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Nematode Fauna of Annual Wild Plants (Koratepa Mountain Massive, Uzbekistan)

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ABSTRACT

In this scientific-research work, the nematode fauna of annual wild grasses growing in the biocenoses of the Karatepa mountain massif was studied. As a result of the research, in the biocenoses of the Karatepa mountain massif, Carthamus oxyasanthus Bieb, Strigosella tursestanica Litv., Capsella bursa-pastoris (L.) Medic., Bromus L., Ranunculus arvensis L. plants and 58 species of nematodes in their rhizosphere soil was determined. The identified species consisted of representatives of two classes (Adenophorea, Secernentea), 4 subclasses (Enoplia, Chromadoria, Rhabditida, Diplogastria) and 6 families (Dorylaimida, Mononchida, Monhysterida, Araeolaimida, Rhabditida, Tylenchida). The identified nematodes were divided into groups of bacteriotrophs, polytrophs, predatory nematodes, mycohelminths and parasitic nematodes according to their nutrition and ecological characteristics. Parasitic nematodes, in turn, are divided into ectoparasites, those that feed on the root epidermis, migratory and sedentary endoparasites. There are many species found in all regions of the Karatepa mountain massif Species of the genera Ditylenchus, Pratylenchus, Aphelenchoides (Ditylenchus intermedus, D. dipsaci, Pratylenchus vulnus, P. pratensis, P. thornei, Aphelenchoides parietinus) with a large number of individuals were recorded in vegetative parts of plants.

KEYWORDS: Tylenchida, Rhabditida, Mononchida, Koratepa mountain, Fitonematode.

Introduction

Nematodes are the most numerous and diverse multicellular organisms in the soil fauna [1]. In natural biocenoses, phytonematodes are associated with green plants to varying degrees. Most of them live freely in the soil and take part in the assimilation of plant residues, while others become parasites on plants and cause some damage. In recent years, the phylogenetic formation and distribution of parasitic nematodes as a species is directly related to wild plants in mountain and sub-mountain biocenoses, as well as the fact that wild plants in biocenoses and weeds in adjacent agrocenoses are natural sources of parasitic nematodes. large-scale scientific researches are being conducted [3].

In the conditions of the Republic of Uzbekistan, the nematode fauna of wild and alien plants distributed in the agrocenoses where various cultivated crops are grown and the natural biocenoses bordering them has been studied to a certain extent. However, the composition of parasitic phytonematodes of wild plants growing in natural biocenoses in mountain and sub-mountain areas remains almost unexplored. It is self-evident that the research conducted on this problem and the scientific data obtained will have theoretical and practical significance.

Among the living organisms present in natural biocenoses, nematodes are a relatively large group of worms, and they are connected to other organisms in the biocenose to varying degrees through their activities. In particular, one group of nematodes lives freely in the soil (or water) and eats humus or microorganisms, another group lives in the soil around the roots of plants and periodically enters the plant body and feeds on

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its sap. Among the nematodes, there are also such species that spend the main part of their life in the plant body, feed on it, have a negative effect on it, and cause various nematodes diseases.

Parasitic phytonematodes in the biocenosis are found as a natural source in the bodies of various wild plants in most cases. Accordingly, studying the nematode fauna of plants growing in natural biocenoses and determining the species composition of parasitic phytonematodes, their ecological and biocenotic characteristics, will be of great theoretical and practical importance.

Materials and Methods

Implementation of the planned work on the subject, collection and observation of its material was carried out in the natural biocenoses of the Karatepa mountain massif in the Urgut district of the Samarkand region.

In March-May of the year, the collection of materials from 5 regions of the Karatepa mountain massif began. Since the main goal of the research is to study the spread of phytonematodes in natural biocenoses, annual wild plants found in 5 regions of the mountain were selected. Samples were taken from the vegetative parts of each plant, i.e. above-ground and below-ground parts and 0-10 and 10-20 cm layers of rhizosphere soil. The received samples were processed on the same day. The soil particles stuck to the vegetative parts of the plant were cleaned by washing in water.

Berman's funnel method was used to isolate nematodes from above-ground and below-ground plant parts and rhizosphere soil samples. The samples are left in this state in water funnels for 14-15 hours. During this time, the vegetative organs of the plant in the water funnels or the nematodes in the rhizosphere soil come out into the water and collect in the tube at the bottom of the funnel. Now the test tubes are specially labeled for the isolation of nematodes. For this, 40% formalin is poured into the test tube 1/10th of the volume, then the tube of the nematode funnel is gently opened into this test tube, the water in the tube becomes 4-5% due to mixing with 40% formalin. We can keep and use this fixed sample for as long as we want.

In this method, if 20 samples (10 vegetative organs, 10 from rhizosphere soil) were taken from 1 region for each plant, and a total of 100 samples were taken from 5 regions, the mountain A total of 435 plant and soil samples from 5 types of plants in different regions of the massif were collected and analyzed for nematodes.

Temporary and permanent micropreparations were prepared for taxonomic evaluation of the nematodes isolated from the samples. For this, the water mixture with nematodes stored in a test tube was poured into a Petri dish. Nematodes were collected from the Petri dish under a binocular microscope using an entomological needle in clean water in a watch glass. After that, 1-2 drops of glycerin-alcohol mixture (glycerin + 960 alcohol in a ratio of 1:1) is added to the nematode water. Nematodes are kept in this mixture for 14-16 hours. During this time, the water in the mixture evaporates, and glycerin passes to the internal organs of nematodes; organs light up and become visible under a microscope.

Temporary and permanent preparations were prepared for detection of nematodes. Nematodes collected during the preparation of a temporary preparation were transferred to a drop of pure glycerin on a glass slide. To prepare permanent preparations, nematodes were placed in a drop of glycerin-gelatin mixture. When determining the types of nematodes, the structure of their external and internal organs was carefully studied under a microscope; with the help of an ocular micrometer, main attention was paid to the length, structure and width of the nematode's body, tail and esophagus, external sexual characteristics, the structure of the reproductive and digestive organs and other anatomo-morphological characteristics. The formula recommended by De Man (de Man) was used for the morphometric description of nematodes. This formula is based on the determination of the ratio of the size of some parts of the nematode body to the body length, and is determined by L, a, b, c, V indices. According to the formula, L is the total length of the nematode body (in microns), α is the ratio of the width of the nematode body to the body length; b- the ratio of the length of the esophagus to the total length of the body; c - the ratio of the length of the tail to the total length

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of the body; V- represents the ratio of the length of the body of the female nematode from the head to the genital opening (vulva) to the total length of the body. In addition to these morphometric characters, a number of additional systematic characters and features are used to identify the species, including a spear (lance) or stinging mouth cavity (needle - stylet) in the mouth cavity of the worm, red The muscular bulb (bulbus) in the eye and its location and shape, the male nematode's organ of attachment (coupling) - the shape and length of the spicule, the shape and number of the testicles, the location of the nerve ring in the throat, in certain groups of nematodes (mononchus). - the basic and additional systematic signs such as the shape, edges and their number of the chitinous capsule in the oral cavity are taken into account. The Witkowski method was used to distinguish the species in the fauna according to the degree of occurrence, from the most common dominant species to the rare subrecessive species.

Results and Discussion

The nematode fauna of annual herbaceous wild plants growing in natural biocenoses in different regions of the Karatepa mountain massif consists of 58 species, 6 genera, 4 large families, 17 families, 13 families belonging to the Adenophorea, Secernentea classes of Nematode type. It was formed by representatives of the younger family and 27 generations.

When we analyzed the nematode fauna of the studied plants and the nematodes identified in their rhizosphere soil by genera, it was found that the genus Tylenchida dominates in this area, including 24 species of nematodes. The Rhabditi family was recorded as a subdominant family (18 species). The rest of the families (Mononchida, Monhysterida, Areolaimida, Dorylaimida) took place in the composition of the fauna, having 3-6 species in their composition. There are 18 types of nematodes belonging to this category. Representatives of the Mononchida and Monhysterida families were relatively rare (out of 3 species).

When we analyzed the identified species by plants, some diversity was observed. In particular, the most species (53 species) were detected in the common jaw-jag, while the fewest species (39 species) were observed in the nematode fauna (Table 2). Distribution of identified species by biotopes was also analyzed (Table 3.1). Vegetative parts of plants, especially the above-ground part, were characterized by a small number of nematode species and individuals. Species of the genera Ditylenchus, Pratylenchus, Aphelenchoides (Ditylenchus intermedus, D. dipsaci, Pratylenchus vulnus, P. pratensis, P. thornei, Aphelenchoides parietinus) with a large number of individuals were recorded in the vegetative parts of plants.

Table 1. Distribution of nematode fauna of annual grasses by biotopes (number of individuals in brackets)

Checked plants	Species and number of individuals	Including biotopes			
		Above ground	Root	0-10 sm	10-20 sm
Asparagus with sharp thorns	46 (907)	9 (53)	11 (93)	39 (421)	32 (340)
Turkestan chitir	42 (801)	10 (61)	14 (82)	36 (387)	30 (271)

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Achambiti	53 (1052)	13 (103)	18 (112)	48 (561)	29 (276)
Shinyhead	39 (723)	9 (49)	12 (78)	31 (374)	24 (222)
Field buttercup	48 (842)	12 (81)	16 (97)	39 (407)	26 (257)
Total Species and Individuals	**58 (4325)**	**18 (347)**	**24 (462)**	**51 (2150)**	**38 (1366)**

907 individuals belonging to 46 species of nematodes were recorded in the sharp thistle plant, and it was observed that the species and individuals were unevenly distributed in the biotopes. 9 species 53 individuals were recorded in the above-ground part of the asparagus plant, 11 species 93 individuals in the root system, 39 species 421 individuals in the 0-10 cm layer of rhizosphere soil, and 32 species 340 individuals in the 10-20 cm layer. In general, the number of species and individuals of nematodes in the 0-10 cm layer of the rhizosphere soil in the remaining annual plants. Rhabditis (Rh. brevispina), Dorylaimus (D. elegans), Eudorylaimus (E. kirjanovae, E. microdorus, E. monhystera, E. parvus), Aphelenchus (A. avenae, A. cylindricaudatus), Helicotylenchus (H. multicinctus), Mononchus (M. truncatus) genera were found to be relatively widespread. The taxonomic list also recorded such genera, which are known to be represented by 3 or 4 species of each of them in biocenoses. it happened. Such genera include Monhystera, Rhabditis, Heterocephalobus, Acrobeloides, Chiloplacus, Panagrolaimus, Aglenchus, Tylenchus, Ditylenchus, Neotylenchus, Helicotylenchus, Tylenchorhynchus. Also, most of the genera in the list have two (Plectus, Proteroplectus, Eucephalobus, Cervidellus, Aphelenchus, Paraphelenchus, Seinura, Pratylenchus, Diphterophora, Mesodorylaimus, Mononchulus) or one (Anaplectus, Rhabdolaimus, Cylindrolaimus, Diplogaster, Diploscapter, Pelodera, Cephalobus, Acrobeles) , Zeldia, Megadorus, Paraphelenchoides, Lelenchus, Nothotylenchus, Hexatylus, Paratylenchus, Alaimus, Prismatolaimus, Laimodorus, Dorylaimoides, Nygolaimus, Tylencholaimus, Mononchus, Clarcus, Anatonchus) species.

Conclusion

It was found that the nematode fauna of annual wild plants growing in different regions of the Karatepa mountain massif consists of 58 species. These species belong to two classes, 6 genera, 18 families and 27 genera of the nematode class. Among the genera, Rhabditida and Tylenchida are distinguished from other genera by their diversity. It was found that the composition of the nematode fauna of each of the annual wild plants differs with the number of species. It turned out that the most species were found in the common jaw-jag (53 species), while the fewest species were found in the gilthead (39 species).

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