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DYNAMICS OF THE POPULATION OF MICROORGANISMS DISTRIBUTED IN IRRIGATED TYPICAL AND MEADOW SOILS BY THE SEASONS OF THE YEAR

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Abstract:

The article carried out field and laboratory studies to study the dynamics of changes in the number of microorganisms in typical irrigated gray soils and meadow soils, depending on tillage and season. It has been established that the largest number of microorganisms corresponds to the spring season, processing, fertilizing and watering planted crops create the basis for the growth of microorganisms. By the summer season, an increase in air temperature and a decrease in humidity cause a decrease in the number of microorganisms. A slight increase in the number of microorganisms in the autumn season compared to the summer season was noted due to the influence of soil and air temperature.

Keywords: Oroshaemye typichnye serozemy, oroshaemye lugovye pochvy, microorganism, bacteria, fungi, actinomycety, oligonitrophily, seasonal dynamics, spring, summer, autumn, deep layer, soil temperature, air temperature, number of microorganisms

INTRODUCTION:

Microbiological activity of the soil plays an important role in its fertility. Because microbiological processes in the soil, such as humification, nitrification, nitrogen fixation, determine the provision of the soil with mobile nutrients. They, in turn, affect other agrochemical and agrophysical properties of the soil. Therefore, the study of soil microbiological activity is an urgent issue.

Biological preparations developed on the basis of biological methods have been considered the mainstay in the protection and fight against various diseases occurring in plants. It has been proven that the main resource in strengthening the biological condition and fertility of the soil is closely related to the life of saprophytic microorganisms. In this place, microorganisms and microbiological processes in the soil have performed an important task. A moderate amount of organic matter in the soil has the property of enriching the soil with biological nitrogen due to the assimilation of free nitrogen from the air by nitrogen-receiving microorganisms. As a result, in the presence of microorganisms, nitrogen does not accumulate in the soil, but is easily absorbed by plants. As a result, the plants' biological nitrogen needs are satisfied, that is, they are satisfied with ecologically clean food. Thanks to the development of current technologies, mineral nitrogen fertilizers have been produced artificially. This produced fertilizer is assimilated by microorganisms, that is, if 20-30% of the applied nitrogenous mineral fertilizer is lost as a result of nitrifier and denitrifier process, microorganisms have the ability to assimilate another 20%. There is a lot of phosphorus in the soil that cannot be absorbed by plants. Every year, plants absorb only 15-20% of phosphorus in its mineral state, and the rest is not absorbed and accumulates in reserves. Scientific work was carried out on the decomposition of these accumulated organophosphates and the compounds Sa, Fe, Al, which are difficult to be assimilated by plants, by microorganisms and their assimilation. Microorganisms involved in the mineralization of organophosphates were identified under the influence of Radiobacter and Aspergillus.

Based on the above, we also conducted field and laboratory studies to study the dynamics of changes in the amount of microorganisms in irrigated soils by the way of tillage and the seasons of the year.

G.I. Djumaniyazova (2005), S.I. Zakiryaeva and others (2015), S.I. Zakiryaeva (2018), U.I. Ruzmetov (2009), M.E. Saidova (2004), G.S. Sodikova (2011)), V.P.Shabaev (2004), A.Sheraliev (2004), K.E.Yuldasheva and others (2003), B.Yu. Yusupov (2004) collected a lot of data on the dynamics of changes in the amount of microorganisms in the soil throughout the year, and as the seasonal conditions on the earth differ sharply, the dynamics of changes in

microorganisms also differ accordingly. However, it is unanimously recognized by many researchers that not only the seasons, but all the events occurring in them have a direct impact on soil microorganisms.

Research object and methods. Field experiments were carried out in two experimental systems on increasing soil fertility by mulching with plant residues and using different fertilizers on typical gray and grassland soils distributed in Yangiyol and Ortachirchik districts of Tashkent region, and field and laboratory analyzes were performed in generally accepted methods.

Field experiments in research were carried out according to the manual "Methods of Conducting Field Experiments" developed by UzPITI scientists. Soil analyzes were carried out according to the manuals "Rukovodstvo po khimicheskomu analizu pochv" by E.V. Arinushkina, "Metody pochvennoy microbiologii i biokhimii" by D.G. Zvyagintsev, statistical analysis of the obtained results was carried out according to the manual "Metodika polevogo opyta" by B.A. Dospehov.

RESEARCH RESULTS.

Bacteria. It is known that bacteria are the most widespread types of microorganisms in the soil. Bacteria turn complex organic matter into humus, and then into mineral salts. It participates in the formation of nutrients necessary for the growth of plants and the increase of soil fertility: ammonification, nitrification, nitrogen fixation and other processes. Rotting bacteria make up the majority of bacteria in the soil. They play a major role in soil formation. Cleaning the surface of the earth from the remains of plants and animals performs an ecologically important sanitary function. Ammonia formed in the soil turns into nitrogenous and then nitric acid.

According to the results obtained in the spring, the amount of bacteria (MPA) in the 0-30 cm layer of the irrigated typical gray soil was 1540 million units per 1g of soil, while in the irrigated grassland soils, this indicator was 1760 million units. This is due to the high humidity in grassland soils and the proximity of seepage waters characterized by (Table 1).

In the summer season, it can be seen that these indicators have decreased somewhat. In irrigated typical gray soils, 1 g of mead was 1200 million units, in irrigated grassland soils it was 1250 million units. In the spring, there was a wheat field in the research area, and in the summer, repeated crops had a significant effect on the amount of microorganisms. We can see that these indicators have slightly increased in the autumn season compared to the summer season. In irrigated typical gray and meadow soils (in 1 g of soil) it was 1300 million pieces. Bac in our studied soils. Bacteria belonging to the genus B. megatherium B. mycoides prevailed.

Quantitative increase or decrease of microbiological properties of the soil depends on the nutrient elements supplied to the soil and the effect of agrotechnical treatments. Deterioration of the physical and mechanical properties of the soil negatively affects the life activity of soil microorganisms. This became even more evident in our research.

Fungi. Along with microorganisms, fungi are also common in the studied soils. A large number of their species actively participate in the decomposition of plant residues in the soil. Soil fungi are not only involved in biological processes in the soil, but also have a great importance in the life of plants. The importance of the flora of fungi in nature and in human economic activity is enormous. Many of their species are used in industry, and from some species, valuable drugs - antibiotics and enzymes are isolated, while they cause several diseases of animals and agricultural crops. Therefore, the study of soil fungi is not only scientific but also of great practical importance. However, despite the need for extensive and deep study of the microflora of Uzbekistan, soil fungi in particular have not been sufficiently studied. According to the data obtained from our research, the number of fungal spores in a typical gray soil irrigated in spring was 600,000 pieces per 1 g of soil at a depth of 0-30 cm, and 305,000 pieces per 1 g of irrigated meadow soil. By autumn, the number of fungi was found to be 370,000 fungi per 1 g of irrigated gray soil, and 220,000 fungi per 1 g of irrigated meadow soil. So, it was observed that fungi are less in autumn than in spring. In the studied soils, the largest amount of fungal spores was found in the spring season in the irrigated typical gray soils, which is due to the large amount of humus and nutrients in the soil, good supply of moisture, and structure (Table 1).

Actinomycetes. Actinomycetes are important in the soil. Their function takes place in different forms in the soil. It participates in the formation of nitrogen by decomposing a large amount of organic matter in the soil. A large amount of them destroys the cell. Some actinomycetes decompose humus.

Quantification of the main taxonomic groups of microorganisms shows the formation of different groups of microbes in terms of density and functional structure in soils depending on temperature and agronomic conditions. One of them is actinomycetes, which are very common and are among the physiological groups that make up the main part of the soil microflora. They are found in all types of soil. However, they prefer neutral and low-alkaline soils (pN-7.0-7.5) rich in organic matter in the humus mineralization stage. This type of microorganisms has the property of breaking down resistant chemical compounds in soils. Many actinomycetes are considered to be antagonists of disease-causing fungi and bacteria, so the interaction of this group of microorganisms in soils is of great interest. Actinomycetes - light fungi, are the most widespread among other microorganisms and make up 30-35% of the soil microflora. In addition to improving the soil structure, light fungi are involved in the decomposition of complex organic substances such as protein and cellulose and in the formation of humic compounds.

This type of microorganisms is widespread in the soil. This is explained by their lack of food selection, the ability to use substances for other types of microflora, and the ability to easily adapt to changes in environmental conditions. Actinomycetes absorb organic and mineral forms of nitrogen, develop mono-di and polysaccharides, as well as organic acids capable of decomposing animal and plant residues. Some actinomycetes are able to decompose humus in the soil. Actinomycetes are resistant to high concentrations of salts.

The number of actinomycetes in the investigated typical gray soil was 1,300,000 cells per 1 g of soil in the spring, and 1,750,000 cells in the irrigated meadow soil. By summer and autumn, it was observed that the amount of actinomycetes was not high. A typical gray t, watered in the summer season 900,000 cells in 1 g of soil, 820,000 cells in 1 g of irrigated meadow soil, and by autumn, we can see that these indicators have changed (1,100,000 cells in irrigated typical gray soil and 1,200,000 cells in irrigated meadow soil). It was observed that the amount of actinomycetes in these soils was low compared to the amount of ammonifiers (Table 1). It was observed that the color of actinomycetes is white, gray, pink in the studied soils.

Table 1
Seasonal dynamics of the number of microorganisms
(1000 pieces per 1g of soil)

№	Part no	Deep lick, cm	Ammonifiers			Oligonitrophils			Dominant species
			Баҳор	Ёз	Куз	Баҳор	Ёз	Куз	
1	K-1. A typical sprinkler is coarser	0-30 30-50	1540 960	1200 480	1300 650	1200 1050	1000 520	1500 800	B. megatherium
2	K-5. Irrigated meadow soil	0-30 30-50	1760 950	1250 450	1500 750	1300 600	990 360	1200 600	B. mycoides
			Actinomycetes			Mushrooms			
№	Part no	Deep lick, cm	Spring	Summer	Autumn	Spring	Summer	Autumn	Dominant species
1	K-1. A typical sprinkler is coarser	0-30 30-50	1300 1100	900 375	1100 800	600 370	150 70	370 180	B. megatherium
2	K-5. Irrigated meadow soil	0-30 30-50	1750 300	820 115	1200 200	305 225	137 85	220 100	B. mycoides

Due to the fact that the air temperature has moderated compared to summer by the autumn season, favorable conditions have been created for microorganisms. This created the ground for the proliferation of oligonitrophils in particular. The amount of bacteria (MPA) in the studied soils was 1540 million cells per 1 g of soil in typical gray soil, while this indicator changed to 1760 million cells per 1 g of soil in irrigated meadow soil, and it was found that 220 million cells were more than irrigated typical gray soil.

Summary. It was observed that the amount of microorganisms in the studied soils changes according to the seasons. The highest amount of microorganisms was found in spring. By the summer season, it became known that their quantity has decreased. By autumn, the temperature of the soil and the temperature of the air led to an increase in the amount of microorganisms. In this season, it was found that the activity of microorganisms in the 0-30 cm layer of the soil decreases towards the lower layers. In addition, their high amount in the spring season is explained by favorable climatic conditions, that is, the occurrence of hydrothermal conditions and the abundance of nutrients.

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