

Two new records of plant nematode species from pomegranate gardens in southern Khorasan Province of Iran

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Abstract

In nematological investigations of pomegranate gardens of Ferdows and Birjand cities ten plant parasitic nematodes species were identified on morphological and morphometrical characters viz., *Boleodorus thylactus*, *Filenchus cylindricaudus*, *Geocenamus tenuidens*, *Irantylenchus clavidorus*, *Merlinius brevidens*, *M. communis*, *M. pistaciei*, *Neopsilenchus magnidens*, *Pratylenchus neglectus* and *Zygotylenchus guevarai*. Among these species *M. communis* and *M. pistaciei* are new records for nematode fauna of Iran.

Key word: New records, plant parasitic nematode, *Merlinius*, pomegranate, Khorasan.

The pomegranate (*Punica granatum* L.) is a fruit-bearing deciduous shrub or small tree growing between 5 and 8 m tall. The pomegranate originated in the region of modern-day Iran and has been cultivated since ancient times throughout the Mediterranean region and northern India. Today, it is widely cultivated throughout the Middle East, Caucasus region, North Africa and tropical Africa, the Indian subcontinent, Central Asia and the drier parts of Southeast Asia (Morton, 1987). Iran is known as the largest producer of pomegranate in the world with more than 700 varieties (www.Anar-Iran.ir). Ferdows city is a major producer of pomegranate in Iran where the annual production of pomegranate is about 30 thousand tones (www.Farsnews.com) followed by Birjand city where pomegranate is largely cultivated (www.Khorasannews.com). Pomegranate plantation greatly affected by the plant parasitic nematodes (www.tishineh.com) causing reduce quantity and quality in product of pomegranate

(www.FAO.org). The literature search of nematode fauna on pomegranate showed that *Meloidogyne incognita* was reported from Pakistan (Nasira *et al.*, 2011). Whereas, *Aglenchus* sp., *Basiria graminophila*, *Basiroides obliquus*, *Ditylenchus* sp., *Helicotylenchus indicus*, *H. multicinctus*, *M. incognita*, *Psilenchus hilarulus*, *Tylenchorhynchus brassicae* and *Xiphinema basiri* were reported by Khan *et al.*, (2005). A new species *Criconema punici* was described from pomegranate by Edward *et al.*, (1971). In Iran, *Longidorus iranicus* new species was described from pomegranate garden of Isfahan along with *Meloidogyne javanica* and *M. incognita* (Sturhan & Barooti, 1983). The diagnostic compendium of the genus *Merlinius* Siddiqi, 1970 was given by Handoo *et al.*, (2007). In this study, nematodes of pomegranate garden of Ferdows and Birjand cities, the major producers of pomegranate in Iran were investigated.

Materials and Methods

Soil sampling: Soil samples were collected from the rhizospheres of pomegranate cultivated gardens in Birjand and Ferdows cities of Iran. Soil samples were taken from the depth of 30-50 cm, put in polyethylene bags with necessary labeling and brought to the laboratory and processed.

Processing of samples: Nematodes were extracted from soil samples by using the Jenkins (1964) method, killed and fixed according to De Grisse (1969). Genera and species were identified based on morphological and morphometrical characters.

Measurements and drawings: Measurements were done with an ocular micrometer of "Olympus BH2" model microscope. Drawings were made by a drawing tube attached to the microscope.

Result and Discussion

In this study 10 species were identified *viz.*, *Boleodorus thylactus*, *Filenchus cylindricaudus*, *Geocenamus tenuidens*, *Irantylenchus clavidorus*, *Merlinius brevidens*, *M. communicus*, *M. pistaciei*, *Neopsilenchus magnidens*, *Pratylenchus neglectus*

and *Zygotylenchus guevarai*. Among these species *Merlinius pistaciei* and *M. communicus* are new records for nematode fauna of Iran.

Merlinius communicus Sultan, Singh & Sakhuja, 1988 (Fig. 1, Table 1)

Female: Body slightly arcuate. Lateral field marked with six incisures, occupying 1/3 or more of body width. Labial region hemispherical, continuous with body, marked with 5 annuli. Labial framework moderately sclerotized. Stylet with posteriorly directed knobs. Median bulb 12-14 μm long. Basal bulb 22.5-25 μm long. Cardia large and disk shaped. Vulva with epiptygma. Spermatheca filled with sperms, slightly invaginated in the middle. Tail 35-60 μm long marked with 35-55 annuli.

Male: Spicicules 18-20 μm long and 9-11 μm long gubernaculum, L-shaped with the ends knobbed.

Remark: General description and morphometric measurements of this species closely fit to the original description of *Merlinius communicus* given by Sultan *et al.*, 1988 except in having larger number of tail annules (35-55 vs 25-30). The species represents a new record for Iranian nematode fauna.

Table 1. Morphometric characters of the Iranian population of *Merlinius communicus* and their comparison with type population (measurements are in μm).

Origin/characters	Ferdows region		Hoshiarpur, India Sultan <i>et al.</i> , 1988	
	Female	Male	Female	Male
Number	9	3	-	-
L	610±56.34(530-720)	566.66±56.82(520-630)	568-581	532-550
a	34.04±1.73 (31.17-36)	34.02±2.35 (31.42-36)	34-36	30.32
b	4.58±0.25(4.37-5.43)	5.35±0.65(4.94-6.11)	4.3-4.6	4.1-4.3
c	12.87±2.45 (10-16.85)	12.37±1.40 (11.55-14)	10-14.2	-
c'	3.36±0.43 (2.71-4.2)	3.39±0.22 (3.21-3.65)	3.1-3.8	2.4-2.6
V/T	56.23±1.54 (53.33-58.33)	49.65±12.75 (47.11-63.46)	55-59	-
Stylet	16.83±0.55 (16-17.5)	16.5±0.5 (16-17)	15.6-17	-
Pharynx length	132.5±8.66 (112.5-145)	107.5±21.36 (85-127.5)	133	-
S.E-pore	98.94±8.71(82.5-109)	85.83±12.58 (87.5-97.5)	-	-
DGO	2.27±0.44 (2-3)	2.27±0.44 (2-3)	-	-
Tail length	48.44±7.15 (35-60)	45.83±1.44 (45-47.5)	40-48	-
Anal body width	15.61±3.43 (10-20)	13.5±0.5 (13-14)	-	-
G ₁	29.17±6.02 (20.83-39.58)	-	-	-
G ₂	26.20±3.01 (22.91-32.03)	-	-	-
Gubernaculum	-	10±1(9-11)	-	10-12
Spicule length	-	19.33±1.15(18-20)	-	18-20

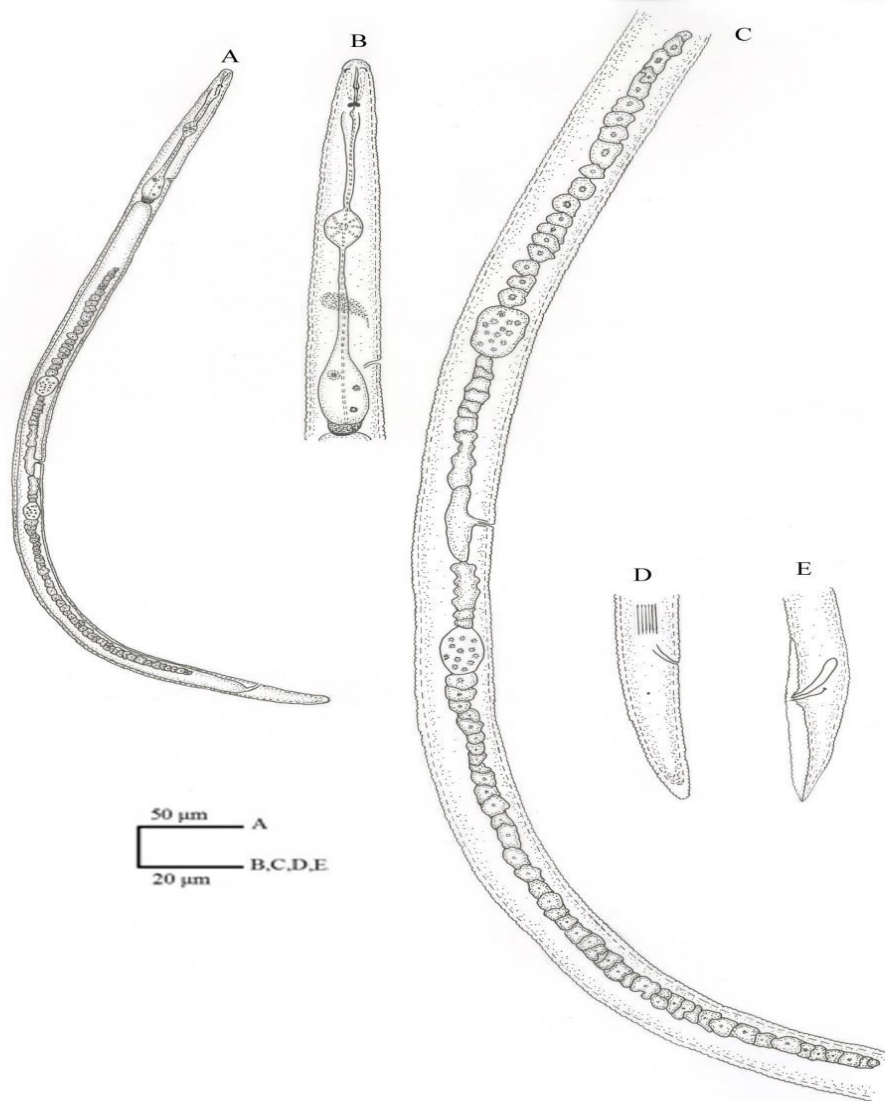


Fig. 1 (A-E). *Merlinius communicus*. A. Whole body; B. Head region with oesophagus; C. Reproductive region; D. Lateral field with transversal striae in female tail; E. Male tail with cloacal region.

***Merlinius pistaciei* Fatema & Farooq, 1992
(Fig. 2, Table 2)**

Female: Body ventrally arcuate. Cuticle finely annulated. Lateral field 1/3 of body width, bearing 6 incisures and the outer incisures finely crenate. Lip region continuous, rounded, bearing 5 annuli. Labial framework lightly sclerotized. Median bulb 7-8 μm wide and 13-14 μm long. Basal bulb cylindrical 22-26 μm long. Cardia discoid. Vulva with epitygma and lateral membrane, vulval lips elevated. Spermatheca

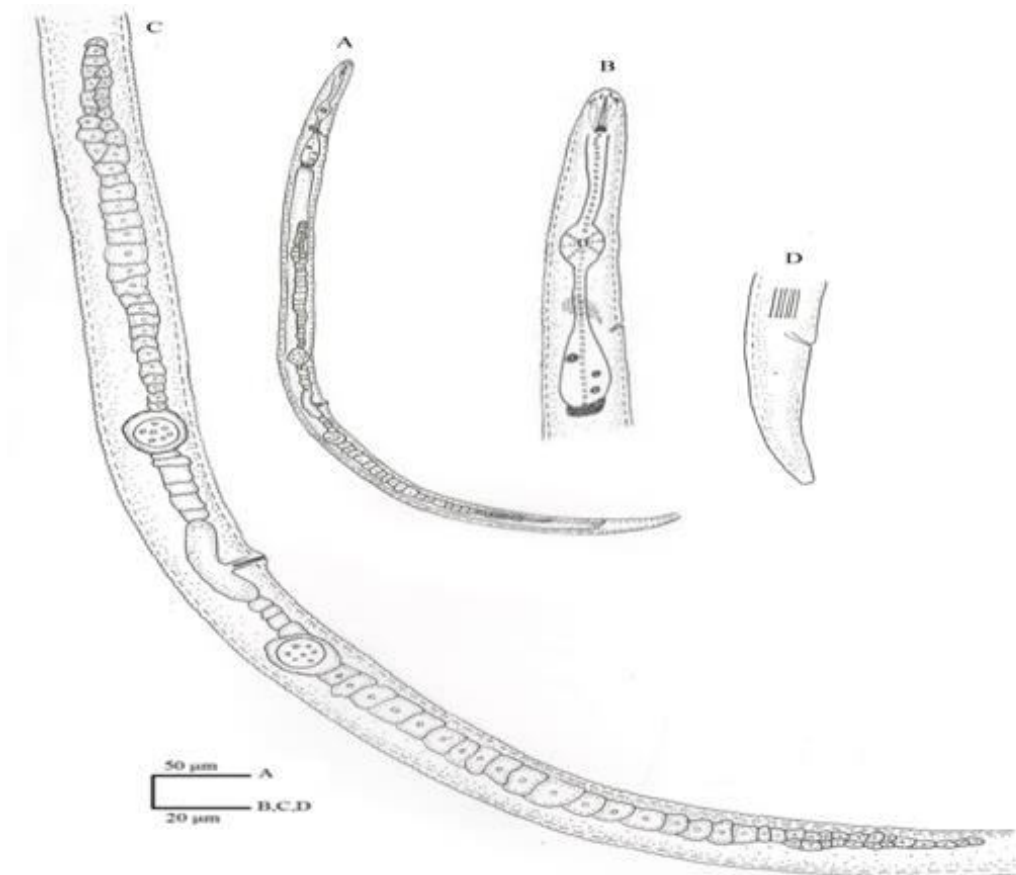
round, axial, filled with sperms. Tail sub-cylindrical, bearing 90-95 annuli, terminus smooth. Phasmid at middle of tail.

Male: Not found.

Remarks: General description and morphometric measurements of this species closely fit to the original description of *Merlinius pistaciei* given by Fatema & Farooq, 1992. The species represents a new record for Iranian nematode fauna.

Table 2. Morphometric characters of the Iranian population of *Merlinius pistaciae* and their comparison with type population (measurements are in μm).

Origin Characters	Birjand region	Quetta-Balochistan, Pakistan Fatema & Farooq, 1992
	Female n=10	Female
L	628 \pm 41.31(550-690)	625-675
a	31.44 \pm 1.62(28.94-34.21)	30-34
b	5.35 \pm 0.23 (5-5.65)	5.3-5.4
c	11.56 \pm 0.35(11-12.03)	11.5
c'	3.65 \pm 0.26(3.18-4.23)	3.6-3.8
V	55.94 \pm 1.67(53.84-59.01)	55-56.9
Stylet	13.1 \pm 0.51 (12.5-14)	13-13.5
Pharynx length	115.8 \pm 5.94 (110-131)	115
SE-pore	110.3 \pm 2.11(107-113)	112
DGO	2.9 \pm 0.37(2-3.5)	3
Tail length	55.6 \pm 3.2 (50-62)	45-56
Anal body width	15.55 \pm 1.34(13-17.5)	16
G ₁	28.27 \pm 1.91(25-31.55)	-
G ₂	25.75 \pm 3.5(22.22-35.22)	-

**Fig. 2 (A-D).** *Merlinius pistaciae*. A. Whole body; B. Oesophageal region; C. Reproductive region; D. Lateral field with transversal striae in female tail.

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