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PARASTOMACHOGLOSSA PERPLEXA (HEYNS *et* ARGO, 1969) N. COMB WITH A DEFINITION OF THE GENUS[1]

by
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Summary. The species *Actinolaimus perplexus* Heyns *et* Argo, 1969 is redescribed and transferred to the genus *Parastomachoglossa* Coomans *et* Loof, 1986. A new definition of the genus and a key to its species is provided.

Heyns and Argo (1969) described a single female of a new actinolaimid spécies which combined characters both of *Actinolaimus* and *Brittonema* and named it *Actinolaimus perplexus*, attributing it to the older of the two genera. Coomans and Loof (1986) described the new taxon *Parastomachoglossa* as a subgenus of *Actinca* with two species, *A.(P.) costata* (Schneider, 1935) n. comb. and *A.(P.) taylori* (Meyl, 1957) n. comb., characterized by large size, thick cuticle with conspicuous body pores, lip region low and wide, vestibular ring well developed and denticulate, short anterior and long middle portion of the tripartite pharynx, small amphidial aperture and robust odontostyle. They based their diagnosis on the morphology of the species *A.(P.) costata*, which they described in detail. Subsequently, Vinciguerra (1987) elevated *Parastomachoglossa* to the rank of genus.

Recently we had the chance to observe some specimens, both males and females, of *A. perplexus*, collected in Ethiopia, about which Zullini (1988) has just reported. We noted that the species showed all the characteristics described for *Parastomachoglossa*, to which genus we transfer it. The species is redescribed here and a new definition of the genus *Parastomachoglossa* is provided.

PARASTOMACHOGLOSSA PERPLEXA (Heyns *et* Argo, 1969) (Figs. 1-5)

Dimensions: see Table I.

Description: Body slender, generally ventrally curved, sometimes very coiled at tail end in males.

Cuticle with prominent longitudinal ridges and extremely fine transverse striations (Fig. 4 A-D). The ridges start as low, somewhat irregular bands about 3 lip region widths behind the anterior end (Fig. 4A), soon becoming higher and numbering 42-43 (n = 2) near the base of the neck region (Fig. 1B), but only 35 in mid-body (Fig. 1E), they disappear after the proximal part of the female tail. Cuticle thickness 2.5 μm, increasing to 5 μm ventrally in supplement region in males. Lateral chord 9-11 μm or about 1/5th of the body width at mid-body. Body pores faint and difficult to count, usually opening on the longitudinal ridges.

Lip region 11-12.5 μm wide and 5 μm high, slightly demarcated by a very shallow depression. Cephalic papillae very small, in the same circlet as inner labial papillae (Fig. 4F), hence anterior sensilla arranged in two circlets: 10 + 6. Amphids with deep, stirrup-shaped fovea; aperture 6.5-7.5 μm wide (Fig. 4E); fusus 14-19 μm behind aperture.

Oral aperture round, surrounded by two sclerotized rings (Fig. 4F). Cheilostomal wall quadrangular, with four broad tooth-like structures, one dorsal, one ventral and two lateral. In between these teeth there are four narrow denticles, about half as long as the teeth and arising from the same base but occupying the four corners of the quadrangle (Fig. 2G).

Fixed guiding ring 13.5-16 μm from anterior end. Folded guiding sheath short when spear is retracted (Fig. 2A) and long when spear is protruded (Fig. 2B). Odontostyle somewhat axe-shaped, 21-23 μm long, i.e. 1.7-1.9 lip region widths; aperture occupying 2/5th of the length. Odontophore poorly demarcated, 19.5-20 μm (n = 2) long, hence slightly shorter than the odontostyle.

Stylet protractors and retractors similar in arrangement to those of *P. costata* (see Coomans and Loof, 1986) except for the subdivision of the muscle strands and that the final

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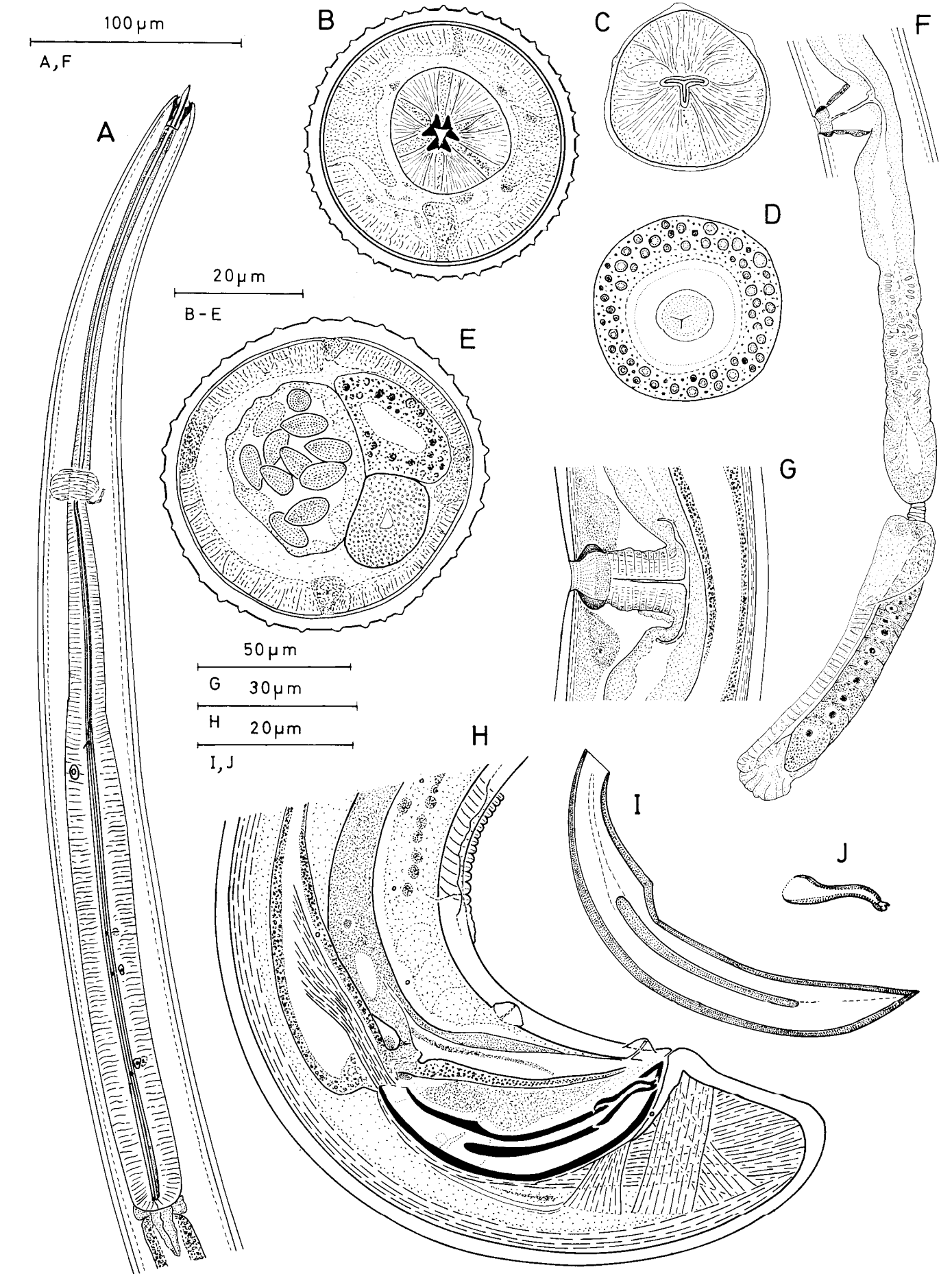
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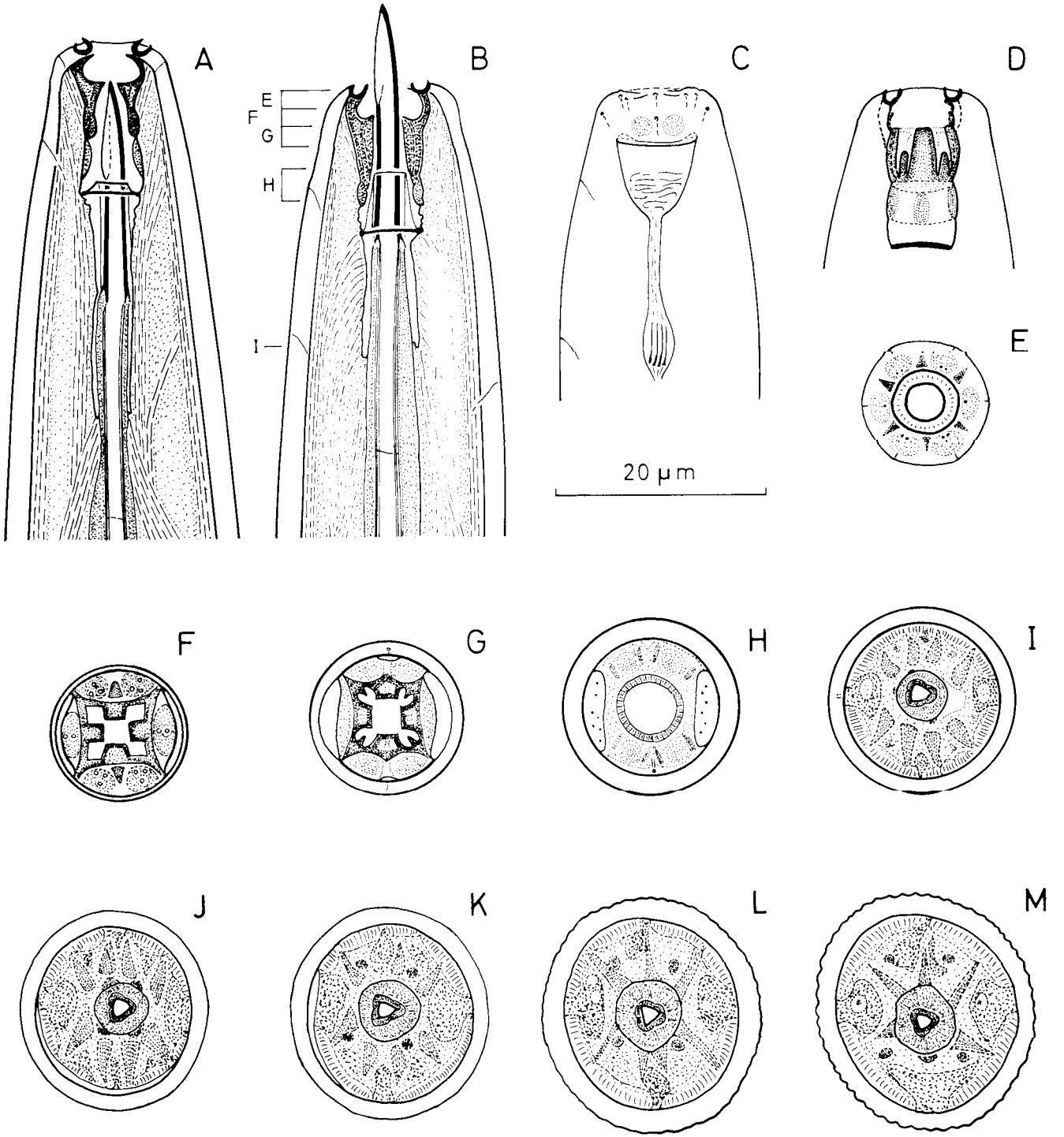

Fig. 2. *Parastomachoglossa perplexa*. A: Head end, holotype female. B: Head end, male. C: Same as B in surface view. D: Same as B, surface view of stoma. E-I: Cross sections at levels indicated in B (odontostyle not shown in the cross sections F-H).

Fig. 1 (front page) - *Parastomachoglossa perplexa*. A: Neck region male. B : Cross section (CS) through the posterior pharyngeal region. C: CS through the base of the pharynx. D: CS through the anterior intestine and pharyngo-intestinal valve. E: CS through male showing posterior testis (with sperm) to the left, intestine in upper right part and vas deferens in lower right part. F : Posterior female reproductive branch of holotype. G: Female, vagina-vulva region. H: Posterior end of male. I: Right spicule. J : Right lateral guiding piece.

number of six protractors is obtained after first one of the dorsal and then one of the ventral strands have disappeared (Fig. 2 I-M).

Pharynx composed of three parts (Fig 1A), a very slender anterior part, an approximately equally long and gradually widening median part, and a longer enlarged posterior part. The second part starts less than a body width in front of the nerve ring and ends where the pharynx attains its full width, i.e. at the level of the dorsal pharyngeal gland outlet (DO). The third part occupies about 42% of the neck length and contains five pharyngeal glands. The distance DO-DN is 10-12 µm. The S_1N are 18-21 µm apart. Locations of outlets and nuclei as follows (see Fig. 1A): DO = 54.4-58.2%; DN = 56.2-60.5%; DO-DN = 1.8-2.3%; S_1O_1 = 71.6-74.8%; S_1N_1 = 71.9-74.8%; S_1O_2 = 76.2-78.5%; S_1N_2 = 75.5-78.3%; S_2O = 86.8-87.8%; S_2N = 85.3-86.8%; K = 80.5-82.3 ; K' = 79.4-80.9.

Nerve ring 170-192 µm from anterior end, i.e. at 31-36% of the neck length.

Prerectum 183-237 µm or 7-9 anal body widths in females; 380-465 µm or 11-13 anal body widths in males. Rectum about 2-2.5 anal body widths in females; very short in males (Fig. 1H).

Females didelphic amphidelphic; uteri moderately long (168 µm and 193 µm in the holotype, i.e. about 4 body widths), composed of three parts: a slightly wider glandular proximal part, a more muscular median part and a distal part with wider lumen forming, together with the uterus of the other branch, a primitive ovejector; sphincter between uterus and oviduct well developed; oviduct composed of a distal wide part and a long narrow part that joins the ovarial sac subterminally (Fig. 1F). Vagina extending more than halfway across the body, surrounded by at least nine circular muscle bands, forming a sphincter; its junction with the vulva somewhat sclerotized. Vulva longitudinal (Fig. 1G).

Male reproductive system comparable to that of *P. costata* (cf. Coomans and Loof, 1986) but glands, especially the anal ones, less distinct. Supplements consisting of an adanal pair on the anterior cloacal lip (Figs. 1H, 5 E-F) and three fascicles, the anterior one with 4-6, the second one with 4-6, and the posterior one with 11-14 supplements. The supplements papilliform with an apical pore and, within each fascicle, tightly connected to each other, forming a contiguous longitudinal series. They are flanked by narrow grooves, a rugose area and longitudinal ridges. The last may be more or less continuous or broken up in several (usually three) parts; subventral pores may open on these ridges (Fig. 5 A-D). About halfway in between the posterior fascicle and the cloacal opening there is a pair of papilliform protuberances on top of which subventral pores open. There is no «kopulationshöcker».

Spicules rather slender, ventrally arcuate, with median piece and pointed tip (Figs. 1I, 5 E-F); 62-67 µm long medially ($\bar{x}$ = 64; n = 6). Lateral guiding piece curved distally, ending in a prong-like apex (Fig, 1J), 13-16 µm long ($\bar{x}$ = 14; n = 6).

TABLE I - *Dimensions of* Parastomachoglossa perplexa.

	Females	Males
n	4	6
L mm	2.84 (2.65-2.93)	2.62 (2.43-3.03)
a	47 (38-57)	52 (48-57)
b	5.1 (5-5.3)	5 (4.5-5.4)
c	14 (12-15)	79 (63-97)
c'	9 (8-10)	0.8 (0.7-0.9)
V/VD	43 (42-45)	46 (44-49)
G_1	15 (13-17)	15 (11-18)
G_2	18 (16-20)	16 (14-17)
Odontostyle µm	22	22 (21-23)
Pharynx µm	590 (580-602)	576 (567-587)
Tail µm	215 (207-225)	30 (24-32)
Odontostyle/LW	1.7	1.8 (1.7-1.9)
Prerectum µm	199 (183-237)	422 (380-465)
Rectum/cloaca	49 (47-55)	53 (52-55)
Spicula µm		64 (62-67)

Female tail elongate conoid with pointed tip and two pairs of caudal pores (Fig. 3C), 8-10 anal body widths long. Male tail short, dorsally convex- conoid, less than the anal body width long; with at least five caudal pores and papillae that are, however, very faint and difficult to observe.

Discussion

P. perplexa and *P. costata* are similar in many aspects, viz. the shape and structure of the pharynx, lip region, cuticle, vulva, vagina, copulatory apparatus, overall structure of the cheilostome and position of the anterior sensilla. For the last character it should be mentioned that re-examination of *P. costata* has demonstrated that most specimens also have a 10 + 6 arrangement, instead of the 6 + 4 + 6 arrangement described by Coomans and Loof (1986). Hence the two species are also similar in that respect. Differences remain in the dimensions: smaller body size (2.43-3.05 mm vs 3.07-4.38 mm) and shorter odontostyle (21-23 μm vs 31-35 μm) in *P. perplexa*. The two species differ also in the following details (the first refers to *P. perplexa*, the second to *P. costata*): cheilostome with four intermediate denticles vs one; radial spikes between sclerotized ring faint vs prominent; amphidial fovea a shallow vs a deep pocket; medioventral supplements in three vs two fascicles; lateral guiding pieces distally curved vs straight.

On the basis of the above observations a new definition of the genus *Parastomachoglossa* Coomans and Loof, 1986 is given.

Genus PARASTOMACHOGLOSSA Coomans *et* Loof, 1986

Actinolaimidae. Actinolaiminae. Cuticle thick, with

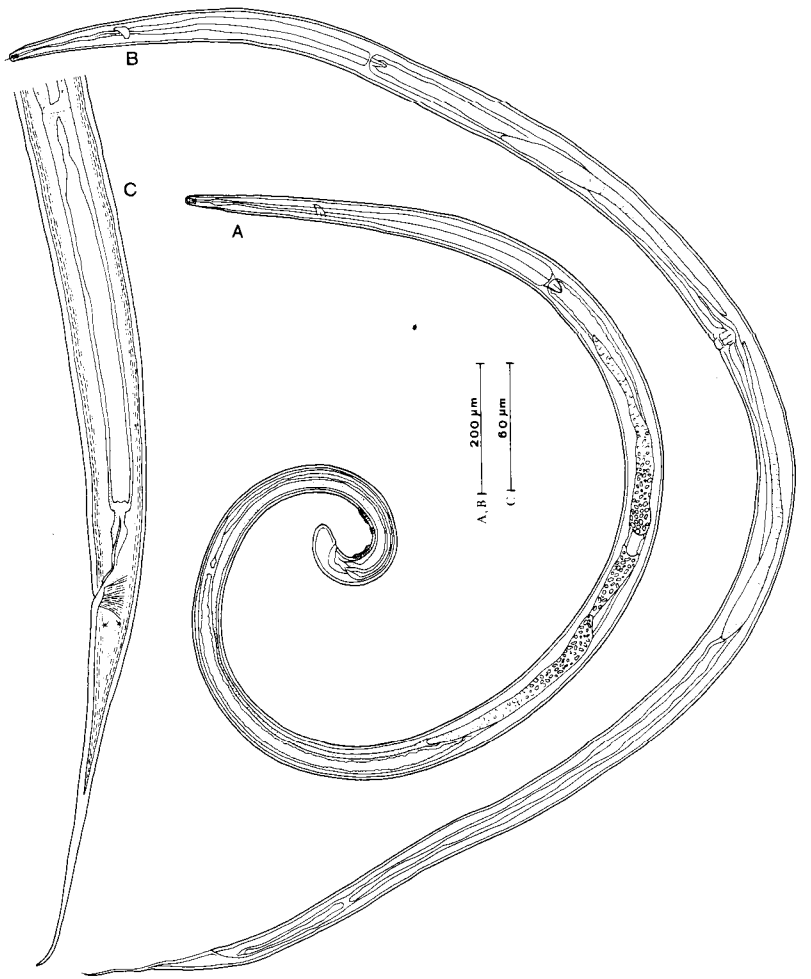

Fig. 3. *Parastomachoglossa perplexa*. A: Male, entire. B: Female, entire. C: Posterior end of female.

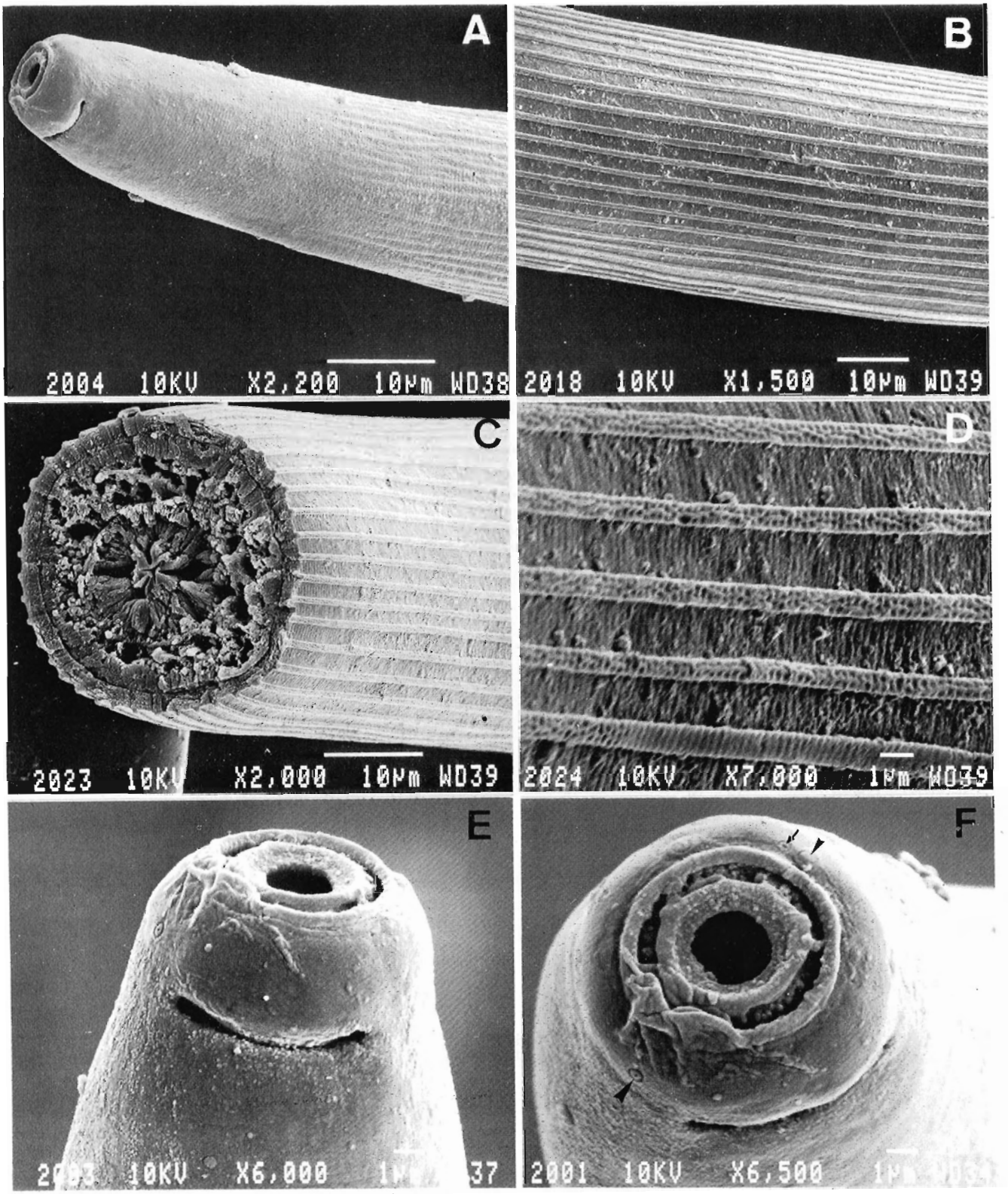

Fig. 4. *Parastomachoglossa perplexa* male. A: Anterior end. B: Longitudinal ridges, mid-body. C: Section at level of pharyngeal bulb. D: Longitudinal ridges and transverse striae. E: Head end in lateral view. F: En face view showing inner labial papillae (arrowheads) and an adjacent cephalic papilla (small arrow).

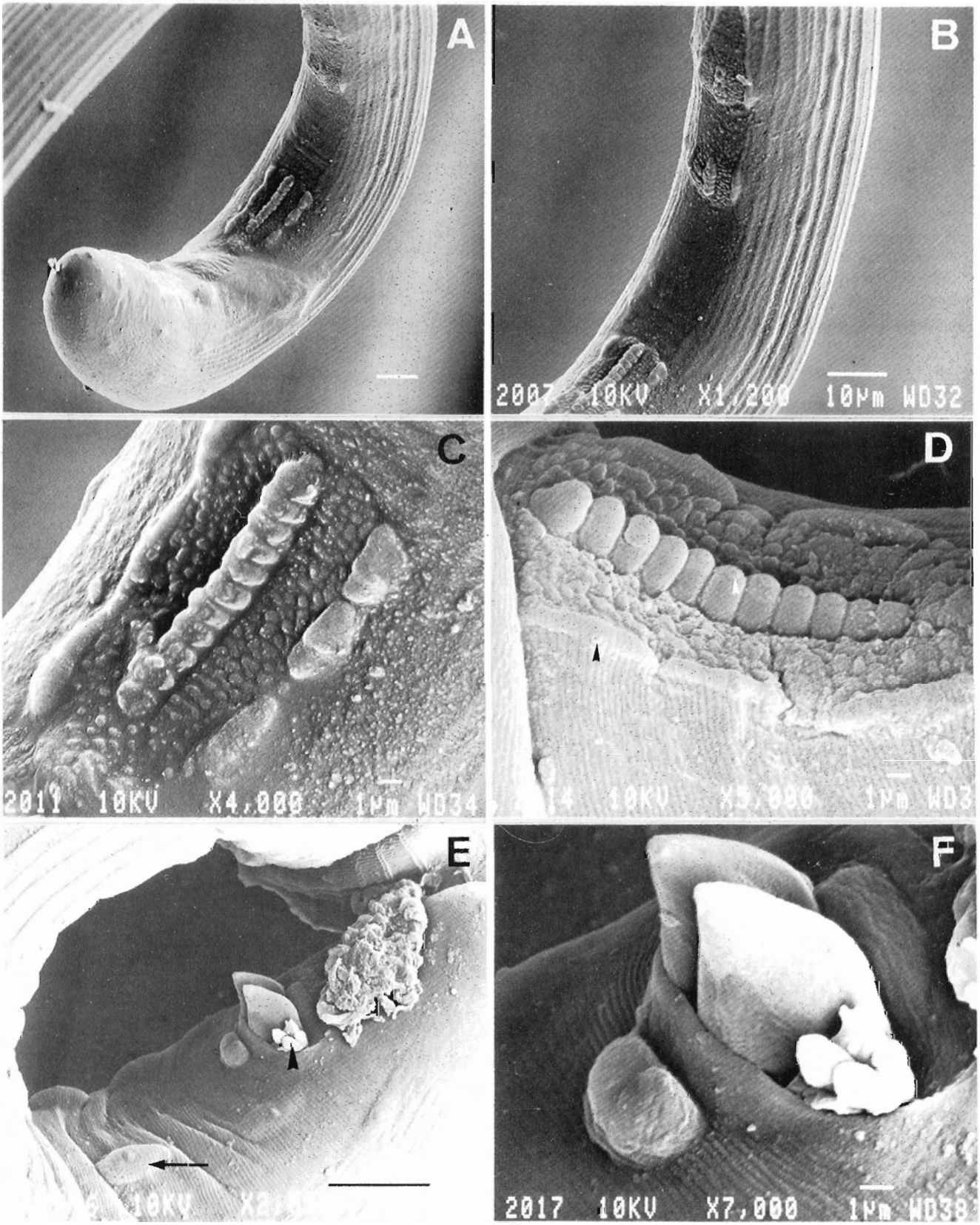

Fig. 5. *Parastomachoglossa perplexa* male. A: Posterior body region. B: Precaudal body region. C-D: Posterior fascicle in ventral (C) and oblique lateral view (D), black arrowhead points to a subventral pore, and white arrowhead to apical pore of a supplement. E: Tail region showing paired mamilliform protuberances (arrow), paired adanal supplements (on anterior cloacal lip), protruded spicule tips and protruded lateral guiding piece (arrowhead). F: Detail of E. Bars equal 10 µm in A and E.

prominent longitudinal ridges. Lip region wide and low, ratio 2.5-3.5. Vestibular ring double and sclerotized. Cheilostome provided with four large onchia: in between them one to four narrow denticles arising from the same basis are present. Odontostyle robust, axe-shaped. Pharynx tripartite, with an anterior hyaline tube, a median gradually widening muscular portion and a posterior evenly enlarged muscular part. The median portion is longer or at least as long as the anterior one. Genital system didelphic in females and diorchic in males. Vagina muscular, its junction to vulva lightly sclerotized. Vulva longitudinal. Male supplements concentrated into two or three fascicles. Tail elongate in females, short and rounded in males.

The genus *Parastomachoglossa* can be distinguished from *Actinca*, *Stomachoglossa* and *Brasilaimus* by the shorter stomatal tube and the longer median portion of the pharynx, by the more robust, axe-shaped odontostyle and by the lower lip region. From *Actinolaimus* it can be distinguished mainly by the tripartite pharynx with a long hyaline tube and by the longer, axe-shaped odontostyle.

Key to the species of Parastomachoglossa

1. Odontostyle length 2.6 lip region widths — *P. taylori*
   Odontostyle length not more than two lip region widths — 2
2. Body length over 3 mm; male supplements in two fascicles — *P. costata*
   Body length under 3 mm; male supplements in three fascicles — *P. perplexa*

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