
**PATHOGENIC SPECIES FOUND IN SOIL CONDITIONS OF THE
KASHKADARYA REGION**

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Abstract

The species composition of soil microflora can only be determined by isolating fungi from the soil and culturing them in an artificial environment. Only by following specific methods for isolating microscopic fungi from the soil can the true quantity and qualitative composition of the samples be approximately determined. This article presents the results of an analysis of soil samples taken from designated layers in regions where experiments and monitoring were conducted during scientific research, as well as the results of analyses conducted to study the composition of soil microflora in laboratory conditions.

Keywords: Soil, pathogen, nutrient medium, microflora, soil analysis, layer, sample, fungus, Petri dish, microorganism, colony.

Introduction

Plant protection in agriculture is one of the main factors limiting the development and spread of diseases. According to Kekalo A.Yu., Nemchenko B.B., Zargaryan N.Yu., Tsypysheva M.Yu., the effectiveness of measures to protect agricultural crops from diseases largely depends on the correct and timely forecasting of the development of the situation [1, 2]. Soil compaction leads to deterioration of its air, water and thermal conditions, weakening of the activity of microorganisms and, ultimately, to a decrease in soil fertility [3]. According to the data of T. Kozulina N.S., Bobrovsky A.V., Vasilenko A.V., Vasilenko A.A., the use of agrotechnical methods that rationally combine methods and technologies of soil cultivation has a significant impact on improving the phytosanitary condition of agrocenoses and plant protection systems [4]. The negative impact of microorganisms living in the soil on the composition of the soil and cultivated plants is very great. The presence of fungi in the soil increases its toxicity, slowing the growth and development of plants, which leads to their death, a sharp decrease in yield and deterioration in quality. One such fungus is *Fusarium*, which is known to cause significant damage to agriculture, affecting 400 plant species. Therefore, the study of soil microflora, the reduction of the number of pathogenic fungi living in it, and the development of countermeasures are considered one of the most important tasks of our time, making a worthy contribution to the development of agriculture.



Materials and Methods

To obtain soil samples for mycological analysis and isolation of microscopic fungi, M.A. Litvinov's method "Method for studying soil microscopic fungi" was used. The average number of colonies per Petri dish was determined by counting the number of colonies formed in all replicate Petri dishes and then converted to 1 g of dry or completely dry soil using the formula [5]. To isolate fungi from the rhizosphere of plants, a soil solution dilution method was used. When conducting a mycological analysis of soil, it is necessary to take at least 3-4 samples and inoculate each one 3-5 times in duplicate on each nutrient medium in Petri dishes. Samples were collected from soil layers 5-10, 10-20, and 20-30 cm thick.

Research Results

Soil is a natural food and habitat for many microorganisms. They lead an active lifestyle in the soil, surviving on plant debris and nutrients during periods of activity and dormancy. Soil microflora is very diverse and includes several types of fungi and bacteria. During the scientific research, soil samples were collected from regions along designated layers in areas where experiments and monitoring were conducted, and the results of laboratory analysis of the composition of soil microflora were presented. This information was obtained from a soil analysis conducted prior to planting. To study microorganisms surviving in the soil, samples were collected and analyzed from the Karshi, Koson, Guzar, Kamashi and Yakkabog districts of the Kashkadarya region. The analyses showed that in the soil layers of the Karshi district at a depth of 5-10 and 10-20 cm, fungi belonging to the genera Mucor, Alternaria, Trichoderma, Penicillium and Fusarium were found, and in the layer of 20-30 cm, the number of fungal genera decreased, and fungi of the genera Alternaria, Penicillium and Fusarium were found.

Types of Pathogens found in soil conditions in different regions

No	Layer of soil	Types of Pathogen				
In the soil conditions of the Karshi district						
1	5-10 cm	Mucor	Alternaria	Trichoderma	Penicillium	Fusarium
2	10-20 cm	Mucor	Alternaria	Trichoderma	Penicillium	Fusarium
3	20-30 cm		Alternaria		Penicillium	Fusarium
In the conditions of the soil of Koson district						
1	5-10 cm	Mucor	Alternaria	Helminthosporium	Verticillium	Fusarium
2	10-20 cm	Mucor	Alternaria	Trichoderma	Verticillium	Fusarium
3	20-30 cm		Alternaria		Verticillium	Fusarium
In the conditions of the soil of Kamashi district						
1	5-10 cm	Mucor	Alternaria	Helminthosporium	Penicillium	Fusarium
2	10-20 cm	Mucor	Alternaria	Trichoderma	Fusarium	Pseudomonas
3	20-30 cm	Mucor	Alternaria		Penicillium	Fusarium
In the conditions of the soil of Guzar district						
1	5-10 cm	Mucor	Alternaria	Fusarium	Xanthomonas	Pseudomonas
2	10-20 cm		Alternaria	Helminthosporium	Penicillium	Fusarium
3	20-30 cm		Alternaria		Penicillium	Fusarium
In the conditions of the soil of Yakkabag district						
1	5-10 cm	Mucor	Alternaria	Helminthosporium	Fusarium	Hanthomonas
2	10-20 cm	Mucor	Alternaria	Helminthosporium	Fusarium	Penicillium
3	20-30 cm	Mucor		Helminthosporium	Fusarium	Pseudomonas

When analyzing the soils of the Kason district, it was found that the microflora of the 5-10-centimeter soil layer contained colonies of fungi belonging to the genera Mucor, Alternaria, Helminthosporium, Verticillium and Fusarium, and in the 10-20-centimeter layer, fungi belonging to the genera Mucor, Alternaria, Trichoderma, Verticillium and Fusarium were found. The presence of fungi of the genera Alternaria, Verticillium and Fusarium was noted at a depth of 20-30 cm of the soil layer.

When studying soil samples from the Kamashi region, it was found that the microflora of the soil layer at a depth of 5-10 cm contained fungi of the genera Mucor, Alternaria, Helminthosporium, Penicillium and Fusarium, while at a depth of 10-20 cm, fungal families Mucor, Alternaria, Trichoderma, Fusarium and the bacterial family Pseudomonas were found. It was found that at a depth of 20-30 cm of the soil layer, a slight decrease in the number of colonies was observed, namely, the occurrence of the genera Mucor, Alternaria, Penicillium and Fusarium.

When analyzing the soils of the Guzarsky district, it was found that the microflora of the soil layer 5-10 cm deep contained a total of 3 species of fungi, namely colonies of the genera Mucor, Alternaria and Fusarium, and 2 genera of bacteria, Xanthomonas and Pseudomonas. It was found that the soil microflora at a depth of 10-20 cm contained colonies belonging to the genera Alternaria, Helminthosporium, Penicillium and Fusarium, while the microflora analyzed at a depth of 20-30 cm contained fungi belonging to the genera Alternaria, Penicillium and Fusarium.

When analyzing the soil condition of the Yakkabag district, at a depth of 5-10 cm of soil, the presence of colonies of fungi belonging to the genera Mucor, Alternaria, Helminthosporium and Fusarium, as well as a group of bacteria belonging to the genus Xanthomonas, was noted. Our analyses showed that the soil microflora at a depth of 10–20 cm contains fungi of the genera Mucor, Alternaria, Helminthosporium, Fusarium, and Penicillium, while the microflora at a depth of 20–30 cm contains three species of fungi of the genera Mucor, Helminthosporium, and Fusarium, as well as bacteria of the genus Pseudomonas.

Conclusion

The influence of soil microorganisms on plant growth and development varies widely. Soil microorganisms have a direct positive or negative impact on plants, depending on the pathogen and environmental factors. Some pathogens actively produce biotic substances that stimulate plant growth; others act as antagonists to phytopathogenic bacteria, fungi, and protozoa, protecting plants from infection; and still others produce toxic substances and limit plant growth and development. Therefore, the study of soil microflora, the reduction of the number of pathogenic fungi living in it, and the development of countermeasures are considered one of the most important tasks of our time, making a worthy contribution to the development of agriculture.

References

1. Kekalo A.Yu., Nemchenko V.V., Zargaryan N.Yu., Tsypysheva M.Yu., Protection of grain crops from diseases // R.: Kurtamysh. "Monograph". 2017 - P. 4-30.
2. Kozhevnikov N.V., The influence of primary tillage techniques on the humus content and reserves of ordinary chernozem in the Krasnoyarsk forest-steppe / R.: Tomsk. "Reflection of bio-geoanthropospheric interactions in soils and soil cover. Proceedings of the VI All-Russian scientific and practical conference. 2016. – P. 288-291.
3. Maksudov H.M., Raupova N.B., Kamilov B.S. Soil fertility and protection are the most pressing issues of our time / T.: Collection of scientific articles "Issues of fertility, protection and efficient use of soils in Uzbekistan". 2013. – P. 24.
4. Kozulina N.S., Bobrovsky A.V., Vasilenko A.V., Vasilenko A.A., The Impact of Agrotechnical Methods on the Spread and Development of Harmful Organisms in Grain Crops / R.: Krasnoyarsk "Problems of Modern Agricultural Science". Proceedings of the international scientific conference October 15. 2021. – P. 72.
5. Litvinov M.A. Methods for studying soil microscopic fungi // L: Nauka. - 1969. - P.23-24.