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CHANGE OF THE MECHANICAL COMPOSITION, THE DEGREE AND TYPES OF SALINITY, AND THE AMOUNT OF HUMUS OF THE GRASSLAND-ALLUVIAL SOILS WITH RICE PLANTATION

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Abstract:
The article provides information on the mechanical composition of meadow-alluvial soils, the results of water absorption, the content of salts in soils, the levels and types of salinization, as well as the soil environment (pH) associated with rice crops, leaching and increasing the content of humus in the soil towards the lower layers of the soil.

Keywords: Meadow-alluvial soils, mechanical composition, seepage waters, plow and subplow layers, water absorption, salinity, content of salts and chloride ions, soil environment, humus condition.

INTRODUCTION

In the irrigated zones of the Republic of Karakalpakstan, meadow-barren, barren-meadow and meadow-alluvial soils are widespread, and they differ significantly from each other according to their water-physical, physico-chemical, agrochemical, biological properties, soil-ameliorative condition and mechanical composition. The fertility of the soil is primarily related to the amount of boron humus, and the mechanical composition of the soil has a significant impact on the state of the above-mentioned processes. Determines the rates of soil salinization, salinization and plastering, the condition of underground groundwater and their level of leakage.

REVIEW OF THE LITERATURES.

Water-salt, heat and nutrient regimes of soils, its specific resistance during tillage, porosity level, viscosity, buffering and buffering properties, number of irrigations, norms, number and duration of salt washing, trench parameters, tillage techniques and technologies, moisture retention, movement of saline solutions in the soil profile, salt accumulation and secondary salinity conditions, water-salt regime and balance, supply of nutrients to plants, biological activity, and fertility and productivity levels also depend on the mechanical composition of soils [1; 280 pp.].

The leaching of salts contained in the soil is also related to the state of humus. Grassland soils have a long history in origin, and in the region they were formed in recent decades as a result of the re-formation of barren and barren-meadow soils. varies up to (0.1-0.5%) [2; 188 pp.].

Therefore, in the assessment of the meliorational and ecological condition of the irrigated soils of certain areas, massifs, farms and farms, the mechanical composition of the soils is put as its basis.

The total land area of the center in the area of the "Scientific Grain and Rice Production Center" of the Nukus District of the Republic of Karakalpakstan is 233.2 hectares. One hectare of plot #1744 and 1.3 hectares of plot #1745 were selected for research. From the genetic layers of selected field soils and 1 main section (0-30; 30-50; 50-80; 80-100; 100-150; 150-200) and two auxiliary sections (0-30; 30- 50; 50-80; 80-100) were placed and soil samples were taken according to soil genetic layers from the selected contours at the end of the growing season of the rice plant. Soil chemical analyzes were carried out in 3 replicates and statistically analyzed.

RESULTS.

The amount of physical clay particles (<0.01 mm) in the meadow-alluvial soils of the studied "Shortanboy" was observed in amounts from 10.5-14.2 to 57.5-64.9%, and in the layers with a mechanical composition of sandy loam, it was shown above 10, 5-14.2%, 20.3-23.7% in light sands, 37.2-42.2% in medium sands, and 57.5-64.9% in heavy sands and clays (1- table). Among the mechanical elements, large dust particles (0.05-0.01 mm) take the leading place, its amount reaches 70-75% in some sandy layers. The amount of il fractions smaller than 0.001 mm fluctuates in a wide range, from 1.4-3.5% to 12.1-15.7% (1-scheme).

1-Scheme
Mechanical composition of meadow-alluvial soils

Section, no	Depth, cm	Particle size in mm, quantity in %							Physical clay	The name of the soil according to its mechanical composition
		Sand			Dust			Il		
		>0,25	0,25-0,1	0,1-0,05	0,05-0,01	0,01-0,005	0,005-0,01	<0,001	<0,01мм, %	
Before planting rice, 25.05.2021 й.										
1	0-40	5,6	1,4	17,85	51,4	5,5	10,45	7,8	23,75	Light sand
	40-70	0,4	0,1	28,7	60,3	4,6	4,5	1,4	10,5	Sand
	70-94	0,4	0,1	2,4	39,6	26,9	18,9	11,7	57,5	Heavy sand
	94-110	1,2	0,3	10,3	46,0	19,4	13	9,8	42,2	Medium grain
	110-150	0,4	0,1	11,5	70,2	7,3	7,0	3,5	17,8	Sand
2	0-30	2,6	0,65	6,15	70,25	13,5	4,85	2,0	20,35	Light sand
	30-50	0,4	0,1	18,45	66,85	6,75	5,7	1,75	14,2	Sand
	50-80	0,4	0,1	13,0	75,6	4,8	4,8	1,3	10,9	Sand
	80-100	0,8	0,2	0,5	33,6	23,6	5,6	15,7	64,9	Light clay
	100-150	0,4	0,1	16,3	69,1	5,5	6,6	2,0	14,1	Sand
	150-200	0,4	0,1	1,0	61,3	14,4	10,7	12,1	37,2	Medium grain

Information on salinization processes, amount of salts, degree and types of salinity in the irrigated soils of the Republic of Karakalpakstan is given in the collective monograph called "Soils of the Republic of Karakalpakstan" and in the collective monographs on the soils of the Khorezm region, a complete description of the condition of the soils distributed in the region [3; pp. 110-118, 2; 188 pp.].

These meadow-alluvial soils are saline to varying degrees, and the amount of water-soluble salts in dry residue was 1,110-1,885% in the upper arable layer of the soil before planting rice (25.05.2021), and 5,556-0,495% in the sub-arable layer. , according to the results of repeated chemical analyzes (water absorption analysis) of soil samples taken after the end of the vegetation period and the cessation of irrigation, the amount of salts in the arable layer of section 1 decreased from 1.110% to 0.270%, and in the sub-arable layer from 0.556% to 0.175%, it was noted that the amount of fresh salts decreased by 4.1 and 3.2 times for the indicated layers, respectively (Table 2).

The amount of salts in the arable layer of section 2 decreased from 1.885% to 0.320% by the end of the growing season, and in the sub-arable layer from 0.495% to 0.286% or 5.9 and 1.7 times. Leaching of salts was also observed in the lower layers, and the amount of salts in the 150-200 cm layer (section 2) decreased from 0.335% to 0.175% or 1.9 times. If we analyze the changes in the dynamics of the amount of chlorine ions, then the amount of chlorine ions in the plowed layer of section 1 decreased from 0.108% to 0.021%, from 0.056% to 0.021% in the subsoil layer, or 5.1 and 2.7 times, respectively (2 -table).

The ratio of sulfates to the amount of chlorine (in mg-equiv. indicator) fluctuated between 1.44-1.64 and 4.01-4.71 in both sections, according to salinity chemistry chloride-sulfate, 0-30 and 30-50 of section 2 cm layers consist of types of sulfate salinity, the ratio of sulfates to chlorine content is 5.05-7.54. The soils are mostly weak, and some layers were recorded as moderately salinized before rice planting (Table 2).

Heavy metals in soils several times higher than REM can lead to a decrease in humus content.

In the studies conducted by László F and Szegedi L., the effect of heavy metals on humus content was studied, and a strong regression was found in the concentration of pollutants in the soil, enriched with heavy metals. Regression can be characterized

2-Table

Amount, degree of salinity and types of water-soluble salts in irrigated meadow-alluvial soils

№	Depth см.	Dry residual	HCO_3	Cl	SO_4	Ca	Mg	Na+	Anions and cations	Collection of components	SO4/ Cl	Salinity: Type	Salinity: Level	pH indications
			%%											
	Status before planting rice, 25.05.2021й.													
1	0-40	1,110	0,024	0,108	0,586	0,115	0,036	0,089	15,61	0,958	4,01	X-C	Strongly salted	7,78
			0,39	3,04	12,18	8,73	3,00	3,88	11,73					
	40-70	0,556	0,027	0,056	0,290	0,090	0,012	0,060	8,05	0,535	3,82	X-C	Medium salted	7,76
			0,44	1,58	6,03	4,49	0,99	2,57	5,48					
	70-94	0,310	0,027	0,049	0,128	0,030	0,012	0,046	4,48	0,292	1,93	X-C	Medium Salted	7,86
			0,44	1,38	2,66	1,49	1,0	1,99	2,49					
	94-110	0,240	0,030	0,035	0,094	0,040	0,006	0,021	3,42	0,226	1,99	X-C	Lightly salted	8,03
			0,49	0,98	1,95	1,99	0,50	0,93	2,49					
	110-150	0,200	0,030	0,035	0,068	0,030	0,006	0,020	2,88	0,189	1,44	X-C	Lightly salted	8,07
			0,49	0,98	1,41	1,49	0,50	0,89	1,99					
2	0-30	1,885	0,024	0,311	0,804	0,200	0,061	0,250	25,88	1,650	1,91	X-C	Lightly salted	7,98
			0,39	8,77	16,72	9,98	5,01	10,89	14,99					
	30-50	0,495	0,024	8,77	16,72	9,98	5,01	0,030	7,05	0,468	7,54	C	Lightly salted	7,22
			0,39	0,78	5,88	4,24	1,50	1,31	3,96					
	50-80	0,275	0,027	0,045	0,109	0,040	0,006	0,034	3,96	0,261	1,79	X-C	Lightly salted	7,70
			0,44	1,26	2,26	1,99	0,50	1,470	2,49					
	80-100	0,270	0,030	0,035	0,118	0,035	0,009	0,033	3,92	0,260	2,50	X-C	Lightly salted	8,00
			0,49	0,98	2,45	1,74	0,75	1,430	2,49					
	110-150	0,200	0,030	0,035	0,068	0,030	0,006	0,020	2,88	0,189	1,44	X-C	Lightly salted	8,07
			0,49	0,98	1,41	1,49	0,50	0,89	1,99					
	150-200	0,335	0,030	0,063	0,131	0,030	0,012	0,057	4,98	0,323	1,54	X-C	Medium salted	8,15
			0,49	1,77	2,72	1,49	1,00	2,490	2,49					

2-Continuation of the table

№	Depth см.	Dry residual	HCO_3	Cl	SO_4	Ca	Mg	Na+	Anions and cationsa	Collection of components	SO4/Cl	salinity type	salinity level	pH indications
			%%											
	Status before planting rice **24.11.2021 й.**													
1	0-40	0,270	0,027	0,021	0,134	0,040	0,009	0,025	3,81	0,256	4,71	X-C	Medium salted	8,10
			0,44	0,59	2,78	1,99	0,75	1,070	2,74					
	40-70	0,175	0,030	0,021	0,064	0,035	0,003	0,010	2,41	0,163	2,25	X-C	Medium salted	7,92
			0,49	0,59	1,33	1,74	0,25	0,420	1,99					
	70-94	0,215	0,030	0,024	0,087	0,035	0,003	0,022	2,96	0,201	2,69	X-C	Medium salted	7,92
			0,49	0,67	1,80	1,74	0,25	0,970	1,99					
	94-110	0,210	0,033	0,024	0,083	0,035	0,003	0,022	2,93	0,200	2,57	X-C	Medium salted	8,09
			0,54	0,67	1,72	1,74	0,25	0,940	1,99					
	110-150	0,155	0,033	0,021	0,046	0,025	0,003	0,014	2,08	0,142	1,61	X-C	Medium salted	7,93
			0,54	0,59	0,95	1,24	0,25	0,590	1,49					
	150-200	0,170	0,030	0,021	0,059	0,025	0,003	0,019	2,30	0,157	2,07	X-C	Medium salted	7,42
			0,49	0,59	1,22	1,24	0,25	0,810	1,49					
2	0-30	0,320	0,027	0,021	0,168	0,045	0,006	0,040	4,53	0,307	5,93	C	Medium salted	7,87
			0,44	0,59	3,50	2,25	0,50	1,78	2,75					
	30-50	0,286	0,024	0,024	0,143	0,030	0,012	0,040	4,06	0,273	4,32	X-C	Medium salted	7,52
			0,39	0,69	2,98	1,50	1,00	1,56	2,50					
	50-80	0,195	0,033	0,021	0,075	0,030	0,003	0,022	2,69	0,184	2,64	X-C	Medium salted	7,98
			0,54	0,59	1,56	1,49	0,25	0,950	1,74					
	80-100	0,235	0,030	0,021	0,105	0,040	0,003	0,023	3,26	0,222	3,69	X-C	Medium salted	8,09
			0,49	0,59	2,18	1,99	0,25	1,020	2,24					
	100-150	0,205	0,033	0,021	0,082	0,035	0,003	0,019	2,83	0,193	2,88	X-C	Medium salted	8,02
			0,54	0,59	1,70	1,74	0,25	0,840	1,99					
	150-200	0,175	0,030	0,021	0,063	0,030	0,003	0,015	2,39	0,162	2,22	X-C	Medium salted	7,97
			0,49	0,59	1,31	1,49	0,25	0,650	1,74					

by a quadratic equation, which consists of quadratic and linear frequency. Both parts have a significant but adverse effect on soluble humus. [7; P. 255-258.].

Soil organic matter is involved in the retention of heavy metals, reducing mobility and bioavailability [4; P. 123–131.].

Purification of polluting toxicants in the soil is considered one of the main agrotechnologies for ecologically clean agricultural products.

In this regard, Cd in wastewater was effectively treated by adding a small dose of calcium hydroxide, reducing its concentration below the discharge limit of 0.1 mg/l in China. Future economically efficient and safe, huminous substances have great potential for replacing conventional soil remediation agents, contaminated Cd. In addition to being environmentally friendly, humic substances can improve physical, chemical and biological properties of soil 5P. 461-467.]

Different indicators of soil agrochemical analyzes depend on genetic layers. It was observed that humus content decreases to 0.92% in plowed soils at 0-40 cm, and to 0.71% under plowed soil, and to 0.31% in lower layers.

The decrease of humus content in the rice fields towards the lower layers was also observed in the samples taken from the same soil layers.

In the 0-30 cm layers of the first and second sections with the same layer spacing, it is in the range of 0.96-1.05%, and under the drive (30-50 cm) in the range of 0.76-0.87%, and towards the lower layers 0, It was determined to be 18-0.23%.

It was observed that in the fields planted with rice, the water stays under water for 4 months depends on the agrochemical condition of the soil and other properties.

According to scientists, the nature and speed of humus formation depends on fertilization and liming system, the use of fertilizer system increases the humus reserves at the same time by 52.88±1.37 t/ha, but according to the acid-base buffering capacity, liming humus level is 1.76±0 up to .04%, and it has been proven to increase reserves by 48.22±1.10 t/ha [6; P. 320-328.].

In our field experiments, changes in the amount of salts and humus in the soil, which were continuously under water for 4 months (June-September 2021), were observed. During the growing season of rice, 400 kg of ammonium sulfate and 100 kg of urea were used in physical form for fertilizing from mineral fertilizers per hectare.

According to the genetic layers of the soil, we can observe that the amount of humus is 1.12±0.093% in the tillage layer and increases by 0.200% since the beginning of the season. +0.047% (Table 3).

3-table

Humus % content of experimental field soil.

№	**Depth см**	**Mean of repetitions and standard error**	**Mean of repetitions and standard error**
		Before the season 25.05.2021	**After the season 24.11.2021**
1-genetic layer	0-40	0,92±0,078	1,117±0,093
	40-70	0,71±0,070	0,873±0,095
	70-94	0,66±0,120	0,580±0,140
	94-110	0,57±0,151	0,600±0,020
	110-150	0,407±0,147	0,440±0,020
	150-200	0,313±0,031	0,360±0,020
1	0-30	0,96±0,020	0,95±0,015
	30-50	0,87±0,025	0,74±0,020
	50-80	0,48±0,020	0,66±0,020
	80-100	0,36±0,015	0,56±0,020
	100-150	0,32±0,021	0,48±0,025
	150-200	0,23±0,030	0,38±0,031
1A	0-30	1,12±0,125	1,00±0,191
	30-50	0,57±0,085	0,57±0,081
	50-80	0,54±0,051	0,53±0,079
	80-100	0,45±0,023	0,44±0,010

1Б	0-30	1,18±0,086	1,05±0,163
	30-50	0,78±0,015	0,53±0,214
	50-80	0,62±0,090	0,59±0,040
	80-100	0,56±0,021	0,47±0,015
2	0-30	1,05±0,218	0,99±0,168
	30-50	0,76±0,091	0,66±0,087
	50-80	0,56±0,140	0,55±0,026
	80-100	0,64±0,025	0,51±0,020
	100-150	0,62±0,020	0,44±0,122
	150-200	0,18±0,023	0,163±0,025
2A	0-30	1,20±0,028	1,19±0,040
	30-50	0,71±0,136	0,69±0,026
	50-80	0,59±0,153	0,53±0,101
	80-100	0,33±0,021	0,32±0,026
2Б	0-30	1,21±0,162	1,18±0,111
	30-50	1,15±0,097	1,14±0,147
	50-80	0,81±0,035	0,79±0,025
	80-100	0,32±0,085	0,31±0,017

As a result of standing under water for 4 months, the dry residual rice plant in the soil changed from 1.00% to 0.380% towards the lower layers, and in the 2nd cross-section it was in the range of 1.120-0.160%. -9.121% decrease was observed in the -section (Fig.1).

Salt leaching, as shown in the figure, was observed to be a total of 0.696% along genetic layers 0-150 cm in section 1, and an increase in the amount of humus along layers up to 200 cm of section 2 was 0.696-1.005%, respectively (Figure 1).

It was found that the change of humus in genetic layers depends on the mechanical condition of the soil. Because the 70-94 cm layer of the soil has a heavy mechanical composition, it was observed that the amount of humus did not change after the season. An increase in the amount of humus was observed in all other layers.

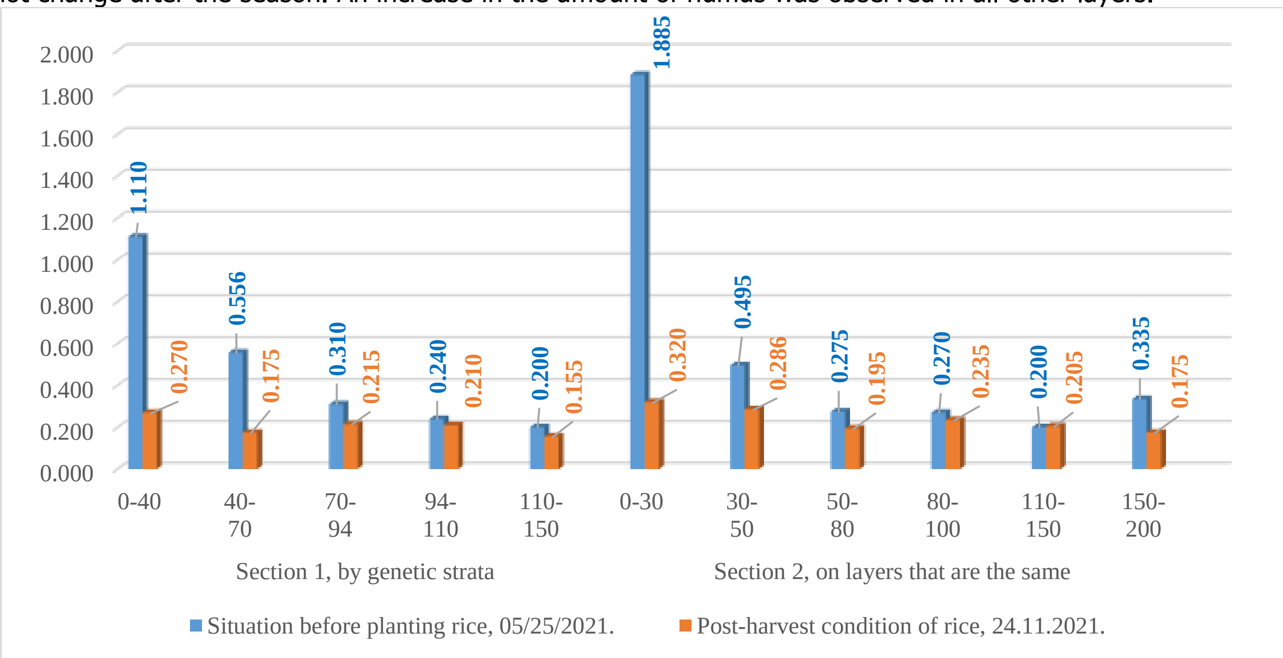

Figure 1. Variation of dry matter in soil samples from genetic and homogenous layers

0.420% salt content was reduced in the 0-40 cm soil taken from the 1st cross-section layer, which is light sandy soil, and in the 2nd cross-section, this condition was observed to decrease only in the 0-30 cm layer, i.e. by 0.783%.

Genetic layer (0-40 cm) and homogeneity (0-30 cm) decreased by 0.40% in the soil layers, and in the next fourth layer it decreased by 0.015-0.018% in both sections.

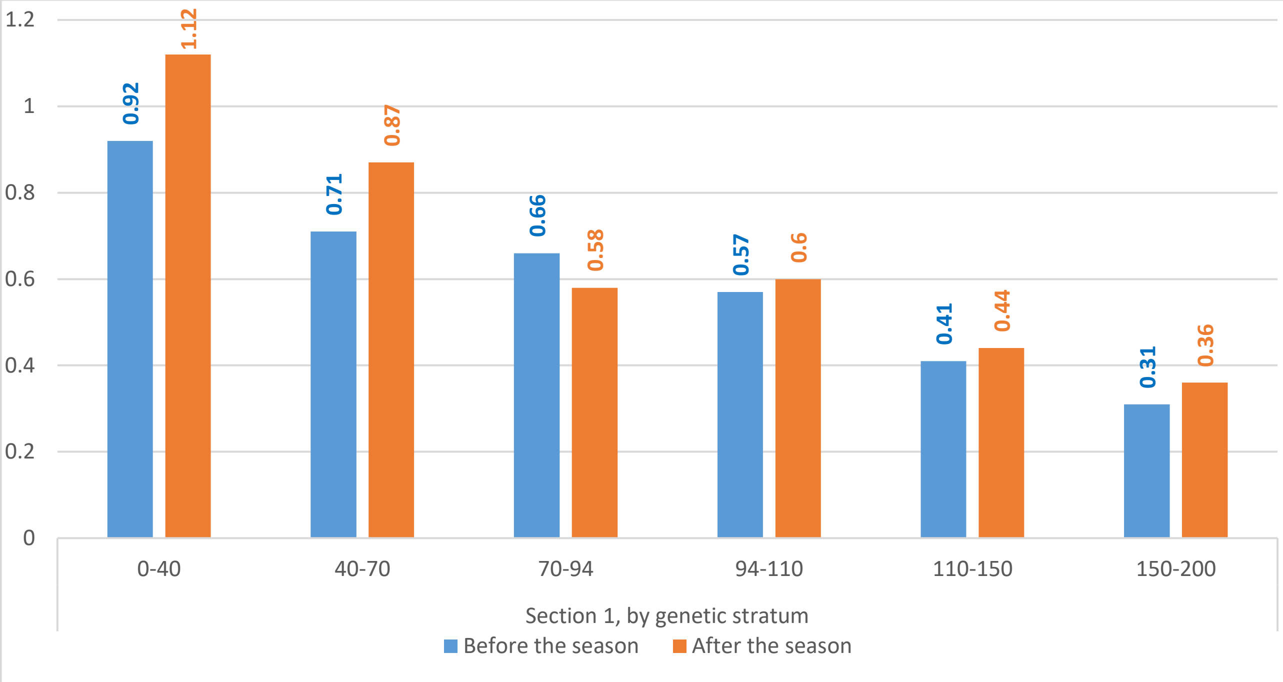

Figure 2. Release of the amount of humus contained in the soil from the stress state, %

It was observed that humus increased by 0.20% in the driving layer (0-40 cm), and by 0.16% in the sub-driving soil (40-70 cm), and towards the lower layers 94-110 cm - 0.030%, 110-150 cm - 0.030%, an increase in humus content by 0.050% was observed in the lower layer of 150-200 cm.

In conclusion, it was found that the leaching of humus and toxic salts from the upper layers to the lower layers depends on the mechanical composition of the soil, and the amount of humus decreases by 0.6% due to the lack of aeration in the layers with heavy mechanical composition. As a result of agrochemical analyzes of samples taken from genetic layers as a result of field soils being constantly under water for 4 months, 0.696% dry residue leaching was achieved at 0-150 cm.

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