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Research Article

PROPERTIES OF SOILS LOCATED IN DIFFERENT GEOMORPHOLOGICAL CONDITIONS

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ABSTRACT

Soil properties can vary to some extent depending on the geomorphological conditions in which they are located. This is due to the diversity of parent rocks, layering and mechanical composition of the soil. The article presents and compares the properties of irrigated gray-meadow, meadow and marsh-meadow soils located on terraces I, II, III of the Syrdarya River. Based on the results obtained, recommendations are given for the rational placement of plants.

KEYWORDS

Terrace, proluvial, alluvial, loess deposits, ground water level, soil salinity, mechanical composition, humus, nitrogen, phosphorus, potassium, dry residue, sulfate, chlorine.

INTRODUCTION

Scientists from different countries have published scientific data on changes in soil properties depending on the geomorphological position. However, the data obtained differ depending on the unique natural and climatic conditions of the regions.

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In the researches of Y.Wang, Y.He, J.Zhan, Z.Li [1], it was determined that the spatial structure of soil particles is different depending on the location of the terrace of the river bank. He compared the properties of soils distributed in the foothills, central alluvial plains, and eastern coastal plains. According to the geomorphological conditions of the soil distributed on the river bank, the mechanical composition of the soil determined the distribution of sand, sand, loam and clay particles.

According to E.A.Batrachenko [2], soil properties mainly depend on the parent rocks that form the soil. The strength of anthropogenic impact on soil properties also directly depends on the geomorphological conditions of the soil. The different topography of the Kurs region has a direct impact on erosion processes. It is noted that the ecological conditions of soils located in different geomorphological conditions are also different.

G.V.Dobrovolsky, P.N.Balabko, N.V.Stasyuk, E.P.Bykova [3] gave information about the specific characteristics and properties of alluvial soils. It has been proven that the soils of the river banks have high biogenicity and intensive soil formation processes.

N.A.Shaporina, A.V.Chichulin [4] and M.V.Konyushkova, B.D.Abaturov [5] studied the effect of microrelief on the hydrothermal condition of the soil cover. It is noted that the hydrothermal conditions of the soils located below in terms of microrelief are rich in moisture and relatively cold.

S.S.Gudimovich [6] expressed his opinion on the location, naming and description of river terraces. He gave a description of soil properties depending on the location of each terrace, analyzed the data of various scientists. The location schemes of the terraces and information on their description are presented.

L.A.Yablonsky [7] provided information on the history of studying the soils of river banks. As a result of the soil being constantly wet, the process of glaciation occurred. This was also shown in the morphological characteristics of soils. As a result of the gliding process, the structure of the soil is disturbed, and the number of useful microorganisms decreases.

Studies have been conducted on the different properties of the soils located in different parts of the Mirzachol oasis and the changes in the soil as a result of human activities. It was noted that the properties of the soils in the old and newly developed parts of Mirzachol differ from each other [8-13].

Research methods. Special experiments were conducted to study the properties of soils located on different terraces of the Syrdarya River. For this, “key sites” were selected from the areas located on the I, II and III terraces of the river. When choosing these areas, they tried to be typical for this terrace. Soil cuttings were placed on selected “key sites”. Soil morphological features were studied and compared. Soil samples were taken from soil sections and analyzed. Soil granulometric composition, total humus, nitrogen, phosphorus, potassium, mobile phosphorus and potassium, water absorption were analyzed.

Results and discussions. In order to study the properties of soils located on different terraces of the Syrdarya river, two massifs in Gulistan district were selected: massifs named “Boyovut” and “Uch Qahramon”. Below is information about the description and mechanical composition, agrochemical parameters of the soils located on the river terrace of these massifs.

It consists of newly irrigated marsh-meadow soils located on the upper terrace I of the Syrdarya,

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consisting of alluvial deposits of the 26th cross-section layer.

The granulometric composition of the soil consists of medium sand

(Table 1). The granulometric composition of the soil is dominated by large dust particles typical of all gray soils. The thickness of the humus layer is 65 cm, the amount of humus in this layer is 1.30% in the 0-30 cm layer, 0.85% in the 30-50 cm layer, the amount of mobile phosphorus is 8.5 in the 0-30 cm layer, 7.0 in the 30-50 cm layer mg/kg, and exchangeable potassium is 80 and 120 mg/kg, respectively. The clayey layer is found at 100 cm. The level of ground waters is 125 cm.

Table 1

Granulometric composition of the soil

№ cross section	Layer thickness, in cm	Fractions of mechanical composition , %							
		1-0,25	0,25-0,1	0,1-0,05	0,05-0,01	0,01-0,005	0,005-0,001	<0,001	Aggregate of physical clay , %
It consists of layered alluvial deposits. Freshly irrigated swamp-meadow soils located on the first terrace of the Syrdarya									
26	0-35	0,5	0,2	13,6	43,3	22,4	12,1	7,9	42,4
	35-45	0,4	0,3	23	35,2	11,8	20,9	8,4	41,1
	45-60	0,3	0,3	19	46,3	22,5	7,4	4,2	34,1
	60-82	0,5	0,4	20,9	36,3	22,8	14,2	4,9	49
	82-100	0,3	0,2	22,3	33,9	24,2	17,2	1,9	43
	100-125	0,1	0,1	20,5	38,6	16,5	16,4	7,8	20
It consists of irrigated meadow soils, located on the II - above-ground terrace of the Syr Darya, consisting of layered alluvial deposits.									
33	0-40	0,5	0,1	17,7	31,7	21,4	18,8	9,8	50
	40-60	0,8	0,2	16,8	35,9	24,1	13,2	9	39,3
	60-80	0,1	0,1	15,8	37,3	18,5	18,3	9,9	43,7
	80-100	1,8	0,2	28,5	33	15,7	13,4	7,7	36,5
	130-160	0,4	0,5	20,8	49,9	10,7	9,6	8,1	28,4

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It consists of irrigated gray-meadow soils located on the III-overland terrace of the Syrdarya, consisting of alluvial-proluvial and loess deposits.									
34	0-35	0,8	0,1	18,3	40,1	18,3	11,8	10,6	40,70,
	35-50	1,6	0,1	14,7	38,0	15,6	19,6	10,4	45,6
	50-75	0,3	0,3	12,6	38,9	16,4	18,0	13,5	47,90
	75-100	15,9	0,6	16,4	41,1	9,7	9,8	6,5	26,00
	140-200	0,7	0,2	20,9	36,0	28,3	8,4	3,5	40,20

The 33rd cross-section consists of irrigated meadow soils located on the II-serum terrace of the Syr Darya, consisting of layered alluvial deposits.

The mechanical composition of the soil consists of heavy and light sand. The thickness of the humus layer is 65 cm, the amount of humus in this layer is 1.37%. The clayey layer is found at 120 cm. The level of ground waters is 200 cm.

Cross-section 34 consists of irrigated gray-meadow soils located on the III-overland terrace of the Syr Darya, consisting of alluvial-proluvial and loess deposits.

Table 2

Nutrients in the soil

№	Depth, cm	N	Gross, %		Active, mg/kg	
			P_2O_5	K_2O	P_2O_5	K_2O
26	0-30	0,168	0,153	1,250	8,5	80,0
	30-50	0,100	0,127	1,18	7,0	120,0
33	0-30	0,114	0,130	1,280	12,2	100,0
	30-50	0,148	0,119	1,56	8,0	60,0
34	0-30	0,134	0,150	1,360	15,2	220,0
	30-50	0,114	0,144	1,280	8,5	50,0

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The mechanical composition of the soil consists of medium and light sand. The thickness of the humus layer is 60 cm, the amount of humus in this layer is 1.40%, the amount of mobile phosphorus is 15.2 mg/kg in the 0-30 cm layer, and 8.5 mg/kg in the 30-50 cm layer, and exchangeable potassium is 220 in the 0-30 cm layer. In the 30-50 cm layer, it is 50 mg/kg. The density is average. There is no clay layer. The level of ground waters is 255 cm.

If one pays attention to the sections located on different terraces of the Syrdarya, first of all, one can see the difference in the depth of seepage waters in them. In the cross-section located on the I-terrace of the Syr Darya, the level of seepage water is higher, while in the cross-section located on the III-upper terrace, it is about 2.5 meters. Correspondingly, the depth of meeting the gley layer also differs.

Also, soil agrochemical properties have different indicators in three sections. The amount of total nitrogen in section 26 is relatively higher than other sections. This is related to the humus and nitrogen content of grassland soils. The amount of total phosphorus and potassium was distributed almost uniformly in all three soil sections. But the indicators of the 3 sections differ from each other in terms of the amount of mobile phosphorus. It is 7-8.5 mg/kg in cut 26, which is very low. This is related to the process of soil grazing. The soil located on the second and third terraces has a relatively higher index in the sections. The amount of mobile phosphorus is low in grassy soils due to the fact that the binding force of phosphorus is intensive.

CONCLUSIONS

The experiment found that the properties of soils located in the same area, but located on different river terraces, are also different. These differences are primarily manifested in the morphological features of the soil. Meadow soils are relatively darker in color because they are richer in humus than other soils. Due to constant moisture, gleying is observed, as a result of which a bluish gley layer forms on the soil profile. In addition, differences in the mechanical composition of the soil, salinity and agrochemical parameters can be observed. Given the above, it is recommended to plant moisture-loving plants on the soil of the I-terrace of the river.

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