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Research Article

Description of some plant parasitic nematodes from fruit orchards of West Azerbayjan, Iran

Hadi Ghorbanzad[1], Ramin Heydari[1*] and Ebrahim Pourjam[2]

1. Department of Plant Protection, College of Agriculture and Natural resources, University of Tehran, Karaj, Iran.
2. Department of Plant Pathology, Faculty of Agriculture, Tarbiat Modares University, Tehran, Iran.

Abstract: In order to identification of plant parasitic nematodes associated with plants in fruit orchards of West Azerbaijan province, Iran, a survey was conducted during 2011 and 2012. Nematodes were extracted from soil and root samples by using centrifugal-flotation and Whitehead's tray, transferred to glycerin and mounted in permanent slides. Morphological and morphometrical characters of the specimens were analyzed and measurated. As a result, 26 species belonging to 21 different genera of tylenchids (Tylenchomorpha, Nematoda) were identified that are presented. *Mesocriconema surinamense* and *Pratylenchoides crenicauda* are reported for the first time from Iran. Iranian population of *Psilenchus aestuarius* is also illustrated here. *M. surinamense* is characterized by having a disk like head originated from large submedian lobes of lip region and morphometic characters. *P. crenicauda* is the type species of the genus *Pratylenchoides* and distinguished by areolated lateral lines on the tail, short pharyngeal overlap and position of pharyngeal glands. *P. aestuarius* is characterized by rounded and smooth head, presence of post anal intestinal sac in both sexes and several morphometric characters.

Keywords: First report, *Mesocriconema surinamense, Pratylenchoides crenicauda, Psilenchus aestuarius*

Introduction

West Azerbayjan is one of the western provinces of Iran, bordering Turkey, Iraq and Nakhchivan, and the provinces of East Azerbaijan, Zanjan and Kurdistan. The climatic variety of this province caused considerable variety of garden, agricultural, pasture and forest plants, so is regarded as one of the important agricultural zones in Iran. The most important garden crops of West Azerbayjan are apple, pear, and stone fruits such as sour cherry and cherry; the province has the third rank of garden crops production in the country (Anonymous, 2010).

Soil pathogens including plant parasitic nematode are of main concern in orchards. Several species of nematodes have been reported from West Azerbayjan (Sturhan, 1977, 1983; Mojtahedi *et al.*, 1980, 1992; Parvizi *et al.*, 1991, Karegar and Geraert 1998; Tanha Maafi *et al.*, 2003; Khezrinejadand and Niknam., 2004, Khezrinejad *et al*,. 2006; Nasrollahzade *et al.*, 2008).

A survey was conducted for identification of plant parasitic nematodes associated with plants in fruit orchards of West Azerbaijan province. Several species of plant parasitic nematodes were recovered and subsequently identified

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* **Corresponding author**, e-mail: rheydari@ut.ac.ir
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from the rhizosphere of different plants in orchards of the province. Some of them are of economically important nematodes and three species are described and illustrated for the first time from Iran.

Materials and Methods

During 2011-2012, 150 soil and root samples were collected from the rhizosphere of different orchard plants in West Azerbayjan province. Nematodes were extracted from 200 gr. of soil and root samples using the centrifugal-flotation method (Jenkins, 1964) and Whithead's tray method (Whitehead and Heming, 1965), preserved in TAF (8% formalin and 2% triethanolamine in distilled water), transferred to anhydrous glycerin according to De Grisse (1969) and mounted on permanent slides. Measurements and drawings were made with a research microscope (Olympus BH-2) equipped with a drawing tube and a digital camera.

Results and Discussion

Based on morphological and morphometric characters, 26 species of plant parasitic nematodes belonging to 21 genera of the infraorder Tylenchomorpha (De Ley and Blaxter, 2002) were identified (Table 1). Among the identified nematodes, *Mesocriconema surinamense* De Grisse and Maas, 1970 and *Pratylenchoides crenicauda* Winslow, 1958 are reported for the first time from Iran and are described here. *Psilenchus aestuarius* Andrassy, 1962 was previously reported from Iran (Mokarram Hesar *et al.*, 2010) without description. It is also being described and illustrated.

***Mesocriconema surinamense* (De Grisse and Maas, 1970) Loof and De Grisse, 1989**
(Figs. 1, 4A, 4B; Table 2)

Description

Female: Body tapering slightly towards both extremities, curved ventrally when heat-killed, cylindrical, anterior end flattened and posterior end rounded. Anastomoses of the annules rare; occurs mostly in the tail region. Lip region with four large submedian lobes, in profile half as broad as first body annulus, laterally connected, which making a disk like head (Figs. 1C-H, 4A, 4B). Labial disc lower than these lobes. First body annulus 17.4 (15-20) µm in diameter, retrorse or directed outward; a part of a broken annulus visible between lip region and first body annulus. All body annuli retrorse, with smooth to finely rough margins. Oral opening I-shaped, amphidial openings large. Stylet strong and large, metenchium 55 (54-57) µm long, telenchium with stylet knobs 20.2 (20-21) µm long. Basal knobs robust, anchor-shaped, 11 (10-12) µm wide and 4.3 (4-5) µm high. Orifice of dorsal pharyngeal gland opening 9 (8-10) µm posterior to stylet base. Pharynx 129.4 (125-132) µm long. Metacorpus muscular, isthmus narrow and very short, basal bulb saccate. Hemizonid indistinct. Excretory pore opposite to end of the pharynx to two annuli posterior to it. Reproductive system monoprodelphic. Oocytes arranged in single row. Vulva open with bi-lobed anterior lip. Vagina straight, anteriorly directed. Spermatheca empty, weakly developed. Anus located less than half of vulval body width distance from vulva. Tail rounded, slightly dorsally curved at tip with platelets and with one or two protuberances on terminal annulus.

Male: Not found.

Juveniles: Generally similar to female. Head and body annulus similar to those of female. Posterior edge of annuli smooth to slightly irregular.

Discussion

Mesocriconema surinamense was originally described as *Discocriconemella surinamensis* by De Grisse and Maas (1970). Loof and De Grisse (1974) transferred *D. surinamensis* to *Macroposthonia* by distinguishing four submedian lobes from the first annuli of head.

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De Grisse and Loof (1965) proposed to divide the large genus *Criconemoides* into several genera that *Macroposthonia* de Man, 1880 was among them. This was not recognized by Luc and Raski (1981) when they declared *Criconemoides* and *Macroposthonia* and placed most of the species in the genus *Criconemella* De Grisse and Loof, 1965. Coomans *et al*. (1990) regarded genus *Macroposthonia* as invalid. However, Siddiqi (2000) still considerd *Macroposthonia* as valid taxon. Loof and De Grisse (1989) replaced the generic name *Macroposthonia* by the oldest available synonym *Mesocriconema* Andrássy, 1965 and revalidated *Criconemoides* based on the arguments by Loof and De Grisse (1967). Brzeski *et al.* (2002) and Geraert (2008) regarded *M. surinamense* in the list of *Mesocriconema* species. Morphological and morphometric characters of the Iranian population of *M. surinamense* are in congruency with those in original description (see Table 2), with 81-84 annuli, four large submedian lobes, strong and large stylet, direct vagina, open vulva and round tail. Males were not found in the present study and also in the original description of the species but Van den berg *et al.* (1997) described males for the first time from Guyana. *M. surinamense* comes close to *M. antipolitanum* De Guiran, 1963 and *M. yossifovichi* Krnjaic, 1967. It differs from *M. antipolitanum* by having large submedian lobes giving the head a disc-like appearance and also by laterally connection of submedian lobes. It can be distinguishable from *M. yossifovichi* by large submedian lobes and fewer annuli (81-84 *vs* 95-108). *M. surinamense* was described by De Grisse and Maas (1970) around the roots of forest vegetation in Surinam. It is the first report of this species from Iran. We recovered the population from the rhizosphere of apple trees and poaceae weeds in an orchard in Sardasht, West Azerbayjan province.

***Pratylenchoides crenicauda* Winslow, 1958**

(Figs. 2, 4C, 4D; Table 3)

Description

Female: Body cylindrical, straight or slightly curved ventrally when heat killed. Cuticle about 1 µm thick. Cephalic region continuous and smooth, 10-12 µm width, 3-4 µm height, head bears 3 or 4 annuli and cephalic framework strongly developed. Stylet strong and conus as long as its shaft, stylet knobs broadly rounded sloping posteriorly. Lateral field with six lines at mid-body; four at deirids region, four or six at the end of the esophageal gland and four on tail region. Lateral lines areolated on the tail (Figs. 2E, 2F, 4C). Sometimes lateral field with four incisures in total body length. Procorpus cylindrical, narrowing slightly at junction with median bulb, median bulb oval by well developed valvular apparatus. Deirid 2-3 annuli anterior to excretory pore. Esophageal gland overlaps intestine dorsally, overlap length 22-36 µm. Dorsal gland nucleus larger than subventral glands. The nucleus of dorsal and one of subventral glands located anterior to pharyngeal-intestine valve, the other subventral gland nucleus posterior to the valve. Reproductive system didelphic-amphidelphic, vagina perpendicular to body axis, ovaries with a single row of oocytes. Spermatheca usually difficult to observe, round to oval, axial and empty. Tail cylindrical, with 27-32 annuli, tip with 5-6 coarse annules (Fig. 4D). Phasmids slightly posterior to mid-tail. Hyaline region 9.5-10 µm long.

Male: Not found.

Discussion

Morphological and morphometric characters of the West Azerbaijan population of *P. crenicauda* agree completely with the original description of the species (see Table 3). *P. crenicauda* is distinguished by areolation of lateral lines at tail region, number of annuli on the female tail, short esophageal overlap of the intestine and number of lateral lines. The Iranian

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population of the species is characterized by having a variation in number of lateral field incisures; Lateral fields with four incisures that increase to six beyond posterior end of pharyngeal gland, outer bands regularly areolated in tail region (as described by Castillo and Gomez-Barsina, 1988), and several specimens with four lateral lines on total body were also observed. Such variation in number of lateral lines was also mentioned before (Sher, 1970). Males were characterized in original description of the species (Winslow, 1958), but were not found in Iranian population of the species examined here and spermatheca was not functional in females. *P. crenicauda* is close to *P. heathi* Baldwin, Luc and Bell, 1983 and *P. variabilis* Sher, 1970. It differs from *P. heathi* by number of annuli of cephalic region (3-4 *vs* 4-6). Also, lateral lines are almost completely areolated on the tail in *P. crenicauda*, whereas they are not areolated in *P. heathi*. The nucleus of dorsal and one of subventral glands located at level of or anterior to pharyngeo-intestinal valve in *P. crenicauda*, but in *P. heathi* the three nuclei of glands located anterior to the valve. *P. crenicauda* differs from *P.variabilis* by having more tail annuli (27-35 *vs* 24), shape of the tail, longer body length (617-757 *vs* 500-660 µm) and number of lateral lines (4 or 6 *vs* 4). *P. crenicauda* was described by Winslow (1958) as the type species of the genus *Pratylenchoides*. In this study, it was recovered from the rhizosphere of apple trees in an orchard in Naghadeh, West Azarbayjan province, and reported for the first time from Iran.

***Psilenchus aestuarius* Andrassy, 1962**

(Figs. 3, 4E, 4F; Table 4)

Description

Female: Body large, slightly curved ventrally or somewhat open "C" when heat-killed. Anterior end slightly flattened; posterior end conical, elongate. Cuticle with fine transverse annulation about 1 µm wide at mid-body, inner layer of cuticle marked by even finer striae. Lateral field marked by four incisures, occupying 8-9 µm of body width; the two internal incisures fainter than the external ones, and the outer lines often weakly areolated. Amphids slit-like, located laterally on the head, behind the lateral lips. Head smooth, often bears one annul near its base, anteriorly truncate. Cephalic framework weak; head 3-4 µm high, 7-8 µm in width, not set off from body contour (Figs. 3F, 4E). Stylet delicate, without knobs, anterior portion shorter than half the length of the shaft. Orifice of dorsal pharyngeal gland opens about 4-5 µm behind base of stylet. Procorpus cylindrical, much longer than the isthmus. Median bulb muscular and well developed. Isthmus slender, circuited by nerve ring behind the median bulb. Basal bulb pyriform, always set off from intestine. Cardia voluminous, hemispheric. Excretory pore located at 94-115 µm from anterior end. Deirids clearly visible at level of excretory pore. Reproductive system didelphic-amphidelphic, vulva transversely located in a slight depression, vagina perpendicular to body axis, uterus with crustaformeria followed by a well developed functional spermathecae, filled with rounded sperms. Posterior part of intestine forms two lobes overtaking beyond linkage of intestinal lumen with rectum (Figs. 3D, 4F). Tail thick, terminus rounded, sometimes slightly clavate. Phasmid punctiform located at 16-38 µm distance from anus.

Male: Body slightly ventrally curved after fixation. General morphology similar to those of females but slightly shorter. Posterior part of intestine forms two lobes overtaking beyond linkage of intestinal lumen with rectum. Bursa 2-3 cloacal body widths long. Tail conical, straight, gradually tapering over its whole length; terminus clavate.

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Table 1 List of nematode species identified in present study, sampling sites and sample sources.

Species	Source	Locality
Aphelenchoides absari	Apple, Almond	Urmia, Naghadeh
Aphelenchoides limberi	Almond	Oshnavieh
Aphelenchus avenae	Almond, Walnut, Apple	Naghadeh, Mahabad, Bukan
Basiria breylla	Apple	Mahabad
Boleodorus thylactus	Peach, Alfalfa	Sardasht
Coslenchus costatus	Walnut, Apple	Naghadeh, Piranshahr
Criconemoides xenoplax	Peach, Sour cherry	Miandoab
Discotylenchus brevicaudatus	Apple, Cherry	Naghadeh, Oshnavieh
Ditylenchus myceliophagus	Alfalfa, Apple, Cherry	Urmia, Naghadeh, Sardasht
Filenchus andrassyi	Nectarine	Salmas
Filenchus vulgaris	Walnut, Apricot	Shahid dezh, Bukan
Helicotylenchus exallus	Apple, Beet	Urmia, Naghadeh
Hemicycliophora sturhani	Apple	Miandoab
Mesocriconema surinamens	Apple, Poacea weeds	Sardasht
Merlinius microdorus	Grape, Apple, Cherry	Urmia, Bukan, Oshnavieh
Nagelus hexageramus	Sour cherry, Beet	Khoy
Neopsilenchus magnidens	Almond, Cherry	Piranshahr
Paratylenchus similis	Cherry, Apple	Naghadeh, Khoy
Pratylenchoides crenicauda	Apple	Naghadeh
Pratylenchoides ritteri	Grape, Apricot	Mahabad, Urmia
Pratylenchus penetrans	Walnut	Sardasht
Pratylenchus thornei	Peach, Apple	Salmas, Oshnavieh
Psilenchus aestuarius	Apple	Urmia
Psilenchus hilarulus	Almond, Grape	Bukan, Miandoab
Tylenchorhynchus maximus	Nectarine	Salmas
Zygotylenchus guevara	Almond, Grape, Apple	Naghadeh, Urmia, Oshnavieh

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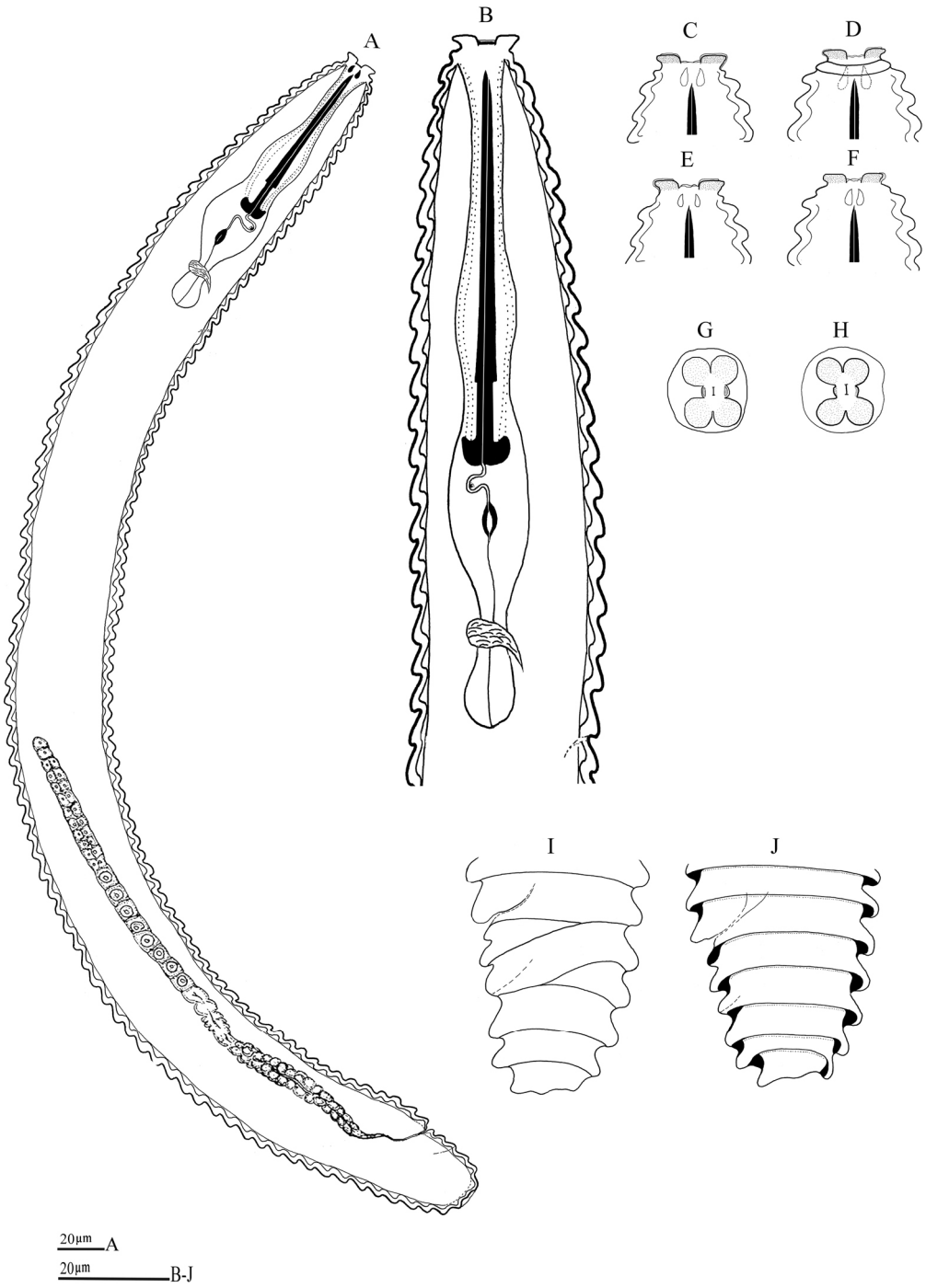

Figure 1 *Mesocriconema surinamense* (Female): A: Entire body; B: Anterior end; C-F: Head in lateral view; G, H: "en face" view; I, J: Tail in lateral view.

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Table 2 *Mesocriconema surinamense*. comparison of morphometric data (measurements in µm) for populations from Iran, Surinam and Guyana.

Origin	**West Azerbayjan Province**	**De Grisse and Mass (1970)**	**Van den berg et al (1997)**	
Characters	**Female**	**Female**	**Female**	**Male**
n	10	20	8	10
L	548 ± 34.1 (482-596)	447 (365-530)	441 ± 30.2 (395-495)	412 ± 37.5 (389-442)
a	12.1 ±0.3 (11-13.2)	10 (7-12)	9 ± 0.4 (9-10)	21 ± 3.5 (18-23)
b	4.2 ± 0.2 (3.9-4.6)	3.9 (3.4-4.5)	4	5
c	31.2 ± 2.3 (24.9-40.9)	27 (19-39)	22 ± 2.2 (18-26)	13 ± 0.8 (12-14)
c'	0.6 ± 0.1 (0.5-0.7)	-	-	2.5 ± 0.2 (2-3)
V	94 ± 0.6 (93.2-94.6)	92 (90-93)	91 ± 0.7 (90-92)	-
Stylet	73 ± 1.9 (70-75)	73 (70-78)	67 ± 1.6 (64-69)	-
m	77.2 ± 1.2 (75.7-78.4)	-	-	-
Oeso.	129 ± 3.1 (125-132)	114 (106-125)	-	-
BW	41.8 ± 1.8 (40-45)	-	-	-
R	83 ± 2.3 (80-86)	82 (78-89)	88 ± 2.2 (85-91)	176 ± 8.4 (160-188)
Rst	14 ± 1.1 (13-15)	15 (14-16)	16 ± 1.2 (15-18)	-
ROes	23 ± 1.3 (22-24)	22 (19-24)	24 ± 1.6 (22-26)	-
Rex	22 ± 1.2 (21-23)	23 (21-25)	25 ± 1.5 (24-28)	53 ± 3.1 (49-59)
Rv	7 ± 0.6 (6-8)	8 (8-9)	8 ± 0.7 (7-9)	-
Ran	4 ± 0.5 (4-5)	5 (4-6)	5 ± 0.5 (4-6)	-
RVan	2 ± 0.5 (2-3)	3 (2-3)	2 ± 0.5 (2-3)	-
Tail	18 ± 1.7 (14-22)	17 (11-23)	20 ± 1.8 (17-24)	-
St/L	13.5 ± 1.5 (12.5-14.5)	16 (14-20)	15 ± 1.7 (12-17)	-
St/Oes	56.4 ± 1.2 (56.0-56.8)	64 (58-69)	-	-
Spicule	-	-	-	31 ± 0.9 (30-32)
Guber.	-	-	-	6.3 (6-7)

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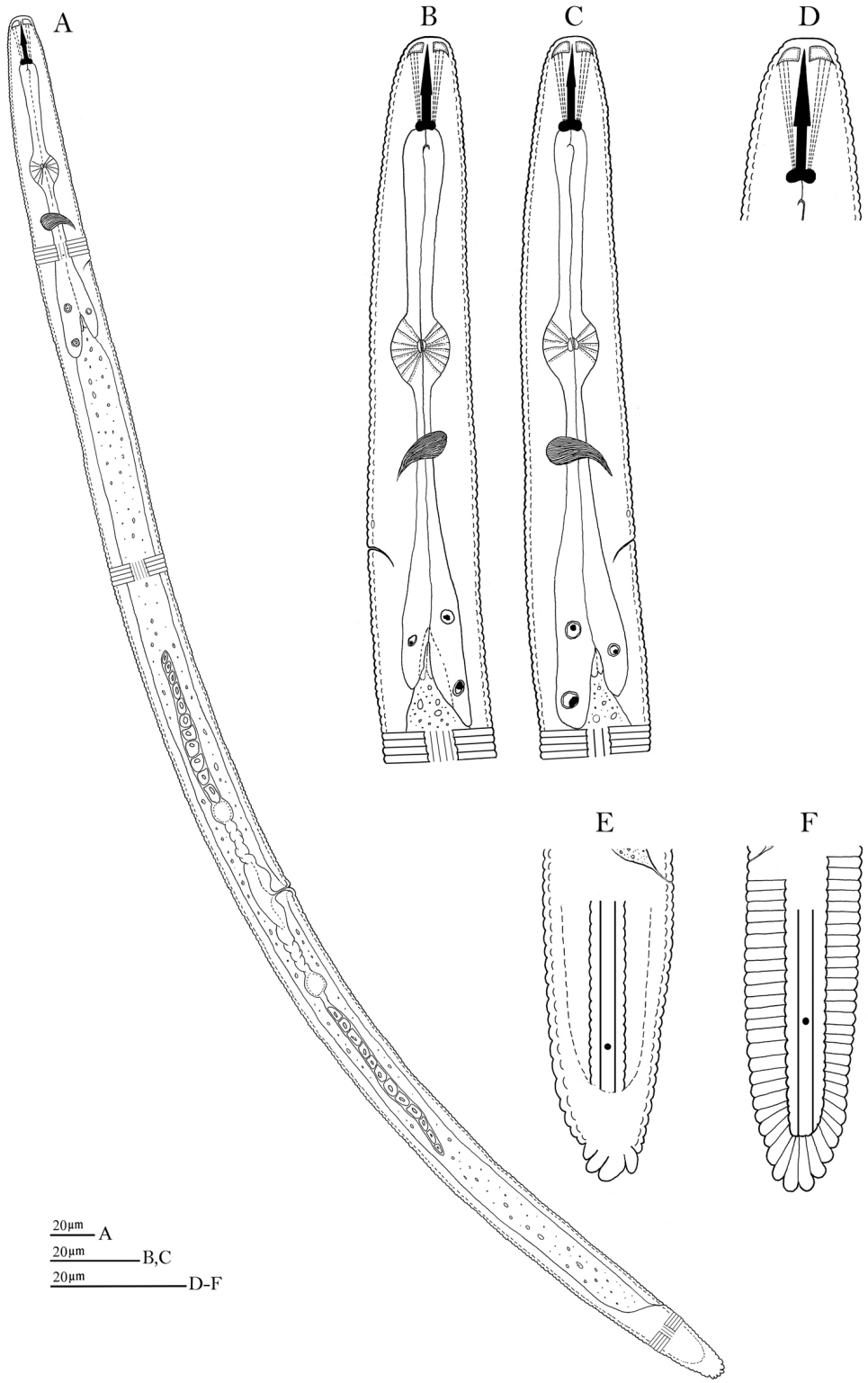

Figure 2 *Pratylenchoides crenicauda* (Female): A: Entire body; B, C: Neck region; D:Anterior end; E, F: tail.

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Table 3 Morphometric characters of *Pratylenchoides crenicauda* population from West Azerbaijan and comparing with other populations (measurements in µm).

Origin	**West Azerbayjan Province**	**Castillo and Gomez, 1988**		**Winslow, 1958**		**Sher, 1970**	
Characters	**Female**	**Female**	**Male**	**Female**	**Male**	**Female**	**Male**
n	12	9	4	24	6	15	4
L	690 ± 42.9 (617-757)	668 ± 77.6 (578-797)	516 ± 68.2 (431-594)	720 (570-910)	690 (640-740)	640 (530-860)	660 (610-720)
a	26.9 ± 2.5 (23.7-30.3)	28.5 ± 1.5 (26.4-31.3)	30.3 ± 3.2 (26.9-34.3)	26.3 (19-32)	28 (26-33)	25 (21-29)	-
b	5.0 ± 0.2 (4.7-5.3)	4.2 ± 0.6 (3.6-5.6)	4.4 ± 0.6 (3.7-5.0)	4.6 (3.3-6.4)	5.1 (4.5-6.2)	4.6 (4.1-5.2)	-
b'	4.1 ± 0.2 (3.9-4.6)	4.3 ± 0.06 (4.2-4.3)	4.4	-	-	4.2 (3.5-5.2)	5.5 (5.2-5.7)
c	17.9 ± 2.1 (14.6-20.6)	14.3 ± 1.1 (12.9-16.5)	11.5 ± 1.2 (10-12.8)	15.3 (12.9-17.6)	13 (11.7-15)	15 (13-18)	-
c'	2.2 ± 0.2 (2.0-2.5)	2.8 ± 0.3 (2.6-2.4)	3.4 ± 0.3 (3.1-3.8)	-	-	-	-
V	59.7 ± 1.6 (57.5-62.8)	57 ± 1.6 (54-59)	35 ± 4.2 (31-40)	57.5 (54-61)	-	58 (56-62)	-
Stylet	20.6 ± 1 (19.0-22)	20 ± 0.5 (19-21)	17 ± 0.7 (16.6-18)	22	-	22 (20-23)	21 (20-21)
MB	53.5 ± 1.3 (51.4-55.7)	-	-	-	-	-	-
E. Pore	116 ± 5.6 (110-125)	103 ± 19.8 (83-125)	95 ± 3.2 (91-98)	-	-	-	-
Oeso.	139 ± 5.1 (127-143)	157 ± 9.4 (142-170)	117 ± 3.7 (114-122)	-	-	-	-
Overlap.	28.2 ± 1.7 (22-36)	-	-	-	-	-	-
Head-Vulva	412 ± 25.3 (367-456)	-	-	-	-	-	-
BW	25.8 ± 1.7 (24-29)	23.5 ± 3.1 (19-29)	-	-	-	-	-
Vulva - Anus	239 ± 23 (200-283)	-	-	-	-	-	-
Tail	39 ± 4.3 (34-45)	47 ± 6.7 (36-57)	45 ± 5 (39-50)	-	-	-	-
Tail Annule	30.4 ± 4 (27-35)	29 ± 2.2 (27-32)	-	-	-	28-36	-
Spicul.	-	-	22 ± 1.4 (20-23)	-	-	-	22 (20-24)
Guber.	-	-	5.7 ± 0.4 (5.5-6.2)	-	-	-	6 (4-7)

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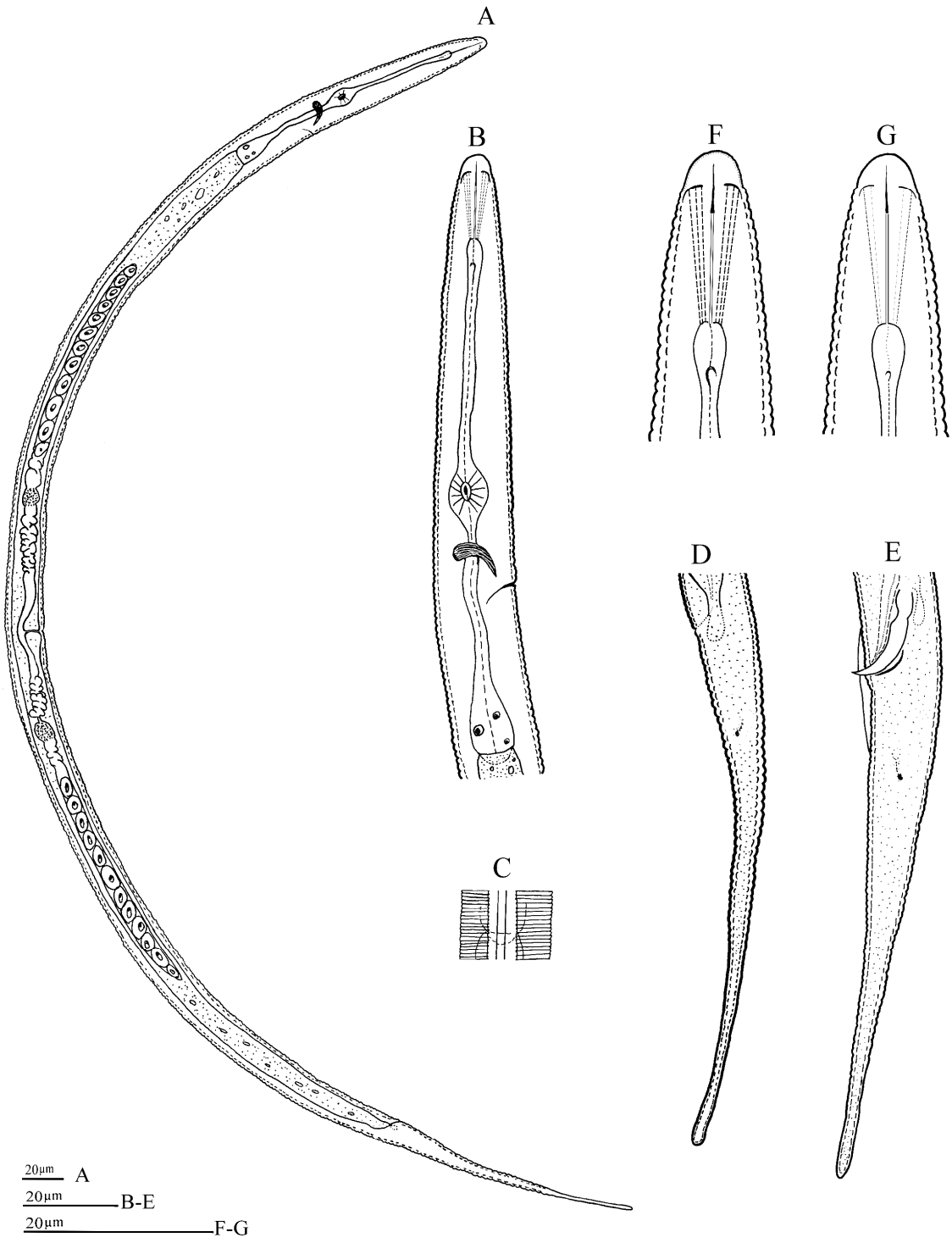

Figure 3 *Psilenchus aestuarius*: Female (A, B, C, D, F). A: Female entire body; B: Neck region; C: End of oesophagus (Lateral view); D: Tail shape; F: Anterior end. Male (E, G). E: Male tail; G: Anterior end.

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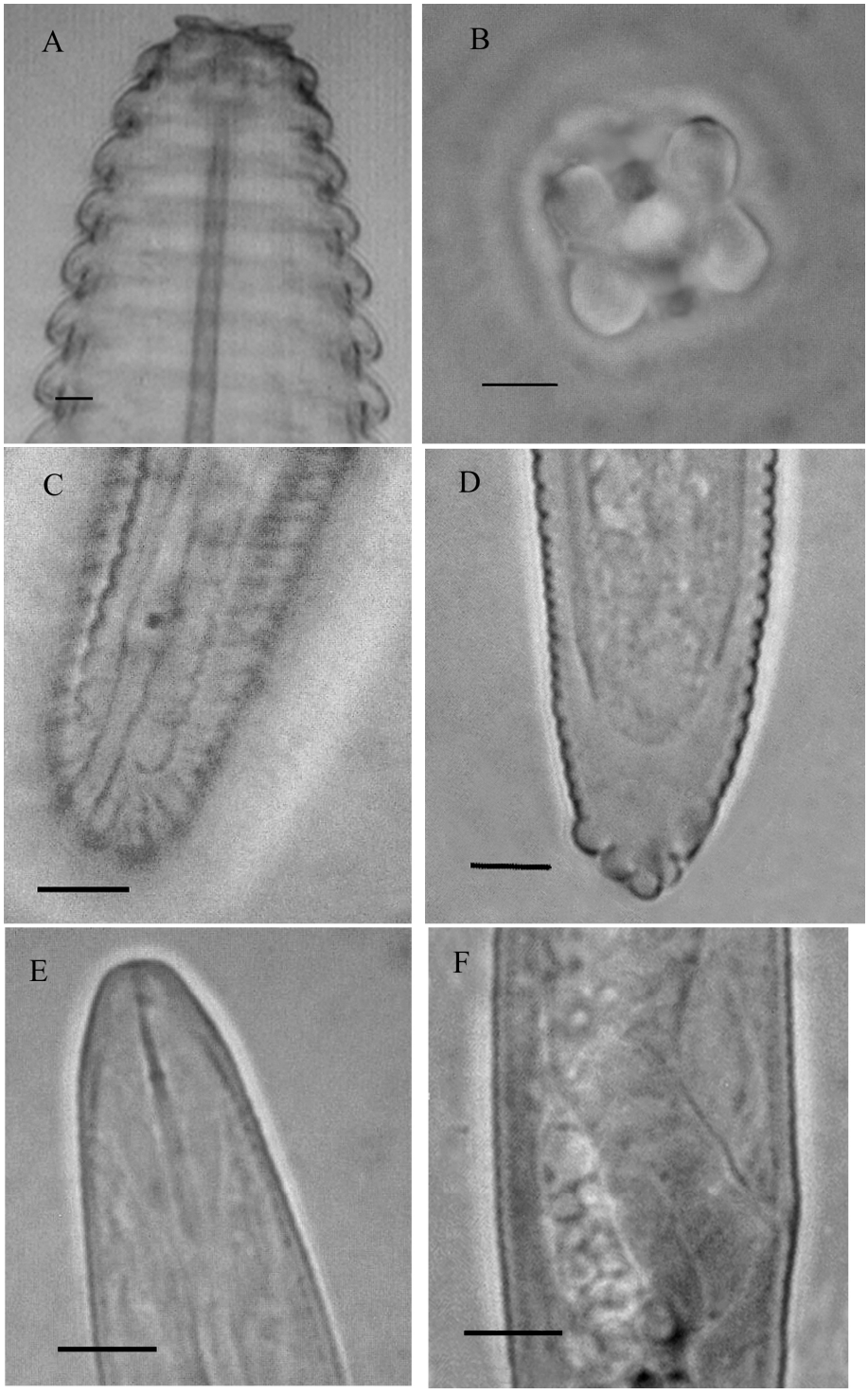

Figure 4 Photomicrograph of identified nematode species: *Mesocriconema surinamense* Female (A and B), A: Anterior end, B: *en face* view of lip region; *Pratylenchoides crenicauda* Female tail (C and D); *Psilenchus aestuarius* Female (E and F), E: Anterior end, F: Intestine end region showing posterior intestine sac. (Scale bar = 5 µm).

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Table 4 Morphometric characters of *Psilenchus aestuarius* population from West Azerbaijan and comparing with other populations (measurements in micrometer).

Characters	West Azerbayjan Province		Andrassy, 1962		Brzeski, 1989	
	Female	Male	Female	Male	Female	Male
n	10	7	-	-	23	5
L	902 ± 92.8 (778-1008)	892 ± 88.9 (768-993)	1009-1067	1021	1377 ± 183.2 (1018-1701)	1107 (987-1216)
a	43.4 ± 3.9 (38.9-48.9)	55.3 ± 4.2 (50.2-61.1)	43.2-50.1	56.6	41 ± 2.6 (35-46)	41 (36-45)
b	6.6 ± 0.7 (5.7-7.5)	6.7 ± 0.7 (5.9-7.8)	6-8.9	6.9	8± 1 (6.2-9.6)	6.8 (6.3-7.4)
c	6.8 ± 0.4 (6.2-7.4)	7.5 ± 0.5 (7.3-8.2)	8.9-10.7	8.3	8.6 ± 1 (6.8-10.3)	7.2 (6.1-7.9)
c'	10.1 ± 0.7 (9-10.6)	9.8 ± 0.6 (9.4-10.1)	-	-	6.7 ± 1 (5.2-8.7)	7 (6.2-7.9)
V	48.7 ± 1.6 (47.2-52.2)	-	47.9-56.3	-	48 ± 1.7 (44-52)	-
V'	57.2 ± 1.8 (54.8-60.4)	-	-	-	55 ± 2.2 (50-57)	-
Stylet	16.1 ± 0.8 (15-17)	15.5 ± 0.7 (15-16)	-	-	16.6 ± 0.8 (15-18)	15 (14-16)
MB	55.3 ± 1.5 (52.6-57.9)	56.1 ± 1.6 (52.9-58.4)	-	-	59 ± 1.9 (55-62)	60 (58-63)
Oeso.	137.4 ± 7.7 (126-150)	136.3 ± 7.6 (125.3-149.8)	-	-	173 ± 7.6 (156-193)	164 (157-171)
E-pore	107.9 ± 7.4 (94-115)	101.2 ± 7.2 (90.2-111.7)	-	-	143 ± 10.1 (128-160)	133 (124-144)
Head-vulva	439.6 ± 48.8 (374-491)	-	-	-	490 ± 74.3 (348-641)	-
Tail	133.3 ± 9.9 (122-147)	132.4 ± 9.7 (121-145)	-	-	163 ± 25.5 (123-220)	155 (149-163)
Spicule	-	29 ± 1.8 (28-30)	-	28	-	31 (29-34)
Guber.	-	9 ± 0.4 (9-10)	-	9	-	10 (8-12)

Discussion

Characters of the Iranian population of *P. aestuarius* is in agreement with the original description of the species (see Table 4). *P. aestuarius* is characterized by a rounded and smooth head, position of orifice of dorsal pharyngeal gland and presence of two lobes overtaking beyond linkage of intestinal lumen with rectum. Presence of post anal intestinal sac has not been reported in the original description of the species (Andrassy, 1962) and it was reported by Brzeski (1989), as mentioned by Geraert (2008). *P. aestuarius* comes close to *P. iranicus* Kheiri, 1970 and *P. hilarulus* de Man, 1921. It differs from *P. iranicus* by distance of the dorsal pharyngeal gland orifice (4-5 *vs* 7), shape of the lip region (rounded-smooth *vs* flattened, striared), the post-anal intestinal lobe (present *vs* absent), and by length of spicules (28-30 *vs* 33) and gubernaculums (9-10 *vs* 12). It differs from *P. hilarulus* by presence of post-anal intestinal lobe *vs* absence, shape of the tail (terminus rounded *vs* clavate) and by length of spicules (28-30 *vs* 20-23 µm) and gubernaculums (9-10 *vs* 6-7 µm). *P. aestuarius* was first reported and described from Budapest, Hungary. In this survey, it was recovered from the rhizosphere of apple trees in

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an orchard in the city of Orumieh. Mokarram Hesar *et al.* (2010) reported this species from Mashhad but there is not any description for this population and so comparisons with the West Azerbaijan population was not possible.

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معرفی چند نماتد انگل گیاهی از باغ‌های درختان میوه استان آذربایجان غربی

هادی قربانزاد[1]، رامین حیدری[1*] و ابراهیم پورجم[2]

1- گروه گیاهپزشکی پردیس کشاورزی و منابع طبیعی دانشگاه تهران.

2- گروه بیماری‌شناسی گیاهی دانشکده کشاورزی دانشگاه تربیت مدرس، تهران، ایران.

* پست الکترونیکی نویسنده مسئول مکاتبه: rheydari@ut.ac.ir

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چکیده: به‌منظور شناسایی نماتدهای انگل گیاهی باغ‌های درختان میوه استان آذربایجان‌غربی طی سال‌های 91-1390 نمونه‌های خاک و ریشه جمع‌آوری و نماتدها با روش‌های سانتریفوژ و سینی وایتهد جداسازی شدند. پس از تثبیت و انتقال نماتدهای جداشده به گلیسیرین، اسلایدهای دائمی تهیه شد. ویژگی‌های ریخت‌شناسی و ریخت‌سنجی نماتدها بررسی و اندازه گیری شد. در نتیجه 26 گونه نماتد انگل گیاهی از 21 جنس شناسایی شد. دو گونه *Mesocriconema surinamense* و *Pratylenchoides crenicauda* که برای فون نماتدهای ایران جدید هستند و گونه *Psilenchus aestuarius* که توصیفی از آن در ایران وجود ندارد، در اینجا شرح داده شده‌اند. *M. surinamense* به‌واسطه سر دیسکی شکل که درنتیجه برجستگی‌های چهارگانه لبی ایجاد شده و مشخصات ریخت‌سنجی شناسایی می‌شود. *P. crenicauda* گونه تیپ جنس بوده و با فرورفتگی شیارهای عرضی کوتیکول در خطوط جانبی کوتیکول در ناحیه دم، همپوشانی کوتاه مری روی روده و موقعیت هسته‌های غدد مری متمایز می‌شود. *P. aestuarius* به‌واسطه سر گرد و فاقد شیار عرضی، وجود کیسه عقبی روده در دو جنس و مشخصات ریخت‌سنجی از سایر گونه ها متمایز می‌شود.

واژگان کلیدی: اولین گزارش، *Mesocriconema surinamense, Pratylenchoides crenicauda, Psilenchus aestuarius*

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