

# Nematodes of the order Rhabditida from Tehran province, Iran. The genus *Chiloplacus* Thorne, 1937

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**Summary.** Five species of the genus *Chiloplacus* are described from natural areas in Tehran province, Iran: *Chiloplacus bisexualis*, *C. magnus*, *C. symmetricus*, *C. tenuis*, *C. trilineatus* and *Chiloplacus* sp. The five species are reported for the first time from Iran. Description, measurements, illustrations and SEM pictures are provided for all species. SEM pictures of *C. bisexualis* and *C. symmetricus* are presented for the first time. Mushroom compost is a new habitat for *C. tenuis*.

**Key words:** Cephalobidae, *Chiloplacus*, Iran, morphology, SEM, taxonomy.

The present paper, belonging to a series (Shokoohi *et al.*, 2007a, b) on rhabditids from the province of Tehran, Iran, deals with six species belonging to the genus *Chiloplacus* Thorne, 1937, collected in natural areas. The genus *Chiloplacus* and its species are reported from Iran for the first time.

## MATERIAL AND METHODS

The nematodes were extracted from soil samples by Baermann's (1917) funnel technique and centrifugation method according to Jenkins (1964). They were fixed with hot 4% formaldehyde solution and processed to anhydrous glycerin according to De Grisse (1969). Measurements were taken using an ocular micrometer and drawings were made using a drawing tube attached to the microscope. For SEM studies fixed specimens were hydrated (1 day), dehydrated in a graded ethanol series (25, 30, 50, 70, 95, 100%) and finally placed in acetone (100%), critical point dried, coated with gold and observed with JEOL JSM-5800 microscope operating at 4kV. The terminology used for morphology of stoma and spicules follows the proposals by De Ley *et al.* (1995) and Abolafia and Peca-Santiago (2006), respectively.

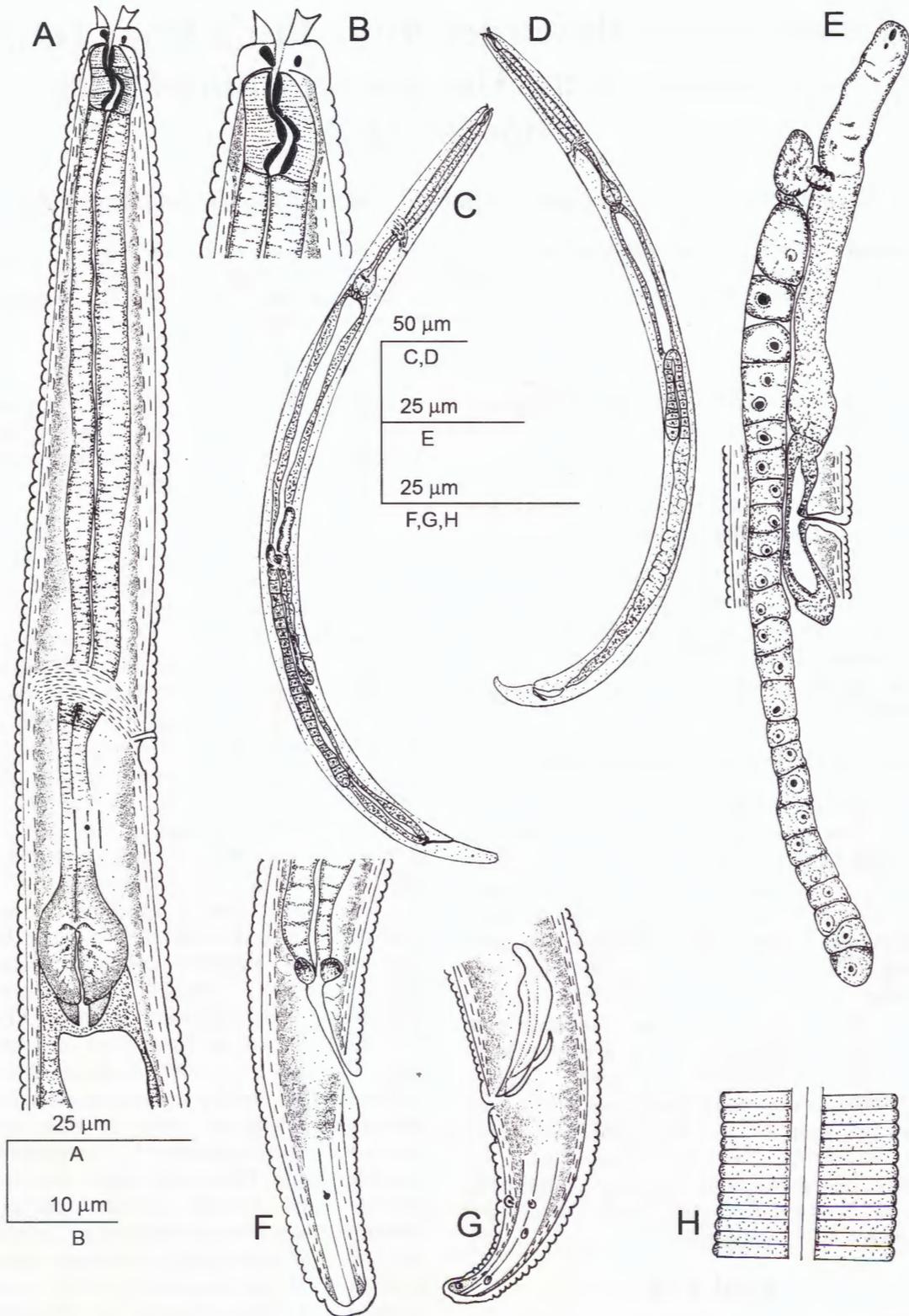
## RESULTS

### *Chiloplacus bisexualis* (Micoletzky, 1916) Thorne, 1937 (Figs. 1 & 2)

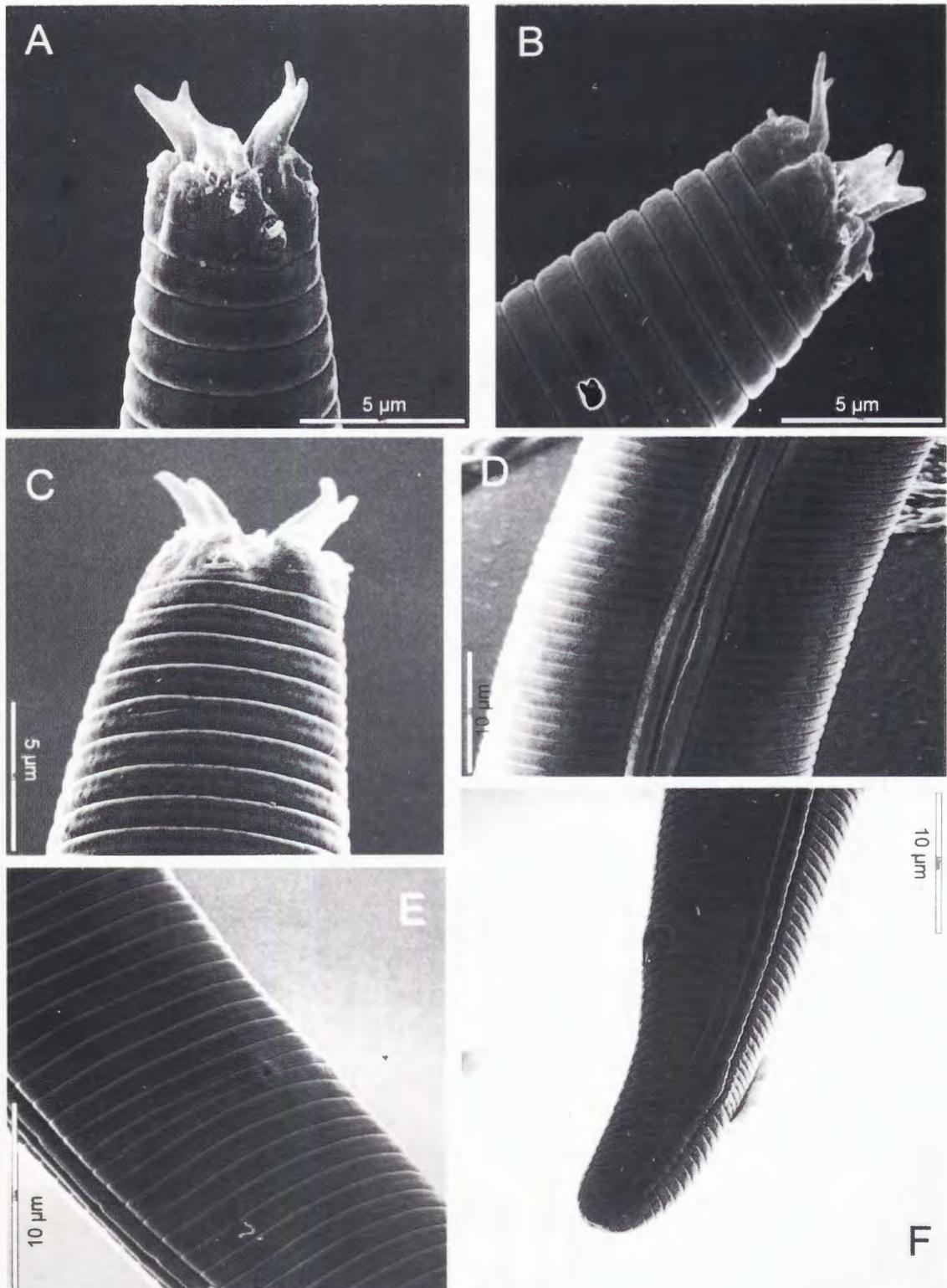
**Measurements.** See Table 1.

Population collected in Hashtgerd, province of Tehran (2 females, 3 males).

**Female.** Body 0.50-0.54 mm long, cylindrical, slightly curved ventrad after fixation. Cuticle annulated; annuli 1-2  $\mu\text{m}$  wide. Lateral field with three incisures occupying 17-18% of mid body diameter, with middle incisure extending to tail tip, while the lateral ones ending at a small distance from terminus. Lip region continuous with neck, with six paired lips and a circular amphid opening. Primary axils deep and U-shaped without guarding process. Secondary axils shallow and V-shaped. Labial probolae symmetrically bifurcated, with prongs shorter than basal part. Lips rounded, cephalic probolae absent. Stoma cephaloboid with distinct cheilo-, gymno- and stegostom. Cheilorhabdia rounded. Gymnostom very short. Stegostom subdivided into four distinct parts. Pharyngeal corpus cylindrical, 3.8-4.6 times isthmus length, with procorpus slightly longer than metacarpus. Isthmus narrower than corpus and separated from metacarpus by the discontinuing in muscular tissue. Basal bulb ovoid, with valves in its middle part. Cardia conoid, surrounded by intestinal tissue. Nerve ring located at metacarpus, at 67-72% of neck length. Excretory pore opening is located at isthmus level, 51-52 annuli from anterior end. Deirid located at 79-88% of neck length, level with isthmus, 60-61 annuli from anterior end. Reproductive system monodelphic-prodelphic, located on right side of intestine. Ovary straight. Oviduct short, less than a half of the corresponding body diameter. Spermatheca



**Fig. 1.** *Chiloplacus bisexualis* (Micoletzky, 1916) Thorne, 1937. A: Neck; B: Lip region; C: Entire female; D: Entire male; E: Female reproductive system; F: Female tail; G: Male tail; H: Lateral field.

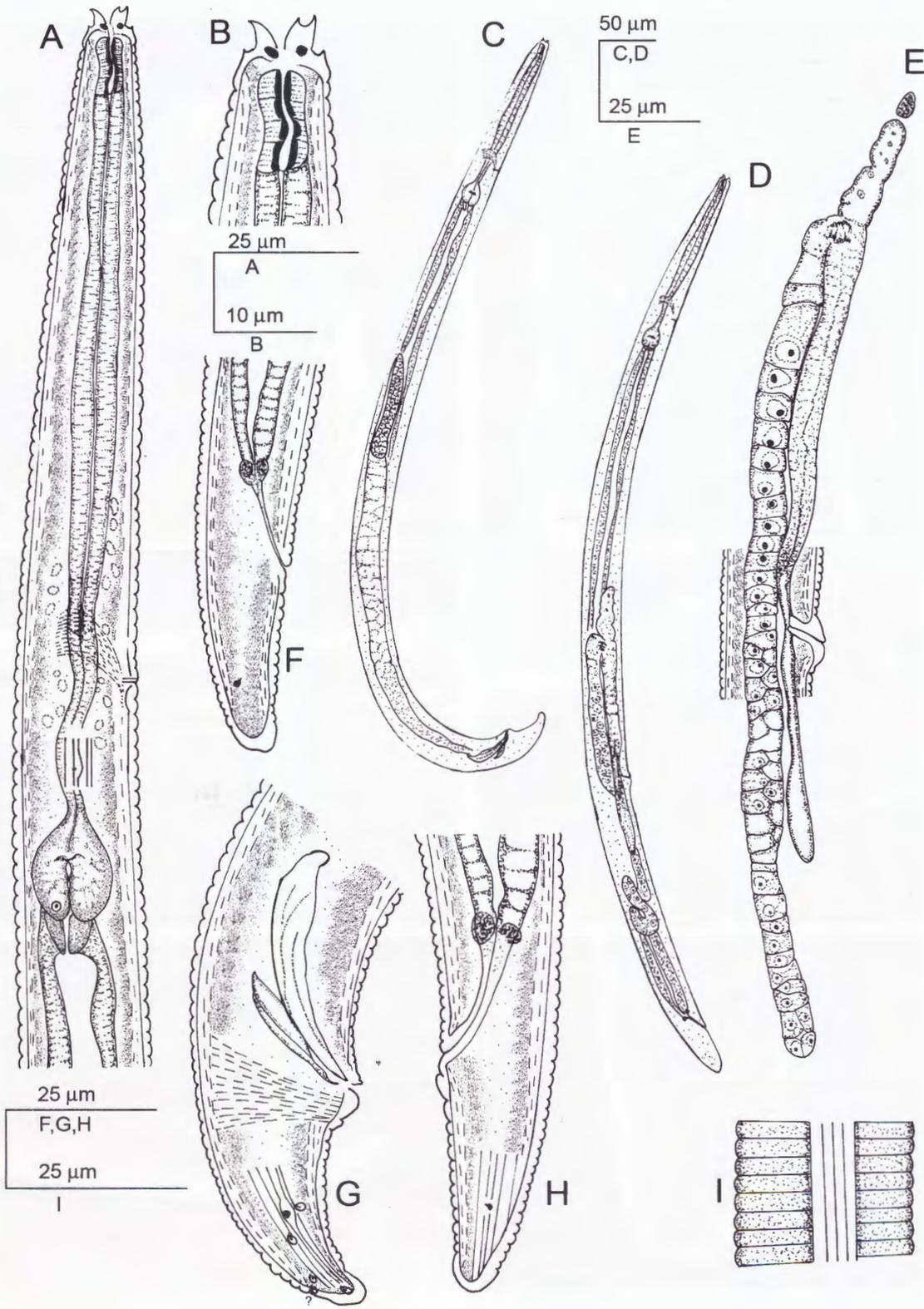


**Fig. 2.** *Chiloplacus bisexualis* (Micoletzky, 1916) Thorne, 1937 (SEM). A, B, C: Lip region (A: Sublateral view, B: Ventrolateral view, C: Sublateral view.); D: Lateral field; E: Excretory pore; F: Female tail.

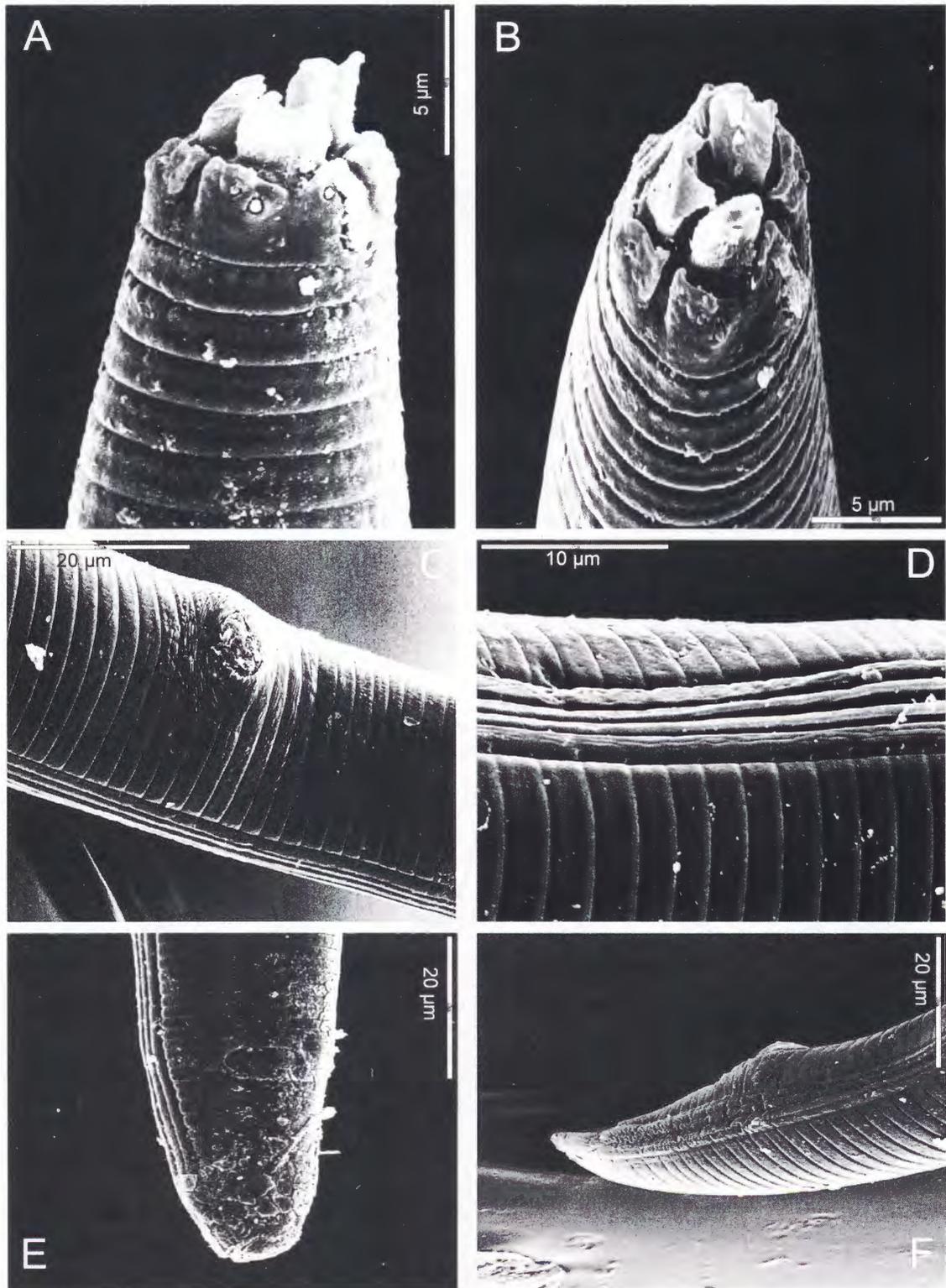
**Table 1.** Measurements of *Chiloplachus bisexualis* (Micoletzky, 1916) Thorne, 1937 and *C. magnus* Rhashid & Heyns, 1990 [all measurements in  $\mu\text{m}$  and the format: mean  $\pm$  standard deviation (range)].

Species	<i>Chiloplachus bisexualis</i>			<i>Chiloplacus magnus</i>	
	Hashtgerd		Karaj	Karaj	
Locality	Tehran		Tehran	Tehran	
Province	Tehran		Tehran	Tehran	
Habitat	Lettuce		Tomato	Cherry	
n	3 ♀♀	1 ♂	5 ♀♀	10 ♀♀	7 ♂♂
Body length	521.2 $\pm$ 18.9 (507-543)	496	552.2 $\pm$ 33 (519-608)	791.6 $\pm$ 82.4 (692-925)	778.5 $\pm$ 49.5 (725-850)
a	26.2 $\pm$ 5.5 (22-33)	26.9	23.3 $\pm$ 0.9 (22.0-24.5)	24.2 $\pm$ 1.5 (21.5-27.1)	25.1 $\pm$ 1.6 (23.6-27.6)
b	4.1 $\pm$ 0.1 (4.0-4.3)	4.2	4.4 $\pm$ 0.3 (3.9-4.9)	4.7 $\pm$ 0.3 (4.1-5.1)	5 $\pm$ 0.2 (4.6-5.3)
c	16.9 $\pm$ 0.1 (16.8-17.0)	16.3	16.9 $\pm$ 0.6 (16.1-17.6)	21.1 $\pm$ 1.2 (18.6-23.0)	18.7 $\pm$ 0.6 (18.1-19.6)
c'	2.9 $\pm$ 0.5 (2.5-3.5)	2.0	2.4 $\pm$ 0.3 (2.1-2.9)	1.8 $\pm$ 0.2 (1.6-2.3)	1.5 $\pm$ 0.1 (1.3-1.6)
V	64.6 $\pm$ 2.8 (63-68)	—	64.5 $\pm$ 0.7 (64-66)	66.9 $\pm$ 0.7 (66-68)	—
Labial probolae	2.7 $\pm$ 0.8 (2-4)	2	2.9 $\pm$ 0.5 (2-4)	4 $\pm$ 0.7 (3-5)	3.6 $\pm$ 0.6 (3-5)
Lip region diameter	7.3 $\pm$ 0.3 (7-8)	7	6.3 $\pm$ 0.5 (6-7)	7 $\pm$ 0.7 (6-8)	6.7 $\pm$ 0.8 (6-8)
Stoma	11.5 $\pm$ 0.5 (11-12)	12	11.3 $\pm$ 0.3 (11-12)	13.1 $\pm$ 1.9 (12-18)	13.8 $\pm$ 0.8 (13-15)
Pharyngeal corpus	86.8 $\pm$ 3.7 (83-90)	82	84 $\pm$ 2.2 (82-87)	104.4 $\pm$ 6.7 (97-117)	98 $\pm$ 3.1 (95-102)
Isthmus	20.5 $\pm$ 3.1 (18-24)	18	24.2 $\pm$ 2.1 (23-28)	37.5 $\pm$ 4.5 (30-42)	34.6 $\pm$ 2.8 (30-38)
Bulb	17.1 $\pm$ 0.6 (17-18)	16	16.7 $\pm$ 0.7 (15-17)	23.3 $\pm$ 1.4 (22-25)	22.6 $\pm$ 1.3 (22-25)
Pharynx length	126.1 $\pm$ 0.3 (126-127)	117	125.8 $\pm$ 3.9 (122-132)	165.1 $\pm$ 1.9 (157-178)	155 $\pm$ 4.5 (153-162)
Nerve ring-ant. end	87.4 $\pm$ 3 (85-91)	85	92.7 $\pm$ 3.8 (90-96)	121.8 $\pm$ 6.6 (115-133)	116.4 $\pm$ 4.0 (112-122)
Excretory pore-ant. end	91.8 $\pm$ 7.6 (87-101)	85	96.5 $\pm$ 3.4 (93-101)	130.1 $\pm$ 7.9 (121-142)	128 $\pm$ 3.2 (123-130)
Deirid-ant. end	105.2 $\pm$ 8.9 (99-112)	97	105.2 $\pm$ 1.6 (104-106)	150.8 $\pm$ 8.7 (138-160)	143.6 $\pm$ 4.3 (140-152)
Annuli width	1.8 $\pm$ 0.4 (1-2)	2	1.9 $\pm$ 0.2 (1.7-2.3)	3.2 $\pm$ 0.2 (2-3)	2.9 $\pm$ 0.4 (2-3)
Cuticle thickness	1.3 $\pm$ 0.3 (1-2)	1	1.6 $\pm$ 0.2 (1-2)	1.6 $\pm$ 0.0 (1.6)	1.6 $\pm$ 0.0 (1.6)
Body diameter: neck base	8.8 $\pm$ 0.3 (8.8-9.2)	9	8.9 $\pm$ 1.0 (7-10)	10.5 $\pm$ 0.8 (9-12)	10.4 $\pm$ 0.6 (10-12)
Body diameter: midbody	20.3 $\pm$ 3.2 (17-23)	18	23.8 $\pm$ 2.2 (22-28)	32.7 $\pm$ 4.0 (29-38)	31.1 $\pm$ 3.1 (28-37)
Body diameter: anus	10.7 $\pm$ 1.4 (9-12)	15	13.6 $\pm$ 2.0 (11-17)	20.3 $\pm$ 3.1 (15-23)	27.3 $\pm$ 2.5 (25-32)
Lateral field	3.2 $\pm$ 0.4 (3-4)	3	3.5 $\pm$ 0.8 (3-5)	7.0 $\pm$ 0.1 (6-8)	8.2 $\pm$ 1.7 (7-11)
Vagina	6.9 $\pm$ 0.9 (6-8)	—	7.1 $\pm$ 0.5 (7-8)	12 $\pm$ 2.4 (8-17)	—
Ovary	157.1 $\pm$ 35.9 (132-183)	—	166.9 $\pm$ 20.6 (152-181)	290.8 $\pm$ 31.1 (248-358)	—
Spermatheca	24.4 $\pm$ 5.2 (21-28)	—	25.9 $\pm$ 5.4 (21-35)	33.3 $\pm$ 6.8 (20-43)	—
Anterior genital branch*	91.2 $\pm$ 0.6 (91-92)	—	96.3 $\pm$ 11.9 (81-114)	152.3 $\pm$ 17.6 (133-180)	—
Postuterine sac	17.4 $\pm$ 0.3 (17-18)	—	16.9 $\pm$ 1.8 (14-20)	65.1 $\pm$ 9.9 (50-82)	—
Rectum	17.1 $\pm$ 2.5 (14-20)	?	17.6 $\pm$ 1.3 (15-19)	23.1 $\pm$ 3.0 (17-27)	?
Tail	30.9 $\pm$ 1.1 (30-32)	31	32.7 $\pm$ 1.3 (31-35)	37.5 $\pm$ 4.2 (30-43)	41.4 $\pm$ 2.4 (38-45)
Vulva-anterior end	336.3 $\pm$ 15.6 (319-349)	—	356.4 $\pm$ 24.1 (330-395)	165 $\pm$ 7.4 (155-178)	—
Spicules	—	22	—	—	42.6 $\pm$ 3.7 (40-48)
Gubernaculum	—	10	—	—	23.8 $\pm$ 2.0 (20-27)

(\*) Anterior genital branch = spermatheca + uterus.



**Fig. 3.** *Chiloplacus magnus* Rashid & Heyns, 1990. A: Neck; B: Lip region; C: Entire male; D: Entire female; E: Female reproductive system; F, H: Female tail; G: Male tail; I: Lateral field.



**Fig. 4.** *Chiloplacus magnus* Rashid & Heyns, 1990 (SEM). A, B: Lip region (A: Lateral view, B: Subapical view); C: Vagina; D: Lateral field; E: Female tail; F: Male tail.

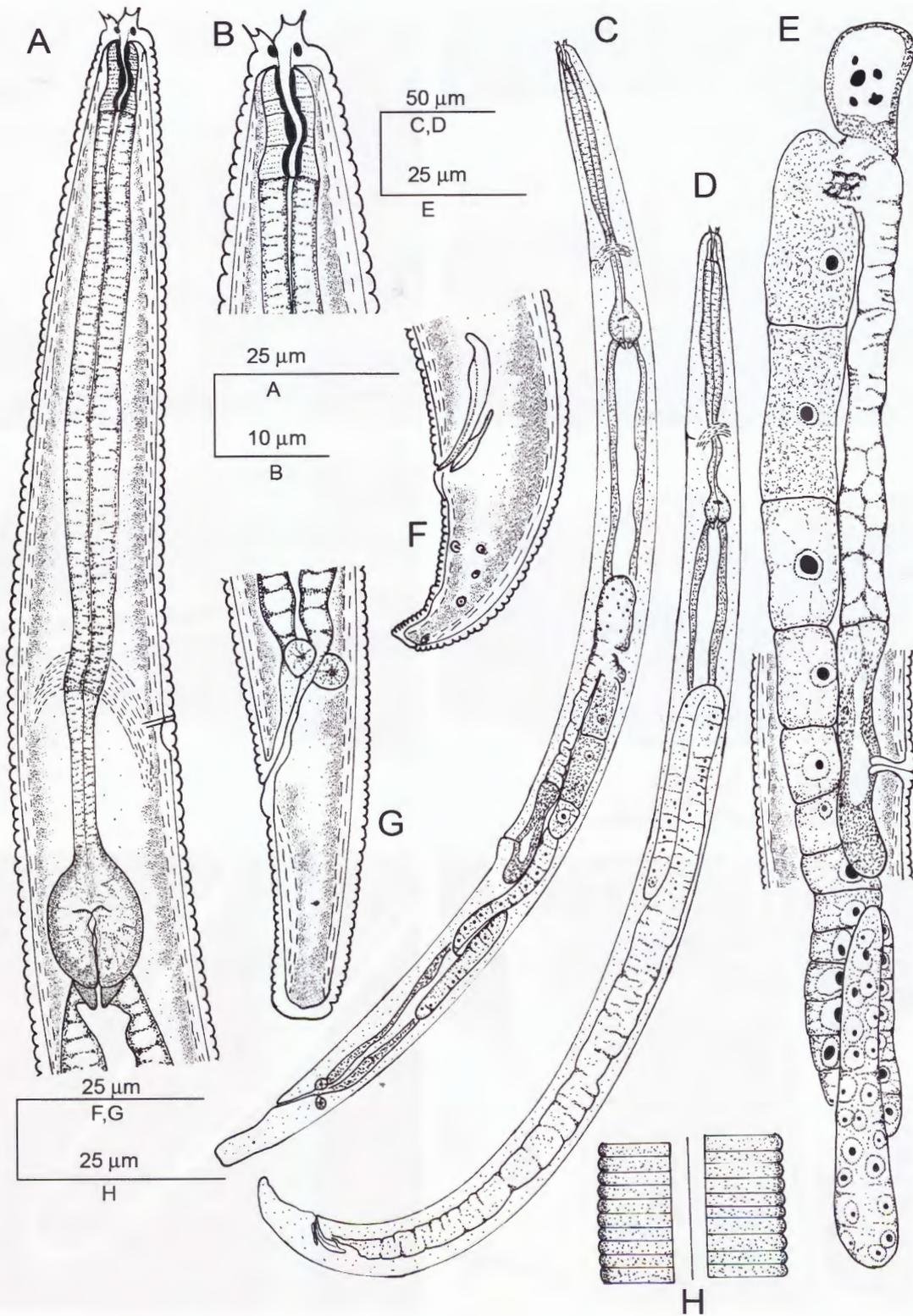
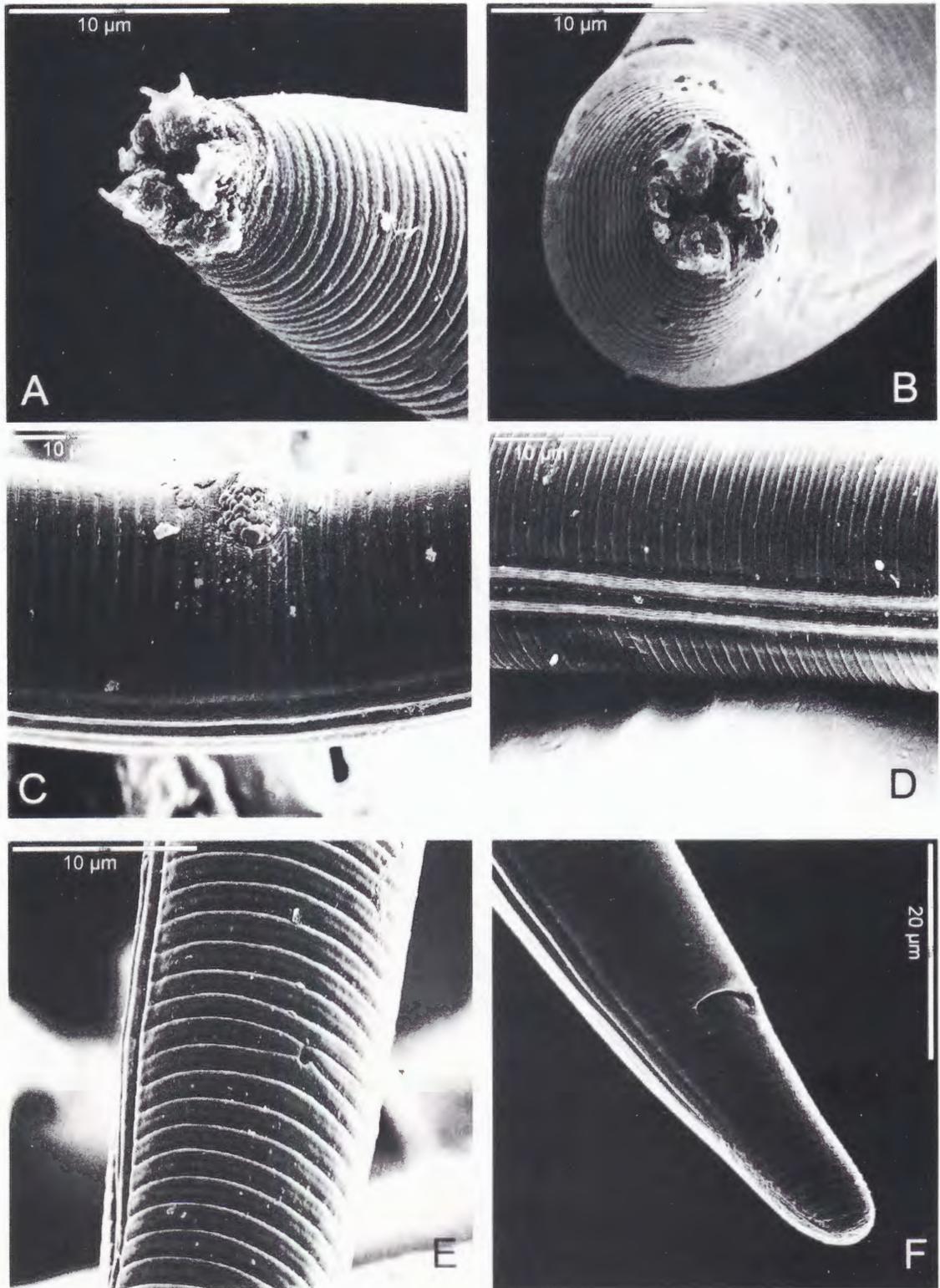


Fig. 5. *Chiloplacus symmetricus* (Thorne, 1925) Thorne, 1937. A: Neck; B: Lip region; C: Entire female; D: Entire male; E: Female reproductive system; F: Male tail; G: Female tail; H: Lateral field.



**Fig. 6.** *Chiloplacus symmetricus* (Thorne, 1925) Thorne, 1937 (SEM). A, B: Lip region (A: Subapical view, B: Apical view.); C: Vagina; D: Lateral field; E: Excretory pore; F: Female tail.

**Table 2.** Measurements of *C. symmetricus* (Thorne, 1925) Thorne, 1937, *Chiloplachus trilineatus* Steiner, 1940, and *Chiloplachus* sp. [all measurements in  $\mu\text{m}$  and the format: mean  $\pm$  standard deviation (range)].

Species	<i>Chiloplachus symmetricus</i>		<i>Chiloplachus trilineatus</i>		<i>Chiloplachus</i> sp.
Locality	Kondor		Karaj-Alikhan Soltani		Lavasanat
Province	Tehran		Tehran		Tehran
Habitat	Apple		Chickpea		Wild grass
n	10♀♀	6♂♂	3♀♀	3♂♂	3♀♀
Body length	600.8±37.5 (533-667)	597.2±55.4 (517-683)	603±95.6 (543-714)	521.2±36 (490-561)	682.1±67.6 (625-757)
a	20.3±0.7 (18.8-21.3)	23±1.6 (20.6-25)	23.1±1.5 (21.5-24.1)	23.5±1.8 (22.3-25.7)	25.6±1.4 (23.9-26.5)
b	4.3±0.3 (3.8±5.1)	4.7±0.3 (4.3-5.2)	4.9±0.8 (4.2-5.7)	4.4±0.1 (4.2-4.6)	5.4±0.5 (4.9-5.9)
c	17±1.1 (15.0-18.1)	17.4±2.1 (13.4-19.5)	18.4±2.0 (16.9-20.7)	16.7±1.2 (15.8-18.1)	21.2±2.0 (19.1-23.1)
c'	2.1±0.2 (1.9-2.3)	1.7±0.1 (1.6-2.1)	2.4±0.3 (2.3-2.7)	1.8±0.1 (1.7-1.9)	2.0±0.2 (1.8-2.2)
V	64.6±0.9 (63-66)	—	64.4±0.8 (64-65)	—	67.1±1.7 (66-69)
Labial probolae	3.6±0.7 (3-5)	4±1.3 (3-7)	2.5±0.9 (2-4)	2.1±0.3 (1.7-2.3)	1.7±0.0 (1.7)
Lip region diameter	7±1 (5-8)	6.3±1.2 (5-8)	5.9±0.7 (5-6)	6.1±0.8 (5-7)	6.3±1.0 (6-8)
Stoma	12.5±0.8 (12-13)	12.7±0.8 (12-13)	11.1±1.2 (10-12)	11.1±0.6 (10-12)	10.7±1.8 (9-12)
Pharyngeal corpus	81.2±4.3 (75-83)	74.3±2.7 (70-77)	81.1±5.7 (75-86)	77.8±1.1 (76-79)	77.8±3.3 (74-81)
Isthmus	34±4.6 (30-45)	31.3±2.9 (28-35)	24.3±3.8 (20-28)	24.2±2.5 (21-26)	30.3±7.8 (21-36)
Bulb	21.6±1.5 (18-23)	20.2±1.9 (17-22)	17.4±1.4 (16-19)	16.7±1.1 (15-18)	18.6±1.8 (17-21)
Pharynx length	137.3±9.6 (125-153)	126.1±4.3 (120-132)	124.2±8.1 (116-132)	119.6±3.2 (116-123)	127.1±8.1 (119-135)
Nerve ring-ant. end	97±7.1 (85-105)	91.6±3.5 (87-95)	88.4±4.4 (83-91)	85.5±1.8 (83-87)	94.9±2.1 (93-97)
Excretory pore-ant. end	100.9±4.3 (95-107)	98±5.6 (92-105)	91.8±5.2 (87-92)	88.7±1.8 (87-91)	100.8±4.8 (96-105)
Deirid-ant. end	112.7±6.7 (107-120)	114±5.3 (108-120)	101, 110	100.1±2.5 (97-102)	113.9±4.5 (109-117)
Annuli width	2.1±0.8 (2-3)	1.7±0.0 (1.7)	2.1±0.7 (2-3)	1.7±0.0 (1.7)	2.2±1.0 (1-3)
Cuticle thickness	1.6±0.0 (1.6)	1.7±0.0 (1.7)	1.3±0.3 (1-2)	2±0.4 (1.4-2.3)	1.2±0.0 (1.2)
Body diameter: neck base	8.5±0.5 (8-10)	9.1±1.3 (8-12)	8.1±0.6 (8-9)	7.7±0.8 (7-9)	9.0±0.7 (9-10)
Body diameter: midbody	29.2±1.9 (25-32)	26±1.4 (25-28)	26.1±3.5 (23-30)	22.2±0.6 (22-23)	26.8±4.2 (25-32)
Body diameter: anus	16.5±1.4 (15-18)	19.4±0.8 (18-20)	13.6±1.4 (12-15)	17.4±1.1 (16-18)	15.9±2.2 (14-18)
Lateral field	4.1±1.6 (3-7)	4.1±0.8 (3-5)	4.0±4 (4-5)	3.3±0.6 (3-4)	4.6±0.8 (4-5)
Vagina	8.4±0.2 (8-9)	—	7.3±0.9 (6-8)	—	6.9±1.7 (5-9)
Ovary	254.7±66.2 (143-323)	—	158 (n=1)	—	213.2±80.0 (157-270)
Spermatheca	28.9±6.0 (18-38)	—	27, 47	—	28.5±4.5 (25-32)
Anterior genital branch*	127.5±14.5 (110-142)	—	114 (n=1)	—	117±33.7 (93-141)
Postuterine sac	23.3±2.8 (18-28)	—	17.1±4.6 (14-22)	—	17.1±5.8 (11-22)
Rectum	19.6±1.0 (18-22)	?	16.7±1.5 (16-18)	?	17.1±2.8 (14-19)
Tail	35.3±2.4 (32-40)	34.4±2.9 (30-38)	32.8±1.7 (31-35)	31.2±0.3 (31-32)	32.2±1.0 (31-33)
Vulva-anterior end	388.3±25.2 (342-425)	—	389.4±66.5 (348-466)	—	456.8±34.5 (431-496)
Spicules	—	22.5±1.3 (22-25)	—	21.5±0.6 (21-22)	—
Gubernaculum	—	11.3±1.2 (10-13)	—	9.4±1.1 (8-10)	—

(\*) Anterior genital branch = spermatheca + uterus.

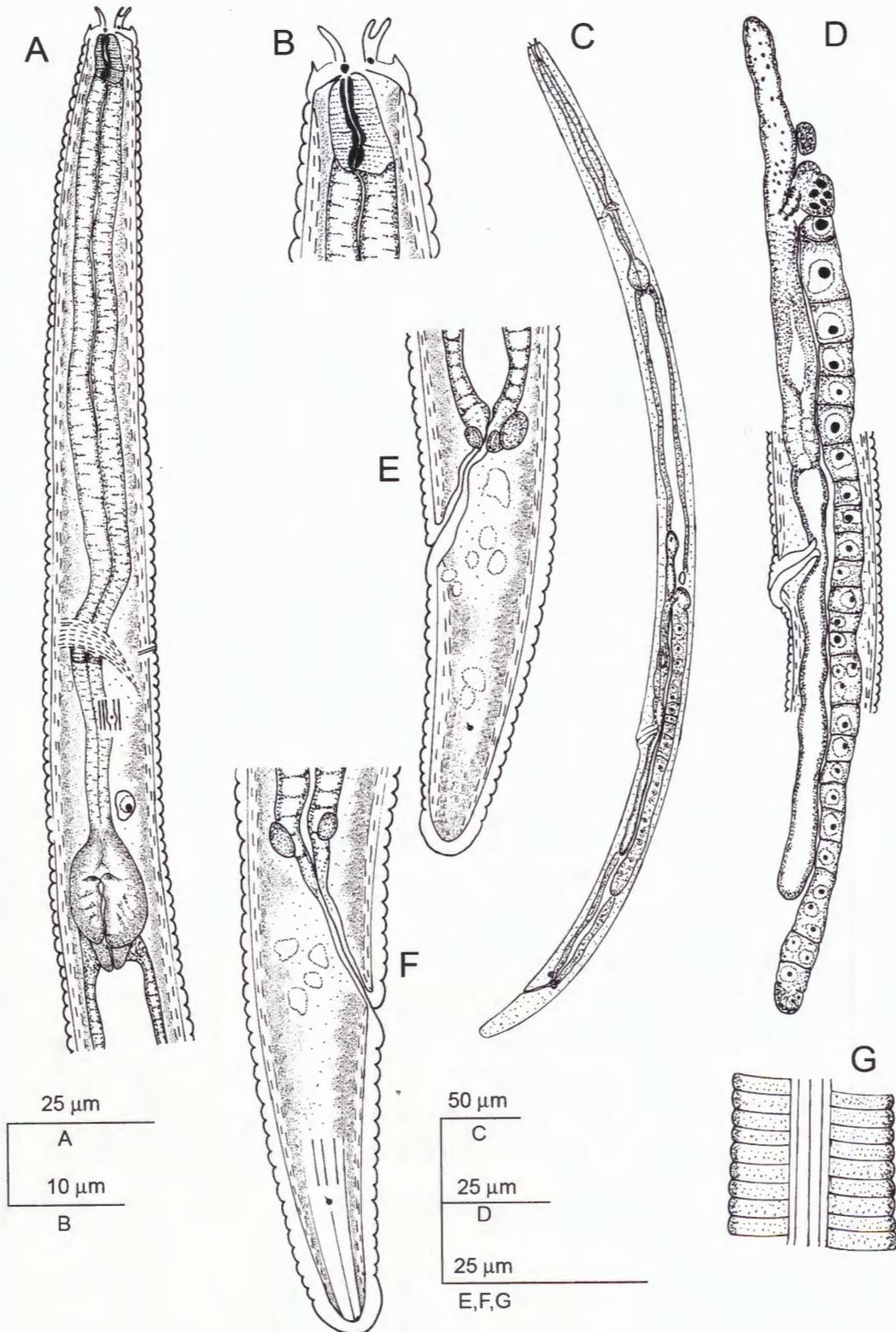
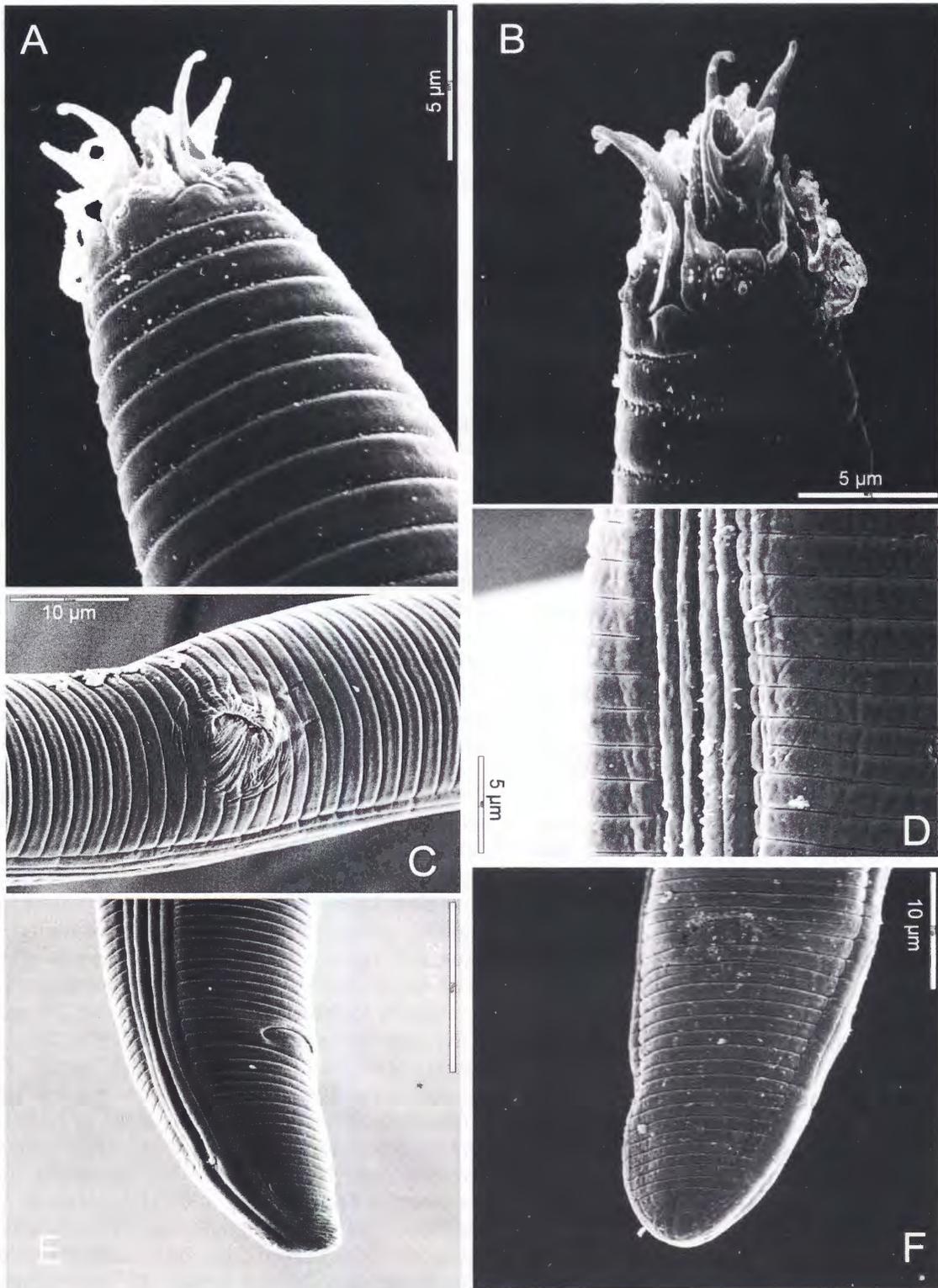


Fig. 7. *Chiloplacus tenuis* Rashid & Heyns, 1990. A: Neck; B: Lip region; C: Entire female; D: Female reproductive system; E, F: Female tail; G: Lateral field.



**Fig. 8.** *Chiloplacus tenuis* Rashid & Heyns, 1990 (SEM). A, B: Lip region (A, B: Ventral view); C: Vagina; D: Lateral field; E, F: Female tail.

well developed, 1.2 times the corresponding body diameter long. Uterus tubular, about three corresponding body diameters long. Postuterine sac 0.8-1.0 times corresponding body diameter long. Vagina extending inwards for half of the body diameter. Vulva not protruding, located posterior to middle of the body. Rectum 1.6-1.7 times anal body diameter. Tail subcylindrical, with rounded terminus. Phasmid located at 43-53% of tail length.

**Male.** General morphology similar to female, except for the sexual character. Genital system monorchic, located on right side of intestine, with testis reflexed ventrad. Tail conical, curved ventrad. Three precloacal papillae are visible. Post cloacal papillae arranged in five pairs: two pairs located ventrally, two pairs laterally near tail terminus, and one pair terminally. Spicules curved ventrad, with manubrium rounded and bent ventrally; calamus with thin walls; lamina curved ventrad, bearing a scarcely developed hump dorsally. Gubernaculum well developed, curved ventrad slightly.

**Other material examined (5 females, see Table 1).** Very similar to the population of Hashtgerd except for somewhat longer body.

**Diagnosis.** *C. bisexualis* is characterized by its body length (0.50-0.60 mm in females and 0.49 mm in male), lateral field with three incisures, labial probolae with symmetrical bifurcation, with prongs shorter than basal part, primary axils deep, rounded lips without cephalic probolae, pharyngeal corpus cylindrical (82-90  $\mu\text{m}$  long, 3.1-4.6 times isthmus length), excretory pore at isthmus level, spermatheca 21-35  $\mu\text{m}$ , postuterine sac 0.6-1.0 times the corresponding body diameter long, female tail length subcylindrical with lateral field ending at tail tip (30-35  $\mu\text{m}$ ,  $c=16.1-17.6$ ,  $c'=2.1-3.5$ ), phasmid located at 43-57% of tail length, male tail conical with rounded terminus (31  $\mu\text{m}$ ,  $c=16.3$ ,  $c'=2.0$ ), spicules 22  $\mu\text{m}$  long and gubernaculum 10  $\mu\text{m}$  long.

**Distribution.** *C. bisexualis* was found in two locations from the province of Tehran: i) Hashtgerd, in association with *Lactuca sativa* L.; and ii) Karaj, in association with *Solanum lycopersicum* L.

**Remarks.** The Iranian specimens of *C. bisexualis* are very similar to previous populations recorded by Micoletzky (1916), Thorne (1925) and Bongers (1988) in projected labial probolae with symmetrically bifurcation at one third of their length, female tail more than twice as long as the anal body diameter with rounded terminus, male tail with three precloacal papillae and postcloacal

papillae and three lateral field incisures. Although having shorter body length (0.50-0.60 vs 0.57-0.72 mm in females and 0.49 vs 0.58-0.66 mm in males), shorter labial probolae, and longer tail. On the other hand, the specimen studied by De Man (1921) shows longer body (0.84 mm).

This species is reported for the first time from Iran.

***Chiloplacus magnus***  
**Rashid & Heyns, 1990**  
**(Figs. 3 & 4)**

**Measurements.** See Table 1.

Population collected in Karaj, province of Tehran (10 females, 7 males).

**Female.** Body 0.69-0.92 mm long, cylindrical, slightly ventrally curved after relaxation. Cuticle annulated; annuli 2-3  $\mu\text{m}$  wide. Lateral field with five incisures occupying 21% of midbody diameter, number of incisures decrease posteriorly to phasmid. Lip region continuous with neck, with six lips weakly amalgamated in pairs and a circular amphid opening. Primary axils deep, U-shaped without guarding process. Secondary axils shallow, V-shaped. Labial probolae symmetrically bifurcated, with short prongs. Lips rounded, cephalic probolae absent. Stoma cephaloboid with distinct cheilo-, gymno- and stegostom. Cheilorhabdia rounded. Gymnostom very short. Stegostom divided into four distinct parts. Pharyngeal corpus cylindrical, 2.8-3.2 times isthmus length, with procorpus slightly longer than metacarpus. Isthmus narrower than corpus and separated with metacarpus by the discontinuity in muscular tissue. Basal bulb ovoid, with valves in its middle part. Cardia conoid, surrounded by intestinal tissue. Nerve ring at corpus-isthmus junction, at 73-75% of neck length. Excretory pore opening is located at isthmus level, 45-48 annuli from anterior end. Deirid at 88-90% of neck length, level with isthmus, 51-54 annuli from anterior end. Reproductive system monodelphic-prodelphic, located on right side of intestine. Ovary with flexure at vulva level. Oviduct short, less than a half of the corresponding body diameter. Spermatheca 0.7-1.1 times the corresponding body diameter long. Uterus tubular, about three corresponding body diameters long. Postuterine sac 1.7-2.1 times the corresponding body diameter long. Vagina, extending inwards for half of the body diameter, inclined. Vulva protruding, located posterior to middle of the body. Rectum 1.1-1.2 times anal body diameter. Tail conoid, with rounded terminus. Phasmid located at 53-60% of tail length.

**Male.** General morphology similar to female, except for the sexual characters. Genital system monorchic, located on right side of intestine, with testis reflexed ventrad. Tail conical, curved ventrad anteriorly. Two precloacal papillae are visible. Genital papillae including five pairs: one pair ventrally, one pair subventrally anterior to phasmid, two pairs laterally near tail terminus, and one pair terminally. Spicules curved ventrad, with manubrium rounded and bent ventrally; calamus with thin walls; lamina curved ventrad, bearing a scarcely developed hump on dorsal side. Gubernaculum well developed, slightly curved ventrad.

**Diagnosis.** *C. magnus* is characterized by its body length (0.69-0.92 mm in females and 0.72-0.85 mm in males), lateral field with five incisures, labial probolae, with well developed symmetrical prongs, pharyngeal corpus cylindrical and 2.7-3.2 times isthmus length, excretory pore and deirid located at procorpus-metacarpus junction, spermatheca 20-43  $\mu\text{m}$  long, postuterine sac 50-82  $\mu\text{m}$  or 1.7-2.1 times the corresponding body diameter long, female tail conoid (30-43  $\mu\text{m}$ ,  $c=18.6-23.0$ ,  $c'=1.6-2.3$ ), phasmid at 53-60% of tail length, male tail conical (38-45  $\mu\text{m}$ ,  $c=18.1-19.6$ ,  $c'=1.3-1.6$ ), spicules 40-48  $\mu\text{m}$ , and gubernaculum 20-27  $\mu\text{m}$  long.

**Distribution.** *C. magnus* has been collected in Karaj, province of Tehran, in association with *Prunus avium* L.

**Remarks.** The material examined here are very similar to the original description of *C. magnus* by Rhashid and Heyns (1990), in bifurcated labial probolae, long postuterine sac, five lateral field incisures which extending to tail tip and male tail morphology, although having shorter body length (0.69-0.92 mm vs 0.88-1.27 mm), shorter pharynx (157-178  $\mu\text{m}$  vs 273-296  $\mu\text{m}$ ), shorter postuterine sac (50-82  $\mu\text{m}$  vs 68-135  $\mu\text{m}$ ), and tail (30-43  $\mu\text{m}$  vs 40-51  $\mu\text{m}$ ). This species differs from material examined by Abolafia and Peña-Santiago (2003) in its shorter body length (0.69-0.92  $\mu\text{m}$  vs 0.88-1.50  $\mu\text{m}$ ), shorter pharynx (157-178  $\mu\text{m}$  vs 222-289  $\mu\text{m}$ ), shorter spermatheca (20-43  $\mu\text{m}$  vs 48-99  $\mu\text{m}$ ), shorter postuterine sac (50-82  $\mu\text{m}$  vs 125-162  $\mu\text{m}$ ), and shorter tail (30-43  $\mu\text{m}$  vs 42-53  $\mu\text{m}$ ). Differences are considered to be due to intraspecific variability. This is recorded from Iran for the first time.

***Chiloplacus symmetricus* (Thorne, 1925)  
Thorne, 1937  
(Figs. 5 & 6)**

**Measurements.** See Table 2.

Population collected in Kondor (Karaj), province of Tehran (10 females, 6 males).

**Female.** Body 0.53-0.66 mm long, cylindrical, slightly ventrally curved after fixation. Cuticle annulated; annuli 2-3  $\mu\text{m}$  wide. Lateral field with three incisures occupying 12-22% of midbody diameter, fading out near the phasmid, only median line extending to tail tip. Lip region continuous with neck, with six lips amalgamated in pairs. Amphid opening circular. Primary axils deep without guarding process. Secondary axils shallow. Labial probolae as long as wide, bifurcated at 25-30% of their length, with symmetric prongs. Stoma cephaloboid with distinct cheilo-, gymno- and stegostom. Cheilostom with rounded rhabdia. Gymnostom very short. Stegostom subdivided into four distinct parts. Pharyngeal corpus cylindrical, 1.8-2.5 times isthmus length, with procorpus longer than metacarpus. Isthmus narrower than corpus and separated from metacarpus by discontinuity in muscular tissue. Basal bulb ovoid to spheroid, with valvular apparatus. Cardia conoid, surrounded by intestinal tissue. Nerve ring at metacarpus-isthmus junction, at 68-69% of neck length. Excretory pore opening is located at isthmus level, 49-55 annuli from anterior end. Deirid at 78-86% of neck length, at metacarpus level, 54 annuli ( $n=1$ ) from anterior end. Reproductive system monodelphic-prodelphic, located on right side of intestine. Ovary with double flexure posterior to vulva level. Oviduct short, less than a half of the corresponding body diameter. Spermatheca well developed, 0.7-1.1 times the corresponding body diameter long. Uterus tubular, about three times the corresponding body diameter, consisting of a long proximal tubular part and a short distal part, this with thinner walls. Postuterine sac 0.7-0.9 times the corresponding body diameter long. Vagina extending inwards for less than a half of the body width. Vulva protruding, located posterior to middle part of body. Rectum 1.2 times anal body diameter. Tail subcylindrical with rounded terminus. Phasmid located at 47-50% of tail length.

**Male.** General morphology similar to female, except for the sexual characters. Body 0.51-0.68 mm long, curved ventrad after fixation, J-shaped. Genital system monorchic, with testis reflexed ventrad. Tail conical, curved ventrad in its posterior part. Three precloacal papillae are visible. Genital papillae including five pairs: one pair ventrally, two pairs subdorsally, one pair laterally, and the last one near tail terminus. Spicules curved ventrad: manubrium rounded and bent ventrad; calamus with thin walls; lamina curved ventrad and swollen anteriorly. Gubernaculum well

developed, scarcely curved ventrad with well developed crural part.

**Diagnosis.** *C. symmetricus* is characterized by its body length (0.53-0.66 mm in females and 0.51-0.68 mm in males), lateral field with three incisures, labial probolae, with symmetrical prongs, pharyngeal corpus slightly fusiform and 1.8-2.5 times longer than isthmus, spermatheca 18-38  $\mu\text{m}$  long, postuterine sac 0.7-0.9 times the corresponding body diameter long. Female tail cylindrical or subcylindrical (32-40  $\mu\text{m}$ ,  $c=15.0-18.1$ ,  $c'=1.9-2.3$ ), phasmid at 47-53% of tail length, male tail conical with rounded terminus (30-38  $\mu\text{m}$ ,  $c=13.4-19.5$ ,  $c'=1.6-2.1$ ), spicules 22-25  $\mu\text{m}$ , and gubernaculum 10-13  $\mu\text{m}$  long.

**Distribution.** *C. symmetricus* has been found in Kondor (province of Tehran), associated with rhizosphere of *Malus domestica* Borkh.

**Remarks.** The material surveyed in the province of Tehran are very similar to previous descriptions published by Thorne (1925), Goodey (1963), Bongers (1988) and Andr assy (2005) in having labial probolae as long as wide and symmetrically bifurcated at one half of its length, lateral field with three incisures of which median line is deeper, male tail morphology with three precloacal papillae, although having shorter body (0.53-0.66 vs 0.6-0.9 mm in females and 0.51-0.68 vs 0.75 mm in males). In addition Iranian specimens agree well with the populations examined by Ivanova (1968) and Vinciguerra (1972).

This species is recorded from Iran for the first time.

### ***Chiloplacus tenuis* Rashid & Heyns 1990 (Figs. 7 & 8)**

**Measurements.** See Table 3.

Population collected in Chenarak, province of Tehran (15 females).

**Female.** Body 0.66-0.86 mm long, cylindrical, slightly ventrally curved after fixation. Cuticle annulated; annuli 2-3  $\mu\text{m}$  wide. Lateral field with five incisures occupying 24-28% of midbody diameter, three of them extending to tail tip. Lip region continuous with neck, with six lips amalgamated in pairs. Amphid opening circular. Primary axils U-shaped, deep, with one low guard process. Secondary axils shallow. Labial probolae symmetrically bifurcate, with long prongs curved towards each others, swollen at tip. Lips with moderately developed cephalic probolae, each subdivided into two tines or acute triangular tine facing primary axils and low rounded tine facing secondary axil. Stoma cephaloboid with distinct cheilo-, gymno- and stegostom. Cheilostom with

rounded rhabdia. Gymnostom as long as stegostom is wide. Stegostom subdivided into four distinct parts. Pharyngeal corpus cylindrical, 2.2-3.5 times isthmus length, with procorpus slightly longer than metacarpus. Isthmus narrower than metacarpus. Basal bulb ovoid, with valvular apparatus in the middle. Cardia conoid, surrounded by intestinal tissue. Nerve ring at metacarpus level, at 68-69% of neck length. Excretory pore opening is located at level of basal part of metacarpus, 44-52 annuli from anterior end. Deirid at 67% of anterior end, at level of isthmus level, 50-59 annuli from anterior end. Reproductive system monodelphic-prodelphic located in right side of intestine. Ovary straight. Oviduct short, less than a half of the corresponding body diameter. Spermatheca 0.6-1.5 times the corresponding body diameter long. Uterus tubular, about three times the corresponding body diameter long, consisting of a long proximal tubular part and a short distal part, the latter with thinner walls. Postuterine sac 3.1-3.2 times longer than body diameter at its level. Vagina extending inwards for a half of the body diameter, and inclined in position. Vulva more or less protruding, located posterior to middle of the body. Rectum 0.6-0.9 anal body diameter long. Tail subcylindrical, with rounded terminus. Phasmid at 55-80% of tail length.

**Male.** Not found.

**Other material examined (9 females, see Table 3).** Very similar to the population from Chenarak, but *C. tenuis* from the mushroom compost has more anterior nerve ring and longer spermatheca.

**Diagnosis.** *C. tenuis* is characterized by its body length (0.59-0.86 mm), lateral field with five incisures, labial probolae long and symmetrically bifurcate, with prongs curved toward each other, cephalic probolae moderately developed, primary axils with short guarding process, pharyngeal corpus cylindrical (78-128  $\mu\text{m}$  long and 2.2-3.6 times isthmus length), excretory pore at metacarpus level, spermatheca 13-44  $\mu\text{m}$  long, postuterine sac 2.3-5.5 times longer than body diameter at its level, female tail cylindrical or subcylindrical (32-46  $\mu\text{m}$ ,  $c=14.7-22.3$ ,  $c'=1.8-2.8$ ).

**Distribution.** *C. tenuis* has been found in five populations from the province of Tehran: i) Chenarak, in association with *Malus domestica* Borkh; ii) Tehran, in association with mushroom compost; iii) Shahriar (Saed Abad), associated with *Gleditsia triacanthos* L.; iv) Karaj, in rhizosphere of *Cicer arietinum* L.; and v) Karaj (Alikhan Soltani), in association with *Cicer arietinum* L.

**Remarks.** The Iranian specimens of *C. tenuis* are very similar to original description of *C. tenuis* by Rhashid and Heyns (1990) in bifurcated labial probolae with long prongs which points toward each others, primary axils deep with one low guard process, long postuterine sac and five lateral field which extend to the tail tip, but have longer body (0.59-0.86 mm vs 0.54-0.66 mm), longer pharynx (126-199  $\mu\text{m}$  vs 139-167  $\mu\text{m}$ ), longer tail (32-46  $\mu\text{m}$  vs 24-30  $\mu\text{m}$ ) and phasmid located more posterior towards tail terminus (53-80% vs 46-62%). The material examined here also shows high similarity to *C. tenuis* reported by Abolafia and Peca-Santiago (2003), although with longer tail (32-46  $\mu\text{m}$  vs 25-40  $\mu\text{m}$ ) and shorter postuterine sac (63-110  $\mu\text{m}$  vs 82-137  $\mu\text{m}$ ). This species is recorded from Iran for the first time.

### *Chiloplacus trilineatus* Steiner, 1940 (Figs. 9 & 10)

**Measurements.** See Table 2.

Population collected in Kondor (Karaj), province of Tehran (3 females, 3 males).

**Female.** Body 0.54-0.71 mm long, cylindrical, slightly ventrally curved after fixation. Cuticle annulated; annuli 2-3  $\mu\text{m}$  wide. Lateral field with three incisures occupying 16-17% of midbody diameter, ending at tail terminus. Lip region continuous with neck, with six lips amalgamated in pairs. Amphid opening circular. Primary axils deep, U-shaped, without guarding process. Secondary axils shallow, with open V-shape. Labial probolae bifurcate; dorsal one with short symmetric prongs, and ventral ones with short asymmetric, acute or rounded prongs. Lips conoid. Stoma cephaloboid with distinct cheilo-, gymno- and stegostom. Cheilostom with round rhabdia. Gymnostom very short. Stegostom subdivided four distinct parts. Pharyngeal corpus cylindrical, 3-4 times isthmus length, with procorpus longer than metacarpus. Isthmus narrower than metacarpus, and separated from it by discontinuity in muscular tissue. Basal bulb ovoid to spheroid, with valvular apparatus. Cardia conoid, surrounded by intestinal tissue. Nerve ring at metacarpus-isthmus junction, at 69-72% of neck length. Excretory pore opening is located at isthmus level, 48-58 annuli from anterior end. Deirid at 83-87% of neck length, at isthmus level, 57-59 annuli (n=2) from anterior end. Reproductive system monodelphic-prodelphic, located in right side of intestine. Ovary with flexure posterior at vulva level. Oviduct short, less than a half of the corresponding body diameter. Spermatheca 1.2-1.6 times the corresponding body diameter long.

Uterus tubular, about three times the corresponding body diameter long, consisting of a long proximal tubular part and a short distal part, the latter with thinner walls. Postuterine sac 0.6-0.7 times the corresponding body diameter. Vagina, extending inwards for less than a half of the body width. Vulva not protruding, located posterior to middle part of body. Rectum 1.2-1.3 times anal body diameter long. Tail subcylindrical, terminus more or less rounded. Phasmid at 63-65% of tail length.

**Male.** General morphology similar to female, except for the sexual characters. Body 0.49-0.56 mm long, and curved ventrad after fixation, J-shaped. Genital system monorchic, with testis reflexed ventrad. Tail conical, curved ventrad in its posterior part. Three precloacal papillae are visible. Genital papillae including five pairs: one pair ventrally, one pair subventrally anterior to phasmid, two pairs laterally near tail terminus, and the last one near tail terminus. Spicules curved ventrad; manubrium rounded and bent ventrally; calamus with thin walls; lamina curved ventrad and swollen anteriorly. Gubernaculum well developed, weakly curved ventrad with well developed crural part.

**Diagnosis.** *C. trilineatus* is characterized by its body length (0.54-0.71 mm in females and 0.49-0.56 mm in males), lateral field with three incisures, dorsal labial probolae with symmetrical acute prongs, subventral probolae having asymmetrical prongs, pharyngeal corpus slightly fusiform and 3-4 times isthmus length, spermatheca 27-47  $\mu\text{m}$  long, postuterine sac 0.6-0.7 times the corresponding body diameter long, female tail cylindrical or subcylindrical (31-35  $\mu\text{m}$ ,  $c=16.9-20.7$ ,  $c'=2.3-2.7$ ), phasmid located at 63-65% of tail length, male tail conical with round terminus (31-32  $\mu\text{m}$ ,  $c=15.8-18.1$ ,  $c'=1.7-1.9$ ), spicules 21-22  $\mu\text{m}$ , and gubernaculum 8-10  $\mu\text{m}$  long.

**Distribution.** *C. trilineatus* has been collected in Karaj (province of Tehran), in association with *Cicer arietinum* L.

**Remarks.** The material surveyed in the province of Tehran is very similar to the original description of the species by Steiner (1940) in ventrosubmedian labial probolae asymmetric and somewhat variable as indicated in the original description, three lateral field and three precloacal papillae, although female tail lacking mucro (vs having mucro). It is also very similar to the population reported by Andr assy (2005), although has shorter postuterine sac (0.6-0.7 times vs 0.8-1.2 times the corresponding body diameter long),

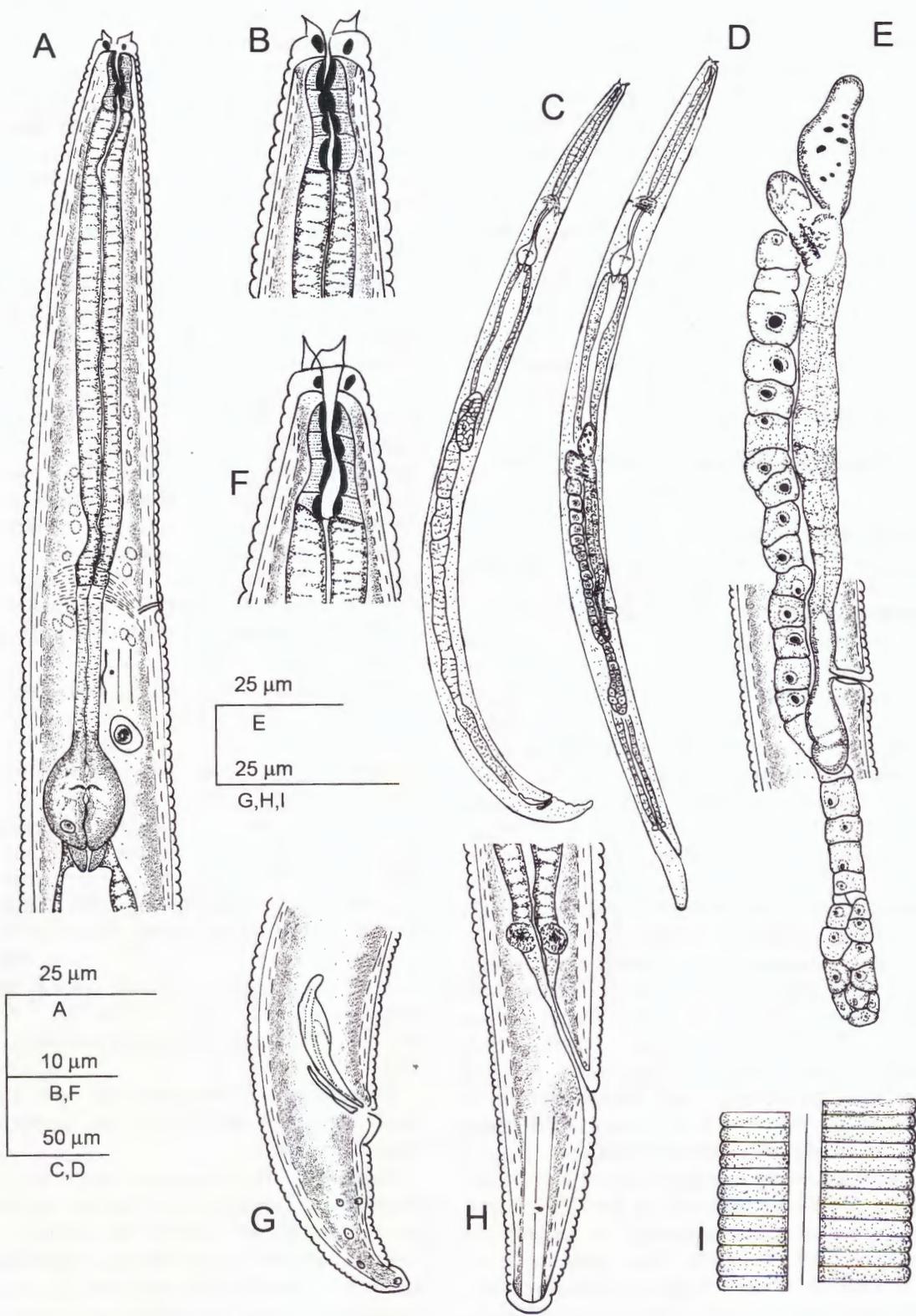
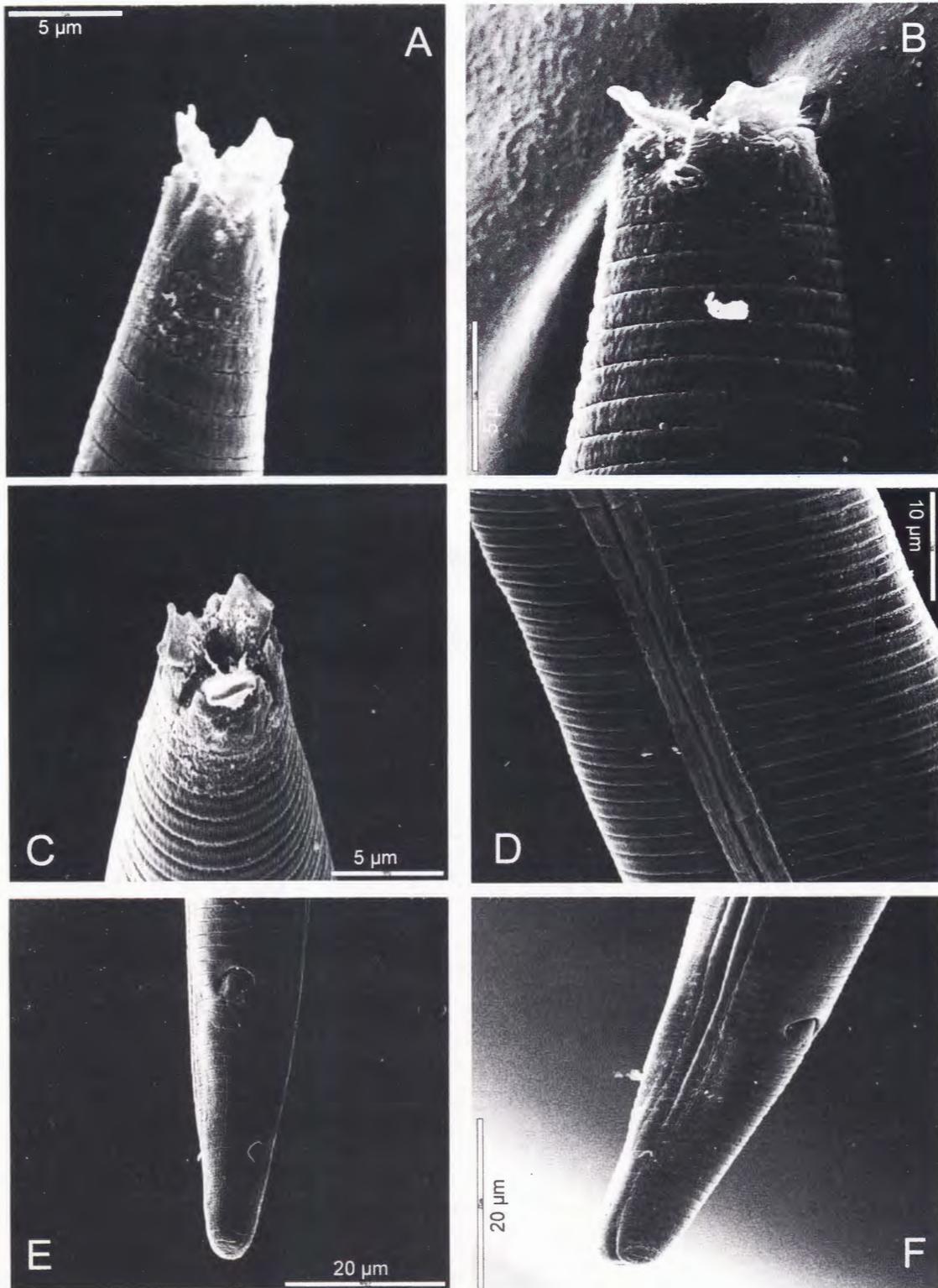


Fig. 9. *Chiloplacus trilineatus* Steiner, 1940. A: Neck; B, F: Lip region; C: Entire male; D: Entire female; E: Female reproductive system; G: Male tail; H: Female tail; I: Lateral field.

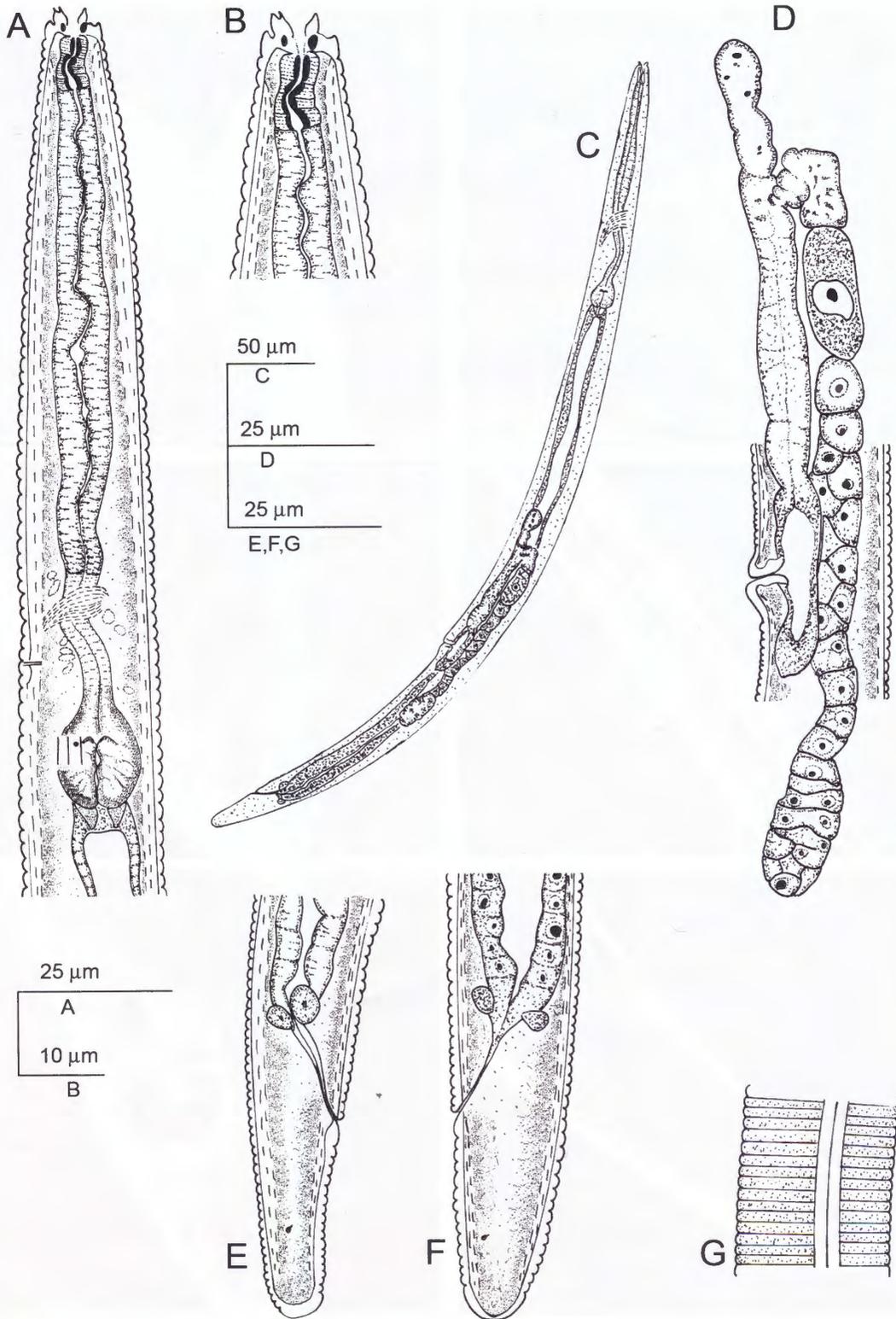


**Fig. 10.** *Chiloplacus trilineatus* Steiner, 1940 (SEM). A, B, C: Lip region (A: Ventral view, B: Lateral view, C: Subapical view.); D: Lateral field; E, F: Female tail.

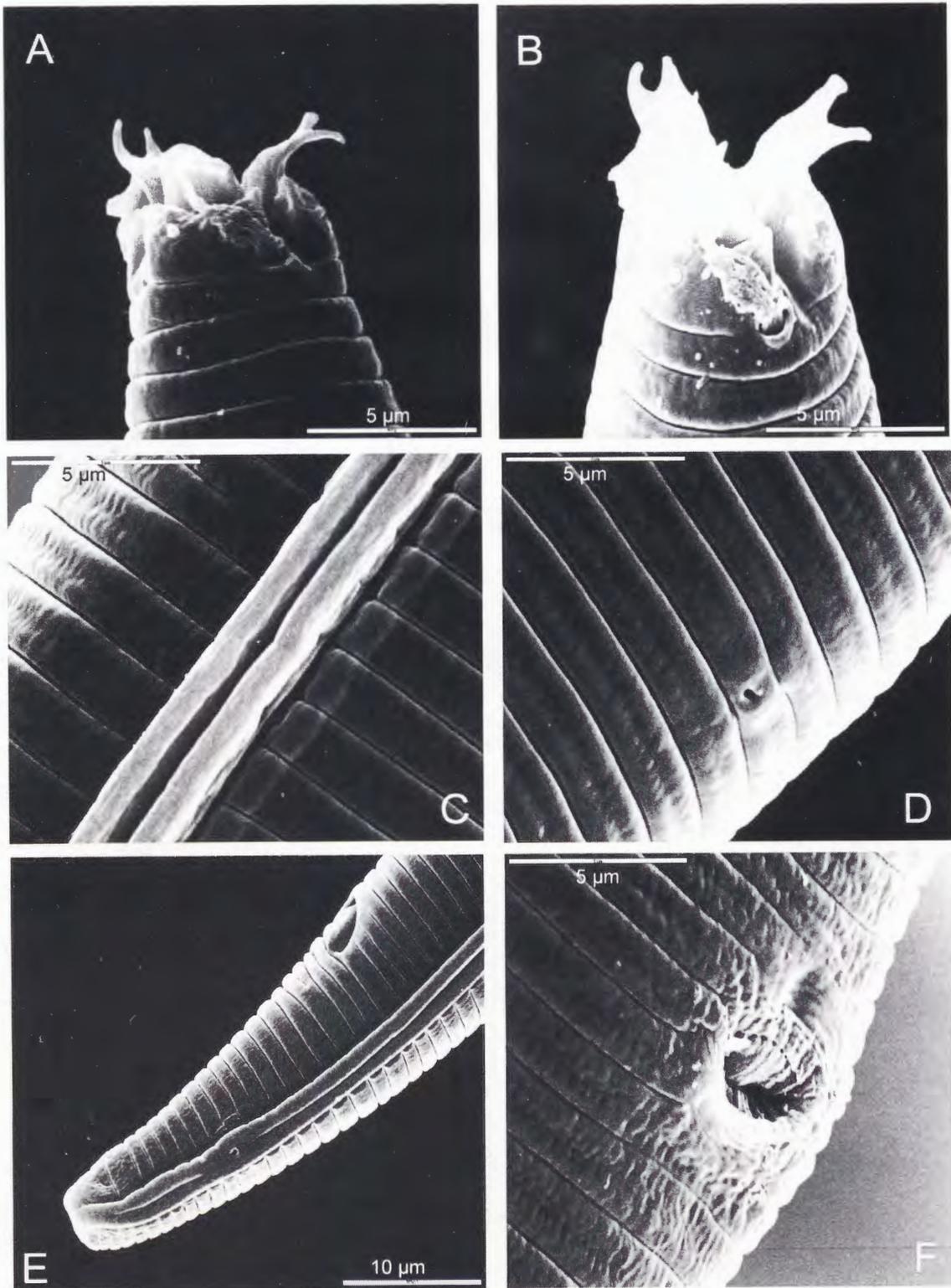
**Table 3.** Measurements of *Chiloplachus tenuis* Rhashid & Heyns, 1990 [all measurements in  $\mu\text{m}$  and the format: mean  $\pm$  standard deviation (range)].

Locality	Chenarak	Shahriar (Saeed abad)	Karaj	Karaj (Alikhan Soltani)	Karaj
Province	Tehran	Tehran	Tehran	Tehran	Tehran
Habitat	Apple	Locust	Chickpea	Chickpea	Mushroom compost
n	15♀♀	3♀♀	4♀♀	1♀	1♀
Body length	741 $\pm$ 70.2 (660-860)	717.8 $\pm$ 14.8 (702-732)	672.6 $\pm$ 79.8 (590-773)	708	696
a	28.1 $\pm$ 1.8 (24.3-29.7)	28.7 $\pm$ 2.4 (26.5-31.3)	23.4 $\pm$ 3 (19.0-26.1)	24.1	35.2
b	4.3 $\pm$ 0.3 (3.6-4.6)	4.5 $\pm$ 0.3 (4.2-4.8)	4.5 $\pm$ 0.2 (4.1-4.7)	4.5	4.2
c	18.1 $\pm$ 1.1 (16.7-20.2)	19.4 $\pm$ 2.6 (17.1-22.3)	17.8 $\pm$ 2.2 (14.7-19.5)	20.1	19.2
c'	2.1 $\pm$ 0.1 (2.0-2.8)	2.1 $\pm$ 0.3 (1.9-2.6)	2.1 $\pm$ 0.1 (1.9-2.2)	1.8	1.9
V	65.7 $\pm$ 2.0 (64-77)	64.3 $\pm$ 0.4 (64-65)	66.3 $\pm$ 1.2 (64-67)	68	67
Labial probolae	5.9 $\pm$ 0.8 (5-7)	4 $\pm$ 0.5 (3-5)	4.2 $\pm$ 0.7 (3-5)	2	4
Lip region diameter	9.0 $\pm$ 1.0 (8-11)	7.8 $\pm$ 0.8 (7-9)	8.1 $\pm$ 0.9 (7-9)	8	7
Stoma	10.8 $\pm$ 0.8 (9-14)	10.5 $\pm$ 0.3 (10-11)	10.1 $\pm$ 0.7 (9-11)	10	10
Pharyngeal corpus	104.4 $\pm$ 6.4 (97-128)	107.3 $\pm$ 8.9 (98-116)	97.6 $\pm$ 13.2 (78-108)	104	108
Isthmus	44 $\pm$ 4.1 (27-57)	30.8 $\pm$ 2.3 (29-33)	29.2 $\pm$ 2.4 (26-32)	31	35
Bulb	23.4 $\pm$ 1.3 (22-26)	21.4 $\pm$ 1.7 (20-23)	21.6 $\pm$ 0.7 (21-22)	22	23
Pharynx length	171.3 $\pm$ 8.9 (162-199)	159.6 $\pm$ 12.3 (148-173)	148.5 $\pm$ 15.7 (126-163)	156	165
Nerve ring-ant. end	119.8 $\pm$ 6.3 (112-135)	106.1 $\pm$ 7.3 (98-111)	107.4 $\pm$ 8.9 (98-117)	108	98
Excretory pore-ant. end	112.7 $\pm$ 9.8 (98-125)	116.1 $\pm$ 12.8 (102-127)	114.1 $\pm$ 6.3 (107-123)	116	103
Deirid-ant. end	122.6 $\pm$ 11.0 (108-134)	144.3 $\pm$ 14.6 (134-155)	129.7 $\pm$ 11.7 (121-138)	125	?
Annuli width	2.3 $\pm$ 0.7 (2-3)	2.5 $\pm$ 0.2 (2-3)	2.4 $\pm$ 0.7 (2-4)	2	2
Cuticle thickness	1.7 $\pm$ 0.7 (1-3)	1.2 $\pm$ 0.1 (1.1-1.4)	1.3 $\pm$ 0.0 (1.2-1.7)	1	1
Body diameter: neck base	11.1 $\pm$ 0.7 (10-13)	9 $\pm$ 0.8 (8-10)	10.5 $\pm$ 1.2 (9-12)	10	10
Body diameter: midbody	26.3 $\pm$ 1.7 (21-29)	25.1 $\pm$ 2.5 (22-28)	28.9 $\pm$ 3.3 (24-32)	29	20
Body diameter: anus	16.6 $\pm$ 1.4 (14-19)	17.2 $\pm$ 2.1 (15-20)	18.5 $\pm$ 2.1 (15-20)	19	18
Lateral field	5.8 $\pm$ 0.8 (5-8)	4.6 $\pm$ 0.8 (4-5)	5.8 $\pm$ 1.6 (5-7)	?	?
Vagina	16.7 $\pm$ 2.9 (9-17)	11.5 $\pm$ 0.8 (11-12)	15.3 $\pm$ 3.2 (13-19)	19	17
Ovary	200.4 $\pm$ 59.7 (175-253)	217.9 (n=1)	221.3 $\pm$ 12.5 (212-230)	279	273
Spermatheca	37.5 $\pm$ 13.1 (13-44)	24.4 $\pm$ 3.6 (22-27)	26.7 $\pm$ 15 (16-37)	29	40
Anterior genital branch*	117.6 $\pm$ 35.4 (95-170)	118.1 $\pm$ 0.4 (117.8-118.4)	128.2 $\pm$ 3.2 (126-131)	?	116
Postuterine sac	82.1 $\pm$ 8.1 (67-94)	64.4 $\pm$ 1.6 (63-66)	80.5 $\pm$ 8.6 (72-89)	86	110
Rectum	20.8 $\pm$ 2.5 (9-17)	18.5 $\pm$ 2.3 (16-21)	18.4 $\pm$ 1.8 (16-20)	21	22
Tail	40.8 $\pm$ 2.4 (33-46)	37.3 $\pm$ 4.5 (32-41)	38.1 $\pm$ 4.8 (33-44)	35	36
Vulva-anterior end	486.9 $\pm$ 41.4 (447-620)	462.1 $\pm$ 9 (454-472)	445.5 $\pm$ 50.1 (395-513)	478	466

(\*) Anterior genital branch = spermatheca + uterus



**Fig. 11.** *Chiloplacus* sp. A: Neck; B: Lip region; C: Entire female; D: Female reproductive system; E, F: Female tail; G: Lateral field.



**Fig. 12.** *Chiloplacus* sp. (SEM). A, B: Lip region (A: Lateral view, B: Subapical view.); C: Lateral field; D: Excretory pore; E: Female tail; F: Vagina.

and shorter pharynx (116-132  $\mu\text{m}$  vs 140-160  $\mu\text{m}$ ). The Iranian specimens in comparison with the material described by Abolafia and Peña-Santiago (2003) show high similarity, although they have longer female body (0.54-0.71 mm vs 0.41-0.67 mm). In addition, the Iranian specimens agree well with those described by Andr assy (1964). This is recorded from Iran for the first time.

***Chiloplacus* sp.**  
**(Figs. 11 & 12)**

**Measurements.** see Table 2.

Population collected in Lavasanat, province of Tehran (3 females).

**Female.** Body 0.62-0.75 mm long, cylindrical, slightly ventrally curved after fixation. Cuticle annulated, annuli 1-3  $\mu\text{m}$  wide. Lateral field with three incisures occupying 15-16% of midbody diameter, fading after phasmid, only lateral ones ending at tail tip. Lip region continuous with neck, having six lips amalgamated in pairs. Amphid opening oval. Primary axils deep, U-shaped, without guarding process. Secondary axils shallow, V-shaped. Labial probolae bifurcate symmetrically, prongs are shorter than basal part and have swollen tips. Lips rounded, cephalic probolae absent. Stoma cephaloboid with distinct cheilo-, gymno- and stegostom. Cheilostom with round rhabdia. Gymnostom as long as stegostom is wide. Stegostom divided into four distinct part. Pharyngeal corpus cylindrical, 2.2-3.5 times isthmus length, with procorpus longer than metacarpus. Isthmus narrower than metacarpus. Basal bulb ovoid with valvular apparatus. Cardia conoid, surrounded by intestinal tissue. Nerve ring at level of anterior part of isthmus, at 72-78% of neck length. Excretory pore at isthmus level, 49-50 annuli from anterior end. Deirid at bulb level, at 87-92% of neck length, 54-59 annuli from anterior end. Reproductive system monodelphic-prodelphic, located on right side of intestine. Ovary with swollen germinal zone. Oviduct short, less than a half of the corresponding body diameter. Spermatheca well developed, as long as the corresponding body diameter long. Uterus tubular, about twice the corresponding body diameter long, consisting of a proximal tubular part and a distal part with thin walls. Postuterine sac 0.4-0.7 times the corresponding body diameter long. Vagina extending inwards for less than half the body diameter. Vulva more or less protruding, located posterior to middle of the body. Rectum 1.0-1.1 times the anal body diameter long. Tail cylindrical, with rounded terminus. Phasmid at 58-61% of tail length.

**Male.** Not found.

**Diagnosis.** *Chiloplacus* sp. is characterized by its body length (0.62-0.75 mm), lateral field with three incisures, labial probolae with symmetrical bifurcation, prongs are shorter than basal part and have swollen tips. Lips fused two by two, pharyngeal corpus cylindrical (74-81  $\mu\text{m}$  length, 2.2-3.5 times isthmus length), excretory pore located at isthmus level, spermatheca 25-32  $\mu\text{m}$  long, postuterine sac 0.4-0.7 times the corresponding body diameter long, female tail cylindrical, lateral field ending at tail tip (31-33  $\mu\text{m}$ ,  $c=19.1-23.1$ ,  $c'=1.8-2.2$ ), and phasmid located at 58-61% of tail length.

**Distribution.** This species has been found in Lavasanat (province of Tehran), in association with wild grass.

**Remarks.** According Abolafia and Pe a-Santiago's (2003) key this species is very similar to *C. bisexualis*, *C. denticulatus* (Thorne, 1925) Thorne, 1937 and *C. symmetricus*. From *C. bisexualis* it differs in the morphology of labial probolae (prongs with swollen tip vs prongs are not swollen at tip), lips morphology (lips paired vs fused two by two), female body longer (0.62-0.75 mm vs 0.50-0.60 mm), and pharyngeal corpus slightly shorter (74-81  $\mu\text{m}$  vs 82-90  $\mu\text{m}$ ). It differs from *C. denticulatus* by having longer probolae with swollen prong tips (vs having shorter probolae with prongs arching toward each other), shorter body length (0.62-0.75 mm vs 0.70-0.95 mm). Finally, it differs from *C. symmetricus* in having longer and thinner probolae with swollen prong tips (vs having shorter probolae with thin prongs), and slightly longer female body length (0.62-0.75 mm vs 0.53-0.66 mm). Although, according to the lip region morphology this Iranian population of *Chiloplacus* belongs to a different species, it is necessary to study additional material, as soon as the SEM study of *C. denticulatus* and other related species are available for comparison and to confirm its identity.

## DISCUSSION

Of the six species examined, two species, *Chiloplacus tenuis* and *C. magnus*, are characterized by distinct morphology, while the other four appear to have a similar morphology, indicating their possible phylogenetic relationship. The first two species (*C. tenuis* and *C. magnus*) are distinguished by flat lips, long and bifurcated probolae, large developed spermatheca and postuterine sac (at least twice as long as the corresponding body diameter), and lateral field with five incisures. The other four species

(*Chiloplacus bisexualis*, *C. symmetricus*, *C. trilineatus* and *Chiloplacus* sp.) are characterised by having more or less conical lips, shorter probolae, shorter spermatheca and small postuterine sac (shorter than the corresponding body diameter), and lateral field with three incisures. However, some taxonomic differences were found that are useful for differentiation, e. g. lip region, lateral field at female tail tip and spicules. Also, some constant character i.e. body length, pharynx length, position of nerve ring and excretory pore, female reproductive system (only the posterior part of ovary in *Chiloplacus* sp. is more swollen than that of the others) are used in species identification.

**Lips.** The morphology of lips is very constant in *C. bisexualis*, *C. symmetricus* and *C. trilineatus*. These two species have conoid lips with similar morphology, paired two by two with a rounded terminus near to primary axils, while in *Chiloplacus* sp. lips are also paired two by two but are fused and have primary axils with rounded to acute tip. Two species, *C. bisexualis* and *Chiloplacus* sp., have very similar lip regions but they can be distinguished according to secondary axils (conoid lips paired with secondary axils marked vs lips fused two by two and secondary axils shallow).

**Probolae.** The morphology of the probolae structure shows more variability. *C. bisexualis* has long probolae (longer than wide) with symmetrical bifurcation. The other species (*C. symmetricus*) has small probolae not longer than its width and symmetrically bifurcate. *C. trilineatus* has bifurcate probolae, the dorsal ones with short symmetric prongs, and the ventral ones with short asymmetric prongs, which are acute or rounded. *Chiloplacus* sp. has long prongs with swollen tip.

**Female tail.** Morphology of female tail in these species is more or less similar, cylindrical or subcylindrical, with rounded terminus. Nonetheless, the length of the lateral field shows an interesting variability in the specimens examined under SEM. In *C. bisexualis*, the lateral field has three incisures with the middle incisure ending in the tail terminus, while the lateral ones extend near to the tail terminus. In *C. symmetricus*, the lateral field has three incisures fading out near the phasmid, with only the median one terminating at the tail tip. In *C. trilineatus*, the lateral field has three incisures ending at the tail terminus and the median incisure is deeper. Finally, *Chiloplacus* sp. has three incisures, fading after phasmid, with only the lateral ones ending at tail tip.

**Male tail.** The general morphology of male tails is similar but the arrangement of genital papillae shows some differences. In the males examined, *C. bisexualis* and *C. trilineatus* arrangement are similar (two pairs located ventrally, two pairs located laterally near the tail terminus, and one pair terminally); however, the *C. symmetricus* male appears to have one pair located ventrally, two pairs located subdorsally, one pair located laterally, and the last one located near the tail terminus. *C. bisexualis*, *C. symmetricus* and *C. trilineatus*, all have three precloacal papillae.

**Spicules.** Some differences appear in spicules morphology in different species. In *C. bisexualis* spicules are short and have hook shape manubrium with more developed lamina without a hump. In *C. symmetricus* spicules are wider than in other species, having large and more bent manubrium with developed lamina with a hump. Spicules of *C. trilineatus* are longer than the other species, having short manubrium with long developed lamina with a hump.

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**Shokoohi E., Abolafia J., Kheiri A., Zad J.** Нематоды отряда Rhabditida из провинции Тегеран в Иране: Род *Chiloplacus* Thorne, 1937.

**Резюме.** Пять видов рода *Chiloplacus* описаны из природных экосистем провинции Тегеран (Иран): *Chiloplacus bisexualis*, *C. magnus*, *C. symmetricus*, *C. tenuis*, *C. trilineatus* и *Chiloplacus* sp. Пять видов отмечены в Иране впервые. Приводятся описания, измерения, рисунки и СЭМ фотографии для всех видов. СЭМ данные для *C. bisexualis* и *C. symmetricus* представлены впервые. Компост для выращивания грибов отмечается как новая среда обитания для *C. tenuis*.