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Ecological State of Irrigated Gray-Meadow Soils and Ways to Increase Their Productivity (By the Example of Sh. Rashidov's District)

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Abstract The article presents opinions on the contamination of irrigated gray-meadow soils with harmful compounds from industrial enterprises, changes in their agrochemical properties, microbiological activity. In field experiments, samples were taken from soil sections, and in the context of variants, changes in the soil caused by the use of bio-organic fertilizers, repeated sowing - moss vegetation, combined use of biological products were studied.

Keywords Soil, Gray-meadow soils, Chemical pollution, Heavy metals, Microorganisms, Bio-organic fertilizers, Re-sowing, Soil section, Agrochemical properties, Biological preparation Rizokom-1, Root crops, Productivity

Techno genic environmental pollution is global in nature and negatively affects the quantitative and qualitative indicators of agricultural products. This problem is especially relevant for irrigated lands, since if preventive measures are not taken to reduce the removal of calcium into the soil and reduce the amount of organic matter in the soil, then productivity will decrease and soil pollution will develop. Currently, an increase in the content of metals such as chromium, lead, copper, vanadium, nickel and zinc has been recorded in field experimental soils. This situation requires a thorough study of the migration of metals and changes in soil properties in irrigated gray-meadow soils. Experimental work was carried out on irrigated gray-meadow soils of Sh. Rashidovsky district of the Jizzakh region. The interrelation of mobile forms of metals with such properties as humus content, mechanical composition, soil pH, mineralization has been studied [1-2].

The accumulation of the main part of pollutants is mainly observed in the horizon of humus-accumulating soil, where they accumulate with alum inosilicates, non-silicate minerals, organic matter due to various interaction reactions. The composition and amount of humus to the elements stored in the soil; depends on acid-base and redox conditions, sorption capacity, and intensity of biological absorption.

Some heavy metals are firmly held by these components and not only do not participate in migration along the soil profile, but also does not pose a threat to living organisms. In the soil profile, the anthropogenic flow of substances meets a number of soil-geochemical barriers. These include carbonate, gypsum, alluvial horizons (illuvial-ferruginous-humus). Some highly toxic elements may become elements that are difficult for plants to access, compounds and other elements, moving in certain soil-geochemical conditions, can migrate in the soil layer, which poses a potential threat to biota. The mobility of the elements largely depends on the acid-base and redox conditions in the soil [3,4].

Atomic absorption, gas chromatographic, photometric, photocolorimetric, gravimetric, spectrophotometric, titrametric and other physicochemical methods were used for the analysis of soil samples.

Water mineralization was determined by gravimetric method. The determination method is based on gravimetric determination of solutes, which is determined by filtering the sample to a constant weight, evaporation of the residue and drying at 150℃ for malamineral waters (105-110℃) and highly mineralized waters.

Ammonium ions were determined photametrically. The main method for determining ammonium nitrogen is the calorimetric method using the Nessler reagent. It allows the determination of ammonium ions in an amount from one hundred to 5 mg / l (with a high content of NH4+, it is necessary to dilute the test water) [4].

Sulfate ions were determined by the complexanametric method, chlorine - ergonometric method, and total stiffness was determined by the complexanametric method.

Methods of analysis of heavy metals. Heavy metals were determined by photometric and photocolorimetric methods. For example, a complex compound of yellow color in a trivalent iron medium was determined by the reaction of hydroxide formation, forming a colored complex compound in the presence of copper xylene.

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Based on the results of field and laboratory studies and observations, the sources and level of soil contamination were determined .Rashidovsky district.

Analysis of the diversity of bacteria in the soil and rhizosphere at the level of taxonomically heterogeneous physiological groups, such as ammonifiers, oligonitrophiles, actinomycetes, microscopic fungi, showed that oligonitrophilic bacteria develop more intensively, their number is in the range of 32-98 thousand/ g, ammonifiers in the range of 38-72 thousand/ g, actinomycetes 5-24 thousand/ g and fungal populations - 2.0-11.0 thousand/g.

In accordance with the established system of experience, the research was carried out on a mix of re-sowing of the Durdona variety in the fields of the Yakub farm of the Rashidovsky district of the Jizzakh region in 2020-2022 [4-5].

The studies were carried out in 4 variants and 4 repeats under conditions of irrigated light gray soils (2020-2022). The surface of each variant was 50 m2, the total area of 1500 m2.

The 1st variant of the experimental system is a control re-seeding gruel (without fertilizers) and the 2nd variant is a re-seeding porridge (biological fertilizers 20t/ha), the 3rd variant is a re-seeding gruel (Rizok-1), the 4th variant is a re-seeding wort (biological fertilizers 20t/ha+Rizokom-1).

In the experiment, a variety of re-seeding mash "Durdon" was planted in accordance with the planting standards specified in the recommendations.

The Durdon variety was created at the Research Institute of Plant Growing and was entered into the State Register in 2011. There are no analogues of the variety in the republic in terms of cooking speed. The first collection of pods can be made 45 days after the appearance of the grass. The period of biological maturation (vegetation period) of seeds corresponds to 65-70 days. The formation of pods in the upper part of the stem (25-30 pieces) facilitates the picking process. The yield is 20.8 c/ha. The weight of 1000 seeds is 60 g. Seeds contain protein - 18.7% and starch - 1.7%. Its seeds are larger than regional puree varieties. It goes well with vegetable and grain crops in the crop rotation system. Improves soil fertility. It is suitable for planting in the spring-summer sowing season, allow you to get high yields. It can be used in the preparation of various dishes. The blue mass of the plant is a nutritious feed for livestock [5-6].

Increasing the productivity of irrigated soil cover, preventing degradation and using biological methods to combat it, in particular, the technology of re-sowing, is the basis for increasing the physical, physic-chemical and biological activity of the soil. Microorganisms have high biological activity and constantly break down a large amount of organic and mineral substances in the soil and synthesize their new forms.

During these processes, the cycle of the main biogenic elements occurs, biologically active substances are released. Microorganisms are necessary to increase soil fertility. With their participation, the processes of accumulation of mineral elements necessary for plants occur in the soil. Also, microorganisms are of great importance in increasing soil fertility and obtaining abundant crops.

Accounting and studying the functional diversity of microbial communities in the soil and rhizosphere of plants has traditionally been evaluated at the level of physiological groups in the appropriate medium: ammonifying bacteria on meat-peptone agar (MPA), spore bacteria with the addition of MPA.1:1), oligonitrophils, actinomycetes on starch-ammonia medium, microscopic fungi on baking medium. Bacterial abundance was expressed in colony-forming units per 1 g of soil.

As a result of the reclamation technology, the chemical and physical properties of the soil have improved, the number of microorganisms has increased, and the initial restoration of fertility has been achieved. The coefficients of the minimum increase in productivity indicators of technogenically degraded soils after reclamation have been developed.

According to the economic analysis of recultivation of technogenically disturbed soils, it is necessary to recultivate such lands as soon as possible, since if irrigated soils that need recultivation are not recultivated for a long time, such great economic damage to agriculture will be inflicted. Also, every time spent on reclamation affects the increase in economic value, so it is recommended to study and recultivate technogenically disturbed soils in a short time.

REFERENCES

[1] B.D. Shodiyarovna "Ecological state of irrigated gray-meadow soils and ways to improve them" ACADEMICIA: An International Multidisciplinary, 2022 -Issue 05, p 238-243 https://www.indianjournals.com/ijor.aspx?target=ijor:aca&volume=12&issue=5&article=043.

[2] Berdieva D.S. Soil pollution by pollutants in the Rashidovsky district of the Jizzakh region and prevention measures" Economics and Society, 12-1 (103) pp. 465-472 https://cyberleninka.ru/article/n/zagryaznenie-pochv-zagryaznyayuschimi-veschestvami-v-sh-rashidovskom-rayone-dzhizakskoy-oblasti-i-mery-predotvrascheniya.

[3] D. S. Berdieva "Soil contamination with heavy metals in the Rashidovsky district of the Jizzakh region and ways to reduce them from the soil composition" Academic research in educational sciences, 2021 VOLUME 2 | ISSUE 5 | 2021 ISSN: 2181-1385 Scientific Journal Impact Factor (SJIF) 2021: 5.723https://cyberleninka.ru/article/n/zagryaznenie-pochv-tyazhelymi-metallami-v-sh-rashidovskogo-rayona-dzhizakskoy-oblasti-i-sposoby-ih-umensheniya-iz-sostava-pochvy.

[4] D.Sh. Berdieva "Soil contamination with heavy metals in the Rashidovsky district of the Jizzakh region and methods of its removal" Actual problems of ecology and nature management, collection of scientific papers of the XXII International Scientific and Practical Conference: in 3 vols. Vol.1. 2021 https://www.elibrary.ru/item.asp?id=47140073.

[5] GN2.1.7.020-94. Approximate permissible concentrations (UEC) of heavy metals and muscle mass and powder. Supplement #1 to the list of MPC and UEC No. 6229-91. -

Moscow: Goskomsanizdat, 1995.

[6] Berdieva D.SH. /Soil contamination with heavy metals in the sh. Rashidovsky district of Jizzakh region and methods of their decrease from the soil composition/ E3S Web of Conferences 265, 03007 (2021) APEEM. https://doi.org/10.1051/e3sconf/202126503007.