

TWO NEW SPECIES OF APORCELAIMELLUS HEYNS, 1965
(NEMATODA: DORYLAIMIDA) FROM THE TROPICS

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This paper provides descriptions of two new *Aporcelaimellus* species. *Aporcelaimellus amazonicus* sp. n. from Brazil is characterized by its size ranged between 1.5 and 2 mm, unusually narrow vulval lips, very thick vagina, and tail measuring one to one and a half anal body widths and possessing a sharply pointed projection. *Aporcelaimellus insularis* sp. n. from the Seychelle Islands is characterized in having very robust body less than 1.5 mm, heart-shaped vulval lips, very short prerectum and half an anal body width long, mammillate tail. The shape of tail is particularly characteristic for both species.

Key words: *Aporcelaimellus*, Brazil, new species, Seychelles

The genus *Aporcelaimellus* HEYNS, 1965 belongs to the taxonomically rather difficult genera of Nematoda. In a recent paper (ANDRÁSSY 2002), I gave an up-to-date overview of this genus, and enumerated 86 nominal species. Less than half of them, 41 species may be treated as (probably) independent representatives in *Aporcelaimellus*, 17 are synonyms, 24 have already been transferred, or should be transferred, respectively, to other genera, while 4 species are of uncertain taxonomic value (*inquirendae*). The genus itself is easily distinguished. It belongs to the family Aporcelaimidae, and contains robust animals of 0.8 to 3.5 mm body length. They are characterized by strongly separated labial region, double layers of cuticle showing different refraction, short and strong stylet with large aperture, in entire length muscular oesophagus, sclerotized vulva, paired gonads, in each sex similar, short tail, and greatly expanded somatic muscle bands in dorsal side of the hind body. Males rare, or unknown in several species.

How clearly *Aporcelaimellus* is outlined, all the more difficult is to recognise its species. Relatively few of them are unambiguously defined, several are insufficiently described and/or have not been found yet since their descriptions. In this paper two new *Aporcelaimellus* species are presented. They show well the main morphological patterns of the genus on the one hand, and can, especially in structure of tail, easily be differentiated from every known species on the other hand.

MATERIALS AND METHODS

The two species described herein were found in soil samples collected in tropical zones of the Earth, one in Brazil, the other in the Seychelle Islands. The samples were fixed *in situ* in FAA, the nematodes were then isolated in the laboratory, fixed again, processed to anhydrous glycerine using a slow method, and mounted on permanent glass slides. Measurements were taken by an ocular micrometer, curved structures were measured along the medial line. Drawings were made using a drawing tube attachment. The type material is deposited in the Department of Zoology of the Hungarian Natural History Museum (Budapest, Hungary).

DESCRIPTIONS

***Aporcelaimellus amazonicus* sp. n.**

(Figs 1 A–D, 2 A–C and 3 A–B)

Holotype (female): L = 1.62 mm; a = 25; b = 3.5; c = 41; c' = 1.1; V = 49 %. Odontostyle 26 μ m. *Paratype (females)* (n = 2): L = 1.63–1.73 mm; a = 21–23; b = 4.3–4.4; c = 36–41; c' = 1.0–1.5; V = 44–45%. Holotype female on slide 14772. Paratypes: two females. Type locality and habitat: Iquitos in Brazil, primary rain forest along the River Amazonas, soil from around trees, collected November 1971 by J. BALOGH.

Body plump, C-shaped after fixation, in anterior half hardly, in posterior half more strongly curved, 65–77 μ m wide at mid-region. Cuticle smooth, 2.8–3.5 μ m in most part of body and 4.4–4.8 μ m on dorsal side of tail. Under optical microscopy, it consists of two layers (especially distinct on tail), of which the outer layer is thin and more transparent, the inner layer thicker and more “solid” and of other refraction. Labial region 18–19 μ m wide (a' = 85–96)*, sharply set off by a constriction; lips moderately separated from one another, more or less angular. Body at posterior end of stylet 1.7–1.9 times, at posterior end of oesophagus 3.5–4.5 times as wide as head. Amphid almost as wide as two-thirds of corresponding body diameter.

Odontostyle strong, 24–26 μ m long and 4.5–5.0 μ m thick, or 5.7–6.3% of oesophagus length, 1.3–1.4 times as long as labial width, and twice as thick as cuticle at the same level. Ventral wall of stylet thicker than dorsal wall. Aperture equal to half length of stylet. Guiding apparatus aporcelaimoid, its ring surrounding the first quarter of stylet. Oesophagus 380–450 μ m, occupying 23–28% of entire length of body, its anterior section also muscular, gradually enlarging at 47–51% of its length. Oesophageal gland nuclei more or less conspicuous; dorsal nucleus at 15% of body length. Glandularium 130–180 μ m long. Cardia elongate-conoid, dorsally with a separate unicellular body

Oesophageal gland nuclei in *Aporcelaimellus amazonicus*

D = 60–66%	AS ₁ = 20–22%
	AS ₂ = 34–35%
	PS ₁ = 63–68%
K = 59–63%	PS ₂ = 66–70%

* Ratio a' = body length divided with labial width.

(gland?). Distance between posterior end of oesophagus and vulva 1.0–1.3 times as long as oesophagus. Prerectum short and spacious, 1.7–2.4, rectum 1.1–1.6 times anal body diameter.

Female. Amphidelphic with equally developed gonads. Vulva transverse, with strongly sclerotized but unusually narrow, 9 μm long inner lips. Whereas, vagina very thick; vulva + vagina equal to 24–29 μm , or occupying about one-third of body diameter. Each genital tract 2.6–3.2 body

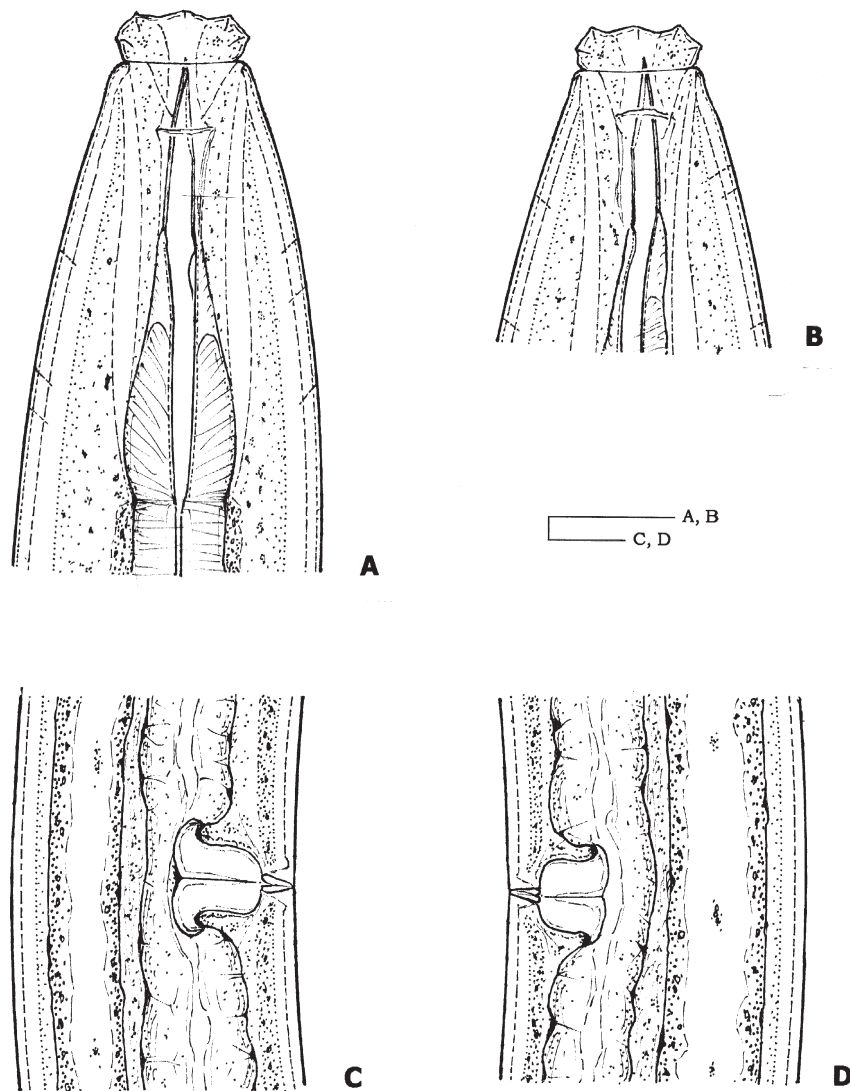


Fig. 1. *Aporcelaimellus amazonicus* sp. n. A–B: anterior ends; C–D: vulval regions (note the long and narrow vulval lips). (Scale bars 20 μm each)

widths long, occupying 12–13% of body length. Each uterine branch about 1.5 body widths long, oviduct transversely striated, proximal with spermatheca-like swelling; the latter and uterus separated by a sphincter muscle from each other. Neither eggs, nor sperms were observed. Distance vulva–anus equal to 18–22 tail lengths. Female tail 40–48 μm , one to one and a half times as long as anal body diameter, 2.4–2.8% of body length, conoid-rounded with sharply pointed terminal projection. Ventral contour of tail convex, dorsal contour concave; projection 10–13 μm long, slightly or strongly bent dorsally. Two pairs of subdorsal caudal papillae lying close to each other.

Male. Not found.

Diagnosis. A middle-sized, rather robust nematode species with sharply separated head, strong stylet, aperture occupying half of the stylet length, an oesophagus widening at its middle, comparatively back positioned dorsal nucleus, slender vulval lips, thick vagina, and with 1.0–1.5 anal body diameters long, sharply pointed tail.

Remarks. By virtue of the characteristic shape of tail: possessing a comparatively long and sharply tipped projection, *Aporcelaimellus amazonicus* sp. n. is unique within the genus. Among the members of *Aporcelaimellus*, 18 species are known each showing concave contour on the dorsal side of tail. If we compare the

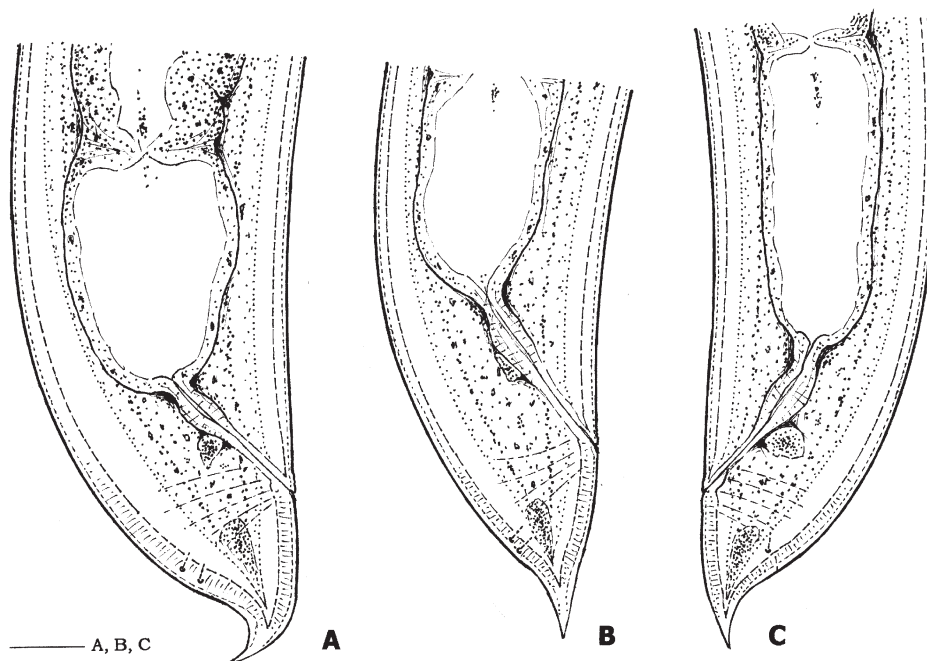


Fig. 2. *Aporcelaimellus amazonicus*. A–C: Posterior ends of three females (C: holotype.) (Scale bar 20 μm)

tail of the present Brazilian species with the tails of those illustrated in Figures 4 A–I and 5 A–I, it can be seen that *A. amazonicus* is immediately differentiated from each of them. In other words, a tail showing such a long, well separated and sharply pointed tip nowhere occurs within the genus. Another distinguishing character is found in the shape of the sclerotized vulval lips which are longer and narrower than is usual in the genus.

MEYL (1956 and 1957) described two *Aporcelaimus* species from Brazil which were later transferred to *Aporcelaimellus*: *A. gerlachi* (MEYL, 1956) HEYNS, 1965 and *A. seinhorsti* (MEYL, 1957) HEYNS, 1965. In comparing the three Brazilian species, we see that our new species differs from *gerlachi* in having a shorter body (1.6–1.7 mm compared with 1.9–2.3 mm), non-punctuated cuticle, longer stylet (24–26 μm compared with 20–21 μm), more anterior vulva (at 44–49% compared with 53–56%) and sharply pointed tail. It differs from *seinhorsti* in having a shorter and plumper body (1.6–1.7 mm, $a = 21\text{--}25$ compared with 2.35 mm, $a = 33$), smooth cuticle, longer stylet (1.3–1.4 labial widths compared with one labial width), and pointed tip of tail.

Etymology. The species is named after Amazonia, the greatest rain forest region on Earth.

***Aporcelaimellus insularis* sp. n.**
(Figs 3 C–D, 6 A–D and 7 A–C)

Holotype female: L = 1.39 mm; $a = 18$; $b = 3.7$; $c = 57$; $c' = 0.6$; V = 54 %. Odontostyle 28 μm .

Paratype females (n = 8): L = 1.20–1.46 mm; $a = 14\text{--}18$; $b = 3.3\text{--}3.9$; $c = 63\text{--}70$; $c' = 0.5\text{--}0.6$; V = 52–54 %. Holotype female on slide No. 14793. Paratypes: twenty-one females and eleven juveniles. Type locality and habitat: Le Niol, Seychelle Islands, 300 m above sea-level, moist soil from rocks. – Further localities on Seychelle Islands: Morne Blanc, 500 m above sea-level, rain forest, soil with roots; Praslin, Vallee de Mai, detritus from rocks; collected June 2000 by L. HUFNAGEL.

Body very robust, 68–96 μm wide at mid-region, in consequence of fixation C- or G-shaped. Cuticle smooth, 2.5–3.0 μm thick and 5.5–7.0 μm thick on dorsal side of tail, consisting of the two usual layers of different refraction; inner layer thicker than outer. Labial region 18–20 μm wide ($a' = 65\text{--}80$), set off by a deep constriction. Lips more or less fused, rounded. Body at posterior end of stylet 1.9–2.0 times, at posterior end of oesophagus 3.4–4.2 times as wide as head. Amphid more than half as wide as corresponding body.

Odontostyle strong, 28–30 μm long and 5 μm thick, 1.4–1.5 times as long as labial width, 7.8–8.0% of oesophagus length, much thicker than cuticle; its ventral wall about twice as thick as dorsal wall. Guiding apparatus aporcelaimoid, dorsally thicker than ventrally. Oesophagus 360–406 μm long, occupying 26–30% of body length, muscular in its entire length, fairly suddenly widened at 43–48%. Glandularium 148–188 μm long. Out of the oesophageal gland nuclei, the dorsal nucleus and the two posterior sublateral nuclei are most conspicuous. Dorsal nucleus at 15–17% of entire length of body. Cardia conoid with a dorsal unicellular body. Distance between posterior end of oe-

sophagus and vulva as long as or somewhat shorter than oesophagus. Intestine, especially in its posterior half, heavily folded. Prerectum often very spacious, thin-walled, short, 1.0–1.8, rectum 1.0–1.5 anal body widths long.

Oesophageal gland nuclei in <i>Aporcelaimellus insularis</i>	
D = 55–60%	AS ₁ = 18–20%
	AS ₂ = 38–41%
	PS ₁ = 65–67%
K = 47–50%	PS ₂ = 66–68%

Female. Amphidelphic with equally developed gonads occupying 28–32% of body length. Vulva transverse with strongly sclerotized, heart-shaped inner lips (sclerotized pieces). Vagina (together with vulval lips) 29–33 μm , occupying one-third or more of body width. Each gonad 2.4–2.8 times as long as body diameter. In younger females (without eggs) each branch of uterus hardly longer than one body width. Oviducts short and narrow. One egg at a time, 78–80 \times 40–45 μm , nearly as long as body width. Spermathecae in egg-bearing females filled with oval spermatozoa. Vulva–anus distance 25–33 times as long as tail. Tail quite short, only half the anal body diameter, ventrally convex, dorsally initially also convex, but near the tip becoming profoundly concave, provided with a 4–6 μm long, sharply offset, dorsally bent conoid peg.

Male. Not observed.

Juvenile. Its tail is quite similar to the female tail.

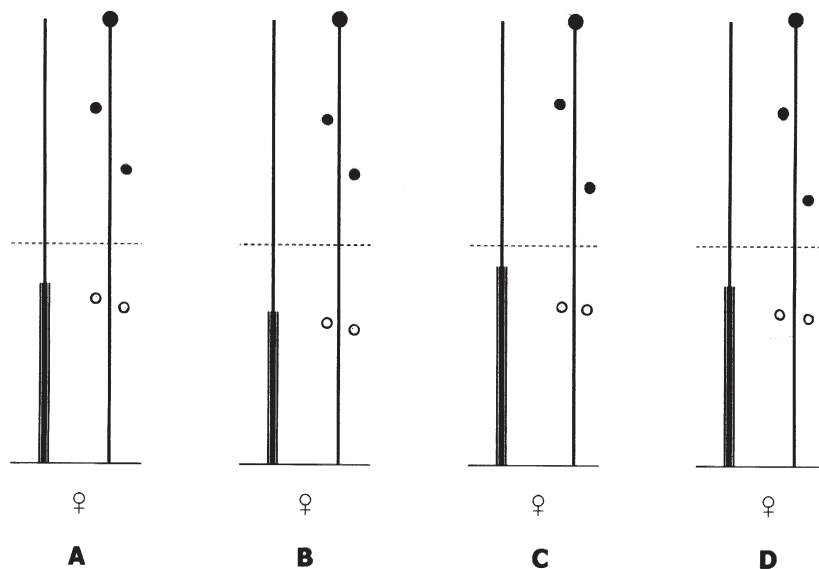


Fig. 3. Maps of oesophageal gland nuclei in the two new *Aporcelaimellus* species. A–B: *A. amazonicus* sp. n., two females; C–D: *A. insularis* sp. n., two females

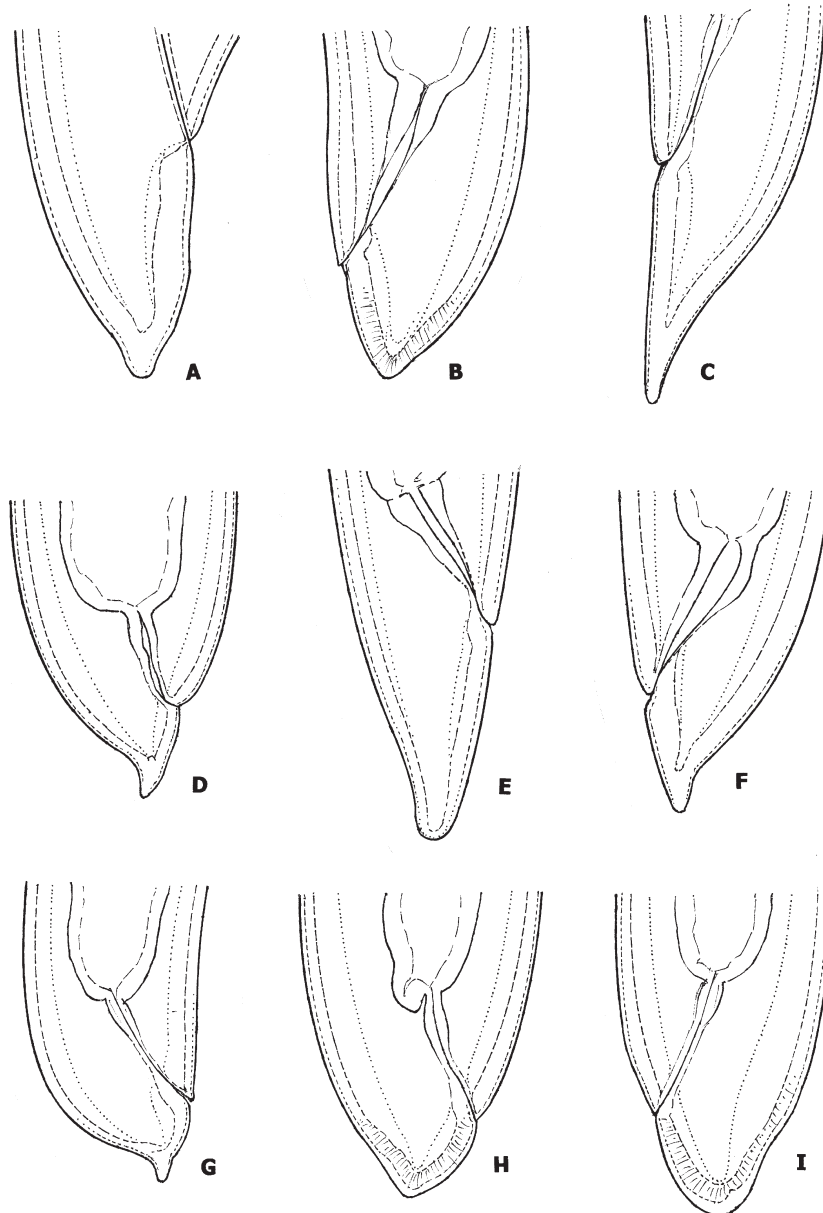


Fig. 4. Schematic drawings of tails of nine *Aporcelaimellus* species each showing concave contour on dorsal side (tails subdigitate, digitate or mammillate). A: *A. estonicus* (KRALL, 1957); B: *A. cocophilus* (LOOS, 1949); C: *A. chauhani* BAQRI et KHERA, 1975; D: *A. gerlachi* (MEYL, 1956); E: *A. maitai* YEATES, 1967; F: *A. kikereensis* BAQRI et COOMANS, 1973; G: *A. paracentrocercus* (DE CONINCK, 1935); H: *A. pycnus* (THORNE, 1939); I: *A. alius* ANDRÁSSY, 2002

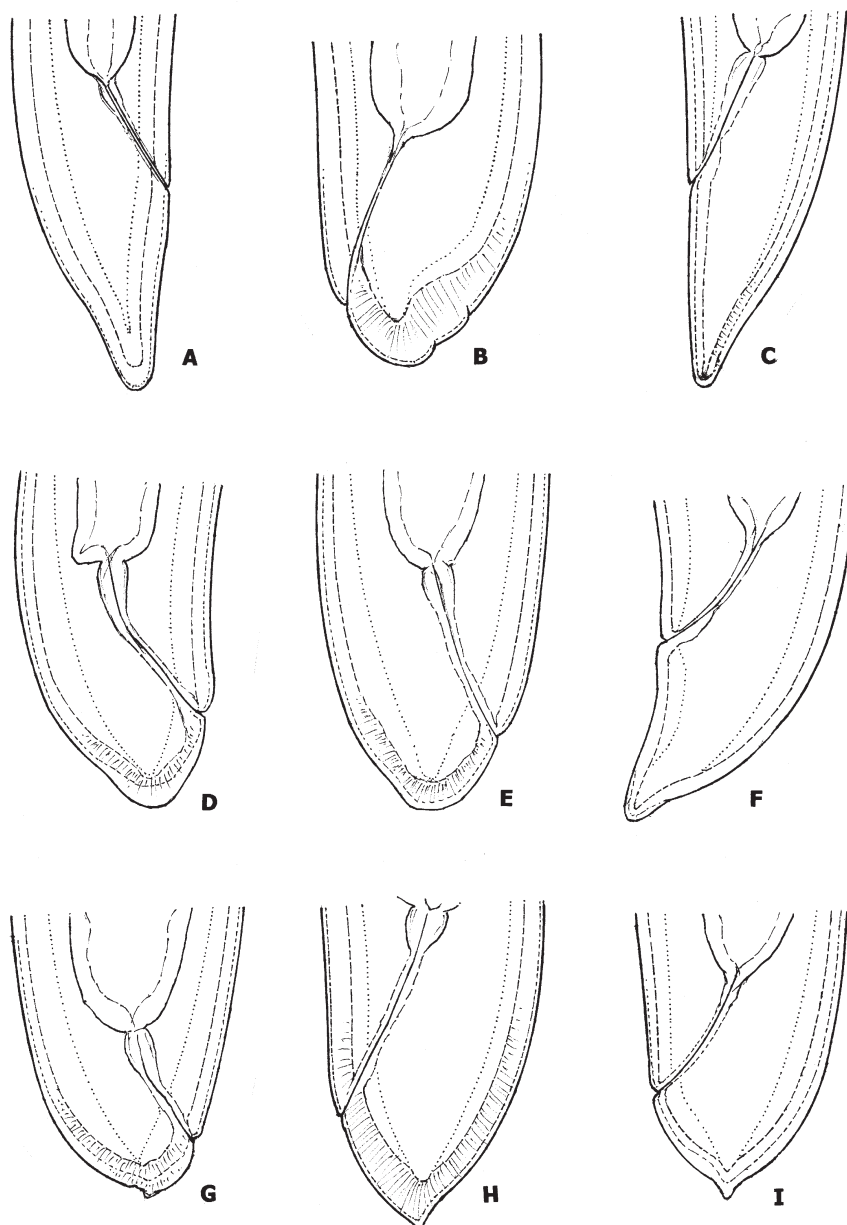


Fig. 5. Schematic drawings of tails of nine *Aporcelaimellus* species each showing concave contour on dorsal side (tails subdigitate, digitate or mammillate). A: *A. heynsi* BAQRI et JAIRAJPURI, 1968; B: *A. duhouxi* (ALTHERR, 1963); C: *A. glandus* BOTHA et HEYNS, 1991; D: *A. samarcandicus* (TULAGANOV, 1949); E: *A. medius* ANDRÁSSY, 2002; F: *A. seinhorsti* (MEYL, 1957); G: *A. krygeri* (DITLEVSEN, 1928); H: *A. malagasi* HEYNS, 1996; I: *A. stilus* (KIRJANOVA, 1951)

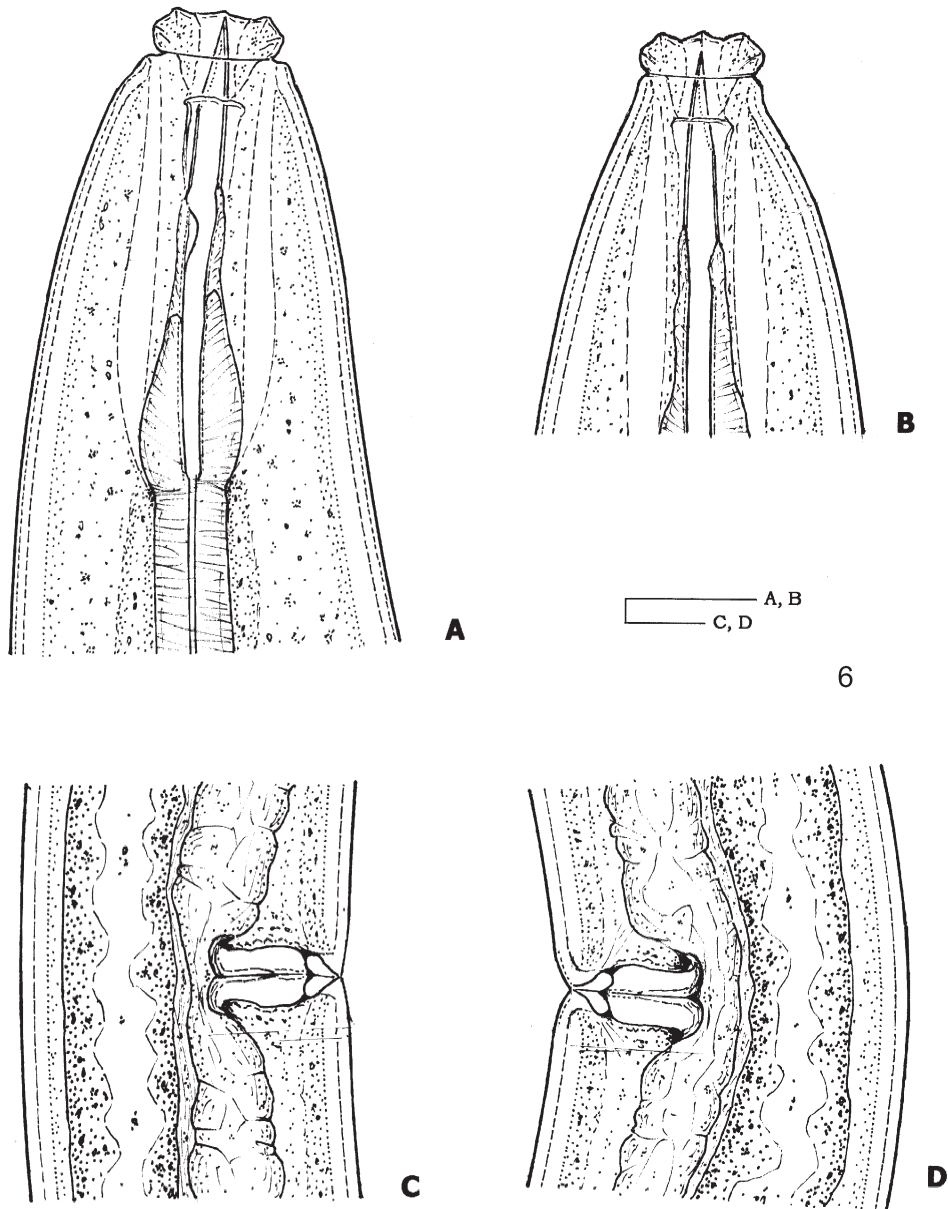


Fig. 6. *Aporcelaimellus insularis* sp. n. A–B: anterior ends; C–D: vulval regions (note the heart-shaped vulval lips). (Scale bars 20 μ m each)

Diagnosis. A very robust, middle-sized species with offset head, strong stylet, aperture occupying half of the stylet length, at middle enlarged oesophagus, heart-shaped vulval lips, short and wide prerectum and with short, dorsally concave tail possessing a dorsally curved peg.

It shall be emphasized that the structure of the tail appears as if it is very permanent within this species: all the 22 females and 11 juveniles studied show the same tail shape.

Remarks. *Aporcelaimellus insularis* sp. n. belongs to the short-tailed (c' shorter than 1) members of the genus, and among them, to those possessing a mammillate tail. They are *A. gerlachi* (MEYL, 1956), *A. kikereensis* BAQRI et COOMANS, 1973, *A. krygeri* (DITLEVSEN, 1928) HEYNS, 1965, *A. malagasi* HEYNS, 1996, *A. paracentrocercus* (DE CONINCK, 1935) BAQRI et COOMANS, 1973 and *A. stilus* (KIRJANOVA, 1951) ANDRÁSSY, 1986. In its very characteristic tail structure, the new species is clearly distinguished from each species listed above (see Figs 7 A–C, 4 A–I and 5 A–I). Furthermore, it differs from *gerlachi*: body shorter (vs. 1.9–2.2 μm), stylet longer (vs. 20–21 μm), prerectum shorter (vs. 3.5–4.0 anal body diameters), tail shorter (vs. $c' = 1$) and other shaped; from *kikereensis*: vulva more anterior (vs. 60–61%), tail shorter (vs. $c' = 1$) with sharply separate peg; from *malagasi*: body shorter (vs. 2.2–3.3 mm), cuticle without punctuation, stylet comparatively longer (vs. 1.0–1.1 labial diameters long) with shorter aperture (vs. two-thirds of stylet length), terminal peg of tail offset and dorsally directed; from *krygeri*: body shorter (vs. 2.5–3.0 mm), a' value smaller (vs. 110–115), tail peg off-

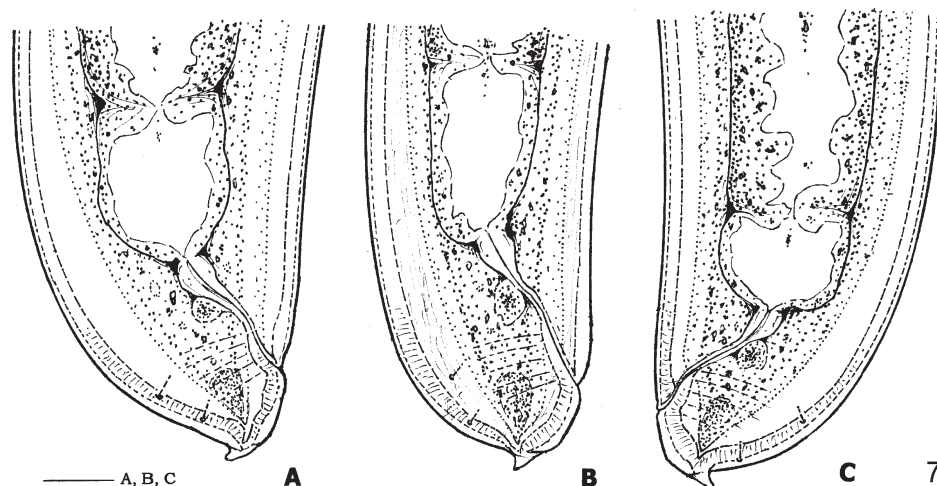


Fig. 7. *Aporcelaimellus insularis* sp. n. A–C: posterior ends of three females (B: holotype). (Scale bar 20 μm)

set and dorsally bent; from *paracentrocercus*: body smaller (vs. 1.8–1.9 mm), gonads much shorter (vs. 40–50% of body length), terminal peg shorter and dorsally curved; from *stilus*: body shorter (vs. 1.9–2.3 mm), oesophagus longer (vs. $b = 4.5–4.8$), terminal peg offset and dorsally directed.

Etymology. The species name *insularis* (Latin) means: island-inhabiting, or an islander, and refers to the type locality, the Seychelles, where this new species seems to be generally distributed.

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