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Phyto melioration of Irrigated Gray-Earth Meadow Soils

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Abstract. The article discusses the results of an experiment on the cultivation of licorice and its Phyto meliorative effect on the agrophysical and agrochemical properties of gray-meadow saline soils. It has been shown that licorice, used as a phytomeliorant, improves the overall physical properties of the soil and prevents the accumulation of water-soluble salts in the surface layers of the soil by lowering the groundwater level

Keywords: Agrophysical and agrochemical properties, salinity, mineralization, biodrenage, licorice, yield increase, phytomelioration

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The relevance of the topic.

One of the factors hindering the further development of agriculture in our republic is the salinity of soils. Despite the implementation of major water management measures, soil salinization is becoming more active and expanding. In particular, secondary salinization occurs in most of the territory of the Sirdarya region due to improper irrigation of agricultural crops and poor functioning of collector-ditch systems. This, in turn, leads to a sharp decrease in the yield of cotton, cereals and other agricultural crops, which leads to a sharp decrease in the yield of crops of large technical means.hyzhaligi ekinlari xosildorligining keskin kamaib ketishiga sabab bilmokdahyzhaligi ekinlari xosildorligining keskin kamaib ketishiga sabab bilmokda large technical means.

Highly saline and saline lands are out of agricultural use due to increased salinity of the soil and the fact that the resulting crop does not cover the costs. The restoration of these saline lands requires significant technical efforts and significant financial investments. Currently, there is a possibility of ecological restoration of saline lands at the expense of plant resources and the development of biodiversity in these territories, without requiring large funds and large technical means.

The total area of irrigated land in Uzbekistan is about 4,3 million hectares, of which about 60% have varying degrees of salinity and poor agrophysical properties. Therefore, in order to improve the ecological and reclamation condition of these lands, it is necessary to develop and introduce environmentally friendly and resource-saving methods and technologies into production. The republic is constantly searching for effective and most rational ways to combat soil salinization, restore fertility and productivity of such lands [2].

According to E.B. Dedov, phytomelioration of saline soils, planting of various plant life forms (trees, shrubs, shrubs and grasses) and ecological specialization when choosing crops such as xerophytes, halophytes, haloxerophytes, mesophytes, hygrophytes, phreatophytes, it is necessary to take into account their attitude to the habitat, reclamation effect on the soil, possible use in agriculture [1]. Among such plants licorice is glycyrhiza glabra L. existing, it belongs to the most valuable raw plants. First of all, licorice is one of the most important medicinal plants, which is sometimes put on the same level as ginseng.

Object and materials of the study

Arid agroekotizimlar hududida shirinmiyaning In the environmental assessment of the agro-reclamation impact of sweet on the territory of arid agroecosystems, the effect of sweet on soils with a degraded reclamation condition and as a phytomeliorant that increases the biological productivity of infertile arable lands should be considered.

The research was conducted from 2018 to 2020 at the experimental farm Galaba and Navbakhor (Syrdarya region, Baimut district). The gray-earth-meadow soils common in this territory are characterized by the presence of 0.6-0.8% water-soluble salts in arable and arable horizons. The depth of groundwater is 1.5-2.2 m.,..the soil density is 1.40-1.46 g/cm3..

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Research results and their discussion

One of the important parameters ensuring an increase in the biological productivity of degraded soil is the intensive growth of the licorice root system and, as a result, the accumulation of organic residues in the soil. It has been established that licorice has the ability to restore the structure of the soil layer. Thus, in the course of studies on the experimental field for licorice, the soil density decreased by 0.14 g/cm3 in a layer of 0-28 cm and by 0.06 g/cm3 in a meter (Table 1).

The cultivation of licorice root on medium and highly saline soils has a positive effect on the overall porosity and density of gray-earth meadow soils, testifies to its phytomeliorative value.

Table 1- Dynamics of soil agrophysics indicators

Layer depth, cm.	Density of the solid part of the soil, g/cm^3		Density, g/cm^3		Porosity, %	
	2018	2020	2018	2020	2018	2020
0-28	2,68	2,64	1,40	1,26	48,0	53,0
28-57	2,71	2,68	1,46	1,40	46,0	48,0
57-89	2,69	2,69	1,38	1,38	49,0	49,0
89-124	2,71	2,70	1,38	1,40	49,0	48,0
124-178	2,73	2,72	1,44	1,42	47,0	48,0
178-205	2,74	2,72	1,44	1,42	47,4	48,0

M.U.Umarov, Zh.Ikromov, R.Kurvantaev noted that the optimal density for irrigated heavy and medium sandy loam, meadow, taurine soils formed in forest-steppe, alluvial-proluvial, alluvial deposits scattered throughout the steppe region is considered to be the best indicator of 1.2-1.4 g/cm3, and the critical density of 1.5-1.6 g/cm3. While in the arable layer of light sandy soils, it is considered desirable that gkjnyjcn is about 1.34-1.43 g/cm3 [2,].

The density of the solid phase of soils is a somewhat stable unit, which depends on the chemical mechanical and mineralogical composition and the degree of humus formation..

The results obtained show that the density of the solid phase of soils in the upper layers has a lower index than in the lower ones, the reason for this is a slightly higher humus content in the upper soil layer. Indicators of the density of the solid phase of soils of irrigated gray-meadow soils in general do not differ much from each other and are not even rapidly changing values (Table 1.).

The soil density of the studied area is variable and diverse in comparison with the density of the solid phase of soils. This explains why the processes occurring in soils are special. The studied soils have different densities, and there is no significant difference between them.

The results obtained from the soil density of the experimental site show that the crop has a different density depending on the type, humus content, mechanical composition, salinity, etc., varying in the range of 1.40-1.46 g/cm3, the subsurface layer is characterized by the highest density (1.26-1.42 g/cm3). In the experimental oil on which sweetmia was planted, there was a decrease in soil density by layers (Table 1.).

With an increase in the productivity of degraded soils, one of the main indicators is the level of provision of degraded soils with biomass. As a result of the rapid growth of the licorice root system, it provides a greater accumulation of organic matter in the soil layers. As a result of planting licorice root, it was noticed that the level of aggregation of soil layers increased, which, in turn, led to an improvement in the overall physical condition of the soil.

The data obtained on the dynamics of changes in the groundwater level indicate that during the year the groundwater level (UGV) fluctuated at a depth of 240+350 cm, that is, the amplitude of the change (UGV) for the period of the year was 110 cm (Table-2.). This is mainly due to irrigation and precipitation precipitation, as well as the cost of transpiration through plants. The fact that the soil surface is covered

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Table 2- Seasonal water level in experimental fields dynamics of changes.

Well numbers	Ground water level, m.					
	January	february	march	april	may	june
1	2,40	2,48	2,52	2,65	2,99	3,12
2	2,43	2,47	2,50	2,70	3,05	3,10
3	2,39	2,51	2,55	2,65	2,98	3,13
4	2,42	2,53	2,56	2,66	3,00	3,16
5	2,41	2,75	2,74	2,75	3,05	3,14

Table 2

Well numbers	Ground water level, m.					
	july	august	september	october	november	december
1	2,62	3,32	3,43	3,45	2,76	2,35
2	2,70	3,40	3,45	3,45	2,82	2,46
3	2,83	3,45	3,51	3,51	2,89	2,50
4	2,96	3,50	3,50	3,50	2,88	2,42
5	2,94	3,48	3,55	3,55	2,88	2.39

with permanent vegetation reduces the consumption of moisture for direct evaporation from the soil surface. This, in turn, prevents the rise of salts from the lower layers to the soil surface.

Based on the data obtained, it can be concluded that due to the use of the licorice plant as a phytomeliorant on saline soils, the agrophysical and agrochemical properties of the soil are improved, and the accumulation of salts toxic to plant growth in the surface layers of the soil is prevented.

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