ECOLOGICAL FEATURES OF NEMATODES OF PLANTS OF THE WESTERN ZARAFSHAN MOUNTAIN RANGE (UZBEKISTAN)

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Annotation
This article provides an ecological analysis of perennial plant species nematodafauna growing in the biocenoses of the West Zarafshan mountain range. The study identified 121 species of nematodes and analyzed the ecological characteristics of these species in the highlands of the mountain. The identified species are divided into groups of pararizobionts, eusaprobionts, devisaprobionts, mycohelminths and parasitic nematodes.
Keywords: nematode, ectoparasites, endoparasites, wild plants, biocenosis.
The works of Paramonov A.A. [4; 480 p.] and Yeates G. [6; P. 315-331] were used to classify and characterize 121 species of perennial grass nematodafauna in the West Zarafshan mountain range according to their nutritional and vital characteristics. The nematode species identified during the study are divided into pararizobionts, eusaprobionts, devisaprobionts, mycophages and parasitic phytohelmints. These ecological groups are also further subdivided into several subgroups.
Pararizobionts usually live freely in the soil around the root. Most species feed on plant cell sap, but do not cause serious damage to the plant. In our material, pararizobionts are relatively diverse and numerous groups include 35 species. The diversity of species and individuals of pararizobionts increases from the top of the mountain to the bottom, reaching a maximum in the lower zone. The number of pararizobiont individuals in the lower zone is almost 3 times higher than in the upper zone. In the foothills, their numbers stop growing. Pararizobionts can be divided into small groups consisting of bacteriotrophs, detritophages, predators and true parasites according to the method of feeding.
Bacteriotrophs or free-living soil pararizobionts can feed on soil microorganisms (bacteria, viruses, single-celled animals), sometimes at the expense of plant cells. For this reason, some species belonging to this group are sometimes considered in the scientific literature as polytrophs [2; P. 64, 3; P. 15-24]. In our study, 19 species of bacteriophage pararizobionts were identified. They are mainly found in rhizosphere soils. However, some species belonging to the genus *Eudorylaimus* are sometimes found in the roots of plants.
Detritophage pararizobionts feed on organic humus formed by plant debris in the soil or freshwater bottom. 7 species of perennial grasses nematodafauna (*Monhystera filiformis, M. microphthalma, M. paludicola, M. similis, Rhabdolaimus aquaticus, Cylindrolaimus melancholicus, Prismatolaimus dolichurus*) were identified in the perennial grasses. Among

the detritophagous species, 6 species were found in the foothills, 7 species in the lower zone, 5 species in the middle zone, and only 1 species of Monhystera microphthalma in the upper zone.

Predator pararizobionts are armed with chitinous tumors - teeth of the oral cavity wall. They feed mainly on small nematodes and their larvae, single-celled. In our material, 9 species of wild pararizobionts were noted: *Mesodorylaimus bastiani, Nygolaimus brachyuris, Mononchus truncatus, Clarcus parvus, Mylonchulus sigmaturus, Anatonchus tridentatus, Seinura demani, S. oxura, S. tenuicaudata*. Predator nematodes were found in all altitude zones of the mountain.

Eusaprobionts feed on plant remains that rot in the soil, helping to accelerate the decay process. They are also found in the tissues of the plant that are damaged by other pathogens and begin to rot. Eusaprobionts are the group with the least diversity in several zones of the mountain. In the collected samples, this group consists of only 7 species (Diplogaster rivalis, D. rhizophilus, Pelodera cylindrica, Rhabditis brevispina, R. filiformis, R. intermedia, Mesorhabditis monhystera).

Devisaprobionts or semi-saprobionts, live freely in the soil; sometimes occurs in decaying processes, even in healthy plant tissues. In the samples we collected, the devisaprobionts varied along with the pararizobionts; in terms of the number of individuals, it is the most numerous ecological group. 28 types of them have been identified.

The diversity and number of individuals of devisaprobionts increases from the high zone of the mountain to the lower zone. This growth peaks in the lower zone. In the foothills there is a slight decrease in the number of their species and individuals. The diversity and abundance of devisaprobionts in the lower altitude zones of the mountain can be explained by the relatively well-developed vegetation cover in these zones, resulting in enrichment of the soil with organic residues, ie soil formation processes in mountain conditions under the influence of hydrobiological and physicochemical factors [1; https://doi.org/10.1038/s41598-017-03655-3].

Mycohelminths (nonspecific parasites) feed mainly on the mycelium of fungi where the saprobiotic process takes place. The stiletto of these nematodes is also thin and delicate. Mycohelminths can also enter the internal tissues of plants. Mycohelminths are a relatively small ecological group in mountain biocenoses. In our materials identified 17 species of them (*Aphelenchus, Paraphelenchus, Aphelenchoides, Bursaphelenchus, Seinura, Hexatylus, Ditylenchus* genus species). Mycohelminths are mainly found in the roots of plants and in the soil around the roots. Among them, *Aphelenchus avanae, Paraphelenchus pseudoparietinus, P. tritici, Ditylenchus intermedius* are more common in plant tissue and rhizosphere.

Ectoparasites. In the oral cavity of most ectoparasites there is a strong and large sucking organ - the stiletto. Yeates (Yeates et al. 1993) notes that some species of ectoparasites (representatives of the family Tylenchidae, Psilenchidae, Atylenchidae) feed only on the root epidermis or root hairs.

Ectoparasites are more common in the mountainous region and consist of 29 species. They consisted of species of *Aphelenchoidies, Criconemoides, Tylenchus, Neotylenchus, Helicotylenchus, Tylenchorhynchus, Merlinius, Rotylenchus, Paratylenchus, Xiphinema* genera.

Some ectoparasites can parasitize and introduce viral pathogens into plants [5; P. 9-21]. In our material, such virus-carrying nematodes as *Xiphinema americanum* and *X. elongatum* were recorded in the rhizosphere layers.

Endoparasites enter plant tissues and feed by absorbing cell sap. The biological substances they produce have a negative effect on the growth and development of plants. In turn, this group is divided into sedentary and migrating endoparasites.

Once the sedentary endoparasites enter the plant tissue, they begin to feed by absorbing the young cells of the root. The female grows rapidly in the nematode and takes on a noxious shape. Only one species of this group, *Meloidogyne hapla*, has been identified in the lower zone of the mountain in the *Cousinia* sp., *Rumex sp*. and *Alhagi sp*.

Representatives of the families Pratylenchidae, Tylenchidae and Anguinidae from migratory endoparasites *Pratylenchus pratensis, P. thornei, P. tumidiceps, Ditylenchus destructor, D. dipsaci, Anguina sp., Mesoanguina picridis* were identified.

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