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COMPARATIVE ANALIZ FAUNA PHYTONEMATODES OF WATERMELON VARIETY MARBLE OF SAMARKAND REGION

Boltaev Komil Sultonovich ,
Ph.D. SamSMU, Samarkand
boltayevkomilsultonovich@gmail. .com

Zhamalova Feruza Abdusalomovna
Trainee-Assistant, SamSMU, Samarkand
feruza.zhamalova@yandex.ru

Mamarasulova Nafisa Isrofilovna,
Trainee-Assistant, SamSMU, Samarkand

Омонова Фаёза Низомиддин кизи,
студент, СамГМУ
fayoza.nizomovna@gmail.com

Annotation
In recent years, there has been an increase in the number of diseases caused by phytopathogens. These pathogens affect plants at different stages of their growth and agricultural production. Depending on weather conditions and the phytosanitary state of crops, the prevalence of diseases can reach 70-80% of the total plant population, and yields decrease in some cases by 80-98% [3] . Plants have innate cellular immunity, but specific phytopathogens are able to overcome it. The article presents a brief description of the types of nematodes, their impact on reducing the yield and quality of watermelon of the "Marmar" (Marble) variety. A comparative study of nematodofauna in the farms of the villages of "Juraboy Darkhan" and "Ozod Darkhon" of the Akdarya district of Samarkand region is carried out.

Keywords: nematodofauna, phytonematodes, watermelon, root soil, phytohelminth, rhizosphere, nematosis.

Topicality. Phytonematodes – obligate endoparasites of the root system that cause plant diseases, are an important factor reducing the yield of most agricultural field and greenhouse vegetable crops [2,6]. Phytonematodes cause

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great harm to agriculture both directly and stimulate the development of a number of fungal, bacterial and viral diseases ofmelons [1,3]. In this regard, the task arises to prevent the loss of agricultural products from pests of cultivated plants.

Materials and Methods

This work was carried out during 2022 in the farms of the village "Jurabay Darkhon" and "Ozod Darkhon" of the Akdarya district of the Samarkand region. The territory of the surveyed farms is located in the floodplain of the Akdarya River. The lands of the farms lie near the tugai zone. The climate is characterized by relatively high humidity. There are sharp fluctuations in temperature during the day and year. Precipitation is timed to the autumn-winter period.

The collection of material on the fauna of watermelon nematodes was carried out during the period of removable ripeness, and August, September 2022. In the process of work on the territory of each farm, 10 plants with root soil at a depth of 0-15 cm were extracted from the plots of vegetable crops. The study of the species composition of the nematodofauna was carried out on the basis of an analysis of its own and literary data obtained during phytohelminthological studies of the rhizosphere of watermelon. When collecting and processing phytohelminthological material, traditional methods are used. Nematodes were isolated by the visual method, the funnel method (Berman method), the Sainhor method of enlightenment, the centrifuge-flotation method was partially used, the study and identification of nematodes by the morphological method was carried out according to temporary and permanent preparations. The determination is based on the structural features of the-vulvar plate of the egg-laying female. In addition, the genetic method of polymerase chain reaction (PCR) was used for identification, which is most accurately allowed the identification of nematode species. In our works, the method of multiplex PCR with two sets of species-specific primers is used to molecularly identify the types of nematodofauna of watermelon.

The degree of similarity of the faunal complexes of watermelon nematodes of farms of the village "Jurabay Darkhon" and "Ozod Darkhon" was established by the indicator of the Community of Mountford, calculated by the formula:

$$J = \frac{2\,j}{2 \times a \times b - (a + b) \times j} 1000$$

ISSN (E): 2980-4612
Volume 2, Issue 4, April -2023
Website: intentresearch.org/index.php/irsj/index

where, J is the index of commonality, j is the number of common species in the two communities being compared, a, b is the number of species in each community.

The Purpose and Objectives of the Study

The purpose of this study is to study the patterns of taxonomic and ecological distribution of nematodobauna of watermelon farms of the villages of "Jurabay Darkhon" and "Ozod Darkhon" of the Akdarya district of Samarkand region.

In accordance with this objective, the following tasks were set:

- to identify the species composition of watermelon nematodes;
- to establish the taxonomic composition of the identified species of nematodes;
- to conduct a comparative analysis of the nematodobauna of farms of the village "Jurabay Darkhon" and "Ozod Darkhon";
- to identify foci of particularly dangerous parasitic species of nematodes.

Introduction

All pumpkins, including watermelon (Citrullus lanatus), are prone to nematosis (gallohelminthiasis, phytohelminthiasis). Affected plants look stunted, they have a general lag in growth, and the color of their leaves varies from pale green to yellow [4,5,9]. Infected plants tend to wilt, since the intensity of water absorption in them is reduced. Although plants infected with nematodes usually eventually die, sometimes they may have difficulty surviving until the end of the growing season. The disease leads to a significant decrease in yield and quality of fruits. On the roots of infected plants, solitary or arranged in groups of nodular, warty growths caused by nematodes are visible. Secondary infection of the roots with phytopathogenic fungi or bacteria is a common phenomenon. Nematodes can persist in the soil for many years. Nematodes are spreading with irrigation water contaminated with effluents from contaminated fields and as a result of the movement of contaminated soil and infected plant material.

The fauna of watermelon nematodes in the CIS has not been studied enough. Studies were conducted only in some CIS countries.

For the first time, studies on the fauna of watermelon nematodes are given in the work of A.T. Tulaganov and S.M. Karimova "On nematodes of garden and melon crops of the Namangan district" in 1953. The authors note 13 species that live in watermelon plants and in the root soil. As harmful, the following were noted: Ditylenchus dipsaci, Helicotylenchus multicinotus. Work on the study of

Intent Research Scientific Journal-(IRSJ)
ISSN (E): 2980-4612
Volume 2, Issue 4, April -2023
Website: intentresearch.org/index.php/irsj/index

the nematodofauna of the watermelon of Karakalpakstan was carried out by S.M. Karimova, A. Tulaganov and Z.N. Narbaev. In the Tashkent region, research was conducted by A.Z. Usmanova, Bratus E.I.

Analysis of literature data shows that the nematodofauna of watermelon and its root soil in the CIS is characterized by more than 120 species of phytonematodes.

Results and Discussions

In the surveyed farms of the village "Jurabay Darkhon" , 60 samples were collected and analyzed from the fauna of watermelon nematodes and its rhizospheres of the Marmar variety. Of these, 39 samples turned out to be with nematodes in the amount of 163 specimens. In the above-ground parts of plants in 7 samples - 24 specimens, in the root system in 15 samples - 80 specimens, in the rhizosphere - 59 (Table 1).

Table 1. The number of analyzed samples on the fauna of nematodes of watermelon and its rhizosphere in the farms of the village "Jurabay Darkhon" and "Ozod Darkhon" of the Akdarya district of Samarkand region

№	Name Village	Sampling location									Total number		
		Stem and leaves			root			rhizosphere			Processed samples		
			Nematodes			Nematodes			Nematodes			Nematodes	
		Altogether	Eat	No	Altogether	Eat	No	Altogether	Eat	No	Altogether	Eat	No
1.	«Jurabay Darkhon»	20	7	13	20	15	5	20	17	3	60	39	21
2.	«Ozod Darkhon»	20	8	12	20	18	2	20	18	2	60	44	16
Total:		40	15	25	40	33	7	40	35	5	120	83	37

The nematodofauna of watermelon and its root soil of the farms of each village is represented differently (Table 2).

Intent Research Scientific Journal-(IRSJ)
ISSN (E): 2980-4612
Volume 2, Issue 4, April -2023
Website: intentresearch.org/index.php/irsj/index

The species composition of the nematodes of watermelon plants and its rhizosphere in the farms "Ozod Darkon" is characterized by 29 species belonging to 4 orders - Chromadorida, Enoplida, Rhabditida, Tylenchida, 9 families, 16 genera.

Table 2. Species composition of nematodes of watermelon and its rhizosphere in farms of the villages "Jurabay Darkhon" and "Ozod Darkhon" of Akdarya district of Samarkand region.

№	View	Number of nematodes in								Total number of nematodes detected
		farms of the village "Jurabay Darkhon"				farms of the village "Ozod Darkon"				
		Stems and leaves	Roots	Soil	Altogether	Stems and leaves	Roots	Soil	Altogether	
1.	Proteroplectus parvus			1	1					1
2.	Eudorylaimus monhystera			1	1					1
3.	Eudorylaimus pratensis			2	2	1			1	1
4.	Aporcelaimellus obtusicaudatus			3	3					3
5.	Diphtherphora communis			1	1					1
6.	Rhabditis brevispira		2		2					2
7.	Rhabditis filiformis			2	2					2
8.	Mesorhabditis monhystera		7	2	9			2	2	11
9.	Mesorhabditis signifera		2		2					2
10.	Prothorhabditis sp.			2	2					2
11.	Panagrolaimus rigidus	9	9	1	19		6	2	8	27
12.	Panagrolaimus subelongatus	12	40	4	56		4		4	60
13.	Cephalobus persegnis		1	1	2		1		1	3
14.	Eucephalobus oxyuroides		1		1					1
15.	Heterocephalobus elongates						1	1	2	2
16.	Chiloplacus bidigulas			3	3					3
17.	Chiloplacus			1	1					1
18.	Chiloplacus propinquus			2	2			3	3	5
19.	Chiloplacus symmetricus			1	1		1	3	4	5

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ISSN (E): 2980-4612
Volume 2, Issue 4, April -2023
Website: intentresearch.org/index.php/irsj/index

20.	Aphelenchus avenae	2	2	2	6		1	2	3	9
21.	Aphelenchus eremitus							1	1	1
22.	Aphelenchus solani							2	2	2
23.	Aphelenchoides parcietinus						1	4	5	5
24.	Tylenchus davainei			2	2			1	1	3
25.	Tylenchus filiformis							1	1	1
26.	Aglenchus agricola		1		1					1
27.	Tylenchorhynchus dubius			1	1					1
28.	Pratylenchus pratenais							1	1	1
29.	Pratylenchus clavicaudatus							1	1	1
Total:		23	65	32	120	1	15	27	43	163

In the farms of the first settlement, the soil is medium-loamy, during the sampling period the soil is of high humidity, the previous culture is onions. In total, 22 species have been registered in these farms, in the amount of 120 specimens.

All detected species of nematodes are distributed unevenly over plant organs and in the soil. The above-ground parts of watermelon plants are poor in nematodes, a total of 3 species have been registered here: Panagrolaimus rigidus, Panagrolaimus subelongatus and Aphelenchus avenae - 25 specimens. These species are common to all organs of watermelon and rhizosphere.

Of the 9 species found in the root system, except for Panagrolaimus subelongatus (40), all species are recorded in small numbers. Only in the roots are the following species noted: Rhabditis brevispina, Mesorhabditis signifera, Eucephalobus oxyuroides, Aglenchus agricola.

The rhizosphere is characterized by a wide variety of species (17), but in terms of the number of individuals (32) it is inferior to the root system (65). Two species are common to roots and soil, these are: Mesorhabditia monhystera,

ISSN (E): 2980-4612
Volume 2, Issue 4, April -2023
Website: intentresearch.org/index.php/irsj/index

Cephalobus persegnis. All speciesrecorded in the rhizosphere are found from 1 to 4 specimens.

A more numerous ecological group are devisabionts - 8 species, of which two species are noted in all organs of watermelon and rhizosphere, one species in the roots and rhizosphere, four species only in the rhizosphere and one - the root system. This is followed by pararizobionts – 7 species recorded only in the soil, except for one species noted in the roots.

Eusaprobionts are represented by 4 species. Of the phytohelminths, only Tylenohorhynchus dubius and mycohelminth Aphelenohus avenae have been noted.

In the farms of the village "Ozod Darkon" the soil is lightly loamy, at the time of taking it is medium humidity, its predecessor is cabbage. Nematodofauna watermelon and its root soil in this farm is poor in species and especially the number of individuals. It is characterized by 16 species in the amount of 48 specimens. Of these, 6 species are registered only in these farms, these are: Heterocephalobus elongatus, Aphelenchus eremitus, Aphelenchus solani, Aphelenchus parietinus, Tylenchus filifornis, Pratylenchus clavicandatus, Pratylenchus pratensis.

In the above-ground parts of the watermelon, the species Eudorylaimus pratensis was found as a single specimen. In the roots of plants, 7 species (15 specimens) were found, basically, these are characteristic species for the root system, noted in the farms of the first village.

In terms of the number of species (14), the rhizosphere is in first place, but the number of individuals (27) of these species is also small, as in previous farms. The presence of dangerous parasites Pratylenchus pratensis and Pratylenchus clavicandatus has been noted here. Of the 16 species discovered, 5 are common to the roots and rhizosphere, namely: Panagrolaimus rigidus, Heterocephalobus elongates, Chiloplacus aymmetricus, Aphelenchus avenae, Aphelenchus parietinus.

In the farms of this village, representatives of all ecological groups are noted: eusaprobionts and phytohelminths for 6 species, pararizobionts - 3 species and eusaprobionts - 1 species.

Analysis of the nematodofauna of watermelon and its root soil showed that the species composition of nematodes in different farms and their distribution in individual parts of plants is diverse.

ISSN (E): 2980-4612
Volume 2, Issue 4, April -2023
Website: intentresearch.org/index.php/irsj/index

Both farms are characterized by the maximum concentration of species in the rhizosphere of watermelon.

Of the 29 species of nematodes detected, 9 are common.

The degree of similarity of the faunal complexes of watermelon nematodes of farms of the village "Jurabay Darkhon" and "Ozod Darkhon" was established by the indicator of the Community of Mountford, calculated by the formula:

$$J = \frac{2 \times 9}{2 \times 22 \times 16 - (22 + 16) \times 9} = 49{,}72$$

The degree of similarity of the nematodofauna of watermelon farms of the village "Jurabay Darkhon" and "Ozod Darkhon" is 49.72.

Of the ecological groups, all representatives are noted and distributed as follows: in the first place are devisabionts - 8 species, 107 - specimens, of which Panagrolaimus subelongatus and pararisobionts predominate - 8 species, 14 specimens. Eusaprobionts and phytohelminths are presented in 6 species, respectively 19 and 20 specimens.

Findings:

1. The work was carried out during 2022 in the farms of the village "Jurabay Darkhon" and "Ozod Darkhon" of the Akdarya district of samarkand region.
2. In the surveyed farms of the village "Jurabay Darkhon" , 60 samples were collected and analyzed from the fauna of the nematodes of watermelon and its rhizosphere of the Marmar variety. Of these, 39 samples turned out to be with nematodes in the amount of 163 specimens. In the above-ground parts of plants in 7 samples - 24 specimens, in the root system in 15 samples - 80 specimens, in the rhizosphere - 59.
3. In the surveyed farms of the village "Ozod Darkhon" , 60 samples were collected and analyzed from the fauna of watermelon nematodes and its rhizospheres of the Marmar variety. In the above-ground parts of plants - 15 specimens, in the root system - 33 specimens, in the rhizosphere - 35.
4. Fumigation or sterilization of the soil are the most effective methods of controlling the phytonematode. Agrotechnical measures, such as deep plowing, compliance with crop rotation and the destruction of weedy host plants susceptible to the disease, can reduce the harmfulness of the disease.

ISSN (E): 2980-4612
Volume 2, Issue 4, April -2023
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