MECHANICAL COMPOSITION OF NEWLY IRRIGATED SEROZEM-MEADOW SOILS OF ARNASOY DISTRICT, JIZZAK REGION

Normatov Yodgor Mamanazarovich,*
Freelance researcher
Akhmedov Almon Usmonovich,*
Candidate of agricultural sciences, senior researcher
Berdimuratov Zakhiriddin Komiljon ugli,**
Magistr
**Institute of soil science and agrochemical research*
***Tashkent State Agrarian University*

Annotation. This article presents information on the granulometric mechanical composition of newly irrigated serozem-meadow soils distributed in the "Kazakhstan" massif of Arnasoy district in Jizzakh region. Depending on the relief, geomorphological-lithological structure of the area, some specific characteristics of the mechanical composition of soils have been determined.

Key words: Soil, mechanical composition, newly irrigated serozem-meadow soil, medium sand, light sand, microaggregate, water permeability, capillarity, porosity, moisture capacity, density, fine sand, dust particles, morphological characters.

Аннотация. В данной статье представлены данные по гранулометрическому механическому составу орошаемых серо-луговых почв, распространенных в массиве “Казахстан” Арнасайского района Джизакской области. Выявлены некоторые особенности механического состава почв в зависимости от рельефа местности, геоморфолого-литологического строения.

Ключевые слова: Почва, механический состав, новоорошаемая серо-луговая почва, средний песок, легкий песок, микроагрегат, водопроницаемость, капиллярность, пористость, влагоемкость, плотность, мелкий песок, пылевые частицы, морфологические признаки.

Introduction

The main tasks facing our country today are to optimize the properties of irrigated land used in agriculture, improve the ecological and meliorative condition, protect it from various degradation processes, restore and increase its productivity, effectively use the land, develop, and ensure the stability of agricultural production.

The issue of agrotechnical and meliorative measures used in this regard should be conducted based on the natural-soil and human-economic conditions of each region (territory), massifs, comprehensive research conducted in this regard, and the results of research in recent years should be analyzed in depth and comprehensively. Based on these, the development of effective and acceptable solutions has important scientific and practical significance and is considered one of the urgent issues of today.

Over the years, a number of negative situations occur on land used for agriculture. In particular, in the irrigated areas, there is an increase in weeds, self-compaction of the soil, deterioration of water permeability, erosion and salinization processes, violation of the balance of acidity and alkalinity of the soil, and a decrease in macro and microelements.[1]

According to the data of the "Soil Science" Institute of the Russian Federation named after V.V. Dokuchaev, it is recognized that excessive compaction of the soil can result in a loss of 15-30% of the yield of grain and root crops, as well as a

decrease in moisture capacity. [2].

The field moisture capacity or minimum capacity of the soil reflects the ability to hold water in the soil, the supply of moisture to plants and the duration of the inter-irrigation period in irrigated conditions. It is known that the thickness of the arable layer of the land in agriculture is 0-40 cm. It does not mean that it is necessary to plow. Soil plowing or soil cultivation is carried out based on the physical and mechanical properties of the soil, the soil of the cultivated crops. The mechanical composition of the soil and climatic conditions in different regions are fundamentally different from each other.

The mechanical composition of the soil determines all its physical and physical-mechanical properties. Soils with a heavy mechanical composition require a high level of moisture, they have a high level of moisture and are rich in nutrients. From an agrotechnical point of view, small dust particles (0.005-0.001 mm) size aggregates determine the level of its fragmentation, resistance to water and wind erosion, resistance to soil compaction under the influence of agricultural machinery during soil cultivation. [3]

Today, soil cultivation is carried out using improved techniques, and before using such technologies, first of all, it is necessary to study the actual condition of the physical and mechanical properties of the soil.

The mechanical composition of soils is of significant importance in the description and evaluation of the state of the land. The development of maps of the mechanical composition of soils is of great practical importance. plays a significant role in managing all ongoing processes.[4]

The mechanical composition of the soil is one of the leading factors in determining its productivity, it significantly affects the air, heat, water-physical, physical-mechanical properties of the soil. In the description of the soil structure, its mechanical composition occupies the main place. Since the 19th century, the mechanical composition of the soil, who began to look at it as a productivity factor. To explain the modern processes of soil formation, it is necessary to analyze the mechanical composition of the soil and its changes.[5]

In the process of tilling the soil with the help of agricultural techniques, the working bodies of the technique affect the mechanical composition of the soil, causing changes in its density, porosity, specific and volume weights, and changes in physical and mechanical properties.[6]

Research location and methods.

The newly irrigated serozem-meadow soils of the "Kazakhstan" massif, located in the serozem soil region of Arnasoy district, Jizzakh region, were selected as the research area. Genetic-geographic, cross-sectional-geochemical, and chemical-analytical methods were used in the research. Soil sampling and laboratory-chemical analyzes It was conducted based on the methods presented in the manual << Instructions on conducting chemical and agrophysical analyzes of soils during land monitoring >> [7] published by the authors' group at the Research Institute of Soil science and agrochemistry. The mechanical composition of soils was determined by N.A. Kachinsky pipette method. The specific gravity of the soil was measured by the pycnometer method, volume weight was conducted by the cylinder method, porosity was calculated.

The results of the research and their analysis. Data on the mechanical composition of newly irrigated serozem-meadow soils scattered in the region of serozem soils is shown in Table 1, according to which it was noted that the soils are mainly composed of light mechanical composition. (<0.01mm) 19.4-38.4%, large sand (>0.25mm) particles 0.2-4.4%, medium sand (0.25-0.1mm) 0.3- 1.2%, fine sand (0.1-0.05mm) is 22.7-50.8%, and large dust particles (0.05-0.01mm) is 30.8-45.3% medium dust (0.01-0.005mm) is 7.3-16.8%, and fine particles (<0.001mm) fluctuate between 3.1-10.2%.

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1-table

Mechanical composition of soils

Sample №	Depth, cm	Number of particles in %, size in mm								Mechanical composition
		Sand			Dust			Il	Physical clay (<0,01mm)	
		>0,25	0,25–0,1	0,1–0,05	0,05–0,01	0,01–0,005	0,005–0,001	<0,001		
8	0-28	0,3	0,8	41,3	31,6	7,5	8,3	10,2	26,0	Light sand
	28-58	2,0	0,7	34,7	40,2	8,2	7,5	6,7	22,6	Light sand
	58-88	1,3	0,3	27,8	37,6	11,4	14,8	6,8	33,0	Medium sand
	88-118	0,2	0,4	35,3	37,3	9,1	8,2	9,5	26,8	Light sand
	118-151	2,6	0,8	50,8	16,5	8,4	12,2	8,7	29,3	Light sand
10	0-32	3,1	0,9	33,1	37,4	8,2	7,8	9,5	25,5	Light sand
	32-60	3,2	1,1	29,4	37,5	9,4	11,2	8,2	28,8	Light sand
	60-92	2,1	0,5	28,2	30,8	14,8	16,8	6,8	38,4	Medium sand
	92-124	1,2	0,8	30,2	38,6	9,6	10,5	9,1	29,2	Light sand
	124-155	2,0	0,6	27,9	45,3	5,7	11,2	7,3	24,2	Light sand
12	0-33	2,9	0,9	35,4	39,4	9,3	8,7	3,4	21,4	Light sand
	33-63	3,2	0,8	33,8	42,8	8,8	7,4	3,2	19,4	Light sand
	63-92	2,4	0,7	22,7	38,4	15,6	13,8	6,4	36,0	Medium sand
	92-122	1,2	0,5	32,8	42,6	12,4	7,4	3,1	22,9	Light sand
	122-155	1,1	0,6	29,3	41,7	9,3	11,7	6,3	26,3	Light sand
14	0-29	2,1	1,1	29,4	38,2	14,2	9,2	5,8	29,2	Light sand
	29-54	2,1	0,9	35,1	32,2	15,4	8,1	6,2	29,7	Light sand
	54-83	3,2	0,8	30,1	39,7	13,6	7,3	5,3	26,2	Light sand
	83-113	3,8	1,1	29,7	37,2	11,6	9,3	7,3	28,2	Light sand
	113-143	4,4	1,2	33,3	34,1	5,7	11,8	9,5	27,1	Light sand

According to the analysis of the obtained research results, the studied soils mainly consist of light sandy mechanical composition, and the amount of fine sand and large dust particles in the soil profile is very close to each other. mainly soils with light mechanical composition are observed. The reason for this can be explained by the fact that the parent rocks forming the soil horizons have different mineralogical and mechanical composition. The studied soils of the "Kazakhistan" massif of Arnasoy district consist of loess and loess-like soils and have their own characteristics.

Conclusion

In conclusion, it should be noted that the mechanical structure of newly irrigated serozem-meadow soils in the study area is mainly dominated by small sand and large dust particles. In the lands of irrigated farming zones, the microaggregate composition of the soil is important in determining the soil fertility indicators and obtaining a high yield from crops. During irrigation, during the processes of tilling the soil with the help of various techniques, a

certain degree of decomposition of the soil aggregates is observed in the areas where salinity occurs. Only when the mechanical composition of the soil is within acceptable parameters water permeability, capillarity, porosity, moisture capacity, movement of nutrients and a number of physical and mechanical properties are formed at an optimal (acceptable) level.

Reference

1. Mironova A.V. Federal Scientific Agroengineering Center VIM, Moscow, Russian Federation //Agricultural technique and technology . – 2022. – T.: 16. – №. 1. – P. – 63-68.

2. Kim Yu. A., Zeleny P. V., Frankevich I. V. The influence of the design parameters of wheel propulsors on the change in the physical and mechanical properties of the soil and the traction qualities of the tractor // Bulletin of the Belarusian-Russian University. – 2008. – №. 4. – P. – 34-42.

3. Bondarev A. G. On the importance of the physical properties of soils in adaptive landscape agriculture // Bulletin of the Soil Institute named after. V.V. Dokuchaeva. – 2007. – №. 60. – P. –71-74.

4. Kurvantaev R. et al. Granulometric composition of soils in the Chirchik-Akhangaran basin // Sustainable directions for land management in Uzbekistan: problems and solutions. – 2023. – T.: 1. – №. 1. – P. –209-215.

5. Eremin D., Eremina D. Influence of granulometric composition structure of anthropogenic-reformed soil on ecology of infrastructure //Procedia Engineering. – 2016. – T.: 165. – P. –788-793.

6. Shovkoplyas A.V. Analysis of the causes of wear of disk working bodies and models of changes in soil properties under their influence // Bulletin of Science and Education of the North-West of Russia. – 2015. – T.: 1. – №. 3. – P. 87–94.

7. Team of authors. Guidelines for conducting chemical and agrophysical analyzes of soils during land monitoring // –Tashkent, 2004, – P-260.

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