

Plant Parasitic Nematodes of Tylenchida (Nematoda) Associated with Walnuts (*Juglans regia* L.) and Chestnuts (*Castanea sativa* Miller) Orchards in the Black Sea Region

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Geliş Tarihi : 01.02.2001

Abstract: In this study, plant parasitic nematodes species of Tylenchida in walnuts (*Juglans regia* L.) and chestnuts (*Castanea sativa* Miller) orchards in some provinces of the Black Sea Region are examined. With this, totally 21 species were determined of which this species belonging to 17 genus of 7 families of Tylenchoidea, Dolichodoridea, Hoplolaimoidea, Criconematoidea, Hemicyclophoroidea, Anguinoidea superfamilies of Tylenchina, Criconematina, Hexatyliina (Tylenchina: Nematoda) suborder. It was not met any literature record about nematodes on walnuts and chestnuts in Turkey, in the end of this study 14 plant parasitic nematodes in walnuts and 10 plant parasitic nematodes in chestnuts were determined. Among them; *Boleodorus* (B.) *acutus* Thorne and Malek, *Nagelus saifulmulukensis* Maqbool and Shahina and *Rotylenchus robustus* (de Man) Filipjev are determined for the first time in the Nematoda fauna of Turkey.

Key Words: Plant parasitic nematodes, new records, walnut, chestnut, Black Sea Region

Karadeniz Bölgesi'nde Ceviz (*Juglans regia* L.) ve Kestane (*Castanea sativa* Miller) Bahçelerinde Saptanan Tylenchida (Nematoda) Takımına Ait Bitki Paraziti Nematodlar

Özet: Bu çalışmada Karadeniz Bölgesi'nde ceviz (*Juglans regia* L.) ve kestane (*Castanea sativa* Miller) bahçelerinde saptanan Tylenchida takımına ait bitki paraziti nematod türleri incelenmiştir. Çalışma sonucunda Tylenchida takımının Tylenchina, Criconematina ve Hexatyliina alttakımlarına bağlı Tylenchoidea, Dolichodoridea, Hoplolaimoidea, Criconematoidea, Hemicyclophoroidea, Anguinoidea üst familyalarından 7 familya ve 17 cins'e bağlı 21 tür saptanmıştır. Türkiye'de ceviz ve kestane'de nematodlarla ilgili herhangi bir literatür kaydına rastlanmamış olup bu çalışma sonucunda cevizde 14, kestanede 10 adet Tylenchida (Nematoda) takımına ait bitki paraziti nematod türü saptanmıştır. Tespit edilen türlerden *Boleodorus* (B.) *acutus* Thorne ve Malek, *Nagelus saifulmulukensis* Maqbool ve Shahina ve *Rotylenchus robustus* (de Man) Filipjev Türkiye nematod faunası için yeni kayıt niteliğindedir.

Anahtar Kelimeler: Bitki paraziti nematod, yeni kayıt, ceviz, kestane, Karadeniz Bölgesi

Introduction

Since appropriate climatic conditions chestnuts and walnuts trees have large planted area in Turkey. Turkey have 6.965.000 trees (chestnuts and walnuts) and the number of trees in the districts of this research is 1.278.369 (Anonymous, 1999).

There is few knowledge about plant parasitic nematodes associated with nuts in the World. Nine plant parasitic nematodes were found associated with apple, almond, peach, plum, pistachio and grapes in the Baluchistan region of Pakistan (Maqbool and Qasim, 1988). A list of Californian vegetable, fruit and nut crops likely to suffer significant damage from common nematode groups (mainly *Meloidogyne*, *Pratylenchus* and *Heterodera* spp.) is given by Flint, 1990.

There was one literature record about plant parasitic nematodes (Tylenchida: Nematoda) on chestnuts (*Castanea sativa* Miller). *Meloidogyne konaensis* found associated with water chestnuts plantation (Zhang and Schmitt, 1994). There was few literature record about nematodes on walnuts (*Juglans regia* L.). *Hemicyclophora juglandis* on *J. sinensis* is determined in Korea (Choi and Geraert, 1975). Descriptions and morphometrics of *P. vulnus* from walnuts (*J. regia*) in the Cordoba region of Argentina was given by Doucet, 1988. *Criconemella xenoplax* found in *J. regia* in Bulgaria (Peneva and Choleva, 1987). *Paratylenchus juglansi* from the rhizosphere of walnut in Kashmir, India, is described and figured (Kaul and Waliullah, 1989). *Meloidogyne arenaria*, *Pratylenchus vulnus*, *Zygotylenchus guevarai*,

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Helicotylenchus sp., *Tylenchorhynchus* sp., *Paratylenchus* sp., *Criconebella* sp. and *Xiphinema americanum* were reported from *J. regia* in Andujar, southern Spain by Talavera et. al., (1999).

It was not met any literature record about nematodes on walnuts and chestnuts in Turkey. This study was done to determined the Tylenchida species in walnuts and chestnuts orchards in some provinces of the Black Sea Region.

Materials and Methods

The main materials of the study were soil and nuts root collected from walnuts and chestnuts orchards of the five provinces; Zonguldak, Kastamonu, Sinop, Ordu and Giresun in July of 1998 (Fig. 1.).

Soil samples were collected according to the standard methods of nematology literature from 20 orchards in five provinces of the region.

In laboratory studies, sieve and funnel methods were used for obtaining active nematodes from soil (Christie and Perry, 1951). For identification nematodes were fixed according to De Grisse (1969). The slides were

prepared by using ring method (Hooper, 1986). Measurements were done according to the formula cited by Siddiqi (1986). Taxonomic status was given according to Siddiqi (1986).

In measurement and drawings for the diagnosis of the species, all the straight and curved structures were measured by using "Curvimeter". Measurements were made on 20 female and male individuals each, for species in high density, and on present adult individuals for species in low density.

Results and Discussion

In this study, 21 species were determined belonging to the order Tylenchida (Table 1.), which are all new records for walnuts and chestnuts in Turkey. The distribution of the determined species in Turkey and the other host association are also given in the same table.

The species, *Boleodorus* (*B.*) *acutus* Thorne and Malek, *Nagelus saifulmulukensis* Maqbool and Shahina and *Rotylenchus robustus* (de Man) Filipjev are determined for the first time in Turkey.

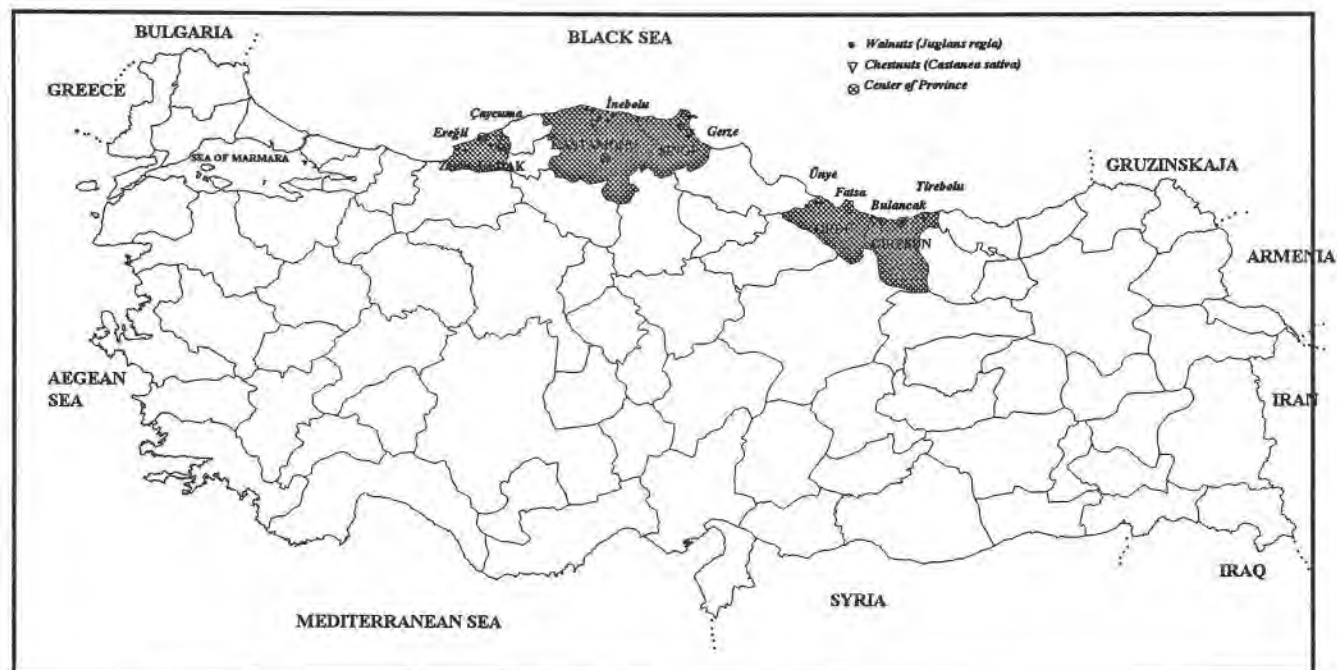


Fig. 1. Map of Turkey; showing sampling sites in the Black Sea Region, Turkey

Table 1. Distribution and host association of plant parasitic nematodes species of Tylenchida with walnuts (*Juglans regia* L.) and chestnuts (*Castanea sativa* Miller) in the Black Sea Region

Nematode species	Host association (common name)	Distribution	Reference
Tylenchida; Tylenchina; Tylenchoidea; Tylenchidae; Tylenchinae			
<i>Irantylenchus clavidorus</i> (Kheiri)	<i>Solanum melongena</i> L.	Istanbul	Slatukoğlu (1974)
	Ornamental plant	Izmir	Borazancı (1977)
	<i>Rosa damascana</i>	Isparta	Akgül(1996)
	<i>Oryza sativa</i> L.	Ankara,Balikesir	Kepenekci et. al., (1998)
	<i>Lens esculenta</i> L.	Yozgat,Ankara	Kepenekci (1999a)
	<i>Phaseolus vulgaris</i> L.	Karaman	Kepenekci (1999a)
	<i>Camelia sinensis</i> L.	Rize	Kepenekci & Akgül (1999)
	<i>Castanea sativa</i> Miller	Zonguldak	In this study
	<i>Juglans regia</i> L.	Kastamonu	In this study
	<i>Coslenchus diversus</i> Lal & Khan	<i>Oryza sativa</i> L.	Ankara,Balikesir
<i>Juglans regia</i> L.		Kastamonu	In this study
Boleodorinae			
<i>Boleodorus</i> (B.) <i>acutus</i> Thorne & Malek *	<i>Juglans regia</i> L.	Kastamonu	In this study
<i>Neopsilenchus peshawarensis</i> Shahina & Maqbool	<i>Nicotiana</i> sp.	Samsun,Sinop	Kepenekci & Ökten (1999)
	<i>Juglans regia</i> L.	Kastamonu	In this study
Dolichodoroidea; Dolichodoridae; Tylenchorhynchinae			
<i>Tylenchorhynchus cylindricus</i> Cobb	Vegetables	Eskişehir	Ediz & Enneli (1978)
	<i>Phaseolus vulgaris</i> L.	Ankara,Yozgat,Afyon	Kepenekci (1999a)
	<i>Lycopersicum esculentum</i> Mill.	Ankara	Kepenekci (1994)
	<i>Juglans regia</i> L.	Zonguldak,Ordu	In this study
	<i>Castanea sativa</i> Miller	Zonguldak	In this study
<i>T. tritici</i> Golden, Maqbool and Handoo	<i>Hordeum vulgare</i> L.		
	<i>Triticum aestivum</i> L.	Eskişehir	Ertuğ (Akyol) (1997)
	<i>Castanea sativa</i> Miller	Kastamonu	In this study
<i>Quinisulcius acutus</i> (Allen)	<i>Lycopersicum esculentum</i> Mill.	Ankara	Kepenekci (1994)
	<i>Juglans regia</i> L.	Ordu,Kastamonu	In this study
Merliniinae			
<i>Nagelus saifulmulukensis</i> Maqbool and Shahina *	<i>Juglans regia</i> L.	Ordu	In this study
<i>Amplimerlinius dubius</i> (Steiner)	<i>Citrullus vulgaris</i> Schrad.	Istanbul	Saitukoğlu (1973)
	<i>Allium cepa</i> L.	Karaman	Öztürk (1990)
	<i>Phaseolus vulgaris</i> L.	Ankara	Kepenekci (1999a)
	<i>Castanea sativa</i> Miller	Giresun	In this study
<i>Scutylenchus lenorus</i> (Brown)	<i>Actinidia deliciosa</i> cv. Hayward	Giresun	Kepenekci & Öztürk (1999)
	<i>Juglans regia</i> L.	Ordu	In this study
Hoplolaimoidea; Hoplolaimidae; Hoplolaiminae;			
<i>Hoplolaimus galeatus</i> (Cobb)	Vegetables	Eskişehir	Ediz & Enneli (1978)
	<i>Dolichos lubia</i> Fornk.	Isparta	Kepenekci (1999a)
	<i>Castanea sativa</i> Miller	Sinop	In this study
Rotylenchinae			
<i>Rotylenchus robustus</i> (de Man) Filipjev *	<i>Juglans regia</i> L.	Kastamonu	In this study
	<i>Castanea sativa</i> Miller	Sinop	In this study
Rotylenchoidinae			
<i>Helicotylenchus crenacauda</i> Sher	<i>Nicotiana</i> sp.	Samsun,Sinop	Kepenekci & Ökten (1999)
	<i>Lens esculenta</i> Moench	Yozgat	Kepenekci (1999a)
	<i>Juglans regia</i> L.	Zonguldak	In this study
<i>H. striatus</i> Firoza and Maqbool	<i>Nicotiana</i> sp.	Samsun,Sinop	Kepenekci & Ökten (1999)
	<i>Castanea sativa</i> Miller	Sinop,Giresun	In this study
<i>H. tunisiensis</i> Siddiqi	<i>Lycopersicum esculentum</i> Mill.	Ankara	Kepenekci (1994)
	<i>Cicer arietinum</i> L.	Ankara,Yozgat	Kepenekci (1999a)
	<i>Phaseolus vulgaris</i> L.	Burdur	Kepenekci (1999a)
	<i>Lens esculenta</i> Moench	Yozgat	Kepenekci (1999a)
	<i>Dolichos lubia</i> Fornk.	Isparta	Kepenekci (1999a)
	<i>Juglans regia</i> L.	Ordu	In this study

*) The species were determined for the first time in Turkey

Table 1. (Continues) Distribution and host association of plant parasitic nematodes species of Tylenchida with walnuts (*Juglans regia* L.) and chestnuts (*Castanea sativa* Miller) in the Black Sea Region

Nematode species	Host association (common name)	Distribution	Reference
Pratylenchidae; Pratylenchinae			
<i>Pratylenchus zaeae</i> Graham	<i>Allium cepa</i> L. <i>Lycopersicum esculentum</i> Mill. <i>Medicago sativa</i> L. <i>Lens esculenta</i> Moench <i>Camelia sinensis</i> L. <i>Castanea sativa</i> Miller	Konya, Nevşehir Ankara Central Anatolia Region Yozgat Rize Giresun	Öztürk (1990) Kepenekci (1994) Öztürk & Enneli (1994) Kepenekci (1999a) Kepenekci & Akgül (1999) In this study
Radopholinae;			
<i>Pratylenchoides bacillisemenus</i> Sher	<i>Actinidia deliciosa</i> cv. Hayward <i>Castanea sativa</i> Miller	Ordu Gresun	Kepenekci & Öztürk (1999) In this study
<i>P. ritteri</i> Sher	<i>Phaseolus vulgaris</i> L. <i>Juglans regia</i> L.	Yozgat, Ankara, Karaman Ordu	Kepenekci (1999a) In this study
Criconematina; Criconematoidea; Criconematidae; Hemicriconemoidinae			
<i>Hemicriconemoides gaddi</i> (Loos)	<i>Lens esculenta</i> Moench <i>Juglans regia</i> L.	Yozgat Zonguldak	Kepenekci (1999a) In this study
Hemicyclophoroidea; Hemicyclophoridae; Hemicyclophorinae;			
<i>Hemicyclophora sturhani</i> Loof	<i>Eriobotrya japonica</i> Ldl. <i>Castanea sativa</i> Miller	İçel Kastamonu, Sinop	Kepenekci (1999b) In this study
Hexatylinae; Anguinoidea; Anguinidae; Anguininae			
<i>Safianema anchilispesoma</i> (Tarjan)	<i>Cucumis melo</i> L. <i>Rosa damascana</i> Mill. <i>Nicotiana</i> sp. <i>Actinidia deliciosa</i> cv. Hayward <i>Juglans regia</i> L.	İstanbul Isparta Samsun, Sinop Rize Ordu	Saitukoğlu (1974) Akgül (1996) Kepenekci & Ökten (1999) Kepenekci & Akgül (1999) In this study

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