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AGROPHYSICAL PROPERTIES OF DESERT SOILS

***Abstract**: The article presents the results of a study of the agrophysical properties of scattered sandy desert soils in the Farish district of the Jizzakh region, resulting in sandy desert soils formed from sand particles of various sizes due to insufficient amount of rotting, volume (1.26 – 1.56 g/cm3) and the specific gravity (2.52 – 2.78 g/cm3) fluctuated over a wide range, and the porosity was 42.4 – 50.0%, hygroscopic humidity 0-10 cm in the layer of vibration around 1.0%, sharply reduced from going to the bottom layer (0.5-0.7-0.8 %), maximum hygroscopic humidity fluctuated around (2.0-3.5%,) and the moisture content of the suction fluctuated around (4.50-7.50%,) which corresponds to the maximum hygroscopic amount of moisture.*

***Key words**: sandy desert, volumetric weight, specific gravity, porosity, pasture, soil fertility, degradation, hygroscopic humidity.*
***Language**: English*
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Introduction

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Pastures in the republic amounted to 20.8 million ha of which 17.4 million hectares refers to a desert area. Over the past 15-20 years, in mobile cattle breeding, as a result of improper use of pastures, over-feeding of livestock on pastures and other anthropogenic influences, there has been a decrease of feed amounts - the degradation occurred. 20.8 million ha of degradation from pasture of 16.4 million ha (78%) amounted to 9,3 million ha of feed area that is 20-30%; 5 million hectares of 30-40%; 2.1 million ha or more than 40% of the feed area is degraded. Pasture degradation is mainly observed in Jizzakh, Samarkand, Navoi, Bukhara regions and the Republic of Karakalpakstan. More than 70%, including one-third, highly degraded [7].

The main reasons for decreasing pasture productivity are: first, climate change; second, the lack of regulation of pasture-use processes in the conditions of growing livestock at the disposal of the population; third, the livestock system has not been developed in the new conditions; fourth, the reduction of species of fodder plants on pastures, their role in the exchange with other non-economic species of plants; fifth, insufficient attention is paid to irrigation, reclamation work on pastures, as well as the use of mineral fertilizers and the organization of seed production. All this is a factor causing pasture degradation, and it is appropriate to recognize that this seriously hinders the accelerated development of the industry.

Considering that the maintenance and improvement of pasture productivity is a pressing issue today, their condition plays an important role in ensuring the stability of rural life, the application of all factors in these works will further enhance the economic power of the country and the welfare of the population. One of the most important issues to be solved is the effective use of pasture resources, the use of advanced technologies and effective methods to improve the reclamation state and eliminate environmental problems.

In order to increase the productivity of steppe pastures, pasture farming technologies have been studied, creating environmental pasture agrophytocenosis [1], it was noted that enrichment of the plant world of pastures in improving productivity and preserving degraded lands, improving the ameliorative state of pastures [3] has great importance from a scientific and practical point of view.

Physical-mechanical, water-physical and agro-physical properties of the soil of the desert and irrigated region have been studied in Uzbekistan [2, 4, 5, 6, 8, 9]. However, data on the properties and prevention of the degradation of sandy desert soils that are common in the sugar region are not enough. Therefore, it is important to obtain high and high-quality pasture harvest, as well as the preservation and restoration of soil fertility, its protection, and improvement of the ecological state of the environment.

Materials and Method

The study was conducted in 2012-2014 years in the Farish district of Jizzakh region in the conditions of sandy desert soils. The studies were conducted mainly with route-forwarding, key stationary areas, cameral and laboratory methods, and the soil analysis was carried out using the capacity weight of the soil - the cylinder, the density soil - the pycnometer, the total porosity is determined by calculation.

Result and Discussion

The general physical properties of the soil, along with the expression of the essence of the processes occurring in the soil, their productivity or the degree of degradation is the most important criterion for use. It is known that the study of the general physical properties of the soil is of great importance for the development of the scientific foundations of highly efficient and reasonable farming, since the general physical properties of the soil have a great influence on soil fertility, degradation processes, and biological processes.

The bulk density of the soil is important in determining its fertility, especially with the normal development of cultivated plants and increasing their yield. The bulk density of the soil is very variable compared to the specific gravity of the solid phase of the soil, mainly depends on the number of aggregates, the degree of compaction and water resistance.

The possession of such a high density of sandy desert soils can be explained by the fact that they are formed as a result of insufficient organic matter content in them, the mechanical abundance of fine-grained particles and the dense arrangement of particles due to the unsystematic nature of the soil, and the soil profile is formed as a result of various sediments, i.e. Aeolian, proluvial, deluvial. Since the solid phase of the soil consists of primary and secondary minerals, as well as organic, organo-mineral substances, the specific gravity of the soil varies depending on Ty on the type and amount of minerals contained in it.

According to the data obtained, in terms of the specific gravity in the profile of the studied soils, no definite pattern is observed. The studied sandy desert soil has a high specific gravity, since it is very low due to rotting, and it is observed that this figure varies according to the soil profile, since such a high specific mass of these soils is associated with the presence of such minerals as quartz, hornblende (hornblende) and iron alkali, while their mineralogical structure has a high proportion (Table I). According to the data obtained, in terms of the specific gravity in the profile of the studied soils, no definite pattern is observed. The studied sandy desert soil has a high specific gravity, since it is very low due to rotting, and it is observed that this figure varies according to the soil profile, since such a high specific mass of these soils is associated with the presence of such minerals as quartz, hornblende (hornblende) and iron alkali, while their mineralogical structure has a high proportion (Table 1). he hygroscopic and maximum hygroscopic soil moisture depends on its mechanical composition, the amount of organic substances, the suction capacity, the mineral composition, the amount of water-soluble salts and the salt content and, finally, its density.

The data obtained indicate that in the analysis of hygroscopic humidity at the maximum hygroscopic humidity on the studied soils and depths of the section, the hygroscopic humidity of 0-10 cm layer of the 1st section is 1.02%, the maximum hygroscopic humidity is 2.25%, humidity of withered is 4.95%, the hygroscopic humidity of 10-25 cm layer is 1.01%, the maximum hygroscopic humidity is 2.52%, humidity of withered is 5.54%, the hygroscopic humidity of 25-40 cm layer is 0.83%, the maximum hygroscopic humidity is 2.75%, humidity of withered is 6.05%, the hygroscopic humidity of 40-72 cm layer is 0.72%, the maximum hygroscopic humidity is 2.75%, humidity of withered is 6.05%,

Table 1. General physical properties of sandy desert soils

Number the section and name of the soil	Layer depth, cm	The capacity weight, g/cm^3	Density, g/cm^3	Porosity %
1-section. Sandy desert soils	0-10	1.42	2.65	46.4
	10-25	1.41	2.62	46.1
	25-40	1.42	2.66	46.6
	40-72	1.56	2.68	41.7
	72-96	1.24	2.62	52.6
2-section. Sandy desert soils	0-9	1.25	2.66	53.0
	9-25	1.38	2.64	47.7
	25-45	1.41	2.65	46.7
	45-85	1.38	2.62	47.3
	85-120	1.46	2.58	43.4
3-section. Sandy desert soils	0-11	1.32	2.66	50.3
	11-35	1.52	2.69	43.4
	35-65	1.42	2.67	46.8
	65-103	1.38	2.65	47.9
	103-154	1.29	2.70	52.2
5-section. Sandy desert soils	0-9	1.32	2.54	48.0
	9-22	1.52	2.58	41.0
	22-41	1.50	2.59	42.0
	41-67	1.37	2.68	48.8

the hygroscopic humidity of 72-96 cm layer is 0.56%, the maximum hygroscopic humidity is 3.01%**,** humidity of withered is 6.65%, the hygroscopic humidity of 0-9 cm layer of the 5th section is 1.05%, the maximum hygroscopic humidity is 2.51%, humidity of withered is 5.52 % the hygroscopic humidity of 9-22 cm layer is 0.75%, the maximum hygroscopic humidity is 3.03%, humidity of withered is 6.67%, the hygroscopic humidity of 22-41cm layer is 0,61%,the maximum hygroscopic humidity is 3.25%, humidity of withered of 7.15%, the hygroscopic humidity of 67-123 cm layer is 0.58%, the maximum hygroscopic humidity is 3.25%**,** humidity of withered is 7.15%.

The hygroscopic humidity of 0-8 cm layer of the 6th section is 1.02%, the maximum hygroscopic humidity is 2.52%, humidity of withered is 5.54 %, the hygroscopic humidity of 8-21 cm layer is 0.78%, the maximum hygroscopic humidity is 3.20%, humidity of withered is 7.04%, the hygroscopic humidity of 22-41 cm layer is 0.59%, the maximum hygroscopic humidity is 2.75%, humidity of withered 6.05%, the hygroscopic humidity of 40-72 cm layer is 0.72%, the maximum hygroscopic humidity is 2.75%, humidity of withered is 6.05%, the maximum hygroscopic humidity is 2.75%, humidity of withered is 6.05%, the hygroscopic humidity of 72-96 cm layer is 0.56%, the maximum hygroscopic humidity is 3-01%**,** humidity of withered is 6.65% in the range will change (Table 2).

Table 2. Hygroscopicity, maximum hygroscopicity and humidity of withered of sandy desert soils

Section	Layer depth, cm	Hygroscopic humidity, %	Maximum hygroscopic humidity, %	Humidity of withered %
1	0-10	1.02	2.25	4.50
	10-25	1.01	2.52	5.04
	25-40	0.83	2.75	5.50
	40-72	0.72	2.75	5.50
	72-96	0.56	3.01	6.02
5	0-9	1.05	2.51	5.02
	9-22	0.75	3.03	6.06
	22-41	0.61	3.25	6.50
	67-123	0.58	3.25	6.50
6	0-8	1.02	2.52	5.04

	8-21	0.78	3.20	6.40
	21-41	0.59	3.52	7.04
	78-120	0.54	3.75	7.50

Hygroscopic humidity varies in the range of 0.51-1.03% of the cross-section of exhausted sandy desert soils. In the studied soils, a high content of hygroscopic humidity corresponds to the upper grassy layers, gradually fits in the sides of the lower layers. We know that the maximum hygroscopic humidity almost depends not only on the mechanical composition of the soil, the amount of organic veterinary nodules, the mineral composition, but also on the accumulation of soil absorbed by calcium and magnesium, as well as on some water-soluble salts (*$NaCl$*, *Na_2SO_4*, *$CaCl_2$*, *$MgCl_2$*) and crystallized water-saving substances (*$MgSO_4 \times 7H_2O$*, *$CaSO_{4,} \times 2H_2O$*, *$Na_2SO \times 10H_2O$* and others). As salts, they are highly hygroscopic; they give a great influence on the water flow in the soil. Depending on the above factors, the maximum hygroscopic utility was shown in the sandy desert soils, the upper layers to the lower layers are prevailed and the maximum hygroscopic humidity of the soil section ranges from 2.51 to 3.75%. Humidity of withered is between 4.50-7.50 %. The values of the humidity of withered content of the section in the lower layers are changed due to a change in the mechanical content and intensity.

Conclusion

Due to the fact that sandy desert soils consist of sandy particles of various sizes, with a low content of decay, the volume (1.26-1.56 g/cm^3) and the specific weight (2.52-2.78 g/cm^3) fluctuate in a wide range, and the porosity is 42.4-50.0%, respectively.

In sandy desert soils, the hygroscopic humidity decreases dramatically when going to the lower layer, if about 1.0% ranges in the soil layers (0.5-0,7-0,8%, the maximum hygroscopic humidity ranges around 2.0-3.5%, and the humidity of withered ranges around 4.50-7.50%, which corresponds to the maximum hygroscopic amount of humidity.

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