



STUDY OF PHYTONEMATODES IN THE SOILS OF THE KHOREZM REGION

**Abdurakhmanova Gulnora Abdurakhmanovna.
Kamilova Mekhriniso Dilshodovna.**

Abstract. *This study examines the species diversity, spatial distribution, ecological adaptation, and agroecological impact of phytonematodes inhabiting the soils of the Khorezm region. The results indicate that soil and climatic conditions play a decisive role in shaping the structure and population dynamics of phytonematode communities. It was found that irrigation regimes, soil texture, and agricultural practices significantly influence the abundance and dominance of plant-parasitic nematodes in regional agroecosystems.*

Keywords: *phytonematodes, agroecosystem, soil properties, species composition.*

Introduction

The investigation of species composition and vertical distribution of soil-dwelling phytonematodes is essential for understanding biological processes occurring within soil horizons [1–3]. Analysis of phytonematode distribution along soil profiles allows assessment of the influence of environmental factors on their population structure. From an applied perspective, such studies are of particular importance, as many phytonematode species are obligate or facultative parasites of plant root systems. Knowledge of their vertical distribution and population density provides a scientific basis for the development of effective control and management strategies against economically important parasitic species [4–6].

The Khorezm region represents one of the major irrigated agricultural zones of the Republic, where cotton, wheat, and vegetable crops are extensively cultivated. Within such agroecosystems, phytonematodes constitute a significant group of soil-borne pests that adversely affect plant growth and productivity. Therefore, comprehensive studies of their fauna and ecological characteristics are crucial for improving crop yield and maintaining soil health.

Materials and Methods

Field studies were conducted in several districts of the Khorezm region, including Shovot, Urgench, and Yangiariq. Soil samples were collected from the 0–30 cm soil layer following standard nematological sampling procedures. Phytonematodes were extracted using the Baermann funnel method in combination with additional flotation techniques. Species identification was performed at the genus and species levels based on morphological and morphometric characteristics using standard taxonomic keys.



Results and Discussion

The analysis revealed the presence of several plant-parasitic phytonematode species belonging to different families:

- **Heteroderidae** – *Heterodera schachtii*, *H. glycines*
- **Meloidogynidae** – *Meloidogyne incognita*, *M. javanica*
- **Tylenchidae** – *Tylenchus pratensis*, *Aphelenchus avenae*
- **Pratylenchidae** – *Pratylenchus neglectus*, *P. penetrans*

Ecological observations demonstrated that phytonematode abundance was highest in irrigated soils with a light mechanical composition. Soil moisture and temperature were identified as key factors influencing nematode development and population dynamics. Areas subjected to intensive agricultural practices were characterized by the dominance of *Meloidogyne* and *Pratylenchus* species.


Soils enriched with organic matter showed a higher occurrence of saprophytic nematodes, which may serve as bioindicators of soil fertility and biological activity. Overall, the results indicate that the structure and distribution of phytonematode communities in the Khorezm region vary depending on soil type, irrigation regime, and agrotechnical practices. The highest infestation levels of economically harmful species were recorded in intensively cultivated cotton and vegetable fields, highlighting the necessity for regular monitoring and the implementation of integrated control measures.

Conclusion

- The phytonematode fauna of the Khorezm region is diverse and plays a significant ecological role in agroecosystems.
- The most economically harmful species belong to the genera *Meloidogyne* and *Heterodera*.
- Soil-climatic conditions and irrigation systems are the primary factors influencing phytonematode population structure and dynamics.
- Continuous monitoring and the application of integrated pest management strategies are recommended to reduce crop damage and improve soil sustainability.

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