural productivity. Accordingly, soil properties can also be divided into three groups, namely, “residual” properties inherited from the parent rocks during the formation of the soil, properties that arose during the development of the soil during the period of stability of the ecological environment, and, finally, properties that arose in the process of evolutionary development of the soil.

Thus, the gradual development of soils is understood as the transformation of already developed full-profile soils in connection with the evolution of the entire natural environment. In this case, one genetic type or subtype of soil can transition to another genetic type or type. In the soil profile, the features characteristic of the previous stage of soil formation gradually disappear or are transformed, and new features are formed in accordance with the new stage of soil formation.

In the periods of stagnation (climax) indicated by V.V. Dokuchaev, when soil-forming factors are in equilibrium, changes in soil genetic horizons are weakly expressed, and no large-scale systematic changes in the soil cover are observed.

The balance between these factors was disturbed under the influence of natural factors up to the higher stages of the development of social formations of human society. Ecological factors that have been in balance for centuries have been disturbed by mechanical, irrigation and similar extensive human influences, and the soil covers lying in a state of preservation have undergone extensive changes. In particular, such changes are observed in the grassland soils in our study area, where the seepage waters are in the saz regime.

Due to the high water pressure, marshy soils differ from hydromorphic soils in river valleys in their constant moisture regime. Unlike river valleys, where the depth of groundwater varies sharply during the seasons, depending on the abundance or scarcity of water in the rivers, such changes are not so noticeable on plateaus and slopes; as you move away from the mountains, the period when groundwater is closest to the surface is delayed and falls on the warm season, and thus moisture rises from the soil capillaries even in summer.

Since irrigated agriculture is practiced almost everywhere, as a result of irrigation during the

growing season, filtration of water in irrigation networks, and also washing of soils in saline areas, groundwater remains on the surface throughout the growing season, even in autumn. This type of moisture regime creates soils that differ from alluvial hydromorphic soils by a number of characteristics, which is the basis for distinguishing meadow saz soils as separate soils.

According to our research, the properties and characteristics of valley meadow peat soils, their morphology and changes in their cross-section occur in different regions of the country depending on the specific soil conditions.

Relatively extensive and detailed studies of meadow soils have been conducted in the Central Fergana region of the Fergana Valley, most of which are soils developed after the 1930s-1950s. This cross-section of soils differs from the cross-section of meadow peat soils in the region in that soils with separate, characteristic layers, such as gypsum, loamy, clayey, gypsum-loamy, and clayey-loamy layers, are also widespread.

The studies conducted on the nature of the grassland soils of other regions of the valley, in particular, the eastern Fergana region, are not as extensive as those of the central region, but in general, this can be considered the case for other soil types.

The characteristics and features of the grassland soils of the eastern Fergana region (the Oyim-Khojaobod - Markhamat Adir backwater area), which have different characteristics from the conditions of the Central Fergana region due to their location and origin, have been previously studied by researchers [2.], including the soils of the Andijan region. Later, their changes as a result of the extensive influence of the human factor were also studied [5., 6.], which indicate that the grassland soils in the region are the result of the transformation of their gray grassland soils under the influence of human activities related to irrigation. Under the influence of irrigation, the marsh, marsh-alluvial and alluvial regimes of groundwater are transformed into irrigation types and lead to an increase in moisture content.

Our study area is the territory of the Shakhrikhansay impact zone, and for more than a hundred years, the waters of this network have been used for irrigation. According to our results, the impact of the human factor associated with irrigation has led to specific changes in the soil cover.

In the soils of the study area, as in previous studies of the marsh soils of the central Fergana steppe, high levels of salinity were not observed, but only soils with a weak level of salinity were found [2., 5., 6.]. In some soil sections, it is reported that, as in the central Fergana region, very dense layers of sediment are found in the lower layers, and the amount of carbonates increases downward in soil sections across the region.

In our studies, in contrast to the works of the above researchers, it was found that in the section of meadow peat soils irrigated by the waters of the Shakhrikhansai River, which we selected as the study area, there are no nutrient layers, both according to the results of morphological analysis of the soil profile and according to the results of chemical analysis. However, the noted nutrient layers are widespread in the soils of the region, and as previously recognized, the content of carbonates in the soil increases from the surface layers (8-11%) to the lower layers, reaching a maximum (16-18%) in the lower layers. However, as noted in the scientific literature (O.K. Komilov, V.Yu. Isakov.1992., V.Yu. Isakov., U.B. Mirzaev. 2009), it is not accumulated

in high quantities together with gypsum and therefore, according to the classifications of existing soil salinity, it is considered to be saline soils and belongs to the category of weak and moderately saline soils. Usually, the fertile soils that were previously studied in the region were formed in areas adjacent to the region.

Such a peculiarity in the soils of the region can be associated with the irrigation period and its inputs. Because, after the completion of the Shakhrikhansay canal, the process of sulfate salts in its waters and their deposition began, as well as the intensity of its leaching, the activity of the sluice gates, and other similar processes.

However, it is observed that the irrigation results have a significant effect on the mechanical composition of the soil, and the changes in this regard confirm the results of the research conducted in the regions adjacent to our research area of Eastern Ferghana [2., 5., 6.].

As is known, the main properties and characteristics of soils are formed based on their mechanical composition. According to the cross-sectional description and analysis data of the soil condition of the region, the soil layers up to 30 cm above the surface are characterized by a heavy loamy mechanical composition in the middle and lower layers [2].

The Shakhirhonsoy, which exists due to the Karadarya waters, which flow turbidly from its formation zone to the plain part of the valley, has also been constantly depositing these rocks in its irrigated areas to varying degrees depending on the seasonality of the seasons. As noted in the scientific literature, these deposits are rich in carbonates and are mainly of a light loamy mechanical composition. This factor has had a certain impact on the mechanical composition of the areas irrigated by the waters of the Shakhirhonsoy, which has been in use for almost 150 years, and therefore on the properties and characteristics mentioned above.

The extent of the changes, primarily in their mechanical composition, was reflected to a small extent in the tabular data.

Mechanical composition of soils of the study area

Cut №	Depth, cm	Fractions %							The amount of physical clay,%	Mechanical structure
		>0,25	0,25-0,1	0,1-0,05	0,05-0,01	0,01-0,005	0,005-0,001	<0,001		
1949. B.V. Gorbunov	0-10	19,09	5,55	33,86	4,25	11,15	15,70	10,40	37,25	Medium grain
	20-28	17,79	5,41	9,25	27,05	10,80	17,90	11,30	40,00	Medium grain
	35-55	3,56	2,63	6,91	25,15	18,05	25,70	18,00	61,75	Light word
	50-70	2,19	2,87	4,94	33,05	10,75	22,80	23,40	56,95	Heavy sand
2024. M.I. Kuldasheva	0-33	8,4	4,2	26,5	28,4	14,3	11,8	6,4	32,5	Medium grain
	33-48	5,2	2,8	21,2	36,5	12,4	14,6	7,3	34,3	Medium grain
	48-66	3,4	2,0	12,4	40,4	13,2	20,2	8,4	41,8	Medium grain
	66-116	2,3	1,4	11,1	39,2	12,3	23,4	10,3	46	Heavy sand
	116-146	4,2	1,2	9,7	36,0	12,4	23,2	13,3	48,9	Heavy sand
	146-185	3,8	2,1	14,6	29,1	12,9	22,4	15,1	49,4	Heavy sand

The cross-section of the grassy soils preserved in the area was mainly replaced by heavy mechanical composition towards the middle and lower layers (Gorbunov, 1949). According to the author's sources, among the fractions, dust particles were the majority, and among them, large, followed by small and medium amounts of dust prevailed. The amount of physical clay increased from 37% to 60% in both the reserve analogues and the irrigated analogues.

Subsequent studies (V. Isakov., U. Mirzaev., Sh. Mansurov, etc.) showed that the changes in the stratification of the mechanical composition of the soil by fractions, and in the general stratification, have moved towards easing in the meadow soils of the valley, which are irrigated. shows that it is giving.

Large dust (0.05-0.01mm - 28-41%) and fine sand (0.1-0.25mm - 9-21%) were the majority in the studied soils in our research. Medium dust (0.01-0.005 mm – 12-14%) and fine dust (0.005-0.001 mm – 6-15%) were in the next places. According to the analysis, the upper layers of the soil were slightly lighter due to the increase of large dust and fine sand particles under the influence of the deposits, and the result of such an effect decreased towards the lower layers, and almost no changes were observed in the lower fertile layers. Downward, on the other hand, the amount of fine dust and silt fractions remained the same as in previous periods and has high values.

Usually, such changes occur naturally under the influence of irrigation, and this phenomenon was recognized by researchers B.V. Gorbunov and others who conducted studies in the region as a result of the richness of Central Asian river waters. Also, the information on the composition of loess given in scientific sources indicates that particles of 0.002-0.005 mm (dust fractions) make up the majority of it, and about 5-30% are clay fractions smaller than 0.002 mm. Due to this, the quantitative composition of the granulometric fractions of the solid part of the soil changes. The granulometric composition of the soil is also expressed in the form of its structural fragments. The forms of lumpy, lumpy granular and granular aggregate gradually pass into a lumpy form towards the bottom. This situation is mainly due to many factors, for example, the composition of humus and infiltrated bases and the mechanical structure of the soil, but the changes occur more depending on the composition of mechanical elements.

Conclusion

According to the above, in the direction of changes in the soils of the research object, the anthropogenic factor is characterized by the fact that it sets in motion a stagnant period in the gradual development of soils, does not exert its influence on some factors in the formation and development of soils (climate, age of the region), but acts as a factor controlling the active change of other factors (mother rock, relief, flora and fauna). Now, directing the movement of this factor in the right directions can serve as a solution to all issues related to the soils of the region.

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