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PHYTONEMATODES AND THEIR ENVIRONMENTAL IMPACT ON ONION CROPS IN THE SAMARKAND REGION

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Abstract
This study is aimed at determining the composition of phytonematodes and their ecological groups found in onion (Allium cepa) crops grown in the Darkhan district of the Akdarya district of the Samarkand region. Soil samples were taken from a depth of 15–30 cm and analyzed using route, funnel (Baermann), and incubation methods. As a result of the study, more than 300 nematodes were identified, which were divided into ecological groups such as polytrofes, eusaprobionts, devisaprobionts, and phytohelminths. The most common species are Panagrolaimus rigidus and Aphelenchus avenae, which play an important role in the agro-ecosystem. The research results are of great importance for monitoring nematodes in onion crops and developing control measures against them.

Keywords: Akdarya (Darkhan), phytonematoda, Allium cepa, Panagrolaimus rigidus, Aphelenchus avenae .

Introduction

Currently, the efficient use of agricultural crops in Uzbekistan is of great importance for the country's economy. Increasing yields is ensured not only by expanding sown areas but also by effectively combating plant diseases and pests. The main factors causing damage to agricultural crops include aphids, whiteflies, thrips, butterfly larvae, and nematodes. In particular, nematodes damage the root system of plants, significantly reducing crop yields. [4,5]. To date, there is no scientific data on the fauna of phytonematodes in onion crops grown in the Akdarya district of the Samarkand region and their environmental impact. Therefore, this study is the first to focus on determining the composition of nematodes in the region, their ecological groups, and their impact on the agro-ecosystem.The results of this scientific work will serve as an important basis for the development of strategies for protecting onion crops and controlling nematodes in the future. According to A.A. Paramonov, approximately 10% of agricultural crops can be destroyed by nematodes. Therefore, the study of phytonematodes and the determination of their ecological characteristics are of great [8]

Methodology

The study was conducted on an onion field located in the Juravoy area of the Pulatdarkhon MFY, Akdarya district, Samarkand region. Soil samples were taken from a depth of 15–30 cm from the plant rhizosphere zone. During the sampling process, the physical appearance and physiological state of the plants were taken into account.

During the research, the following methods were used: route method, Baermann's vortex method, and incubation method. The route method is used to isolate nematodes from the soil

and determine their population. The Baermann vortex method is a method for isolating actively moving nematodes from the soil. The incubation method involves incubating nematodes under laboratory conditions and determining their developmental stages. The obtained samples were analyzed under laboratory conditions, and nematodes were isolated. As a result of the study, more than 300 nematodes were identified, and 20-30 micropreparations were prepared. Under the microscope, they were divided into taxonomic groups based on their morphological features.

Results

Based on the research results, the identified nematodes were divided into ecological groups according to the classification of A.A. Paramonov (1962): polytrofes, eusaprobionts, devisaprobionts, and phytohelminths.

Polytrophs are primarily associated with the plant's root system and feed on plant sap. Eusaprobionts live in association with decaying organic matter. Devisaprobionts, on the other hand, lead a life associated with both decayed plant remains and healthy roots. Phytohelminths are considered plant parasites.

As a result of the study, representatives of all ecological groups were identified within the plant's rhizosphere. Their distribution is as follows:

devisaprobionts - 5 species

pararizobionts - 4 species

phytohelminths - 3 species

eusaprobionts - 2 species

The identified nematode species and their numbers are presented in Table 1. (according to K.S. Boltaev) Table 1

	A type of nematode.	Number of nematodes.
1.	Eudorulaimus monhystera	1
2.	E.pratensis	2
3.	Aporeelaimellus obtusicaudatus	5
4.	Rhabditis brevispina	2
5.	Pelodera eytindrica	1
6.	Prothorhabditis op.(larvae)	5
7.	Panagrolaimus rigidus	88
8.	Panagrolaimus subelongatus	19
9.	Cephalobus persignis	18

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10.	Heterocephalobus elonatus	16
11.	Akrobeles sp. (larvae)	1
12.	Chiloplacus bibidulas	4
13.	Chiloplacus demani	2
14.	Chiloplacus propinquus	12
15.	Chiloplacus summetricus	8
16.	Aphelenchus avenae	164
17.	Aphelenchus erimetus	1
18.	Aphelenchus solani	4
19.	Pylenchus davainei	1
20.	Tylenchus (filenchus) filiformish	1
21.	Aglenchus aricola	1
22.	Helicotylenchus multicinctus	1
23.	Tylenchorhynchus dubius	2

The results of the analysis of the quantitative and qualitative composition of the nematode complex isolated from the rhizosphere of the onion (Allium cepa L.) plant showed a high degree of heterogeneity and uneven distribution. The species composition of nematodes identified during the study belongs to several trophic groups, among which polytrofes, eusaprobionts, devisaprobionts, and phytoparasitic forms are noted.

According to the results obtained, certain species exhibited sharp dominance in the nematode population. In particular, the species Aphelenchus avenae was distinguished by the maximum indicator (more than 160 individuals). The high density of this species indicates a sufficiently developed fungal biomass in the soil environment and the availability of a favorable nutrient environment for phytonematodes. At the same time, the relatively high number of the species Panagrolaimus rigidus (over 80 individuals) indicates the richness of the soil in organic matter. The small number of phytoparasitic nematodes identified during the study, including Tylenchus, Helicotylenchus, and Aglenchus species (around 1–5 individuals), indicates a low level of potential damage to the plant's root system. This indicates the preservation of biological balance in the agro-ecosystem and the predominance of beneficial nematodes.

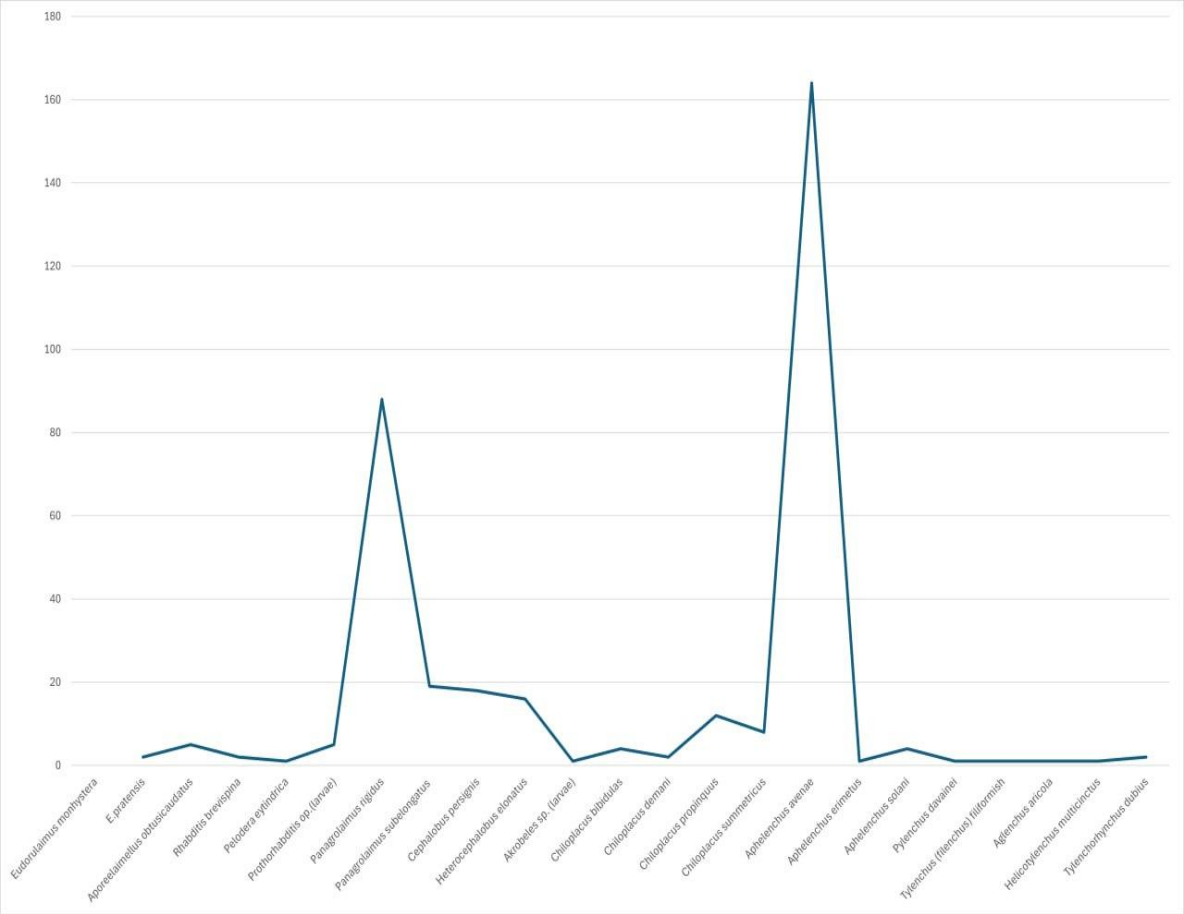

Figure 1

Conclusion

The research results showed that Panagrolaimus rigidus and Aphelenchus avenae species are most commonly found in onion fields in the Akdarya district of the Samarkand region, which is important for identifying the main nematodes that damage crops in this region. The rarest species (Eudorulaimus monhystera, E. pratensis, Pelodera eytindrica, and Pylenchus davanei) demonstrate the diversity of the nematode fauna in the region. These results will serve as a basis for organizing nematode monitoring and protecting onion crops in the future.

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