International Journal of Science and Research (IJSR)
ISSN: 2319-7064
ResearchGate Impact Factor (2018): 0.28 | SJIF (2018): 7.426

Nematodes of Soil and Coastal Zone of Uchkizil and South Surkhan Reservoir

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Abstract: ***The article analyzes the fauna of nematodes of the Uchkizil and South Surkhan reservoirs. The study showed that the detected nematode species belong to 9 orders, 39 families of 61 genera and 115 species. As studies have shown, the registered species of the orders Dorylaimida, Chromadorida and Araeolaimida are the most numerous. The nematodes found were distributed among the five ecological groups, among which the species from the groups of para-isobionts and dysaprobionts were more numerous in terms of species and number of individuals.***

Keywords: nematodes, fauna, systematics, ecological groups, dominance, faunistic studies.

1. Introduction

Nematodes are one of the most widespread multicellular animals on the planet. Nematodes are organisms adapted for life in various environmental conditions. They live in marine and freshwater bodies of water, in soil, animal and plant organisms. According to zoologists, the total number of species of nematodes on the planet may exceed 500,000, of which about 15,000 are described. Nematodes are actively involved in the metabolism.

The most significant factor affecting the fauna of nematodes in water bodies is the degree of mineralization of these water bodies. A much smaller role is played by the area, depth and absolute height of the reservoir. In natural and human-created biocenoses, nematodes are found, as a rule, not by separate species or even separate ecological groups, but by their complexes. The nematological status of free-living and parasitic nematodes of reservoirs in Uzbekistan, in particular, of the Surkhandarya region, is being studied by us for the first time.

2. Material and Methods

The material for this work was the collection of samples from the soil from the bottom of Uchkizil and the South Surkhan reservoir. Materials were collected in 2010-2018. 800 samples were collected and analyzed from the coastal part of water bodies, as well as 510 samples of coastal and aquatic plants. Samples were taken from a depth of 0.5-1m. A flushing method was used to isolate nematodes from the soil.

The sample was thoroughly washed with a jet over a tray through a sieve from mill gas No. 58. Then, the contents of the sieve were washed from the pear into a vial with a solution of 7 parts of glycerol, 23 parts of 96 percent alcohol, 70 parts of distilled water [1]. This is a small addition to the generally accepted technique and has its advantages in that the nematodes can be stored in this solution for a very long time, and the glycerin in its composition helps to clear the cuticle.

To extract nematodes from soil and plant samples, the modified Berman funnel method was mainly used. Samples of soil (20 cm3) and cut roots (length 0.5-1 cm) roots (20 g) were placed in glass funnels with a diameter of 15 cm on metal nets with milk filters, a rubber tube with a clamp was put on its narrow end. The funnels were filled with tap water and left for 24 hours in the summer, 48 hours in the autumn and spring, and 72 hours in the winter at room temperature 10–200 ° C.At 24-48 hours exposure, the best results were obtained. During this period, mobile nematodes emerged from the soil or roots into the water and settled into the narrow end of the funnel with a rubber tube clamped into test tubes. After the expiration of the exposure tags with nematodes settled there. Permanent preparations were prepared on pure glycerol according to the method of Sinhrost [6]. Nematodes were fixed using 4-5% formalin.

To determine the species used morphometric indicators obtained by the generally accepted formula de Mann in the modification of Mikolettsky [5]. For a systematic analysis, we used a system developed by A.A. Paramonov [2,3].

3. Results of the Study

In total, from the collected and processed material, we found 115 species of nematodes belonging to 9 orders, 39 families, and 61 genera (Table 1).

Table 1: Distribution of the number of species and the number of individuals of nematodesby units

Order	Number of species	%	Number of individuals	%
Enoplida	24	20,8	1781	11,5
Dorylaimida	22	19,3	5500	37,0
Mononchida	11	9,5	778	5,5
Chromadorida	6	5,2	1888	12,5
Monhysterida	4	3,4	156	1,0
Araeolaimida	15	13,0	3544	23,5
Rhabditida	20	17,5	1018	6,7
Aphelenchida	5	4,4	172	1,1
Tylenchida	8	6,9	222	1,5
Total:	115	100%	15059	100%

Order Enoplida is represented by 5 suborders: Alaimina, Enoplina, Tripylina, Tripyloidina, Tobrilina; 6 families: Tobrilidae, Tripylidae, Alaimina, Prismatolaimidae, Enoplidae, Oxystominidae; 4 subfamilies: Alaiminae,

Tobrilinae, Prismatolaiminae,Tripylinae; 9 genera: *Tobrilis, Prismatolaimus,Paramphidelus, Alaimus, Tripyla, Paratripyla, Trischistoma, Odontolaimus, Enoplides;* 24 species (representing 20.8% of the total number of species) and a total of 1781 specimens (11.5% of the total number of nematodes detected).

Detachment Dorylaimida is represented by 2 suborders: Dorylaimina, Ironina; 1 superfamily: Dorylaimoidea; 7 families: Nygolaimidae, Dorylaimidae, Qudsianematidae, Aporcelaimidae, Paradorylaimidae, Thornematidae, Ironidae; 8 subfamilies: Nygolaiminae, Dorylaiminae, Mesodorylaiminae, Qudsianematinae, Aporcelaiminae, Paradorylaiminae, Ironinae, Paractinolaiminae; 12 genera: Dorylaimus, Nygolaimus, Mesodorylaimus, Eudorylaimus, Aporcelaimus, LaimidorusAquatides, Ironus, Parampidelus, Paradorylaimus, Thornia, Paractinolaimus and 22 species (19.3%), a total of 5500 individuals (37.0%) of nematodes.

Order Chromadorida - represented by 3 suborders - Chromadorina, Cyatholaimina, Desmodorina; 4 families - Chromadoridae, Cyatholaimidae, Microlaimidae, Ethmolaimidae; 4 subfamilies - Chromadorinae, Cyatholaiminae, Microlaiminae, Ethmolaiminae; 5 genera - Punctodora, Achromadora, Ethmolaimus, Microlaimus, Prodesmodora and 6 species (5.2%), a total of 1888 specimens (12.5%) of nematodes.

Order Monhysterida is represented by one suborder - Monhysterina; one family is Monhysteridae; one subfamily - Monhysterinae; one genus: Manhystera and 4 species (3.4%), a total of 156 specimens (1.0%) of nematodes.

Order Araeolaimida is represented by one suborder - Araeolaimina; 6 families of Leptolaimidae, Chronogasteridae, Rhabdolaimidae, Plectidae, Cylindrolaimidae, Axonolaimidae; 6 subfamilies Leptolaiminnae, Chronogasterinae, Rhabdolaiminae, Cylindrolaiminae, Axonolaiminae, Plectinae; 9 genera: Aphanolaimus, Paraphanolaimus, Chronogaster, Cylindrolaimus, Axonolaimus, Rhabdolaimus, Plectus, Anaplectus, Proteroplectus and 15 species (13.0%), a total of 3544 specimens (23.5%) of nematodes.

Order Rabditida is represented by 2 suborders Cephalobina, Diplogasterina; 4 families of Rhabditidae, Panagrolaimidae, Cephalobidae, Teratacephalidae; 5 subfamilies Rhabditinae, Mesorhabditinae, Panagrolaiminae, Teratocephalinae, Cephalobinae, Acrobelinae; 10 genera of Rhabditis, Mesorhabditis, Mononchoidis, Diplogaster, Panagrolaimus, Cephalobus, Eucephalobus, Heterocephalobus, Acrobeloides, Teratocephalus and 20 species (17.5%), in total 1018 specimens (6.7%) of nematodes.

Order Aphelenchida is represented by 1 suborder - Aphelenchina; 3 families Aphelenchdidae, Paraphelenchidae, Aphelenchoididae; 1 subfamilies Aphelenchoidinae; 3 genera Aphelenhus, Paraphelenchus, Aphelenchoides and 5 species (4.4%), a total of 172 specimens (1.1%).

Order Tylenchida encompasses one suborder Tylenchina; 5 families of Tylenchidae, Tylodoridae, Anguinidae, Hoplolaimidae, Neatylenchidae; 4 subfamilies: Rotylenchinae, Ditylenchinae, Hexatylinae, Tylenchinae; 7 genera: Tylenchus, Cephalenchus, Filenhus, Helicotylenchus, Ditylenchus, Noplolaimus, Nexatylus and 8 species (6.9%), a total of 222 specimens (1.5%) phytonematodes.

According to the environmental classification of A. A. Paramonov [4], the detected nematodes belong to 5 ecological groups: para-isobionts - 83 species (72.3% of the total number of species), 13669 individuals (90.8% of the total number of detected phytonematodes); devisaprobionts - 14 species (12.2%), 674 individuals (4.5%), eusaprobionts - 5 species (4.3%), 322 individuals (2.1%), phytohelminths of a non-specific pathogenic effect - 10 species (8, 6%), 344 individuals (2.3%) and phytohelminths of a specific pathogenic effect - 3 species (2.6%), 50 individuals (0.3%) of nematodes (Table 2).

Pararizobionts belong to the orders: Enoplida, Mononchida, Dorylaimida, Araeolaimida, Monhysterida, Rhabditida, Chromadorida and are represented by the families Alaimidae (1 species), Enoplidae (2 species), Oxystominidae (1 species), Prismatolaimidae (2 species (8), Trip , Tobrilidae (10 species), Dorylaimidae (9 species), Quadsianematidae (3 species), Aporcelaimidae (2 species), Nygolaimidae(2 species), Paradorylaimidae (3 species), Ironidae (3 species), Mononchidae (8 species), Mylonchulidae (3 species), Chromadoridae (1 species), Gyatholaimidae (2 species), Ethmolaimidae (1 species), Microlaimidae (2 species), Monhysteridae (4 species), Leptolaimidae (2 species), Cylindrolaimidae (1 species), Axonolaimidae (2 species), Chronogasteridae (2 species), Rhabdolaimidae (2 species), Plectidae (6 species), Panagrolaimidae (1 species).

Table 2: The number of species and the number of individuals of nematodes of various ecological groups of the Uchkizil and South Surkhan reservoirs

Environmental groups	Number of species	%	Number of individuals	%
Paraisobionts	83	72,3	13669	90,8
Davisaprobions	14	12,2	674	4,5
Eusaprobionts	5	4,3	322	2,1
Phytohelminths of non-specific pathogenic effect	10	8,6	344	2,3
Phytohelminths of a specific pathogenic effect	3	2,6	50	0,3
Total:	115	100	15059	100

The group of devisaprobionts includes 14 species that belong to the orders of Rhabditida; family Panagrolaimidae (2 species), Cephalobidae (11 species), Teratacephalidae (1 species). The group of eusaprobionts in the material studied by us turned out to be the group with the smallest number of species (5 species), only 4.3% of the total number of species. Representatives of this group include the families Rhabditidae (4 species), Diplogasteridae (1 species).

Phytohelminths of a nonspecific pathogenic effect including 10 species belonging to the orders Aphelenchida and Tylenchida; family Aphelenchididae (1 species), Paraphelenchidae (2 species), Aphelenchoididae (2 species), Tylenchidae(1 species), Tylodoridae (2 species),

Neotylenchidae (1 species), Anguinidae (1 species). Small in the number of species and individuals was a group of phytohelminths of a specific pathogenic effect, including 3 species belonging to the orders of Tylenchida; Families Hoplolaimidae (3 species).

According to the classification of Krogerusa, the nematode species registered by us are distributed as follows: the dominant species are Rabdolaimusterrestris, Punctodorasalinarim, Ironustenuicaudatus, Laimydorusdadayi; subdominants - Ironusignavus, Chronogastertypicus, Ch. longicollis, Mesodorylaimusbastiani, Achromadoratenax, Laimydorusflavomaculatus, L. pseudostagnalis, Tobrilusgracilis. All other species relate to the case law.

4. Conclusion

The above analysis shows that among the orders by species composition, the first place is occupied by the order Enoplida, which makes up 20.8% of the total species detected. Then detachment Dorylaimida (19.3%), detachment Rhabditida (17.5%) and detachment Araeolaimida (13.0%).

According to the number of individuals among the orders, the first place is occupied by the Dorylaimida order, which is 37.0% of the total number of nematodes detected. It is followed by the orders of Araeolaimida (23.5%), Chromadorida (12.5%) and Enoplida (11.5%).

By species (72.3%) and by the number of individuals (90.8%) among ecological groups, pararizobionts occupy the first place. It is followed by devisaprobionts, eusarobionts, phytohelminths of a nonspecific pathogenic effect and phytohelminths of a specific pathogenic effect.

Thus, the fauna of nematodes found in water bodies is characteristic. Therefore, the study of the fauna of free-living and phytoparasitic nematodes in water bodies is of great scientific and practical importance.

References

[1] Kiryanova E.S., Krall E.L. Parasitic nematodes of plants and measures to combat them. Monograph. -L.- "Science." -1969. T.1. 447 sec
[2] Paramonov A.A. Fundamentals of phytohelminthology // Publishing House "Science" ”-M.: - 1962. T.1.S. 480.
[3] Paramonov A.A. Fundamentals of phytohelminthology // Publishing House "Science" -M.: - 1964. T.2.C.446.
[4] Paramonov A.A. Fundamentals of phytohelminthology // "Taxonomy of nematodes of the superfamily Tylenchoidea." Publishing house "Science" -M.: - 1970. V.3.S. 225.
[5] Micoletzky G. Die freilebendenErd-Nematoden, mitbesondererBerucksi-chtigung der SteiermarkunderBukowina, Zugleichmiteiner Revision Samt-lichernicht mariner, freilebenderNematoden in Farm von esenus – Beschreibungen und Bestimmungs – Schlusseln // Arch. Naturgesch., 1922. V. 87. -650 p.
[6] Seinhorst J.W. A rapid method for the transfer of nematodes from fixative to anhydrous glycerin // Nematologica. 1959. V. 4, № 1. P. 67-69.