Chemical properties of Zarafshon lower and middle flow soils

Rakhmon Kurvantaev[1], *Nodira* Khakimova[2*], and *Bobirjon* Vafoev[2]

[1]Soil science and agrochemistry research institute, Street Kamarniso, 3, 100179, Tashkent, Uzbekistan
[2]Bukhara State University, Street Mukhammad Ikbol, 11, 200118, Bukhara, Uzbekistan

Abstract. The article describes the chemical composition of newly irrigated, newly developed sandy-desert, old-irrigated alluvial-meadow, newly-irrigated gray-brown-meadow, gray-earth-meadow soils, common in the lower and middle reaches of the Zarafshan River, describes the decrease in the amount of nutrients in the soil under the influence of anthropogenic factors. In arable and subarable layers of old irrigated meadow-alluvial soils, the amount of humus is 0.859-0.971% and 0.715-0.894%, while in newly irrigated gray brown-meadow soils it is 0.891-0.750%. In irrigated and newly developed desert sandy areas, the total amount of nitrogen is 0.052-0.082%, phosphorus - 0.075-0.15%, potassium content - 66-0.916%.

1 Introduction

Today, "50% of agricultural land in the world is moderately and severely degraded, 12 million hectares of land are lost from agricultural circulation every year. Because of this, the land, which is the means of livelihood and livelihood of millions of people, is under threat. Almost 800 million people suffer from chronic malnutrition, which in turn is directly related to land degradation, reduced soil fertility, unsustainable water use, droughts and drastic reductions in biodiversity.

According to scientific predictions, over the next 25 years, as a result of the acceleration of soil degradation processes, global food production will decrease by 12%, which may lead to an increase in food prices by 30% (www.fao.org.). Therefore, it is necessary to determine the current condition, agrochemical, agrophysical properties and characteristics, microbiological activity and productivity of the soils scattered in the lower and middle reaches of Zarafshan located in the area of irrigated agriculture, to improve the current condition of the soil by preventing existing negative processes, to maintain, increase and protect the productivity of the soil and to protect it from land resources. effective use is important.

A number of republican scientists on formation and development of soils, determination of changes in their morphogenetic structure and properties under the influence of irrigated agriculture, prevention of degradation processes, application of geological information systems to the field [1-10] and researches were carried out by others. However, studies on

* Corresponding author: n.x.hakimova@buxdu.uz

soil cover structure, chemical and water-physical and physical-mechanical properties, biological activity, formation and changes of agro-irrigation layers under the influence of anthropogenic factors of the soils scattered in the Zarafshon river basin and middle course have not been carried out sufficiently.

2 Research objects and methods

As a research object, widely irrigated, developed sandy desert, old irrigated alluvial meadow, newly irrigated brown-meadow, gray-meadow soils were selected as the research object.

The following laboratory and field studies were carried out from the obtained soil samples and selected soil sections: Morphological structure of soils, humus content by the Tyurin method, total nitrogen by the K'eldal method, ammonia content by the Nesler reagent, nitrate content by the Greenwald Lyaju method, total phosphorus content by the Meshcheryakov method, mobile phosphorus B. P.Machigin's method, mobile potassium was determined by Smith's method, SO2 carbonates by acidimetric method, pH meter.

3 Research results

It is important to know the chemical properties of the soil, i.e., the level of provision of the soil with basic nutrients and organic matter. During the conducted research, a significant change in the chemical properties of the soils distributed in the lower and middle reaches of the Zarafshan River due to the influence of salinity was observed.

It is known that humus is the main resource that ensures soil fertility and improves soil physical condition, agrochemical parameters, biological activity, structural condition, plant growth and development conditions. An increase in the amount of humus has a strong effect on soil fertility and the yield of agricultural crops.

The obtained data show that the amount of humus in the irrigated and newly cultivated sandy desert soils is 1.126-0.991% and 0.872-0.721% in the plowed and under-plowed layers, and the abundance of humus in the lands of "Azim Shafirkon Star" farmer is achieved at the expense of giving, due to regular local manure by the farmer. If the amount of humus is 0.859-0.971% and 0.715-0.894% in the plowed and under-plowed alluvial soils of the old irrigated grassland, the humus content is 0.891-0.750% in the plowed and under-plowed layers of the newly irrigated brown-meadow soils.

The amount of humus in plowed and under-plowed layers of old irrigated gray-meadow soils is 0.800-0.625%. In all soils, a large amount of humus is distributed in the upper layers, and a significant decrease in the amount of humus is observed towards the lower layers (table 1).

M.M. Tashkoziev [7], N.I. Shadievalar [9] analyzing the supply of humus according to the indicators of humus status, the irrigated sandy desert soils are average (1.0-1.5%), and the rest of the soils are poorly supplied (0.5-1.0%)

Total nitrogen content is 0.075-0.082 and 0.052-0.061% in plowed and sub-ploughed layers of irrigated and newly developed sandy desert soils, and 0.049-0.031 and 0.088-0.071% in alluvial soils of old irrigated meadow. Newly irrigated brown-meadow soils and old irrigated gray-meadow soils are close to each other, the difference between them is very small, its amount fluctuates around 0.076-0.018 and 0.085-0.019% according to the section. It can be explained that the main reasons for this are the holding of the same agrotechnical activities in these farms and the fact that they are located in the middle of the Zarafshan river.

Changes in the amount of total phosphorus depend on the amount and mechanical composition of humus, and the fact that the total amount of phosphorus is mostly in the upper layers can be attributed to its biological accumulation in these layers. The amount of total phosphorus is 0.13-0.075 and 0.15-0.08% in cross-section layers of irrigated and newly developed sandy desert soils, and 0.26-0.10% and 0.35-0, in old irrigated grassland alluvial soils. 10% indicates slightly higher phosphorus content in irrigated meadow soils.

The amount of total phosphorus in newly irrigated brown-meadow soils is very low and is 0.10-0.08%, while the amount of total phosphorus in old irrigated gray-meadow soils is somewhat higher, its amount is 0.25-0.12 oscillates around %.

Changes in total potassium content depend on humus content and mechanical composition, and it was observed that the total potassium content is mostly in the upper layers. It is 0.744-0.660 and 0.916-0.722% in cross-sections of irrigated and newly developed sandy desert soils, and it is 0.816-0.600 and 1.00-0.60% in old irrigated meadow alluvial soils, indicating that the amount of potassium in irrigated meadow soils is relatively higher. shows. The total amount of potassium in newly irrigated brown-meadow soils is 0.916-0.560%, while the total amount of potassium in old irrigated gray-meadow soils fluctuates around 0.980-0.600%.

All types of soil investigated are close to each other, indicating that its quantity is generally low. The reason for this is that farmers do not apply potassium fertilizer regularly.

The amount of nitrogen ammonium - (N-NH4) is high in the tillage layers of all soil types, oscillating around 25-37.9 mg/kg, the highest amount of which was formed in the alluvial soils of the old irrigated grassland of Shafirkon district called Babur (37.9 mg/kg kg).

Nitrate nitrogen in soil - (N-NO3) was distributed in almost the same amount (1.0-5.5 mg/kg) across the studied soil types.

It is known that the amount of exchangeable potassium is important in plant nutrition. Also, at the same time as having a positive effect on the physico-chemical properties of plants, their.

Table 1. Chemical composition of different irrigated soil types.

Layer depth, cm	**Humus, %**	**Gross, %**			**Active, mg/kg**				**CO2 carbonades, %**	**pH**
		N	**P**	**K**	**N-NH4**	**N-NO3**	**P2O5**	**K2O**		
Section 1. Bukhara massif, Shafirkon district, "Azim Shafirkon star" farm, irrigated sandy desert soils										
0-26	1.126	0.075	0.13	0.744	25.4	5.5	35	90	7.52	7.4
26-41	0.872	0.052	0.12	0.742	20.2	3.5	20	80	7.83	7.4
41-71	0.715	0.039	0.075	0.732	17.4	3.0	12	55	8.92	7.3
71-110	0.225	0.018	0.062	0.65	15.1	1.0	8	12	8.90	7.3
110-160	0.125	0.011	0.075	0.66	12.1	1.0	4	10	8.39	7.3
Section 2. The newly developed sandy desert soils of the farm "Mirzo Jamshid" of the Asia massif, Shafirkon district										
0-21	0.991	0.082	0.15	0.916	27.8	2.5	12	110	6.84	7.5
21-44	0.721	0.061	0.08	0.732	24.1	1.7	16	103	6.36	7.5
44-66	0.532	0.042	0.08	0.722	17.3	1.0	10	65	6.3	7.6
Section 3. Old irrigated meadow-alluvial soils of Bakhtishod Amon Zamini, Zarafshan massif, Gijduvan district										
0-33	0.859	0.049	0.26	0.816	28.1	1.7	23	150	7.73	7.4
33-48	0.715	0.031	0.26	0.732	21.9	3.1	19	135	7.84	7.4
48-74	0.618	0.019	0.21	0.744	19.7	2.0	13	90	7.8	7.3
74-105	0.525	0.014	0.19	0.72	15.6	4.8	12	60	8.47	7.3
105-132	0.332	0.012	0.15	0.60	14.3	3.7	10	55	6.88	7.3
132-170	0.27	0.013	0.12	0.67	13.7	1.4	9	40	6.51	7.2
170-200	0.195	0,01	0.10	0.6	11.7	4.2	6	30	6.52	7.3
Section 4. Shafirkon District Babur massif "Mirzo Jamshid" farming house old irrigated meadow-alluvial										

soils										
0-38	0.971	0.088	0.35	1.00	37.3	5.5	6	148	7	7.4
38-53	0.894	0.071	0.24	0.792	19.4	1.6	13	128	6.64	7.3
53-85	0.715	0.065	0.18	0.612	20.2	2.5	12	80	7.52	7.3
85-115	0.697	0.049	0.16	0.612	17.9	1.5	12	50	7.83	7.3
115-156	0.532	0.038	0.10	0.60	14.4	1.7	10	35	8.92	7.2
Section 5. Q. Qabilov Massif, Kyziltepa District, Navoi Region, "Yangi Asr" farming newly irrigated brown-meadow soils										
0-30	0.891	0.076	0.10	0.916	27.7	2.5	10	55	7.58	7.1
30-47	0.750	0.069	0.08	0.792	22.4	6.7	7	12	8.67	7.2
47-74	0.562	0.054	0.06	0.732	19.9	2.5	13	18	6.56	7.2
74-95	0.445	0.025	0.10	0.588	12.5	3.5	10	30	7.69	7.1
95-120	0.190	0.018	0.08	0.560	9.8	2.7	9	18	7.74	7.1
Section 6. Karmana District, Navoi Region, Narpay massif "Karimov Rozik" farming house old irrigated gray-meadow soils										
0-25	0.800	0.085	0.25	0.980	28.1	2.75	20	90	6.63	7.3
25-38	0.625	0.056	0.17	0.792	23.2	1.75	14	80	7.90	7.3
38-52	0.455	0.039	0.16	0.732	20.9	1.75	12	50	8.59	7.3
52-68	0.315	0.040	0.15	0.744	18.5	1.0	10	40	8.36	7.2
68-90	0.256	0.025	0.14	0.720	17.1	1.0	9	32	6.78	7.2
90-125	0.190	0.019	0.12	0.600	10.1	1.0	8	18	6.64	7.1

Potassium nutrition of plants is 150 mg/kg in alluvial soils of old irrigated meadow "Bakhtishod Amon Zamini" farm in Zarafshan massif, G'iduvan district, and 135 mg/kg towards the next layer "Bukhara massif" "Azim Shafirkon star" farm, plow layer of irrigated sandy desert soils (90 mg/kg) found that the amount of exchangeable potassium (55 mg/kg) in newly irrigated brown grassland soils was very low in the plow layer.

The results of the research showed that A. J. Bairov and others [2], when analyzed based on the manual "Nitrogen Fund of Soils of the Chirchik River Basin", the soils are moderately supplied with the mobile form of phosphorus (15-30 mg/kg), and poorly supplied with the mobile form of potassium (100-200 mg/kg).

The studied hydromorphic soils have almost the same parameters in terms of carbonate content. In all soils, the carbonate content fluctuates between 6.94 and 8.75% across the cross-section, depending on the mechanical composition of the soil.

The soil environment is its most descriptive and sensitive sign. The soil environment represents the most important features of soil chemical composition, all conditions of soil formation, soil genesis, as well as the most subtle aspects of soil changes. It is known that most agricultural crops grow well when the soil environment is close to neutral and weakly alkaline (pN=6-7, pN=7.1-8.0). The soil environment, that is, its acidity, neutrality or alkalinity, is of great importance for the chemical and biochemical properties of the soil.

According to the results of determination of soil pH during the research, the studied soils mainly have a weak alkaline environment, it was noted that the pH of the soil oscillates around 7.4-7.7.

According to the results of the conducted research, it can be seen that the distribution of nutrients in the soil along the section depends on its mechanical composition and the amount of humus. Also, with an increase in salinity, the amount of humus and nutrients decreases from one to the minimum level. With the deterioration of the most important agronomic and agrophysical properties of the soil, there is a sharp decrease in the amount of humus.

These soils can be attributed to the low supply of basic nutrients, the lack of plant residues, as well as the unfavorable climatic characteristics of the region, which cause rapid evaporation of moisture from the soil surface due to high summer temperatures, relatively low relative humidity, and frequent winds. and all these in turn lead to intensive salinization and an increase in the demand of plants for water.

4 Conclusion

The amount of humus in newly developed sandy desert, old irrigated alluvial meadow and newly irrigated brown meadow, old irrigated gray-meadow soils is in the low supply group, fluctuating around 0.625-0.991% in the plowed and sub-harvested layers. The amount of humus in the irrigated sandy desert soils is 1.126% in plowed layers, and the abundance of humus has been achieved due to local manure application for many years.

Over the years, as a result of irrigation and tillage, it is observed that the level of soil compaction has increased, soil particles have been washed to the lower layers, the amount of humus and nutrients has decreased, and agro-irrigation layers have been formed.

Total nitrogen-0.052-0.082%, phosphorus-0.075-0.15%, potassium content in the tillage and sub-tillage layers of the irrigated and newly developed sandy desert soils is 0.66-0.916%, in the alluvial soils of the old irrigated meadow, respectively 0.031-0.088%. , is 0.10-0.35%, 0.60-1.00%.

It fluctuates around 0.018-0.085%, 0.08-0.25%, 0.560-0.980% in newly irrigated brown meadow and old irrigated gray-meadow soils. The amounts of total nitrogen, phosphorus, and potassium in the alluvial and gray-meadow soils of the old irrigated meadows are slightly higher than those of the newly irrigated sandy deserts and brown-meadow soils. These soils are low in total nitrogen, phosphorus, and potassium.

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