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ECOLOGICAL GROUPING OF PLANT PHYTONEMATODES.

Fatima Sharipovna NAZAROVA
Department of Medical Biology and Genetics, Samarkand State Medical University, Uzbekistan

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Abstract:

Plant nematodes usually affect plants of various ages, but for woody plants they are dangerous in the first years of life. When plants are infected with phytohelminths, growth retardation, deformation of stems and shoots, wilting of shoots, and chlorosis are observed. The study of plant nematodes, their types and conditions of development and adaptation conditions is relevant.

The ability of plant nematodes to adapt to a certain degree of humidity allows them to be divided into the following large ecological groups: xerophylls, mesophylls, hygrophiles, and eurybionts. Xerophyllums include an ecological complex of nematode species confined to purely arid living conditions. The mesophilic ecological complex includes species of nematodes confined to biotopes with an average degree of moisture. Hygrophiles make up a complex of species associated with excessive moisture due to the proximity of groundwater. Hygrophiles are divided into two subgroups: megathermic and mesathermic. Mesathermic hygrophiles are confined to floodplain forests (tugai) of river valleys. Under conditions of irrigated agriculture, megathermal hygrophiles can move into the cultural zone and cause enormous damage to agriculture. Mesathermic hygrophiles include species of nematodes confined to biotopes with excessive moisture at moderate or cold temperatures. Some species of mesathermic hygrophylls are potentially dangerous parasites of agricultural plants grown under irrigated farming conditions, but cannot survive in rain-fed crops. It should be noted that this is a unique habitat. Having a unique complex of environmental factors, it is also unique in the composition of phytonematodes

Root gall-forming phytonematodes cause the disease meloidogynosis. They are dangerous pests, damaging up to 5% of the world's crops of cultivated plant varieties. Phytonematodes or phytohelminths are microscopic worms belonging to the class Nematoda type Roundworms, usually their body is filamentous or fusiform, usually 0.5 - 35 mm long, covered with a dense shell (cuticle). In the oral cavity of phytonematodes there is a stele - a piercing-sucking oral apparatus with which the nematode pierces plant tissue. The function of nutrient absorption in nematodes is performed by the bulbus, a muscular expansion of the middle part of the esophagus. Many species of plant nematodes overwinter in the soil, especially in the overwintering parts of plants. (roots, tubers, bulbs, galls). In phytonematodes, eggs are the overwintering stage, therefore, when the larvae emerge from the eggs, they infect the plants, penetrating into small roots, and some move into the above-ground parts. Phytonematodes have very high fertility, up to 3 thousand eggs per season. In addition, many nematodes produce several generations per year and therefore the offspring of one female amounts to several billion individuals.

Keywords: Phytonematodes, phytohelminths, organism, growth, biotope, mesophiles, hygrophiles, xerophiles, eurybionts.

PURPOSE OF THE STUDY: Nematodes are the most important component of the soil community and the most numerous animals on Earth. They play a key role in the processing of organic matter and control over populations of soil microorganisms, regulation of carbon and nutrient dynamics and processes of soil fertility formation. More than 4,000 nematodes **parasitizing** plants have been identified. They destroy about 14% of plant yields annually. Phytohelminths transmit viruses and aggravate fungal and bacterial diseases. They disrupt the absorption of water and nutrients by the roots and reduce productivity. Lead to mass death of plants during drought **.** The life of plant nematodes depends on air and soil humidity, temperature, acidity, and mechanical composition of the soil. They are usually propagated by plant material, irrigation and rainwater. They affect plants of various ages, but for woody plants they

are dangerous in the first years of life. Phytohelminthoses of many deciduous and coniferous species, fruit trees and ornamental shrubs, flower and agricultural crops are common. Typically, when plants are infected with phytohelminths, growth retardation, deformation of stems and shoots, wilting of shoots, chlorosis and browning of needles and leaves are observed. Particularly pronounced is the underdevelopment and deformation of the root system. Root nematodes of the genus Meloido gune, Xiphinema and Dongidorus form spherical galls on the roots of deciduous trees; in conifers they form thickened roots. Nematodes of the genus Nererodera cause massive formation of secondary lateral roots.

MATERIALS AND METHODS OF RESEARCH: Among the environmental factors influencing the energy of reproduction, the speed of development. The distribution and population dynamics of phytonematodes, the main role is played by soil humidity and temperature, since nematodes are active in the water film and are very sensitive to cooling or overheating. A number of special indices have been developed to effectively assess the degree of habitat disturbance and provide an idea of the state of the soil ecosystem based on an analysis of the nematode community. To obtain information about the composition, structure and number of nematodes in the soil, a large number of methods have been developed for isolating nematodes from the soil, their fixation, and the production of temporary and permanent preparations. Sample selection. The simplest sampler is a piece of metal pipe of the required diameter, sharpened on one side. Typically, for most nematodes, it is recommended to use samplers with a diameter of at least 3 cm to count them . Sampling in natural biotopes is usually carried out at a depth of 10-15 cm. However, the depth of sampling may vary significantly depending on the study area. In forests in the upper organic horizon by 3-5 cm. 90-98% of nematodes are concentrated, so in such ecosystems it is reasonable to carry out selection at the depth of the organic horizon. In meadows and agricultural systems in the upper 10 cm. Only 30% of nematodes are concentrated in the upper layer, and in the upper 30 cm. about 80%. In such ecosystems, sampling is usually carried out to a depth of 30cm. When studying the vertical distribution of nematodes, the sampling depth can reach 150 cm. The number of nematodes may vary depending on weather conditions. Nematodes in the soil are unevenly distributed and form a patch of high and low density. In our studies, samples were taken from 5 to 30 soil samples to determine the abundance and diversity of the nematode complex of the biotope under study. The number of samples collected and samples analyzed differed. During the research, several sites of the same type were selected located at a distance from each other. Samples were collected in 10 samples at three separate sites. To isolate nematodes from soil, i.e. The Berman method was used for extraction. This method depends on the thickness of the soil layer (the thinner the soil layer, the better the nematodes come out of the substrate). Nematodes were extracted from a sample of fresh soil weighing 25-100 g. The acidity of the soil and its mechanical composition, seasonal physiological changes in host plants and other factors are also important. For example, a large number of plant nematodes that cause diseases of conifer seedlings are observed in nurseries that are located on sandy soils, at soil temperatures of + 18 - + 20 degrees and humidity of 18 - 28%.

Phytonematodes overwinter in the soil, some species in roots, tubers, bulbs, and galls. They can spread through contaminated plant materials, soil, irrigation or rainwater. The ability of plant nematodes to adapt to a certain degree of humidity allows them to be divided into the following large ecological groups: xerophiles, mesophiles, hygrophiles, eurybionts. Xerophiles include the ecological complex of nematodes confined to purely arid living conditions. Nematode species included in this group were not found in tugai plants. The mesophilic ecological complex includes species of plant nematodes confined to biotopes with an average degree of moisture. Species included in this group were not found in tugai plants.

RESULTS AND THEIR DISCUSSIONS : Hygrophiles constitute a complex of nematode species confined to biotopes due to excessive moisture due to the proximity of groundwater. The Zerafshan tugai biotopes belong precisely to such biotopes, which is perhaps why 127 (836 specimens) of the 152 species of nematodes discovered are part of this ecological group. Hygrophiles are divided into two subgroups: megathermic and mesathermic.

Megathermal hygrophiles are confined to floodplain forests (tugai) of river valleys in Central Asia. Among the nematodes of this ecological complex there are no cold-resistant species. The hydrothermal regime of floodplain forests in which megathermal hygrophiles live is practically no different from the zone where crops are grown in the valleys. Under conditions of irrigated agriculture, megathermal hygrophiles can move into the cultural zone and cause enormous damage to agriculture. In our studies, 86 species of nematodes belonging to megethermal hygrophiles were recorded. These species are found mainly in spring, summer and autumn. Nematode species such as Meloidogune have been found to have high populations in spring and summer hapla , Mincognita , Neterodira uzbiirestonica , H. _ turangae , N. _ glycyrrhira , Pratulenchus pratensis , P. _ vulnus , P. _ tulaganovi , Ditylenchus dipsagi , Nathorylenchus aliii , N. _ Loksul , N. _ thorneki , Ektapne – Renoviya macrostylus , Apnelenchoides besseyi , Aph . bicaudatus , Aph . compsticola , Aph . spinosus .

Mesathermic hygrophiles include species of nematodes confined to biotopes with excessive moisture at moderate and cold temperatures. Biotopes are also characteristic of the floodplains of rivers in Central Asia, where formations of small-leaved microdark forests are concentrated. Some species of mesathermic hygrophiles are potentially dangerous parasites of agricultural plants grown in irrigated farming conditions, but cannot survive in rain-fed crops. Due to the close proximity of tugai biotopes to mountainous areas, nematode species. Members of this group. They were found very often and amounted to 41 species. The population of these species may also increase in winter.

It was established that even in winter nematodes such as Merlinius are found in large numbers doubtful , M. _ Soclatus , Rotylenochus goocleyi , Philenochus polyhipnus , F. _ delenhus ,, F . contrasting , Aphelenhoides kuchnii , Aph . sugar , Aph . saprophilus , Aph . scalacaudanus , Mesorhabditus inarimensis , M. _ Signifera , Rhabditus brevispina , Acrobeloides emarginatus , Prismatolaimus clolichurus , Mylonchulus lauusitrita , Gylencholaimus the next , Eudoruclaeus talking _

These types of nematodes. Like Aph . kuchnii , Aph . Sacchari are much more common in winter than in spring, summer and fall. This indicates that puppies are much better adapted to the winter period of existence.

The morphological character and life cycle of the bitter bitter nematoda were also studied on the creeping bitter weed - Acroptilon repens in foothill conditions. The second instar larva overwinters in the upper layers of the soil. The weed is infected during the period of seedling germination in March. The larvae penetrate into the axil of the seed leaves and at the point of growth of young shoots. As plants develop, grayish-white galls form on the leaves, stems and root collars. Ripe galls darken.

During the bitterling growing season, two generations of nematodes can develop. The first generation develops at the beginning of June, the second at the end of August. At the end of the weed's growing season, numerous second-instar larvae can be found on the galls. With severe infection, galls are located in clusters around the main and lateral stems, which is why the plants take on an ugly shape: the generative organs develop poorly or do not develop at all.

During the study period, 45 species of phytonematodes were identified in the root system and root soil of cultivated pecans on the territory of Uzbekistan. Belonging to 7 orders, 26 families and 29 genera. Of the 17 species of registered plant nematodes, representatives of the orders Dorulaimida and Gilenchida are parasitic. The rest are considered as pararhizobionts (18 species), Eusaprobionts (3 species), devisaprobionts (17 species).

The results of the study showed that pecans are dominated by representatives of the order Phabditida , which is represented by a large number of species, i.e. it accounts for 37.7% of the entire complex of plant nematodes.

The second place is occupied by phytonematodes of the order Gylenchida , constituting 22.2% of the total phytonematode complex. The remaining orders Chromadorida , Plectida , Alamida , Mononchida are represented by more than one or two species.

The highest density of nematode populations on pecan is represented by the order Rhabditida , the number of which is 71.6% of the number of all nematode individuals. The number of representatives of the order Aphelenchida is 16.5% of all individuals. Dorilaimida 10.5%, Alaimids, mononchids, aphelenchids, ecoclids and chromodorids do not exceed 1.4% of the total number of nematodes.

In terms of the number of species, phytohelminths and devisaprobionts predominate, accounting for an equal share of 37.7% of all plant nematode species. Especially devisaprobionts are the most numerous and account for 53.7% of the total number of nematodes in the samples. Fewer nematode species were eusaprobionts.

The nematode fauna of vegetable crops mainly belongs to two subclasses (Adenophorea , Secernentea), 6 orders (Araeolaimida , Monhesterida , Enoplida , Dorylaimida , Rabditida , Gylenchida), 15 families and 31 genera. The listed taxa are unequally represented by the number of species, i.e. The order Gylenchida is characterized by the greatest diversity (24 species), and in second place is the order Rhabditida (16 species). It should be noted that a unique habitat, which has a unique set of environmental factors, is also unique in the composition of plant nematodes. From the point of view of the relationship of nematodes with plants and the method of feeding, all species are divided into 4 ecological groups: pararhizobionts, eusaprobionts, devisaprobionts and phytohelminths.

Pararhizobionts are common free-living soil nematodes, mostly gravitating to the rhizosphere, and are represented by 15 species. The vast majority of species of this ecogroup are concentrated in two layers (0-10cm, 10-20cm) of root soil. However, three species - Eudorylaimus monhystera , Eud . Sulphasae , and Gylencha laimus minimus were also found in a small number of individuals, in the root system of cucumbers. Among the pararhizobionts leading a parasitic lifestyle is Nygolaimus brahyuris and Mezodorylaimus bastiani - found in the root soil of tomatoes in greenhouses.

Representatives of eusaprobionts are represented by 2 species. The first species, in a small number of individuals, was found in the root system and root soil of tomato in greenhouses, and the second - only in the soil. In this regard, we can say that the named eusaprobionts have no practical significance for greenhouse farms.

Devisaprobionts – atypical saprobionts – are represented by 14 species. In our opinion, of this ecogroup, three species are of greatest interest - Pangrolaimus rigidus , Heterocephalobus elongates and Chiloplacus propinguus , recorded in the root system of cucumbers and tomatoes.

Phytohelminths are true phytophages. 24 species were found from this ecogroup. Plant helminths, by their attitude and method of food intake, are divided into ectoparasitic mycohelminths (16 species), ectoparasitic phytophagous perforators (5 species) and true endoparasitic phytohelminths (3 species). The mycophagous subgroup includes species belonging to the genera Aphelenchus , Paraphelenchus , Seinura , Aphelenchoides and Gylenchus .

The subgroup of ectoparasitic phytophages - perforators - is represented by 5 species. But two of them (Merlinius dubius and Helicotilenchus multicinchus) are found in the root system of cucumbers and tomatoes. Apparently, nematodes of this subgroup sometimes behave like true endoparasitic phytohelminths. Among the phytohelminths of tomatoes and cucumbers, a special place is occupied by true endoparasitic phytonematodes, which are represented by 3 species: Meloidogyne hapla , Ditylenchus dipsagi and Pratylenchus pratensis . These species were recorded in the root system of both crops, and the last two were also recorded in the above-ground parts.

CONCLUSIONS . Thus, out of 55 species of nematodes, 33 species are associated with plants to varying degrees, and in all cases, the majority of species found in the vegetative organs of plants , dominance belongs to representatives of the ecological group of phytohelminths.

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