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BIOGEOCHEMICAL PROPERTIES OF VEGETATION IN SALINATED SOILS

G. Yuldashev
Fergana State University, professor

Z. Azimov
Associate Professor, Fergana State University, PhD

I. Mamajonov
PhD, Docent of the Fergana State University

S. Makhramkhujayev
Fergana State University, (PhD)

Abstract
The article presents materials on the study of biological absorption coefficients of oleaster, beets, radishes, carrots, which have high rates of biological absorption coefficient in relation to Se, Pb, Zn. It is also given that these plants are concentrators for these elements and they can be used from this point of view.

Keywords: Accumulation, migration, absorption, coefficient, saline soils, salt marshes, metals, non-metals.

Introduction
Today, there are “1.5 billion hectares of arable land in the world, of which 0.4 billion hectares are of high quality, 0.8 billion hectares are of good quality, and 0.3 billion hectares are of poor quality. In these areas, mainly as a result of intensive farming, more than 6-7 million hectares of land are being lost from

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agricultural land turnover annually due to degradation processes"[1]. Taking this into account, it is important to develop scientifically based land reclamation and phytoreclamation measures aimed at preventing various degradation processes in the soil cover: dehumification, erosion, nutrient imbalance, soil pollution with heavy metals, secondary salinization of soils under the influence of anthropogenic factors, and salinization.

Relevance of the topic

Many scientific studies are being conducted by world scientists on the restoration, preservation and increase of the fertility of saline and degraded soils, heavy metal pollution, the causes of soil salinization and salinization, and the correct and high-quality implementation of agro-ameliorative measures aimed at eliminating them. Also, studies have been conducted on increasing soil fertility and productivity, treating it properly, preventing various soil salinizing factors, taking into account soil climatic conditions, and proper crop placement and protection, and scientific developments and recommendations have been developed, and certain results are being achieved.

In this regard, it is of great scientific and practical importance to study the negative processes observed in saline soils of the Central Fergana region: pollution with heavy metals under the influence of pesticides and mineral fertilizers, secondary salinization of soils, water and wind erosion, degumming, etc., to develop scientifically based effective measures and technologies to prevent such negative processes, eliminate their consequences, and to identify ways to use phytoameliorative agro-plant species and their application in agriculture.

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Research object and method

The main object is saline soils, saline soils, natural and agro-vegetation cover. The morphogenetic methods of VVDokuchaev were used as a research method. In addition, the generally accepted methods in laboratory conditions and the geochemical approach methods of AIPerelman, MNGlazovskaya, BBPolinov [13] were used as an object.

Research results

In the current rapidly developing agricultural sector, research is being conducted around the world to study the agrochemical, chemical, physical, and land reclamation properties of irrigated soils, to determine the migration and accumulation of chemical elements in the soil, and to determine the causes of the concentration and deconcentration of salts present in the soil and plants.

It is no longer a secret that the concentration of heavy metals, some metalloids, and ions and salts toxic to plants in the soil solution is increasing, and that the reclamation measures used to prevent such negative situations are not bringing sufficient benefits.

It is of great practical and theoretical importance to determine the biogeochemical and eco-reclamation characteristics of plants adapted to arid and saline soils in the world and, on this basis, to effectively use them in agricultural production sectors. Today, about 700 species of plants resistant to drought and soil salinity are used in medicine and phyto-reclamation [2].

In the world, a number of scientific studies are being conducted to identify cases of man-made soil degradation and pollution under the influence of processes related to the chemical industry, thermal power industry, oil and gas, coal, and mineral fertilizers, and to create reclamation technologies appropriate to soil and climatic conditions. There is an increase in natural and anthropogenic impacts on soils, resulting in a change in the properties, ecological state, and fertility of soils, as well as in some cases their unusability. Man-made degradation of irrigated and

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protected, saline soils of varying degrees is noticeable, resulting in a sharp decrease in soil fertility and the efficiency of their use. Therefore, in most countries of the world, it is important to prevent the degradation of irrigated saline soils due to man-made impacts, to develop reclamation technologies for them, and to clean up and effectively use them.

The Action Strategy of the Republic of Uzbekistan for 2017-2021 sets out important tasks to "... increase soil fertility and crop yields, further improve the reclamation status of irrigated lands, expand the production of environmentally friendly products, and effectively and rationally use land resources." In this regard, the identification of the properties and characteristics of natural and man-made degraded soils, the degree of pollution and their areas by genetic layers in soil types, and the development of appropriate phytoremediation and reclamation technologies for them have not been sufficiently studied.

Studies conducted in the Central Fergana region show that the majority of naturally growing phytoameliorative plants are desert plants, salt marsh plants. With their participation, it was determined that 7-10 t/ha of water-soluble salts are removed from saline areas. Plants, especially natural and agro-plants growing in saline lands and salt marshes, remove salts in the form of salts, anions and cations from mineralized groundwater, from the soil, and include them in the biogeochemical cycle of elements and substances. Such conditions are more pronounced in the desert region, especially in the conditions of Central Fergana with hydromorphic soils, where groundwater is close to the surface. Halophytic plants stand out in this regard.

According to MMSovetkina [3], woolly climacteric grows well on saline soils and can cause their desalination, which corresponds to conditions where the constant migration of salts from groundwater to the soil is limited. In forest stands, as a result of mineralization of plants, up to 600 kg of salts per hectare accumulate in the surface layer of the soil.

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In some types of salt marshes, the ash content reaches 50%. However, sulfates and chlorides have a sequence depending on the province in which this salt marsh grows, that is, in the sulfate province, sulfates play a leading role in the amount of salts in the salt marshes, in the chloride province, chlorides are the majority, the average ash content of salt marshes is 38-40%, with an annual yield of 13-16 t/ha, bringing 0.5-0.6 t/ha of salts to the surface. The intensity of this process depends on a number of factors, so the intervals also vary.
VR Volobuyev [4] wrote that such plants remove salts from the soil annually in an amount of 0.1 to 1%. It is evident that in saline soils and saline soils, large amounts of salts are removed from the soil and groundwater, contributing substances and elements to the large biogeochemical and small biological circulation.
Soil studies have shown that in some peninsulas, including Mangyshlak, 305-393 kg/ha of ash is returned to the soil annually through the vegetation cover of the desert region [5]. However, it should not be forgotten that the desert region is often characterized by strong winds. These winds play a role in the migration and accumulation of salts in varying quantities and qualities, depending on their strength, time, soil moisture, air temperature, etc.
In saline soils, salt marshes, unexpected salinization phenomena also occur. This occurs when plants release large amounts of certain cations into the upper layers of the soil, resulting in the formation of alkalis in the upper layers of the soil, and when the amount of sodium absorbed in the soil in the form of cations exceeds 5-10% of the total amount of absorbed cations. One of the characteristic features of soil formation in the desert region is the formation of carbonates in almost all types and subtypes. This idea was also expressed by Ye.V. Lobova [6]. That is, in this case, groundwater can also be deep. However, it should not be forgotten that the roots of natural plants of the desert region are located deep, that is, they can grow inland up to 20 meters (yantok, saxaul) and can obtain sufficient salt, water, and other nutrients from there. In the desert region, especially in areas where

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saxaul grows, there are open, that is, plant-free spots that are crusted, the crust is dark brown in color. This indicates that these spots were formed under the influence of soda.

It is not difficult to predict that vegetable crops and perennial medicinal plants, shrubs, and some trees will remove from the soil various amounts of salts dissolved in water, as well as non-metals and heavy metals, as well as radionuclides that have toxic properties for plants.

A lot of information can be cited from the literature on this subject, but there is little information on the biogeochemical properties that characterize plants, in particular, the absorption of individual or group metals, non-metals, etc., that is, biological absorption coefficients. Moreover, it is worth noting that this indicator has an individual character for each plant in a particular soil.

This issue, namely the bioavailability coefficient of plants, is of great importance in everyday life, including plants, in particular beets, carrots, radishes, etc., as this property ultimately affects human health.

Therefore, in order to study it, the elemental composition of some root vegetables was initially given by IMSkurukhin [7], but the biological absorption coefficient (BAC) of these root vegetables for a number of chemical elements was not obtained in relation to the soil, that is, according to the calculations given, they are as follows.

Bioavailability coefficient of beets, carrots, radishes in relation to chemical elements Table 1

Crops	Chemical elements								
	Ca	**K**	**Fe**	**Mg**	**P**	**No**	**Yes**	**F**	**Zn**
Beetroot	0.100	0.220	0.0002	0.038	0.50	0.130	700	-	0.08
Carrot	0.022	0.210	0.0007	0.020	0.44	0.110	100	0.16	0.40
Radish	0.017	0.160	0.0008	0.017	0.25	0.065	600	0.30	0.06
Soil clarke [12]	15000	15000	40000	6000	800	6000	0.01	200	50

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As can be seen from the table, beets absorb 7 times more selenium than carrots, and radishes absorb 6 times more. Selenium and its compounds are considered toxic, requiring special attention when planting vegetable crops in selenium-rich provinces.

Each element, in turn, has its place among the biogenic elements, but selenium is of particular importance. On the one hand, selenium and its compounds are toxic, very toxic. In this regard, if we look at the data of GQ Yang, S. Wang, R. Zhou, S. Sun [8], according to which a high content of selenium in human blood can lead to selenosis, that is, nail deformation, hair loss and other diseases. It is known that an increase in the concentration of selenium in the soil can have a toxic effect on plants growing there. Under its influence, not only endemic diseases appear in plants, but also morphological changes occur, and even new species can be transformed [9].

Of course, selenium reaches the human body through plants and animal products and manifests itself in the body with its negative or positive effects. If we look at it differently, selenium deficiency can lead to cardiovascular, gastroenterological, and oncological diseases in humans. Until recently, the main source of selenium for humans and animals was grain and its products [10]. However, it is clear that beets and radishes can also be among the main sources. Therefore, one should not forget about the moderation in their consumption, so as not to lead to the above-mentioned diseases.

The element selenium penetrates the body, leaves, fruits and other organs of most plants, and is concentrated in different amounts. In this regard, based on the data of GN Artikova, AD Matchanov [11], if we consider that not only selenium, but also other macro and microelements are quickly absorbed in the fruits and organs, it is not difficult to see the following situation.

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Bioavailability coefficients of the plant and fruit of the yam. Table 2.

Elements	Soil clarke,mg/kg [12]	Plant organs				
		Skin	Seed	The soft part of the fruit	leaf	flower
Hand	70000	2,020	0.00036	0.018	0.003	0.002
Yes	500	0.012	0.019	0.015	0.012	0.010
Ca	15000	0.106	0.076	0.075	0.55	0.32
Fe	40000	0.0003	0.0024	0.00045	0.0058	0.0045
K	15000	0.003	0.198	0.470	1,143	1,330
Lee	30	0.004	0.0038	0.0081	0.0423	0.0084
Mg	6000	0.047	0.055	0.059	0.361	0.297
No	6000	0.132	0.137	0.222	0.676	0.346
Mn	850	0.003	0.004	0.003	0.051	0.026
Rb	100	0.022	0.017	0.035	0.105	0.092
Yes	0.01	685.8	500.4	1029	849	257
Sr.	300	0.066	0.047	0.047	0.243	0.151
V	100	0.015	0.008	0.017	0.015	0.013
Zn	50	0.283	0.239	0.119	0.973	0.821
P	800	1,180	1,160	2.19	5.4	6.5
Pb	100	5,250	844	96.8	4740	3239
What?	40	0.056	0.007	0.005	0.068	0.077

As can be seen from the table, a number of heavy metals (Pb, Zn, Ni) and macroelements Al, Ba, Ca, Fe, K, Mg, Na, as well as microelements Li, Mn, Rb, Se, Sr, V, etc. are absorbed to varying degrees in the plant and fruit of the plant. The plant has different biological absorption coefficients.

It is known that the jiyda plant is a cryptohalophyte, i.e. a salt producer. Therefore, it is relatively natural for its organs to contain high concentrations of salt-forming metals such as Ca, Mg, K, Na, and non-metals such as S, Se, and P. It is expected that the biological absorption coefficient of these elements in the jiyda organs and fruits is high.

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Indeed, it is seen that Ca, K, Mg, Na have higher BSK than other elements, which was expected, since they are among the active bioelements. If we compare them with soil clarke [12], in the leaves of the plant BSK > 1, i.e. about 0.55, but we see less cases in the flower, i.e. BSK = 0.32, in the peel of the fruit 0.106, in the seeds 0.076, and so on.
According to the classification of AI Perelman [13], BSK is one greater than and one less than one. If BSK is less than one, the element is only taken up, but if it is greater than one, the element is absorbed. Similar situations are observed for K, Mg, Na. However, the potassium element is absorbed into the leaves of the jiyda, i.e. BSK < 1.133. As expected, the highest BSK values correspond to phosphorus, and BSK in this case fluctuates from 1.16 to 6.5. The strongest BSK corresponds to the leaves and flowers of the jiyda and fluctuates between 5.4-6.5. BSK is also higher than 2 in the soft part of the jiyda fruit. Therefore, when phosphorus deficiency is observed in the body, the use of flowers, leaves, and fruits of the jiyda will lead to good results.
The highest BSK of trace elements are selenium and lead. For example, selenium is 685.8 BSK in the fruit peel of the gooseberry, while in the soft part of the fruit this indicator is 1029, in the leaves and flowers it is 849 and 257, and in the seeds it is on average 500.4. In addition, the BSK of the lead element is also distinguished by a relatively high BSK, and this value fluctuates in the range from 5.25 to 47.40. The highest amount is observed in the leaves. We can even see the color of lead to a certain extent in the leaves. There is also a variety in the remaining elements, but they are simply taken up by the plant, far from the category of absorption in the AI Perelman classification.

Conclusion

Soil erosion can be prevented by planting salt marshes, saline soils, and other plants in forestry. It acts as a natural source for selenium-deficient conditions.

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By selectively planting beets, carrots, radishes, and other crops in irrigated areas and using them as medicinal plants, based on recommendations, it is possible to reduce the need for Se, Pb, P, K, etc. In addition, the above plants can be used to reduce Se, Pb, P, K, etc. from excess amounts in the soil, just as they reduce salt-forming elements, and to bring them to permissible concentrations and background conditions.

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