

IMPROVEMENT OF IRRIGATED SOILS IN THE BUKHARA REGION

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Abstract: In this article discusses irrigated soils in the Bukhara region, which are the acquisition of external signs of cultivation, a decrease in humus reserves, as well as a low availability of soils with mobile forms of phosphorus, sometimes potassium.

Index Terms: anthropogenic, cultivation, fertilizer, humus soil, impact, irrigation, soil-forming, water.

1. INTRODUCTION

After the development of virgin lands for irrigation, among the factors affecting soil-forming processes, human production activity becomes dominant, i.e. anthropogenic factor. The natural factor does not cease to act on the soil, but the intensity and nature of this action changes significantly. Anthropogenic impacts on the soil are very diverse and they begin from the moment of development and continue throughout the long period of soil exploitation. This includes various soil cultivation, drainage reclamation, watering of the developed massifs and irrigation, the application of mineral and organic fertilizers, etc. All these measures, with their various combinations and combinations, radically change the direction of soil-forming processes and diversify the quality of soils. Like soil-forming conditions, the soil is in constant development. Developing in time, it gradually acquires new properties and qualities, passing from one variety to another.

2. METHODS OF RESEARCH

Old-irrigated meadow alluvial soils of the desert zone formed under conditions of constant or periodic moistening by capillary currents of moisture from shallow underlying soil water (1-2.5 m). These soils characterized by the presence of an agro-irrigation horizon, the thickness of which reaches 80-100 cm. By the thickness of the humus horizon, they mainly classified as medium-power (up to 40-60 cm, rarely up to 80 cm). The humus horizon has a gray or dark gray color, a dusty-lumpy structure. The arable horizons are dense, 10-12 cm thick. From a depth of 25 cm, sometimes bluish and rusty spots observed below a meter. The presence of gliding at this depth explained by the fact that in the recent past, groundwater lay close to the surface. Along the riverbed Zarafshan and the Amu-Bukhara Canal, the presence of rust spots observed from 50 cm, since in these places' groundwater lies at a depth of 0.5-1.0 m. Excavators throughout the entire thickness of the humus horizon worked out the profile of meadow soils.

Old-irrigated desert meadow soils have a very low humus content. In the arable layer, its fluctuations are very wide - from 0.4-0.5 to 0.9-1.2%. It evenly distributed along the profile, gradually decreasing downward. Accordingly, the content of nitrogen also varies with humus - 0.03-0.07%. The content of mobile phosphates varies widely, but all of the old irrigated meadow soils very poorly provided with them (3-18 mg / kg of soil). Such a low supply, obviously, explained by low rates of fertilizers applied to the soil. Very low content and gross phosphorus. Mobile forms of potassium, these soils are also very low and medium endowed. Down its content gradually decreases (> 100 mg / kg of soil). By mechanical composition, old-irrigated meadow soils are predominantly medium loamy. Heavy and light loamy-loamy sandstones found along the profile. There are less carbonates in old-irrigated meadow soils than their amount

varies between 6-8% of CO₂. Carbonates distributed unevenly over the profile, which is probably due, on the one hand, to their washing out during irrigation, and, on the other hand, to the heterogeneity of alluvial sediments. Gypsum in alluvial sediments is small - 0.17-0.73%. Old-irrigated meadow alluvial soils of the desert zone are everywhere subject to salinization with spots of varying degrees - from lightly saline to highly saline. Until now, many researchers have identified a pattern: soil salinization is increasing from the upper Bukhara delta to its lower reaches and further to the Karakul delta. Now the differences in salinization not expressed in such a sharp form as was noted by other scientists before (Pankov et al., 1974; Feliciant et al., 1984), but nevertheless they exist. With a high degree of salinization, a large amount of chlorides and sulfates observed in the composition of salts. Sulfates are not toxic salts. If chlorides have a negative effect on plants (cotton) in an amount of more than 0.01%, then sulfates affect plants with a content exceeding 0.6-0.7%. A negative effect reflected in an increase in the concentration of soil solution and in violation of the nutritional regime of plants. The type of salinity in old irrigated meadow alluvial soils is chloride-sulfate and rarely sulfate. Newly irrigated meadow alluvial soils formed occupy on the I-II floodplain terraces of the river. Zarafshan. According to the morphological structure, the newly irrigated soils have a somewhat shortened humus horizon, in contrast to the old irrigated ones. According to the degree of agro technical impact, the newly irrigated soils are medium and poorly cultivated. A distinctive feature of newly irrigated meadow soils is the presence of a relatively thin (30-60 cm) agro-irrigation horizon. It is dark gray or light gray in color, then to a depth of 50-70 cm a pale gray transition horizon, layered alluvial loams with many gray and rust spots are below. Groundwater revealed from a depth of 1.5-2.0 m. The humus content in the arable horizon varies from 0.35-0.48 to 0.7-1.0%. Down its content is gradually decreasing. Newly irrigated soils are low in humus content. Humus staining reaches a maximum of 60 cm. The nitrogen content in the arable horizon is from 0.02 to 0.06%. The supply of these soils with gross nitrogen is low and very low; in terms of the content of mobile phosphorus and potassium, the soils are low and very poor. The content of gross phosphorus ranges from 0.102 to 0.142%, and for gross potassium - from 0.70 to 0.142%. The amount of all of the above nutrients is gradually decreasing.

According to the mechanical composition, the newly irrigated meadow alluvial soils are mainly medium and light loamy. Light loamy soils are predominant, which characterized by increased water permeability, poor water-holding ability, ease of processing. They require 1-2 watering more than other soils. Medium loamy soils have the most favorable water-physical properties. Soils have a variegated fractional composition and layer profile truth. Newly irrigated meadow alluvial soils are saline everywhere. Non-saline at the time of examination not identified. Widespread are medium- and highly saline soils. Highly and medium saline soils are characterized by both a high total salt content, reaching 1.1-2.6%, and a large amount of chlorides and sulphates. The type of soil salinization is mainly chloride-sulphate and rarely sulphate. Old irrigated meadow soils distributed only in the upper part of the Bukhara delta of Zarafshan. They are formed among meadow soils on more elevated elements of the relief with relatively weak moistening with groundwater occurring at a depth of 3-4 (5) m. During the period of maximum volumes of water supply and water consumption, groundwater can temporarily rise to 1-2 m. All meadow soils of the Bukhara oasis are old-irrigated. The upper part of the profile of these soils to a depth of 1-2 m is composed of agro-irrigation sediments, represented mainly by medium and heavy loams. Located in elevated areas with a relatively good local outflow of groundwater, meadow soils are less susceptible to processes than meadow. Therefore, they are mostly slightly saline and washed. Medium and highly saline soils occupy

small areas. The type of salinization is sulphate, less often chloride-sulphate. In the arable horizon of the old irrigated meadow soils contains 0.5-1.1% of humus and 0.04-0.12% of nitrogen. Down the profile, their content decreases. Soils poorly and moderately provided with mobile forms of phosphorus and potassium. There is little gypsum in soils (0.08-0.42%). The carbonate content ranges from 7.4 to 9.2%. Irrigated meadow soils due to the short-term impact on them of agricultural crops (soils are mainly newly developed and newly irrigated) differ in the presence of arable horizon from virgin only in the upper part of the profile. There are no other significant morphological differences between irrigated and virgin soils. According to the mechanical composition, the arable horizon of meadow soils is mainly medium and heavy loamy. Below layered deposits of lighter composition. Humus in the upper horizons of meadow envelopment. Nitrogen in soils 0.05-0.07%. The carbonate content correlates with the mechanical composition of the layers and ranges from 8 to 13%. There is little gypsum in soils (0.136-2.286%). Irrigated soils are mostly moderately saline virgin - in strong. The type of salinization is sulphate and chloride-sulphate. Long-term irrigation of soils accompanied by a rise in groundwater level to 3-5m. Depending on the lithological and geomorphological conditions, this happens either towards the end of the development period (category of newly developed soils) or during cultivation (category of newly irrigated soils). Under the influence of irrigation and soil-capillary moisture in the soil, the hydrothermal regime is fundamentally changing. In this regard, microbiological activity increases and organic matter is rapidly processed. In irrigated soils, the reverse process begins - a return to gelation. In soils at this stage of development, signs of meadow soils combined. Soils become transitional - meadow. Meadow soils in the initial period of development differ little. Despite the increase in the intake of organic residues in the soil and increased microbiological activity, they remain low-humus (0.7-0.8%). Nitrogen in them is 0.06-0.07%.

3. RESULTS

According to the mechanical composition, the described irrigated meadow soils are light loamy, virgin-fallow soils are medium- and heavy loamy, crushed, with pebbles lined with 0.4-1 m. Carbonates in soils 8-10%. Their content correlates with the mechanical composition of the layers. Meadow soils are saline to a weak and moderate degree. Sulphates prevail in the composition of salts. Newly irrigated sulphur-meadow soils have been under irrigation for more than 25 years. The characteristic features of the newly irrigated brown-meadow soils are as follows: the arable horizon above is dry, sandy loam or light loamy with an admixture of the skeleton from 20 to 40%. The content of fine earth decreases, sand appears. From a meter deep, the soil lined with pebbles. Gypsum crystals and rust spots rarely found on the profile. The transition from one horizon to another is unclear, since the profile is interspersed with loam, sand and cartilage. Groundwater during the survey (in autumn) lay on 3-4 m depth. The humus content in the arable horizon of newly irrigated grey-brown-meadow soils ranges from 0.35 to 0.78%, nitrogen - from 0.036 to 0.087%. With depth, the humus content often persists. The availability of soils with mobile forms of phosphorus and potassium is low. The amount of CO₂ carbonates in the profile is in the range of 5-6%. The gypsum content is from 0.23 to 0.74%. The mechanical composition of the newly irrigated grey-brown meadow soils is mainly sandy and light loamy. These soils characterized by a small amount of silt fraction and a large fine sand obsession. These soils are also characterized by strong (from 20 to 40%) rockiness and skeletal origin, starting from the surface. Water permeability of soils is high. Newly irrigated Sulphur-meadow soils are slightly saline, washed out in places. The distribution of salts along the profile is almost the same. The type of soil salinization is chloride-sulphate.

4. CONCLUSION

In a significant part of the irrigated lands, along with the acquisition of external signs of cultivation, there is a decrease in humus reserves, as well as a low supply of soils with mobile forms of phosphorus, sometimes potassium.

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