



PHYTONEMATODES APPLE TREE (*Malus domestica* L.) OF SURKHANDARYA REGION OF UZBEKISTAN

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Abstract

The article provides data on the fauna and the distribution of phytonematodes in the root soil and root system of apple plants in the conditions of the Surkhandarya region of Uzbekistan. As a result of the research, 33 species of plant nematodes belonging to 22 genera, 15 families, 4 orders and 2 subclasses were identified. The species of *Chiloplacus sclerovaginatus*, *Ch. quintastratus*, *Panagrolaimus rigidus*, *Aphelenchus avenae*, *Aphelenchoides parietinus*, *A. composticola*, *A. blasthophthorus*, *A. graminis*, *Helicotylenchus erythrinae*, *Pratylenchus pratensis* and *Ditylenchus dipsaci* dominated in the fauna of phytonematodes in apple trees.

Keywords: apple tree, plant nematodes, Surkhandarya region, order, fauna, root soil, root system, ecological groups.

Introduction

Providing the population of the country with ecologically clean fruit products with high taste and commercial qualities, not damaged by pests and diseases, is an important socio-economic problem.

Apple trees are mainly grown in temperate regions. Apple orchards are located in areas where there are no extreme temperatures, the soil is fertile and there is enough





water for irrigation. The main world fruit producers are Germany, Italy, France, Spain, China, Japan, USA, Canada, Argentina, Chile, Australia, New Zealand and South Africa. According to the FAO (Food and Agriculture Organization, FAO), a UN organization whose main task is to combat hunger, in 2013, 29.8 million tons of apples were grown in China, 4.3 million tons in the USA, and 2 million tons in Poland. .8 million tons, in Russia - 1.4 million tons. The yield of apple trees in many countries is up to 50-60 tons / ha. On average, in Kazakhstan, the yield in recent years has been within 4 t/ha [4;9].

Of the valuable fruit trees, the apple tree, like other plants, is infected with various pests, including parasitic nematodes. Therefore, to determine the nematode fauna of this plant, the development of measures to combat parasitic species is of great practical importance in the fruit growing of Uzbekistan.

Material and Methods of Research

To study the faunistic complex of phytonematodes of apple plants in the period from 2021-2022. we collected phytonematodes from the root soil and the root system of plants from 16 shirkat farms in the Surkhandarya region of the Republic of Uzbekistan. The studies were carried out by the generally accepted route method [3]. During the phytohelminthological study, 600 samples of soil and root system of apple plants were collected and analyzed.

Phytonematodes were extracted by the Berman funnel method and fixed with 4% formalin solution. Nematodes were clarified in a mixture of glycerol and alcohol (1:3), and permanent preparations on glycerol were prepared for in-office processing of the material according to the Seinhorst method [8]. Soil samples for the presence of cyst-forming nematodes were usually analyzed according to the standard Dekker method [1].

The species composition of nematodes was studied under an MBR-3 microscope. Species were identified using morphometric parameters obtained according to the generally accepted De Man formula [5] in its modification according to Micoletzky [7]. The degree of dominance of phytonematodes in plant and soil samples was determined from the percentage of individuals of individual species to the number of all detected by Witkowsky [6].

Research Results

As a result of phytohelminthological studies in the apple orchards of the Surkhandarya region of Uzbekistan, we have found 33 species of plant nematodes





belonging to 22 genera, 15 families, 4 orders and 2 subclasses. The detected nematodes are distributed by groups as follows: (table).

Table. Taxonomic composition of apple plant nematodes (by order)

Orders	Number of species	%	Number of individuals	%
Dorylaimida	5	15,2	117	9,5
Rhabditida	7	21,2	235	19,1
Aphelenchida	10	30,3	564	45,7
Tylenchida	11	33,3	317	25,7
Total:	33	100	1233	100

The analysis of the conducted studies showed that among the orders in terms of species composition, the order Tylenchida occupies the first place, which is 33.3% of the detected nematode species of apricot plants. In terms of the number of individuals, the order Aphelenchida occupies the first place, which is 45.7% of the total number of plant nematodes found.

Discussion

Phytonematodes identified from the roots and rhizosphere of apple plants, according to the ecological classification of A.A. Paramonov [2], belong to 5 ecological groups: pararhizobionts, devisaprobionts, eusaprobionts, phytohelminths of nonspecific pathogenic effect, phytohelminths of specific pathogenic effect.

Representatives of the pararhizobiont group were found mainly in the root soil of the apple tree. Species *Eudorylaimus pratensis*, *D. communis* are found in the rhizosphere of plants in large numbers. Species *Enchodorella penetrans*, *Leptonchus obtusus* are the smallest in terms of the number of individuals.

Devisaprobionts were found in the root system and rhizosphere of plants. Species *Cephalobus persegnis*, *Eucephalobus oxyuroides*, *Acrobelides buetschlii*, *Chiloplacus sclerovaginat*, *Panagrolaimus rigidus* found in the rhizosphere and root system of apple plants are the most numerous in terms of the number of individuals. Species *Heterocephalobus latus*, *Cervidellus serratus* were in small numbers in terms of the number of individuals.

Of the eusaprobionts *Rhabditis brevispina* was found in large numbers in the root system of plants and root soil of apple trees. *Rhabditis intermedia* was found only in the rhizosphere of plants, and in the smallest number of individuals.



In the roots and rhizosphere of the apple tree, the group of phytohelminths with a nonspecific pathogenic effect was the most numerous in terms of the number of species and individuals. The species *Aphelenchus avenae*, *Aphelenchoides parietinus*, *A. bicaudatus*, *A. blastophthorus*, *A.composticola*, *A.graminis*, *Ditylenchus myceliophagus* were found in the rhizosphere and root system of the apple tree, and were the most numerous in terms of the number of individuals. Phytonematodes *Aphelenchoides cylindricaudatus*, *A. eremitus*, *Seinura citri*, *Filenchus leptosoma*, *Aglenchus agricola* were insignificant in terms of the number of individuals.

Of the phytohelminths with a specific pathogenic effect, species *Quiniculcius capitatus*, *Helicotylenchus dihystra*, *H. erythrinae*, *Pratylenchus pratensis*, *Paratylenchus hamatus*, *Ditylenchus dipsaci* dominated. They were found in the rhizosphere and the root system of plants, and were the most numerous in terms of the number of individuals. Species *Xiphinema basiri*, *X. elongatum* were found in single specimens only in the rhizosphere of apple plants.

Conclusion

The results of the research showed that the fauna of plant nematodes of apple plants in the conditions of the southern regions of the Surkhandarya region of the republic is insufficient. Therefore, conducting large-scale phytohelminthological studies, determining the faunistic complex of phytonematodes in apple orchards of a given territory and substantiating measures to combat parasitic species are of great scientific and practical importance.

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