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SALINATION OF SOILS

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ANNOTATION

Saline soils include soils that contain mineral salts in amounts harmful to plants. Crushing of agricultural crops begins when the amount of salt in the profile exceeds 0.25% of the soil mass. In arid desert and semi-desert zones without deep soil moisture, salt accumulation occurs as a result of their biogenic accumulation, weathering, soil formation, as well as impulse formation (wind passage). it can. In the semi-desert and desert areas, there are favorable conditions for the formation of sodium sulfates and chlorides, gypsum and nitrates. Sometimes soda formation and the formation of soils with a soda type of salinity can occur. Saline soils are divided into low, medium and high salinity, as well as saline, salty, malty. It is 0.25-0.4% in water in slightly saline soils, 0.4-0.7% in medium salinity, and 0.7-0.1% in strong salinity.

Keywords: Saline soils, Salt redistribution, Salt marshes, Salinity composition, Malt semi-hydromorphic soils, etc.

INTRODUCTION

Saline soils do not have a continuous distribution, but are found in separate places among the main soil types and form complexes with the latter. They are common in all zones, but mostly in Kazakhstan. Central Asia, Western Siberia, along the Middle and Lower Volga, in the south of Ukraine. The formation of saline soil is associated with the accumulation of salts in groundwater and rocks and favorable conditions for their accumulation in the soil. Significant amounts of salts are formed during the breakdown of rocks. The annual flow of soluble salts from the land to the ocean is 2735 million tons, and about 1 billion tons of salts enter the closed areas of the continents. During volcanic eruptions, many easily soluble salts are formed. Wind, surface water, and runoff play important roles in the redistribution of salts, but climate is the leading factor affecting the accumulation and redistribution of salts in soils. Precipitation and evaporation ratio, soil filtration properties, parent rocks, different

solubility of salts. climatic conditions change strongly, in this regard, a certain zoning is clearly observed in the distribution of salts on land. The concentration of salts in groundwater and soil increases with increasing aridity of the climate. The highest concentration of salts was recorded in the desert zone, and the lowest in the steppe and forest-steppe zones. In a humid climate, with the washing type of water regime, salts are washed from the soil and therefore do not accumulate in the soil. In an arid climate and an effusion-type water regime, when evaporation is much higher than precipitation, conditions are created for the accumulation of salts in groundwater and host rocks. In these areas, mostly saline soils are common. There is a certain regularity in the qualitative composition of salts in certain natural zones, which is related to the specific characteristics of the climate, which affect the geochemical and biochemical processes of soil formation. In the forest-steppe and steppe regions, soil salinity and mineralization of groundwater are insignificant, sodium carbonates and bicarbonates dominate the composition of salts, there are sulfates that determine the soda and soda-sulfate types of soil salinity. Accumulation of soda in these zones is due to its low solubility compared to sulfates and sodium chlorides. Salt marshes include soils, in meter profile, starting from the upper horizon, most contain large amounts (more than 1%) of water-soluble salts that inhibit plant growth. Salt marshes occur along various lowlands - river plains, lakeside lowlands, coastal lowlands, and dry lakes. On the surface of salt marshes, there are many (up to 25%) salts, which is related to the specific features of their formation. They are formed mainly in the effusion type of water regime, when evaporation exceeds the amount of precipitation. With such a water regime, there is constant evaporation of water from the soil surface and its rise from the lower horizons. If the underground water is located nearby and contains easily soluble salts, the latter will be moved to the surface along with the water, and after the water evaporates, they will accumulate in the upper horizons of the soil. The composition of salts is different and depends on the conditions of their formation... On the surface of the earth, chloride-sulfate salt marshes containing NaCl and Na2SO4 are found more often than others. In salt marshes with NaCl salinity, the surface is covered with crust. Cultivated plants do not grow in salt marshes. The most harmful for them is soda salinization of the soil, when there is a large amount of soda on the surface of the salt marsh. Solonetz is called soil, in which the soil absorption complex of the illuvial horizon contains more than 20% of the absorption capacity of exchangeable sodium. Salt flats are common in patches from several meters to several kilometers in different soil zones. They are often located among light chestnut soils. In the upper horizon of solonets there is an insignificant amount of easily soluble salts, and below it lies an illuvial horizon with a lot of exchangeable sodium. The amount of sodium exchanged among absorbed cations affects the physical and physico-chemical properties of soils. Salt beds are formed when salts are washed from the upper horizons of saline soils with high sodium salts. The influence of groundwater determines the alternation of summer salinization (the rise of salts through capillaries along with water) and autumn-winter-spring salinization processes. Decomposition of plant residues (wormwood, salt, etc.) leads to biogenic accumulation of sodium and sodium salts enter the soil during precipitation. atmospheric precipitation... During the formation of solonetza, the amount of sodium salts remains high enough, but below the coagulation threshold, to displace some of the absorbed

Ca and Mg with sodium from the soil absorbing complex conditions are created. The name of salt marshes is determined by the types of zonal soils located between them... According to the conditions of formation, each type of solonets soils is divided into three subtypes: 1) meadow, 2) meadow-steppe and 3) steppe. Saline soils are characterized by poor agrophysical and agrochemical properties and low natural fertility. Due to the swelling of the Solonets horizon, they conduct water poorly, and in the spring, water stagnates for a long time in the plates of Solonets soils. This delays field work. Because the soil adheres strongly to plow waste, wet sals are difficult to grow, and dry sals are not well grown due to their high density and hardness. These soils contain little moisture available to plants. Such unfavorable characteristics are explained by the high amount of exchangeable sodium in the illuvial horizon, which can be up to 40% or more of the assimilation capacity. Salt lickers have an alkaline or strongly alkaline reaction. Crustacean and small salt mints have the least favorable agrotechnical properties. Malts belong to the group of semi-hydromorphic soils... They are distributed in forest-steppe and steppe zones and are found in closed depressions under meadow, meadow-swamp vegetation and swamp forests. A characteristic feature of malt and saline soils is the presence of amorphous silicic acid, which dissolves in a 5% solution of caustic potash in the upper horizons. Malting and the formation of free silicic acid occur under conditions of increased soil moisture and leaching. Such conditions are usually created in various lowlands (birch-aspen groves, hearths, rivers). The malt profile varies dramatically across genetic horizons. Distinguish the following subtypes of malts: meadow-swamp, meadow, meadow-steppe and soda. Agricultural use... Field, vegetable and fruit crops differ in relation to soil salinity. The most resistant to salinity are beets, moderately resistant - grains, tomatoes, cabbage, potatoes, carrots, unstable - sunflowers, legumes, radishes, onions, garlic, cucumbers. From fruit crops, stone fruits are less resistant to salinity, and pomegranate fruits are less resistant. But salt-tolerant plants also tolerate relatively low salt concentrations. Therefore, in order to make saline soils suitable for arable land, they are pre-washed (from 2 to 18 thousand tons of water are used per hectare). Flushing salt water is removed through drainage pipes. Salt marshes in rainfed farming zones are used as pasture. Cultivation of salt lilacs is carried out in different ways, depending on their properties, the depth and area of the suprasolonets horizon. The thickness of the suprasolonets horizon of small and medium-sized solonets soils of the chernozem zone, located in small spots, increases with grazing. For this purpose, the surrounding non-saline soils are pulled into the depression of the solonets with the help of lifting machines. Then the field surface is leveled. The most effective way to grow salt plants is gypsum, that is, the introduction of gypsum (from 3 to 25 tons per hectare is used). After gypsum plastering, deep drilling is carried out to mix gypsum, suprasolonets and solonets horizons. Added calcium displaces exchangeable sodium from the soil uptake complex (AUC). You may also be interested: Salinity is not only a disease that causes a lot of suffering to people, it kills the living soil, makes it sterile. Soil salinization can occur due to natural causes (the formation of salt marshes and salt marshes), as well as improper irrigation of agricultural land. Only a few vegetable growers water their gardens and fields from natural water bodies or very deep artesian wells with good water quality. All other owners with wells, shallow wells, use underground water, the so-called vyerkhovodka, to irrigate their

beds. The water in the upper horizon is very salty. It contains various proportions of carbonate, sulfate, chloride compounds, salts of calcium, magnesium, iron, sodium and other elements, the total amount of which can vary from 0.5 to tens of g/l. In addition, the composition and concentration of salts changes throughout the year. The water is richest in salts in August-September, in May their quantity and concentration are significantly reduced - winter moisture is diluted. Water with a salt content of up to 0.5 g/l is good for irrigation, from 0.5 to 1 g is allowed, from 1 to 3 g is dangerous for plants, and all agrotechnical and can be used very carefully with reclamation activities and activities. If the water contains more than 3 g / l of dry salts, it is not suitable for irrigation. To determine the quality of water, you need to take samples to the laboratory. And the total amount of salt can be determined at home: you need to evaporate a certain amount of water, then weigh the dry residue. A simpler and more civilized way is to use an electronic salt meter, which allows you to determine the salt content of water with an accuracy of milligrams per liter and whether it is suitable not only for irrigation, but also for drinking (it is known that high-salt drinking water is not recommended). In most areas, it is obvious that the water is too mineralized. This is also confirmed by the measurement in the teapots. Natural water contains salts from 300 mg/l to 2 g/l. With simple calculations, you can determine how much harmful salts enter the garden with irrigation. If we take an average amount of salt of 1 g / l, 10 times a season with full irrigation and an irrigation rate of 20 l / m 2, the soil will receive 200 g of unnecessary salts per year. And for 5 years of watering - 1 kg. And this is without taking into account the unused residues of mineral fertilizers, mineralized dead organic matter (you can accurately determine the total mineralization of water for irrigation using a salt meter or evaporation). The basis of productivity is when humus is lost, when mineralization occurs, when soil moisture is tied up, when the physical properties of the soil become unfavorable for plants, when the activity of soil organisms is stopped. Although, in fact, some plants have a high resistance to irrigation with saline water, the decrease in productivity is mainly due to the deterioration of the physical properties of the soil, capillary blockage, excessive density, impermeable roots, associated with poor gas and plant impermeability. moisture exchange. The data obtained in the Baltic States indicate the robustness of the plant reserves manifested in the sandy soil. And watering fertile chernozems with saline water is strictly not recommended. By the way, it should be noted that different salts have different effects on the acidity of the soil, its pH level, and therefore this parameter should be taken into account, especially in regions with a high salt content in water. I also encountered a similar phenomenon in my garden. My water for irrigation is not of the best quality, but it was necessary to grow and understand something. There was no choice. We had to water with everything we had. But at the same time, he tried to solve the problem in some way: he talked with experts, experienced vegetable growers, changed mountains and studied scientific literature, not to mention submitting newspapers and magazines. I did not try in vain. I found what I was looking for - several methods of growing vegetables without irrigation, in particular, technologies that prevent salinity, revitalize the soil with no or minimal irrigation, and obtain a marketable product. In addition, using many of his own developments, he created and mastered a low-cost, comprehensive method of growing vegetables without irrigation. It consists of several technological operations. With

its help, without watering, a tomato crop was obtained with 2-2.5 kg of tomato fruits per bush at a planting density of 400 pieces. per hundred square meters. With his project, he took part in the All-Ukrainian business plan competition, where he won one of the prizes. Agriculture against salinity: The problem of soil salinity in vegetable gardens can be easily solved by our own efforts. Of course, pour the fields with a meter layer and wash clean water is not realistic for a private trader. But there are alternative methods. If you need to water your gardens, it is better to collect water in barrels, containers, and ponds in sufficient quantity rather than from wells. Mineralized water settles for 2-3 days. The process begins with the precipitation of salts. In the upper, 70-centimeter water layer, after 2-3 days, 30% of the original amount of minerals remains, and the lower layers become more saturated. The same applies to water bodies, rivers, canals. Irrigation pumps should be installed to irrigate gardens with a higher, less saline layer of water. In order to avoid secondary salinity, it is necessary to water the beds infrequently, but abundantly, deeply moistening the soil. Surface irrigation is harmful, because the water soaked in the upper layer of the soil evaporates quickly, and all the salts remain there. This means infrequent and abundant watering with forced loosening of the soil. In saline areas, it is necessary to apply organic fertilizers in the form of humus, manure, compost every year. Organic substances are able to cure this disease (salt deposition). Normal manure contains a complete set of elements that restore fertility: stimulators, enzymes, vitamins, microorganisms that have a multifaceted effect on the soil, as a result of which it is more resistant to changes in the response of the environment. display ability is restored, heavy sticky soils are lightened, sandy soils. connected. The soil will have a fine-grained structure with optimal air retention, or rather, restore it. One of the main means of combating salinity is the introduction of gypsum for autumn digging. Gypsum introduced into the soil, not construction, but natural, quarried (30 kg per hundred square meters), helps to improve its physical properties, to form an agrotechnically valuable structure - exchangeable sodium gypsum is replaced by calcium, and it is squeezed into deep underground layers. Siderates have the ability to bind and remove salt compounds: mustard, alfalfa, as well as wheat, barley. During their growth, the root exudates partially demineralize the soil, and they use some harmful compounds to grow the above-ground mass. These plants have a strong root system that penetrates deep into the soil. After green manure, a whole network of underground canals remains in place of rotting roots. Such natural drainage occurs, through which salts are washed into the deep layers of the soil by precipitation. Vegetables have the ability to obtain mineral elements only from the soil. Therefore, it is necessary to introduce non-irrigated beet crops into crop rotation in irrigated gardens. The benefit is two-fold: you can get a decent harvest and clear the land. To prevent salinity, in irrigated garden areas, it is necessary to leave part of the beds without irrigation for one season. And it is not necessary to keep the black steam, there you can grow salt and drought-resistant plants - melons, watermelons, pumpkins, beans, beets, late cabbage. But it is better not to allow the soil to become salty and dry, then there will be fewer problems and the yield will be higher.

CONCLUSION. I hope my recommendations will be useful for you. If you have any questions on the topic of soil salinity, write in the forum. Saline soils are soils with an abundance (more than 0.25%) of easily soluble mineral salts in water. They are found mainly in the

southern arid regions of many countries (Pakistan, India, China, Egypt, etc.), often in patches between uninhabited soils. The area of wages in the USSR is 52.3 million square meters. yes, or 2.4% of all soils in the country; they are widespread in the south of the Ukrainian SSR, along the Volga, in Central Asia (half of all arable land is saline) and other regions. They mainly contain sulfate (sodium sulfate, calcium and magnesium), chloride (sodium, calcium and magnesium chloride) and carbonic (sodium in two forms: carbonate or common soda and bicarbonate or baking soda) acids. Sodium and calcium salts of nitric acid are sometimes found in salmon. The abundance of water-soluble salts in the soil leads to the thinning of the vegetation cover and the emergence of a special group of wild-growing plant species. hodgepodge or halophytes adapted to life in the west.

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