AMERICAN JOURNALS
Open Access, Peer Reviewed Journals

American Journal of Pedagogical and Educational Research
ISSN (E): 2832-9791| Volume 17, | October, 2023

ECOLOGICAL GROUPING OF PLANT PHYTONEMATODES

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ABSTRACT	KEYWORDS
Mesathermal hygrophils are confined to floodplain forests (tugai) of river valleys. In irrigated farming, megathermal hygrophils can transition to a cultural area and cause enormous harm to agriculture. Mesathermal hygrophils include nematode species associated with biotopes with excessive moisture under moderate or cold temperature conditions.	

Introduction

They are dangerous pests, damage up to 5% of the world's crop of cultivated plant varieties. Phytonematodes or phytogelmints microscopic worms belonging to the class Nematoda type Roundworms are usually filamentous or fusiform, usually 0.5-35mm long, covered with a dense shell (cuticle). In the oral cavity of phytonematode there is a stele - the wheel-sucking oral apparatus of which the nematode pierces plant tissues. The nutrient absorption function in nematodes is performed by bulbus, a muscular expansion of the middle part of the esophagus

The ability to adapt phytonematodes to a certain degree of humidity allows you to divide into the following large ecological groups: xerophylls, mesophylls, hygrophils, and eurybionts. Xerophyllam refers to an ecological complex of nematode species confined to purely arid conditions of existence. Species of nematodes associated with biotopes with an average degree of moisture belong to the mesophilic ecological complex. Hygrophils form a complex of species associated with excessive humidification due to close proximity to groundwater. Hygrophils are subdivided into two subgroups: megathermal and mesathermal. Some species of mesathermal hygrofills are potentially dangerous parasites of agricultural plants grown in irrigation farming, but cannot survive on rich plantings. It should be noted that a peculiar habitat. Having a kind of complex of environmental factors, it is also peculiar to the composition of phytonematodes. Root gall-forming phytonematodes, cause the disease meloidoinosis.. Many species of phytonematodes winter in the soil, especially in the wintering parts of plants. (roots, tubers. bulbs, gallas). In phytonematodes, eggs are a wintering stage, so when larvae

emerge from the eggs, they infect the plants by introducing themselves into small roots, and some pass into the above-ground parts. Phytonematodes have a very large fertility, up to 3 thousand eggs per season. In addition, many nematodes produce several generations per year and therefore the offspring of one female is up to several billion individuals.

Phytonematodes usually affect plants of various ages, but for woody plants they are dangerous in the early years of life. When infecting plants with phytogelminths, there is a lag in growth, deformation of trunks and shoots, wilting of shoots, chlorosis. The study of phytonematodes of their types and conditions of development and conditions of adaptation is relevant.

Key words: phytonematodes, phytogelmints, organism, growth, biotope, mesophiles, hygrophils, xerophils, eurybionts.

Purpose of the study: Nematodes are a critical component of the soil community and the most abundant animals on Earth. They play a key role in the processing of organic matter and the control of soil microorganism populations, the regulation of carbon dynamics and nutrient processes of soil fertility formation**.** More than 4,000 plant parasitic nematodes have been identified. They destroy about 14% of the plant harvest each year. Phytogelmints carry viruses, aggravate fungal and bacterial diseases. They disrupt the processes of absorption by the roots of water and nutrient substances, reduce productivity. They lead to mass death of plants in drought. The life of phytonematodes depends on the humidity of the air and soil, temperature, acidity, mechanical composition of the soil. Usually their distribution is vegetable material, irrigation and rainwater. They affect plants of various ages, but for woody plants they are dangerous in the early years of life. Phytogelminthoses of many deciduous and coniferous species, fruit trees and ornamental shrubs, flower and agricultural crops are common. Usually, when plants are infected with phytogelminths, stunting, deformation of trunks and shoots, wilting of shoots, chlorosis and browning of needles and leaves are observed. The underdevelopment and deformation of the root system is especially pronounced. Root nematodes of the genus Meloidogune, Xiphinema and Dongidorus form spherical galls on the roots of deciduous trees, in conifers they form a thickening of the roots. The nematode of the genus Nererodera causes mass formation of secondary lateral roots.

Research Materials and Methods:

Among environmental factors affecting reproduction energy, development rate. The distribution and dynamics of phytonematode abundance, the main role is played by moisture and soil 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 give an idea of the state of the soil ecosystem based on the analysis of the nematode community. To obtain information on the composition, structure and abundance of nematodes in the soil, a large number of methods have been developed for isolating nematodes from the soil, fixing them, and making temporary and permanent preparations. Sampling. The simplest selection is a cut of a metal pipe of the desired diameter, sharpened on one side. Usually, for most nematodes, samplers with a diameter of at least 3 cm are recommended for their accounting. Sampling in natural biotopes is usually carried out at a depth of 10-15 cm. However, the depth of selection can vary significantly depending on the study area. In forests in the upper organogenic horizon at 3-5 cm. 90-98% of nematodes are concentrated, therefore, in such ecosystems it is justified to select at the depth of the organogenic horizon. In meadows and agricultural systems in the upper 10 cm. only 30% of nematodes are

concentrated in the layer, and in the upper 30 cm. about 80%. In such ecosystems, sampling is usually carried out to a depth of 30 cm. When studying the vertical distribution of nematodes, the selection depth can reach 150 cm. Nematode abundance may vary depending on weather conditions. Nematodes in the soil are unevenly distributed and form a spot of high and low density. In our studies, samples were taken from 5 to 30 soil samples to determine the number and diversity of the nematode complex of the biotope under study. The number of samples sampled and analyzed differed. During the studies, several sections of the same type were selected at a distance from each other. 10 samples were taken at three separate sites. The Berman method was used to extract nematodes from the soil, i.e. for extraction. This method depends on the thickness of the soil layer (the thinner the soil layer, the better the nematodes leave the substrate). Nematodes were extracted from 25-100 g of fresh soil. 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 phytonematodes that cause diseases of coniferous seedlings are observed in nurseries that are located on sandy soils, at a soil temperature of + 18 - + 20 degrees and humidity of 18 - 28%.

Phytonematodes winter in the soil, some species in roots, tubers, onions, gallas. They can spread with contaminated plant materials, soil, watering or rainwater. The ability to adapt phytonematodes to a certain degree of humidity allows them to be divided into the following large ecological groups: xerophils, mesophils, hygrophils, eurybionts. Xerophiles include the ecological complex of nematodes, confined to purely arid conditions of existence. Nematode species in this group have not been found in tugai plants. Species of phytonematodes associated with biotopes with an average degree of moisture belong to the mesophilic ecological complex. Species in this group have not been found in tugai plants.

Results and their Discussions:

Hygrophils constitute a complex of nematode species confined to biotopes by excessive humidification due to close proximity of groundwater. Zerafshan tugai biotopes belong precisely to such biotopes, perhaps therefore 127 (836 copies) out of 152 types of nematodes discovered make up the composition of this ecological group. Hygrophils are subdivided into two subgroups: megathermal and mesathermal.

Megathermal hygrophils are confined to floodplain forests (tugai) of the river valley of Central Asia. Among the nematodes of this ecological complex, cold-resistant species are not visible. The hydrothermal regime of floodplain forests in which megathermal hygrophils live practically do not differ from the zone of growing crops in the valleys. In irrigated farming, megathermal hygrophils can transition to a cultural area and cause enormous harm to agriculture. In our studies, 86 nematode species belonging to megathermal hygrophils were recorded. These species are found mainly in spring, summer and autumn. It was found that in spring and summer, a high degree of population in nematode species such as Meloidogune 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.

Mesathermal hygrophils include nematode species associated with biotopes with excessive moisture under moderate and cold temperature conditions. Biotopes are also characteristic of floodplains of rivers in Central Asia, where formations of small-leaved microdark forests are concentrated. Some

species of mesathermal hygrophils are potentially dangerous parasites of agricultural plants grown in irrigation farming, but cannot survive on rich plantings. Due to the close proximity of tugai biotopes to mountainous areas, nematode species. Members of this group. They were very common and amounted to 41 species. The population of these species may also increase in winter.

It was found that in winter in large numbers there are species of nematodes, as Merlinius dubius, M. Soclatus, Rotylenochus goocleyi, Filenohus polyhipnus, F. delenhus,, F. discrepans, Aphelenhoides kuchnii, Aph. sacchari, Aph. saprophilus, Aph. scalacaudanus, Mesorhabditus inarimensis, M. Signifera, Rhabditus brevispina, Acrobeloides emarginatus, Prismatolaimus clolichurus, Mylonchulus lauusitrita, Gylencholaimus proximus, Eudoruclaimus pratensis.

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

And also the morphological characteristic and the life cycle of the mustard nematode on the Gorky weed creeping - Acroptilon repens in foothill conditions was studied. The larva of the second age winters in the upper layers of the soil. Weed infection occurs during germination in the month of March. Larvae penetrate the sinus of seed leaves and at the point of growth of young shoots. As plants develop, grayish-white galls form on the leaves, stems and root neck. Ripened galls darken.

During the growing season of mustard, two generations of nematodes can develop. The first generation develops in early June, the second - at the end of August. At the end of the weed vegetation, numerous second-age larvae can be found on the gallas. With severe infection, galls spread in clusters around the main and lateral stems, which is why plants take on an ugly shape: generative organs develop weakly or do not develop at all.

During the study period, 45 species of phytonematodes were identified in the root system and basal soil of cultivated pecan in Uzbekistan. Belonging to 7 orders, 26 families and 29 genera. Of the registered phytonematodes of 17 species, representatives of the orders Dorulaimida and Gilenchida are parasitic. The rest are considered as pararizobionts (18 species), Eusaprobionts (3 species), devisaprobionts (17 species). The results of the study showed that representatives of the Phabditida order prevail on pecan, which is represented by a large number of species, i.e. it accounts for 37.7% of the total phytonematode complex.

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

The highest density of nematode populations on pecan is the Rhabditida order, which accounts for 71.6% of the number of all nematode individuals. The number of representatives of the order Aphelenchida is 16.5% of the number of all individuals. Dorilaimida 10.5%, Alaimids, mononhids, afelenchids, ecoclides and chromodorides exceed 1.4% of the total number of nematodes.

The number of species is dominated by phytogelmints and devisprobionts, which account for 37.7% of all phytonematodes. Especially devisaprobionts are the most abundant and account for 53.7% of the total number of nematodes in samples. Fewer nematode species had eusaprobionts.

The vegetable nematode fauna mainly belongs to two subclasses (Adenophorea, Secernentea) of 6 orders (Araeolaimida, Monhesterida, Enoplida, Dorylaimida, Rabditida, Gylenchida) of 15 families and 31 genera. The listed taxa are not equally represented by the number of species, i.e. the order Gylenchida (24 species) is characterized by the greatest diversity, and the order Rhabditida (16

species) is in second place. It should be noted that a peculiar habitat, which has a peculiar complex of environmental factors, is also peculiar to the composition of phytonematodes.

From the point of view of the relationship of nematodes with plants and the method of nutrition, all species are divided into 4 ecological groups: pararizobionts, eusaprobionts, devisaprobionts and phytogelmints.

Pararizobionts - ordinary free-living soil nematodes, mostly gravitating to the rhizosphere, are represented by 15 species. The main majority of species of this ecogroup are concentrated in two layers (0-10 cm, 10-20 cm) of basal soil. However, three species are Eudorylaimus monhystera, Eud. Sulphasae, and Gylencha laimus minimus are also found in a small number of individuals, in the root system of cucumbers. Among the pararizobionts leading a parasitic lifestyle - Nygolaimus brahyuris and Mezodorylaimus bastiani - found in the basal soil of tomato in a greenhouse.

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

Devisaprobionts - atypical saprobionts - are represented by 14 species. In our opinion, of this eco-group, three species are of greatest interest - Pangrolaimus rigidus, Heterocephalobus elongates and Chiloplacus propinguus, registered in the root system of cucumbers and tomato.

Phytogelmints are real phytophages. Of this ecogroup, 24 species were found. Phytogelmints are divided by their attitude and way of eating into ectoparasitic mycogelmints (16 species), ectoparasitic phytophages of perforators (5 species) and real endoparasitic phytogelmints (3 species). The mycophagus subgroup includes species belonging to the genera Aphelenchus, Paraphelenchus, Seinura, Aphelenchoides and Gylenchus.

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

Conclusions

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

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