STUDYING THE SALT COMPOSITION IN THE SOILS OF THE KARSHIN DESERT

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АННОТАЦИЯ

Высокая технологическая качество волокна тесно связано с солевым режимом почвы, так как избыточное содержание легкорастворимых солей в почвах приводит к снижению урожайности сельскохозяйственных культур, в частности хлопчатника. С изменением солевого режима снижается урожайность хлопчатника. По степени засоления изучали исходное содержание в них солей. Почвы опытных участков относятся к хлоридно-сульфатному типу засолению. В составе солей преобладают сульфаты, запас которых составляет более половины сухого остатка.

ANNOTATION

The high technological quality of the fiber is closely related to the salt regime of the soil, since the excess content of easily soluble salts in soils leads to a decrease in crop yields, in particularly cotton. With change in the salt regime it decreases salt content in them. Based on the degree of salinity, the initial content of salts in them was studied. The soils of the experimental plots belong to the chloride-sulfate type of salinity. The composition of salts is dominated by sulfates, the reserve of which makes up more than half of the dry residue.

Key words: *fibers, salt regime, degree of salinity, mineralization, dense residue, salt accumulation, dry residue, growing season.*

INTRODUCTION

In the soil and climatic conditions of the Karshi steppe, obtaining high cotton yields with high technological fiber quality is closely related to the salt regime of the soil, since the excess content of easily soluble salts in the soil leads to a decrease in the yield of agricultural crops, in particular cotton. This is due not only to the toxic effect of salts, but also to an increase in the concentration of the soil solution, accompanied by an increase in its osmotic pressure. As a result, the suction power of root hairs decreases; they cannot use the necessary water from the soil, which causes a deterioration in the water regime of plants, and in some cases their complete death.[1]

RESEARCH METHODS

To characterize the soils of the experimental plots according to the degree of salinity, the initial content of salts in them was studied (Table 1). Analyzing the data obtained, we see that the soil of area I, due to its heavier mechanical composition and the close (1.5-2.0 m) occurrence of mineralized (6-10 g/l of dense residue) groundwater, is relatively more saline than area 2. section I in the upper meter layer contained 0.496% of dense residue and 0.0048% of chlorine ion. There were even more salts in the soil layer underlying below a meter layer: up to 0.725% of dry residue and 0.063% of chlorine ion. Salt accumulation in the soil of area 2 looks different; here in the upper 0-100 and lower 200-300 cm layers of soil there is a small salt content - respectively 0.121 and 0.171% of dense residue and 0.025% and 0.015% of chlorine ion. In the middle part of the aeration zone in the 100-200 cm layer, relatively more salt accumulation is noted, the total amount of salts increases to 0.5% [2,3].

RESEARCH OUTCOMES AND DISCUSSIONS

According to the initial salt content, the soil of area I is subject to weak salinity. In area 2, the upper 0-100 cm and lower 200-300 cm layers are practically not saline, its middle part (100-200 cm) is slightly saline. The soils of the experimental plots belong to the chloride-sulfate type of salinity. The composition of salts is dominated by sulfates, the reserve of which makes up more than half of the dry residue. Sulfate anions in the soil of plot 2 exceeded 4.8-8.1 times, plot 2-1, 8-5.0 times. Since the soil in plot I is slightly saline, in plot 2 it is subject to salinization in a deeper (100-200 cm) layer; when favorable conditions are created, water-soluble salts can easily move to the upper layers of the soil and cause the normal growth and development of cotton to become difficult.

Initial content of water-soluble salts in the soils of the experimental plots

Layer, cm	Dense residue	Total alkalinity	Chlorine ion	Sulfuric acid residue
Section I				
0-20	0,654	0,037	0,028	0,378
20-40	0,876	0,032	0,053	0,513
40-60	0,470	0,038	0,046	0,143
60-80	0,473	0,039	0,057	0,237
80-100	0,477	0,038	0,048	0,260
100-200	0,952	0,040	0,045	0,252
120-140	0,830	0,020	0,072	0,490
140-160	0,817	0,030	0,072	0,481

160-180	0,680	0,020	0,060	0,380
180-200	0,617	0,036	0,043	0,344
0-60	0,666	0,035	0,043	0,344
60-100	0,375	0,038	0,052	0,248
0-100	0,496	0,037	0,048	0,296
100-200	0,725	0,025	0,063	0,402
0-200	0,610	0,031	0,054	0,349
Section 2				
0-20	0,120	0,034	0,012	0,056
20-40	0,108	0,037	0,018	0,039
40-60	0,122	0,029	0,033	0,034
60-80	0,140	0,029	0,033	0,042
80-100	0,116	0,032	0,014	0,048
100-120	0,460	0,026	0,021	0,275
120-140	0,656	0,017	0,023	0,427
140-160	0,600	0,018	0,025	0,305
160-180	0,448	0,018	0,033	0,261
180-200	0,338	0,020	0,018	0,207
200-220	0,260	0,025	0,033	0,130
220-240	0,128	0,024	0,014	0,056
240-260	0,124	0,025	0,012	0,063
260-280	0,118	0,024	0,009	0,057
280-300	0,126	0,024	0,011	0,063
0-60	0,140	0,033	0,021	0,043
60-100	0,129	0,030	0,023	0,045
0-100	0,121	0,032	0,025	0,043
100-200	0,500	0,019	0,024	0,295
200-300	0,171	0,023	0,015	0,073
0-200	0,315	0,026	0,024	0,169
0-300	0,264	0,037	0,022	0,205

The results of our three-year studies showed that different irrigation regimes for fine-fiber cotton played a certain role in changing the salt regime of soils in experimental plots. Experiments conducted on a site with a groundwater level of 1.5-2.0 m showed that under the influence of irrigation regimes, sensitive changes in the salt regime of soils occur. Under the pre-irrigation soil moisture regime of 70-70-65% HB (var 2), the content of dense residue in the 0-60 cm layer from spring to autumn decreased from 1.153 to 1.121% in 60-100 cm from 1.105 to 1.046% and in the 100-200 cm it increased from 1.019 to 1.240%. However, the amount of chlorine ion at the end of the growing season in the 0-60 cm layer increases from 0.027 to 0.096%, in the 0-100 cm layer from 0.028 to 0.075, in 100-200 cm from 0.029 to 0.062%. In option I, where the pre-irrigation soil moisture regime is 60-70-65% NV, the salt content in the soil increases significantly from spring to autumn. The same picture is observed in options 3-4. So, if at the beginning of the growing season the 0-60 cm layer contained 1.153% of dense residue, by autumn it was found in option 3-1.270 and in option 4-1.261%. However, in deeper soil layers (100-200 cm) the salt content is lower (1.227-1.262%:) than in option I (1.328%). A comparative analysis of the data obtained showed that the most favorable soil reclamation regime is observed in options 2-3, where the pre-irrigation soil moisture regime is 70-70-65 and 70-75-65% NV.

Data on the salt regime of the soil in an area with deep groundwater, where the upper 0-100 cm layer is practically not saline; in such conditions, as three-year data show, the salt content in the 0-100 cm layer, both in terms of dry matter and chlorine – ion under different irrigation regimes from spring to autumn does not change significantly and is maintained in a stable position. A more noticeable change in the salt regime occurs in the 100-200 cm layer, where the soil is relatively more saline than in the previous layer. Here, in all years of research under all soil moisture regimes, the movement of salts into the underlying layers was noted, i.e. water-soluble salts are washed out[4,5]

If we consider the change in salts in the context of different irrigation regimes, we can see that options with pre-irrigation humidity 70-75-65 and 75-75-65% HB were more effective in desalinizing the 100-200 cm layer. Desalinization is worse at a humidity level of 60-70-65 HB. version 2, where cotton was watered at a moisture content of 70-70-65% HB, occupied an intermediate position [6].

The desalinizing effect of preventive watering must be secured by carefully carried out vegetation watering. In our experimental plots, early spring reserve preventive irrigations were carried out annually closer to cotton sowing, with norms of 1200-1500 m3/ha. If we take into account that in an area with deep groundwater, the soil is composed, with the exception of the arable layer, of light loam, has a loose composition, lighter from top to bottom, and has good water permeability, then with such rates of preventive irrigation it is quite possible to achieve desalinization of the soil to a depth of 2 m. Naturally, this was also facilitated by vegetation irrigation, carried out according to standards for the deficit of the design layer in combination with high-quality inter-row tillage, timely fertilizing of plants, weed control and other types of agrotechnical measures.

CONCLUSION

Thus, from the above it follows that on irrigated lands of the Karshi steppe, subject to low salinity, when cultivating cotton, pre-sowing reserve preventive irrigation should be used annually as a mandatory agrotechnical practice at a rate of 1200-1500 m3/ha. The effect in soil desalinization achieved by these irrigations must be consolidated by using optimal irrigation regimes for fine-fiber cotton during its growing season in combination with other agrotechnical measures carried out using intensive technology. When implementing such interconnected agro-reclamation measures, a prerequisite is created for maximally preventing the process of moving water-soluble salts from the lower, more saline layers to the upper ones. Thanks to this, farmers will be able to ensure that the upper layers of the soil are maintained in the most favorable reclamation condition throughout the entire growing season.

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