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ANALYSIS OF THE INFLUENCE OF SAND AND SOIL SEDIMENTS ON PLANT GROWTH AT THE BOTTOM OF THE DRY ARAL SEA

Jabbarov Zafarjon*,
Professor of the Department of Soil Science, Faculty of biology and ecology
e-mail: zafarjonjabbarov@gmail.com

Tokhtasin Abdrakhmanov*,
Professor of the Department of Soil Science, Faculty of biology and ecology
e-mail: to.abdraxmonov@nuu.uz

Peter Kováčik**,
professor

Shokhrukh Abdullaev*,
Teacher of the Department of Soil Science, Faculty of biology and ecology,teacher
e-mail: sh.abdullayev@nuu.uz

Otamurod Imomov*,
Department of Soil Science of the Faculty of biology and ecology, doctarate
e-mail: o.imomov@nuu.uz

Urol Nomozov,***
of livestock and biotechnology, teacher
e-mail: urolnomozov@gmail.com

Lubos Smutka****

**National University of Uzbekistan named after Mirzo Ulugbek*
***Slovak University of Agriculture in Nitra, Slovak Republic*
**** Tashkent branch of Samarkand State Veterinary Medicine, University*
*****Czech University of Life Sciences Prague, Czechia*

Annotation. Scientific data suggests that certain strata are of the sulfate-chloride type, with high calcium and magnesium absorption capabilities (Ca2+ 26.1-61.6%, Mg2+ 35.4-72.2%),

which impedes plant growth and development absorption capacity and chemical composition of soils Aral Sea bottom is critical. Biopreparations used in place of numerous creative achievements, the application of «Earth Ointment» +1% biochar had a positive growth of black saxaul plants. Microorganisms increased biochemical processes in the soil, but biochar helped to retain moisture and increase organic matter.

Key words: biochar, saxaul, absorption, Biopreparat, Aral Sea, plant growth.

Annotatsiya. Ilmiy ma'lumotlar shuni ko'rsatadiki, ayrim qatlamlar sulfat-xlorid bo'lib, kalsiy va magniyni (Ca2+ 26.1-61.6%, Mg2+ 35.4-72.2%) yutish qobiliyatiga ega, bu esa o'simliklarning o'sishi va rivojlanishiga to'sqinlik qiladi. Orol dengizi tubi tuproqlarining yutish qobiliyati, shuningdek, kimyoviy tarkibi juda muhimdir. Ko'plab ijodiy yutuqlar o'rniga ishlatilgan biopreparatlar, "Yer malhami" + 1% biochardan foydalanish qora saksovul o'simliklarining o'sishiga ijobiy ta'sir ko'rsatdi. Mikroorganizmlar tuproqdagi biokimyoviy jarayonlarni kuchaytirdi va biochar namlikni saqlab qolish va organik moddalar miqdorini oshirishga yordam berdi.

Kalit so'zlar: biochar, saksovul, adsorbsiya, biopreparat, Orol dengizi, o'simliklarning o'sishi.

Аннотация. Научные данные свидетельствуют о том, что определенные слои относятся к сульфатно-хлоридному типу, с высокой способностью поглощать кальций и магний (Ca2+ 26,1–61,6%, Mg2+ 35,4–72,2%), что препятствует росту и развитию растений. Способность поглощать, а также химический состав почв на дне Аральского моря имеют решающее значение. Биопрепараты, используемые вместо многочисленных творческих достижений, применение "Земляной мази" +1% биоугла положительно сказалось на росте растений черного саксаула. Микроорганизмы усилили биохимические процессы в почве, а биоугол помог сохранить влагу и увеличить содержание органических веществ.

Ключевые слова: биоугол, саксаул, абсорбция, биопрепарат, Аральское море, рост растений.

Introduction. The Aral Sea is located inside the borders of two Central Asian nations, Kazakhstan and Uzbekistan, and its growth began in 1960. Researchers have thoroughly examined the motives for its genesis, which are complex. Expansion of irrigated agriculture, inefficiencies in water resource management, flaws in drainage infrastructure, desertification, and the influence of climate change are among the justifications. This includes temperature, relative humidity, and precipitation changes, all of which have been studied scientifically [1–3]. Currently, approximately 10 % of the Aral Sea remains owing to yearly water volume reductions, resulting in an increase in salt content and continuous deterioration in the region [1]. Remote sensing research (ARSEI) using ecological indicators (greenness index, salinity index, heat index, and land degradation index) for the dry parts of the Aral Sea has shown promising results [2]. Between 1960 and 2004, the water level in the Aral Sea fell by 8.5 times, resulting in a 20-meter decrease and environmental issues Soil salinity along the Aral Sea and on its dried bed has grown, with anthropogenic salinity and wind erosion dominating the desert bottom [3], [4], [5].

The desiccation of the Aral Sea has triggered substantial soil transformations in the area, manifesting as desertification, salinization, and aridification [6], [7]. Modeling the construction process of the Aral Sea revealed that between 1986 and 2020, construction and salinization occurred rapidly in the southern part, while progress was slower in the northern part [8], [9]. The dwindling water levels in the Aral Sea resulted in heightened salt accumulation in the sands, yielding a soil pH range of 7.7-8.6, along with contamination by heavy metals like Cd. Over time, salt dust has become a

source of storms, potentially transporting these particles to the Siberian plain and the Iranian plateau [10], [11]. Calcium carbonate is mainly distributed in the sand and soil soils at the dry bottom of the island, its distribution depends on the granulometric composition of the soil, and CaCO3 is combined into microaggregates in the following order (mol/l): calcite (CaCO3) → gypsum (CaSO4·2H2O) → eugsterite (2Na2SO4·CaSO4)·2H2O), astrakhanite (Na2SO4 · MgSO4 ·4H2O) and mirabilite (Na2SO4 · 10H2O) → halite (NaCl) salts change [12], [13], [14]. Afforestation on the dry bottom of the Aral Sea improves soil formation and properties, including (Ca2+, K+, Mg2+ and Na+) cation exchange capacity (CEC), plant phosphorus exchange, soil electrical conductivity, pH environment, enzyme activity (phosphatase, β-glucosidase and N-acetyl-glucosaminidase) improved in the 0–10 cm layer of the soil [15], [16]. In the dry bottom of the Aral Sea, there are several soil groups, whose chemical composition, salinity level, type, and type are very different from each other. The plants distributed there are also different, most of them are halophytes, including eugalophytes, hemigalophytes, hyper-halophytes, psammophytes that grow in salt water. In the northern region of the dry bottom of the Aral Sea, that is, in the Kazakh part, Anabasis salsa, Halostachys belangeriana Botsch, Halocnemum, Strobilaceum Pall, Climacoptera lanata Botsch, Climacoptera brachiate Botsch and Suaeda microphylla Pall, Artemisia terrae-albae Krasch, Ceratocarpus, Arenarius L, Kochia prostrata L, Allium sabulosum Bunge, Ceratocarpus utriculosus Bluket, Aeluropus littoralis Parl, Alhagi pseudalhagi Fisch, Petrosimonia brachiata Bunge, Salsola nitraria Pall, Artemisia terrae-albae Krasch, Petrosimonia brachiate, Bunge, Salsola nitraria Pall and Kochia prostrata L., Haloxylon aphyllum Minkw, Peganum harmala L. , Salsola paulsenii Litv, Alhagi pseudalhagi Fisch, Haloxylon aphyllum, Halostachys belangeriana Botsch, Salsola paulsenii Litv, Tamarix hispida Willd, Zygophyllum fabago L., Girgensohnia oppositifora Pall, Nitraria sibirica Pall, Petrosimonia sibirica Pall, Astragalus orbiculatus Ledeb plants do not grow in most areas. Cultivation of licorice in the dry bottom of the Aral Sea improves soil properties, and the use of various reed barriers also prevents sand from flying, which affects the preservation of moisture and improves its chemical properties [17], [18], [19]. Diversification of agricultural crops in the regions along the island has a positive effect on the ecological condition of the region and food security The dry area of the Aral Sea is 6 million hectares, of which 3.2 million hectares belong to the territory of the Republic of Uzbekistan, and it can be used for soil strengthening and fodder for livestock by creating desert agrophytocenosis in this area [20].

Data and Materials. Researches were conducted in the following area of the dry bottom of the southern part of the Aral Sea. Experiment 1 innovation area (section 1). The dry bottom of the Aral Sea is a sandy desert relic-swamp saline soil soil, sand dunes (59^{o} 1' 42", 43^{o} 46' 40") around the «Ship Graveyard» in Moynak district. Experiment 2 innovation area (section 2). The dry bottom of the Aral Sea is a sandy desert relic-swamp saline soil ground, the region of point «0» is a sandy desert relic-swamp saline soil ground, (44.135556; 58.87) (Fig.1).

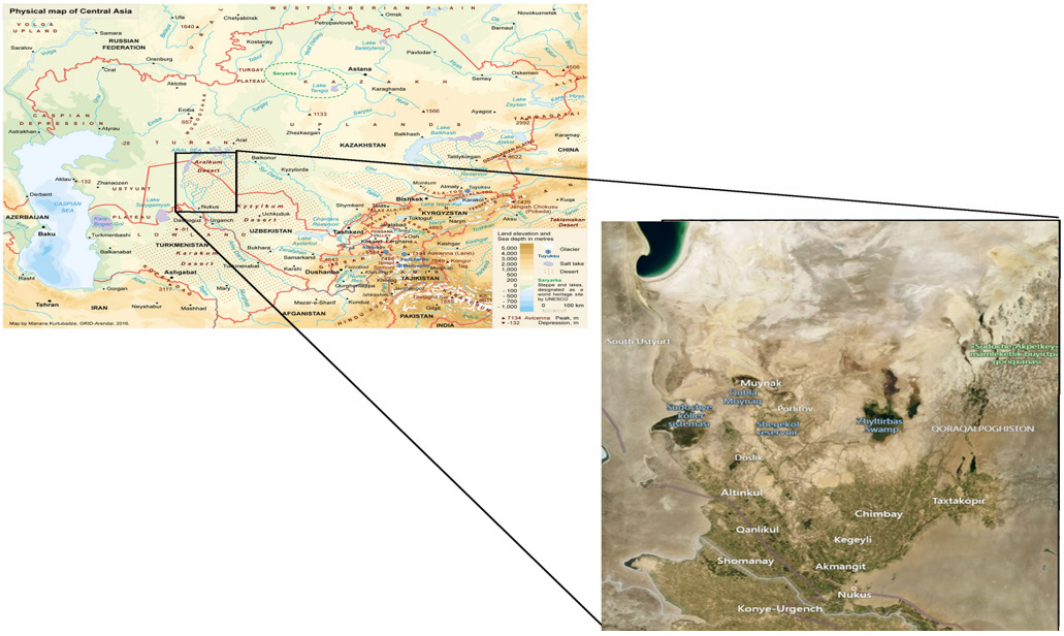


Fig. 1. Study area

1 and 2% amount of biochar was used to test the growth of plants, “El malhami”, “Inbikom”, “Bioazot” were used from biopreparations, Black saxovul (Haloxylon aphyllum L) “Nortuya” variety, Camphorosma lessingii L. “Sugdiyona” variety, Cho‘gon were used. (Halothamnus subaphylla, aellen) “Jayhun” variety, Izen (Kochia prostrata L.) “Otavniy” varieties were selected.

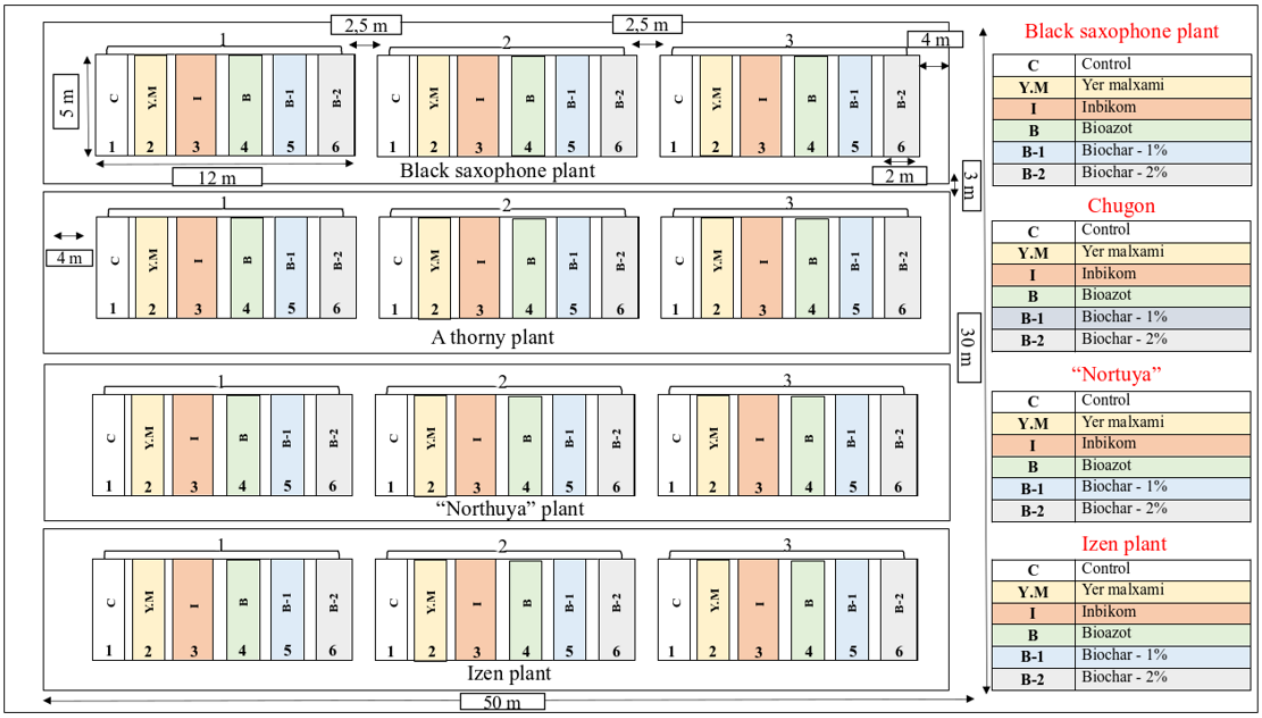


Fig. 2. The experimental schemes were formed as follows.

Methodology. The GOST:17.4.3.01–83 International Standard describes the correct implementation of soil sampling and preparation for laboratory analysis. These include soil sampling procedures, plot size, number, depth and type of samples, sample processing, sample packaging, transportation and storage, as well as sample analysis requirements and ensure reliable analysis results. The

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GOST 26423–85 International Standard is one of the main methods of testing saline soils in laboratory conditions, which is based on water absorption analysis. Data on water absorption are commonly used to provide a comparative description of the amount and composition of water-soluble substances in different soils and to determine soil salinity. Among the water-soluble salts, the most common in soils are calcium, magnesium, sodium and potassium sulfates, chlorides and bicarbonates. Aqueous absorption method consists of short-term treatment by mixing the soil with water and then filtering this liquid. The filtered liquid-suction is subjected to further tests. When the soil is treated with water, water-soluble compounds are absorbed. From the composition of water absorption, dry residue, total alkalinity, alkalinity under the influence of normal carbonates and bicarbonates, and the amount of water-soluble humus are usually accepted. In some cases, nitrates, nitrites, some oxides and other compounds are also detected. Based on the state standard GOST 26423–85, to estimate the total concentration of salts during soil, agrochemical and reclamation testing of soils, to control the state of the salt regime of soils, as well as to estimate the total concentration of salts in other research and research activities, the specific electrical conductivity, rN value and density of water from saline soils includes methods for determining the remainder. GOST 26428–85 International standard - currently, the trilonometric method is widely used for the determination of absorbed (exchangeable) bases, for the determination of calcium and magnesium in aqueous extract, in the content of seepage waters and in saline extract. Trilon-B first determines the total amount of calcium and magnesium, and then only calcium, and magnesium is calculated from the difference between the first and second determinations. Trilon-B (sodium salt of ethylenediaminetetraacetic acid) and black chromogen (black ernochrome) indicator used to determine the amount of Ca+Mg and murexide (ammonium salt of purple acid) indicator used only for determining calcium belong to the group of organic compounds - complexons.

Results

Formation of soil layers and appearance of morphological features

The chemical composition, physical properties and biological world of the sands scattered in the dry bottom of the Aral Sea are different. It was determined that the morphological characteristics of the soils of the area where the 1 st section of the research area was taken are as follows:

0–2 cm. The surface layer is volatile sand, dry, stones and other inclusions are rare, shells are found, plant remains are not found, scattered, salt and its remains are not found.

2–17 cm. Sand, low density, low moisture, plant and animal remains are not found, stones and other inclusions are rare, friable, salt and/or its residues are not found, structureless, gray in color, does not stand still when the section is dug, flying and falling under the influence of wind.

17–22 cm. Unconsolidated sand, low density, slightly moister than the upper layer, plant and animal remains are not found, stones and other inclusions are rare, friable, salt and/or its residues are not found, structureless, the color of the discharge is gray, it is not stable when the cross section is dug, it is blown away by the wind. and down is observed.

22–30 cm. Unconsolidated sandy layer, low density, slightly moist relative to the upper layer, plant and animal remains are not found, stones and fresh wounds are found, shells, scattered, salt and/or its residues are not found, structureless, gray discharge, not stable when the section is dug, wind it is observed to fly and fall under the influence. 30–54 cm. Sand, medium density, moist, plant and animal remains, stones and other

inclusions are rare, cohesive, not sandy, no salt or its remains, structureless, pale yellow in color, does not stand when the section is dug.

54–102 cm. Mixed with a sandy layer, medium density, wet, plant and animal remains are found, stones and other inclusions are rare, salt and/or its remains are not found, structural, black bluish, shell remains are found.

102–130 cm. Muddy, medium density, moist, plant and animal remains are rare, there are rust spots, stones and other inclusions are rare, salt and/or its remains are not found, low structure, whitish-blue color, shell remains are found.

130–145 cm. sandy layer, density is average, moist, plant and animal remains are rare, there are rust spots, stones and other inclusions and salt and its residues are not found, structureless, blue color.



Fig. 2. The experimental schemes were formed as follows.

145–165 cm. sandy loam, medium density, moist, few plant and animal remains, rust spots, no stones and other inclusions, white crystalline salts, structureless, blue-white color.

165–210 cm. sandy loam, medium density, moist, few plant and animal remains, rust stains, 5 cm diameter stones, rare white crystal salts, structureless, bluish in color.

The next soil cross-section 2 is a sandy desert relic-swamp saline soil at the bottom of the Aral Sea, which differs from cross-section 5 in its physical properties, according to:

0-2-Hardened layer, moistened, with inclusions, soft crushable, structureless layer.

2-6-Sandy layer, soft crumbly, light yellow, very moist, with inclusions, structureless layer.

6-22-Highly condensed, well-moistened, grayish structureless layer with crystalline salt and gold spots.

Salinity level and absorption capacity of soil grunts

The level of salinity of sand and soil soil distributed in the dry bottom of the Aral Sea is different, and the type, level and type of salinity in it are different from each other. The analysis of the salinity of these samples revealed the following situation, according to the results, the amount of dry residue in the 0–2 cm layer was 1.542%, the amount of HCO3- was 0.022%, the amount of Cl– 1.09%, the amount of SO4 - was 0.242%, Ca2+ - 0.023%, Mg2+ -0.156, Na+ contains 0.0009%, the type of salinity is chloride, and the degree of salinity is considered strong. Up to the next 2-145 cm layer, the amount of dry residue is between

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0.431–0.716%, the amount of HCO3 is 0.019-0.037, Cl 0.010-0.019%, the amount of SO4 - is 0.021–0.041%, Ca2+ - 0.010–0.016%, Mg2+ - 0.140-0.286 , and Na+ varied between 0.176-0.284%, and it was determined that the type of salinity is chloride-sulfate and the level is weakly saline. In the lower 145–200 cm layers, the type of salinity is chloride and moderately saline.

Table 1

Salinity level of sands and soils in the dry bottom of the Aral Sea

	Layer depth cm	Dry residue	NSO_3^-	Cl^-	SO_4^{++}	Sa^{++}	Mg^{++}	Na^+	Salinity	
									Type	Degree
Section 1	0 -2	1,542	0,022	1,090	0,242	0,023	0,156	0,009	x	strong
	2 - 17	0,431	0,037	0,010	0,023	0,010	0,140	0,202	x-s	weak
	17 -22	0,716	0,025	0,020	0,021	0,016	0,259	0,358	x-s	average
	22 - 30	0,625	0,039	0,017	0,031	0,010	0,246	0,270	x-s	weak
	30 -54	0,411	0,019	0,018	0,038	0,010	0,143	0,176	x-s	weak
	54 - 102	0,668	0,015	0,019	0,041	0,010	0,286	0,284	x-s	weak
	102 - 130	0,518	0,022	0,016	0,037	0,010	0,189	0,233	x-s	weak
	130 - 145	0,551	0,037	0,018	0,033	0,016	0,208	0,229	x-s	weak
	145 - 165	1,040	0,012	0,580	0,048	0,037	0,324	0,037	x	average
	165-200	1,363	0,012	1,040	0,050	0,019	0,227	0,015	x	average
Section 1	0-2	2,69	not identified	0,71	0,470	0,860	0,13	0,5	x-s	Salty
	2-6	2,02		1,18	0,170	0,240	0,12	0,3	x	Salty
	6 - 22	0,78		0,45	0,050	0,160	0,01	0,11	x	average
	22 - 29	1,91		0,72	0,480	0,060	0,006	0,62	s-x	strong
	29 - 40	0,91		0,28	0,310	0,010	0,02	0,28	s-x	average
	40 - 70	0,62		0,36	0,040	0,103	0,03	0,08	x	weak
	70 - 85	0,90		0,37	0,210	0,021	0,03	0,26	s-x	average
	85 - 120	0,61		0,27	0,120	0,062	0,01	0,14	x	weak

The next experimental area, the bottom of the island, point “0” is the residual marshy saline soils. It was 2.69% of dry residue in the 0–2 cm layer, 2.02% in the 2–6 cm layer. In terms of dry residue, 0.61–1.91% of dry residue was accumulated in the remaining layers. In this section, the 0–6 cm and 22–29 cm layers are highly saline. The remaining layers are weakly and moderately saline, no carbonate was detected in the soils of this section, and Sl- was found to fluctuate between 0.27–1.18%. The SO4- ion varied between 0.120–0.480%, the highest indicators were recorded in the 0–2, 22-29 cm horizons, while the Ca2+ ion was found to be high in the 0-2, 2–6 cm layers, in the remaining layers between 0.010–0.160%. changed throughout.

Mg2+ ions (0.12–0.13%) are also observed in this layer. It varied between 0.006–0.03% in the lower horizons. No clear pattern was observed for Na+ ion diffusion. In layers 6–22, 40–70, 85–120 cm it changed between 0.08–0.14%, while in other layers it was found that chlorine ion was high (0.28–0.62%).

According to salinity chemistry, it was found that it is chloride-sulfate and chloride, and in some layers (70–85) sulfate-chloride type. According to the level of salinity, it was found that the upper layers (0–2, 2–6) are salty, and the lower layers are weakly, moderately and strongly saline. The amount of salts changes very sharply at this point, i.e., these residual-marsh saline soils are classified as chloride, chloride-sulphate type according to the chemistry of salinity, from weak salinity to moderate salinity in terms of salinity. At the bottom of the island at point “0” it was determined that the residual marshy brackish water

has chloride salinity, chloride sulfate, and the salinity level is brackish. The bottom of the island is relic-swamp saline soils of the "0" level, the upper layers are saline, and the lower layers have changed from medium to strong salinity. Types of salinity consist of chloride-sulfate, chloride, sulfate-chloride types.

Our next analysis is the sum of absorption capacity and absorbed bases (Table 2). It was found that the percentage of Mg2+ in the island's sedimentary marsh soils is high, varying from 11.51 to 26.64 mg/eq and widely varying between layers. The percentage of Ca2+ in absorbed capacity varied between 0.6–1.85%, and the percentage of K+ ion was between 0.01-0.33%. It was found that the percentage of sodium in the layers varied from 0.39 to 15.57%.

Table 2.

Absorption capacity of soils of the island bottom areas and indicators of bases

	Layer depth cm	Sa^+	Mg^+	K^+	Na^+	Sum of absorbed bases, mg/eq in 100 g	Sa^+	Mg^+	K^+	Na^+
		mg/eq in 100 g					%			
Section 1	0 -2	1,15	12,83	0,01	0,39	14,38	8,0	89,2	0,1	2,7
	2 - 17	0,50	11,51	0,23	8,79	21,03	2,4	54,7	1,1	41,8
	17 -22	0,80	21,30	0,41	15,57	38,09	2,1	55,9	1,1	40,9
	22 - 30	0,50	20,23	0,31	11,75	32,79	1,5	61,7	1,0	35,8
	30 -54	0,50	11,76	0,20	7,65	20,12	2,5	58,5	1,0	38,0
	54 - 102	0,50	23,52	0,33	12,36	36,70	1,4	64,1	0,9	33,7
	102 - 130	0,50	15,54	0,27	10,14	26,45	1,9	58,8	1,0	38,3
	130 - 145	0,80	17,11	0,26	9,95	28,12	2,8	60,8	0,9	35,4
	145 - 165	1,85	26,64	0,04	1,63	30,16	6,1	88,3	0,1	5,4
	165 - 200	0,95	18,67	0,02	0,64	20,28	4,7	92,1	0,1	3,2
Section2	0-2	43,00	10,69	0,58	21,7	76,01	56,6	14,1	0,8	28,6
	2-6	12,00	9,87	0,35	13,0	35,26	34,0	28,0	1,0	37,0
	6 - 22	8,00	0,82	0,13	4,8	13,73	58,3	6,0	0,9	34,8
	22 - 29	3,00	0,49	0,72	27,0	31,17	9,6	1,6	2,3	86,5
	29 - 40	0,50	1,64	0,32	12,2	14,64	3,4	11,2	2,2	83,1
	40 - 70	5,15	2,47	0,09	3,5	11,19	46,0	22,1	0,8	31,1
	70 - 85	1,05	2,47	0,30	11,3	15,12	6,9	16,3	2,0	74,8
	85 - 120	3,10	0,82	0,16	6,1	10,17	30,5	8,1	1,6	59,8

In the absorption capacity of the layers described above, the indicators are, respectively, the percentage of Mg2+ up to 54.7-89.2%, Ca2+ 1.4-8.0%, K+ 0.1-1.1%, Na+ 2.7-41 changed between 8%. It can be seen that the percentage of Mg+ and Na+ ions in the absorption capacity is high. In the absorption capacity of the bottom of the island in the 2nd experimental area at point "0", the percentage of Ca2+ ion changed from 9.25 to 22.65%, while Mg 2+ fluctuated from 11.51 to 49.10%. It was found that the share of K+ and Na+ in the absorption capacity is very low. The amount of bases absorbed in the soils of the island's residual-swamp salt marshes (0–1, 1–19, 19–30, 30–45, 45–90 cm) was studied. In 100 g of soil, absorbed Sa2+ ion is up to 9.25-22.65 mg/eq, Mg2+ is 11.51-49.10 mg/eq, and K+ ion is up to 0.01-0.02 mg/eq, and Na It was found that + changed in the amount of 0.55-0.94 mg/eq. The percentage of these amounts was Sa2+ 26.1-61.6%, Mg2+ 35.4-72.2%, K+ 0.0-0.1% and Na+ 1.2-2.9%, lower distributed in descending order in the horizons. Ca2+ 26.1–61.6%, Mg2+ 35.4–72.2%, K+ and Na+ share 0.0–2.9% of the total absorbed bases. The high absorption capacity of Sa2+ ions in the 0–22 cm layer slightly favors the structure of the soil, such a

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situation was noted in the 40–70 and 81–120 cm layers. The balanced state of Mg2+ ion is observed between 6–29 cm, and it was 1.6% at 22–29 cm. In terms of K+ ion, there was no significant difference, oscillating between 0.8–2.3%. The amount of Na+ varied and was between 28.6–86.5%. The amount of bases absorbed in mg/eq in 100 g of soil was as follows, the Ca2+ ion varied from the highest (43.00 mg/eq) in the upper layer to 0.5–12.00 mg/eq in the lower layers. The absorption of Mg2+ decreases towards the lower layers (10.69–0.49 mg/eq), it was found that K+ ion was absorbed in the amount of 0.09–0.72 mg/eq, and Na+ ion was 4.8–27.0 mg/eq in the layers. varied up to eq. Based on the results of the research, it can be said that the amount of sodium and magnesium ions in the soil absorption capacity of the dry bottom of the island is high. At point "0" in the dry bottom of the Aral Sea, it was found that the proportion of calcium and magnesium in the content of absorbed bases in the residual-swamp salt marsh soils is high. It was found that the concentration of calcium and sodium ions, especially sodium ion, is high in the sediment-swamp shurkhoks of the bottom of the island "0". This means that the dry bottom of the Aral Sea contains salts of different composition and it means that plants cannot grow with a homogeneous approach, that is, it is appropriate to recommend planting plants depending on the absorption capacity of the soil.

Effect of different prerata on germination and growth of plants

In the dry bottom of the Aral Sea, the formation of soil has not been completed, that is, there is no soil cover, because it takes 200 years for the formation of 1 cm of soil. It has been 60 years since the Aral Sea dried up. As the 6th factor in the formation of soil, the role of man is great, from this point of view, in order to activate the process of soil formation in the dry bottom of the Aral Sea, several studies on growing plants using soil biopreparations and biochar were conducted and the following results were obtained (Table 3).

Table 3.

Status of plant growth in the dry bottom of the Aral Sea using different preparations

Cultivated plant species Options	black saxophone, % Haloxylon aphyllum	Chogon, % Salsona subaphylla	Nortuya, % H. aphyllum (Minkw)	Izen, % K. Kochia
The area where the 1st section was taken from the dry bottom of the Aral Sea				
Control	13,8	11,3	12,6	9,4
Earth's crust	65,7	58,9	62,7	41,1
Inbikom	28,3	23,4	25,2	10,7
Bioazot	23,6	24,7	22,1	8,9
Biochar - 1%	62,9	47,3	57,7	41,6
Biochar - 2%	53,1	43,5	51,3	39,4
The area where the 2nd section was taken from the dry bottom of the Aral Sea				
Control	9,2	6,3	11,9	7,4
Earth's crust	52,8	41,4	47,3	39,7
Inbikom	17,4	13,7	16,1	10,3
Bioazot	15,7	11,4	13,6	9,2
Biochar - 1%	50,3	43,1	47,2	37,5
Biochar - 2%	43,6	37,5	38,3	31,8

Variants According to the researches, the plant Haloxylon aphyllum gave the highest result in the study of its growth and development, planted in the dry bottom of the Aral Sea. in the area where the 2nd section was taken from the bottom, this indicator was 52.8%, comparing the results of the experimental options to the control option, it is 4.76 times higher, followed by the plant H. aphyllum (Minkw) in the area where the 1st section was taken, when the same biopreparation was used, 62, 7% (12.6% in the control), 47.3% (11.9% in the control) in the area where the 2nd section was taken. It should be noted here that Haloxylon aphyllum and H. aphyllum (Minkw) plants grown in different regions of the Aral Sea were expected to grow differently, which is related to the amount of salts and salinity in sand and soil soils, as well as their physical and chemical properties. It has been scientifically proven that the most effective of the used biopreparations is Erhami biopreparation. The amount of applied biochar of 1% had a good effect on the growth of plants, because the amount of 2% has a burning effect on the roots of the plant at a high temperature - 58-60 oC. Among the plants, Haloxylon aphyllum and H. aphyllum (Minkw) species grow well in the dry bottom of the Aral Sea, it was recommended to plant them with Earth ointment biopreparation.

Conclusion. In conclusion, it can be said that in the 3.2 million hectares of the dry bottom of the southern part of the Arol Sea, that is, in the territory of the Republic of Uzbekistan, salts of different composition and different soils are spread, and the process of soil formation has begun in all areas. The level of salinity, type and type of existing sand and soil-soils, the layers are different, it is mainly sulfate and chloride, and it is scientifically proven that some layers are of sulfate-chloride type, the absorption capacity is mainly calcium and magnesium (Ca^{2+} 26.1–61.6%, Mg^{2+} 35.4-72.2%) is high, which hinders the growth and development of plants. Therefore, it is recommended to improve the absorption capacity of the chemical composition of soil soils scattered in the dry bottom of the Aral Sea. Also, among the biopreparations used in the place of various innovative achievements, the use of "Earth Ointment" + 1% biochar affected the relatively good growth of the black saxowul plant, in this case, the microorganisms improved the biochemical processes in the soil, and biochar affected the preservation of soil moisture and the increase of organic matter.

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