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Ecological Grouping Of Phytonematodes Of Pomegranate Agroecosystems Of The Surkhandarya Region Of Uzbekistan

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ABSTRACT

The article provides data on the ecological grouping of detected phytonematodes on pomegranate agroecosystems of the Surkhandarya region of Uzbekistan. The study revealed 98 species of phytonematodes belonging to 5 ecological groups: parasitobionts-20 species, desaptobionts-23, eusaptobionts-4, phytohelminths of nonspecific pathogenic effect-34 and phytohelminths of specific pathogenic effect-17.

KEYWORDS

Phytonematodes, pomegranate agroecosystems, root system, rhizosphere, parasitobionts, desaptobionts, eusaptobionts, phytohelminths of nonspecific pathogenic effect, phytohelminths of specific pathogenic effect.

INTRODUCTION

Phytonematodes are a heterotrophic component of biogeocenosis. They are one of the most numerous and varied groups among invertebrates. They are microscopic worms that, with the help of digestive enzymes introduced into plant tissues, digest some of them, thereby causing serious damage to the entire body of the flower and increasing the risk of infection with viruses.

In the world, much attention is paid to the identification of parasitic plant nematodes that affect the yield of subtropical crops, their species composition, distribution, ecology, seasonal dynamics on the influence of environmental factors, as well as the development of integrated measures to combat them. In this regard, it has been determined that parasitic plant nematodes cause a decrease in the productivity of

subtropical fruit plants by 50-60%. It should be noted that in recent years, the influence of pests on pomegranate agrocenoses grown in different environmental conditions, there has been a significant increase in the pathogenic properties of phytoparasitic nematodes in the roots and root soil of pomegranate. This requires a comprehensive study of the fauna of harmful species, features of distribution, ecology and economic importance. Therefore, the taxonomic and ecological analysis of the nematodofauna of pomegranate plants, the identification of dominant species, the identification of parasitic species in the roots and root soil of plants, and the development of measures to combat them are acquiring important scientific and practical significance.

Pomegranate, like many other plants, is attacked by nematodes and these parasites cause huge damage to the harvest of these crops. Therefore, the study of the nematodofauna of pomegranate plants will determine the bioecological characteristics of parasitic species, which play an important role in solving economic and social problems.

MATERIALS AND METODS

In order to study the species composition and distribution, bioecological features of phytonematodes of pomegranate agrocenoses in the period from 2005-2019 we collected phytonematodes from the root soil and root system of plants in 28 shirkat farms from 14 districts of the Surkhandarya region of the Republic of Uzbekistan. The studies were carried out by the generally accepted route method [3; P. 338-369].

During the phytohelminthological study, 1700 samples of soil and root system of

pomegranate plants were collected and analyzed. Phytonematodes were removed by the Berman funnel method and fixed with 4% formalin solution. Enlightenment of nematodes was carried out in a mixture of glycerin with alcohol (1:3), and permanent preparations on glycerin were prepared for in-office processing of the material according to the Seinhorst method [5; P. 67-69.]. Soil samples for the presence of cyst nematodes were usually analyzed according to the standard Decker method [1; 447 p.]. Preparations for the determination of the types of root-knot nematodes were prepared according to the well-known method of E.S. Kiryanova, E.L. Krall [2; 447 p.].

RESULTS AND DISCUSSIONS

As a result of the carried out phytohelminthological studies in the pomegranate agrocenoses of the Surkhandarya region of Uzbekistan, we found 98 species of phytonematodes belonging to 43 genera, 28 families, 7 orders and 3 subclasses. Of these, 98 species were recorded in the root soil, and 58 species in the root system of plants.

Phytonematodes identified from the roots and rhizosphere of pomegranate plants, according to the ecological classification of A.A. Paramonov [3; P. 338-369, 4; 480 p.], belong to 5 ecological groups: pararisobionts - 20 species; devisaprobionts - 23 species; eusaprobionts - 4 species; phytohelminths of nonspecific pathogenic effect (potential parasites) - 34 species and phytohelminths of specific pathogenic effect (real parasites) - 17 species (Fig. 1, 2).

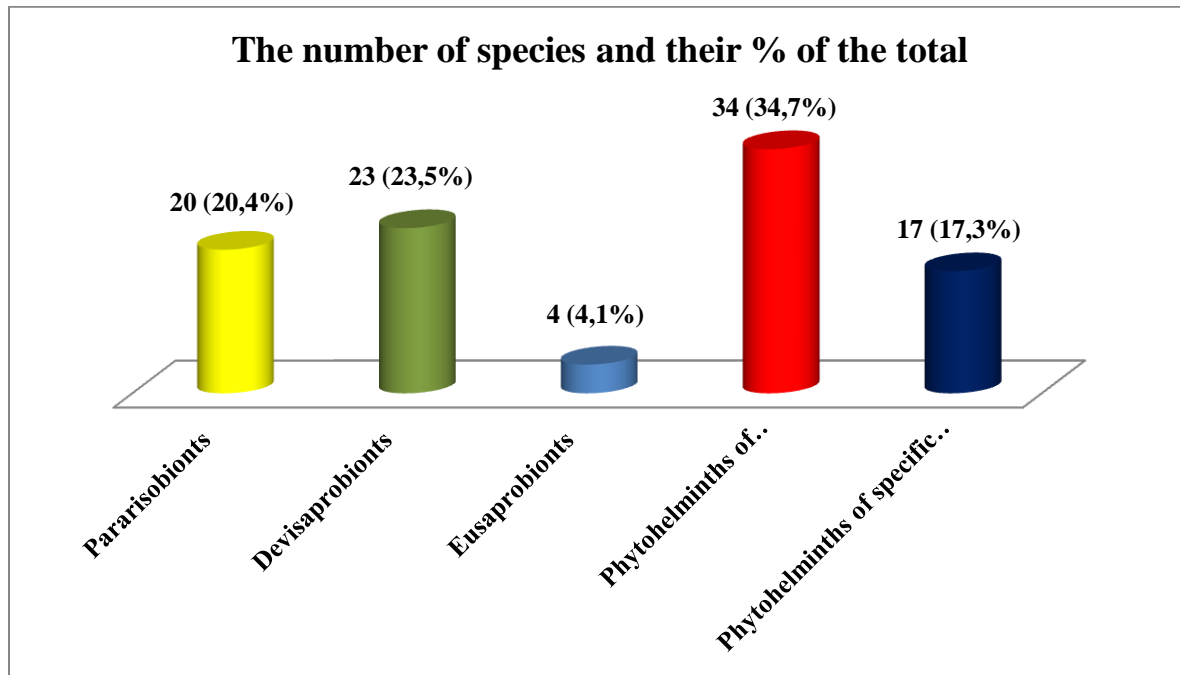


Figure: 1. The number of species of pomegranate plants found by ecological groups.

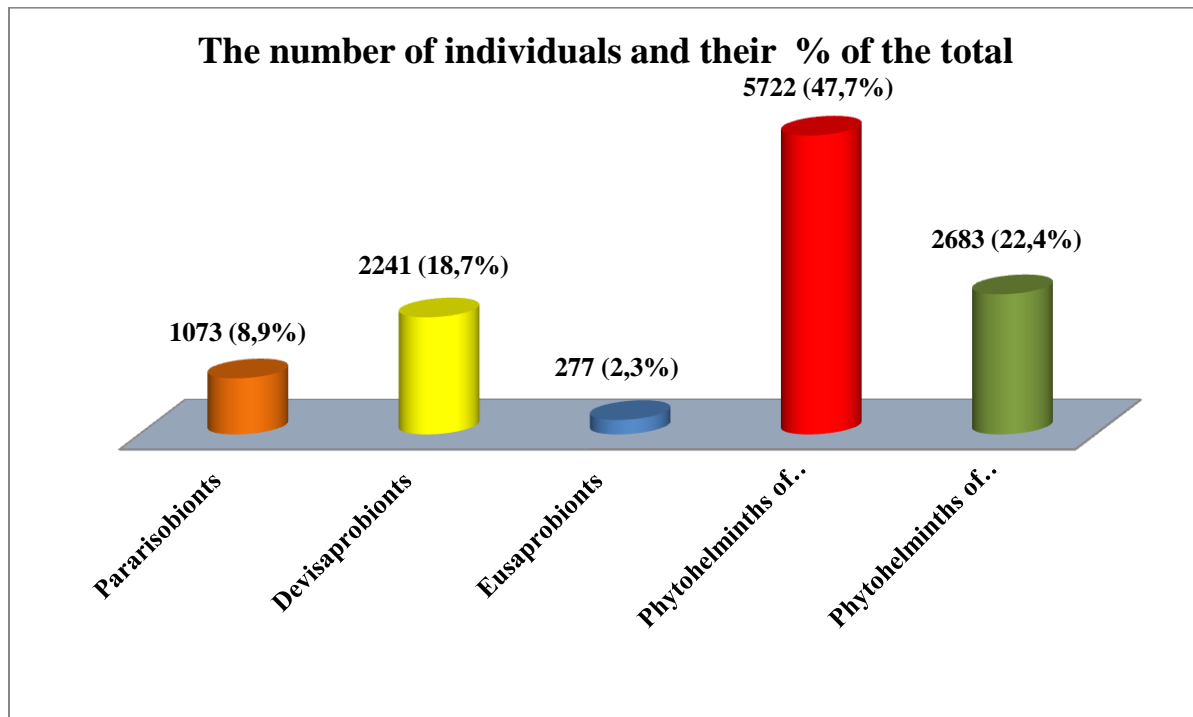


Figure: 2. The number of individuals discovered pomegranate plants by ecological groups.

Pararisobionts. Pararisobionts belong to the orders: Enoplida, Mononchida and Dorylaimida and are represented by the families Alaimidae (1 species), Pristomatolaimidae (1 species), Mylonchulidae (1 species), Nygolaimidae (1 species), Dorylaimidae (1 species), Qudsianematidae (7 species) (2 species), Nordiidae (2 species), Leptonchidae (1 species), Tylencholaimidae (2 species) and Diphtherophoridae (1 species). Representatives of this ecological group were found mainly in the rhizosphere of plants, where 95.1% of the total number of nematodes were recorded.

The species *Pristomatolaimus dolichurus*, *Eudorylaimus labiatus*, *E. parvus*, *E. pratensis*, *E. similis*, *E. discolaimioides*, *Tylencholaimus minimus*, and *Diphtherophora communis* are found in large numbers in the root soil, while the species *Alaimus primitivus*, *Nygolaimus brachyurus*, *Ecumenicus monohystera*, *Aporcelaimellus krugeri*, *Enchodorella penetrans*, and *Leptonchus obtusus* are the smallest.

Devisaprobionts. The group of devisaprobionts includes 23 species that belong to the orders Plectida and Rhabditida; family Plectidae (2 species), Cephalobidae (19 species), Paragrolaimidae (2 species). They were found in the root system and rhizosphere of plants.

Species *Cephalobus persegnis*, *Eucephalobus oxyuroides*, *Chiloplacus propinquus*, *Ch. quintastriatus*, *Ch. sclerovaginatus* and *Panagrolaimus rigidus* were found in the rhizosphere and root system of pomegranate plants and were the most numerous in terms of the number of individuals.

The species *Proteroplectus varians*, *Heterocephalobus latus*, *H. longicaudatus*, *Eucephalobus striatus*, *Cervidellus serratus*, and *C. insubricus* were insignificant in terms of the number of individuals, while the species *P. parietinus*, *P. varians*, *H. latus*, *H.*

longicaudatus, *C. serratus* and *C. habibullae* - found only in the rhizosphere of plants.

Eusaprobionts. The group of eusaprobionts, in the material we studied, turned out to have the smallest number of species - 4 species (4.1% - of the total number of species). The family Rhabditidae belongs to the representatives of this group. Of the eusaprobionts, *Rhabditis brevispina* was found in large numbers in the root system of plants and root soil, while the species *Xylorhabditis operosa* and *Rhabditis intermedia* were found only in the rhizosphere of plants in the smallest number of individuals.

Phytohelinths of nonspecific pathogenic effect. The most numerous in terms of the number of species and individuals was the group of phytohelinths of nonspecific pathogenic effect, including 34 species belonging to the orders Aphelenchida and Tylenchida; families Aphelenchidae (3 species), Aphelenchoididae (14), Seinuridae (2), Tylenchidae (7), Psilenchidae (1), Anguinidae (6), Sphaerulariidae (1). Among families in terms of the number of individuals and species composition, Aphelenchoididae occupies the first place, which is 41.2% of the total number of species and 77.5% of the total number of individuals detected by phytonematodes.

The species *Aphelenchus avenae*, *Aphelenchoides parietinus*, *A. bicaudatus*, *A. blastophthorus*, *A. clarolineatus*, *A. composticola*, *A. dactylocercus*, *A. graminis*, *A. limberi*, *A. macronucleatus*, and *Ditylenchus myceliophagus* were found in the rhizosphere, and the root system of the pomegranate, were the most numerous in terms of the number of individuals.

Phytonematodes *Aphelenchus cylindricaudatus*, *A. eremitus*, *Seinura citri*, *S. diversa*, *Filenchus infirmus*, *F. leptosoma*, *F. polyhypnus*, *F. thornei*, *Aglenchus agricola*, *Nothotylenchus exiguus*, *N. allii* and

Prothallonema asymmetricus were insignificant in the number of individuals.

Among the group of phytohelminths with a nonspecific pathogenic effect, the species *Aphelenchus eremitus*, *Aphelenchoides chinensis*, *Seinura citri*, *S. diversa*, *Filenchus infirmus*, *Aglenchus agricola*, *Nothotylenchus exiguus*, *N. allii* and *Prothallonema asymmetricus* were found only in the root system in the rhizosphere of plants.

Phytohelminths of specific pathogenic effect. Phytohelminths of specific pathogenic effect, including 17 species, belong to the orders Dorylaimida and Tylenchida; The family Xiphinematidae (4 species), Dolichodoridae (2 species), Hoplolaimidae (6 species), Pratylenchidae (1 species), Meloidogynidae (2 species), Paratylenchidae (1 species), Anguinidae (1 species) are found in a large number of nematodes.

Among the true parasites, the dominant species were *X. opisthohystrum*, *B. dubius*, *Q. capitatus*, *H. dihystrera*, *H. erythrinae*, *P. pratensis*, *M. incognita*, *M. javanica*, *P. hamatus*, and *D. dipsaci*. They were found in the rhizosphere and root systems of plants. They were the most numerous in terms of number of individuals.

The species *X. basiri*, *X. elongatum*, *X. pachtaicum*, and *R. goodeyi* were found in single specimens only in the rhizosphere of pomegranate plants.

CONCLUSION

The research results showed that out of 17 species of phytoparasitic nematodes widespread in the roots and rhizosphere of the pomegranate, 8 species have a noticeable pathogenic significance: *Xiphinema opisthohystrum*, *Helicotylenchus dihystrera*, *H. erythrinae*, *Pratylenchus pratensis*, *Meloidogyne incognita*, *M. javanica*, *Paratylenchus hamatus*, and *D. dipsaci*. And the rest of the species, in view of their small number, do not have a certain parasitological significance.

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