

TWO NEW SPECIES OF *APORCELAIMELLUS*
(NEMATODA: DORYLAIMIDA) FROM THE AMERICAS

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This paper provides the descriptions and illustrations of two new species of the nematode genus *Aporcelaimellus* (family Aporcelaimidae). *Aporcelaimellus salsus* sp. n. from the United States is characterized by the medium-sized body, short odontostyle, unsclerotized vulva, conical, dorsally not concave tail with distinctly separated layers of terminal cuticle. *Aporcelaimellus acaudatus* sp. n. from Ecuador is distinguished by the large body, sclerotized vulva and especially by the exceedingly short and blunt tail with strongly thickened inner layer of terminal cuticle.

Key words: *Aporcelaimellus*, description of new species, Ecuador, United States.

INTRODUCTION

Within the superfamily Dorylaimoidea, *Aporcelaimellus* HEYNS, 1965 is one of the more problematic genera. According to ANDRÁSSY (2009), 57 (probably) valid species can be listed under it. The difficulty in their identification and systematization is due to the often very similar morphological structures, on the one hand, and to the inadequate descriptions particularly of the older species, on the other.

Nevertheless, the genus *Aporcelaimellus* itself is well-defined. The mostly large (to over 3 mm) and robust body, strongly offset lip region, commonly present cervical lacuna between the cuticle and the longitudinal muscle band, short and thick odontostyle with large aperture, aporcelaimoid guiding apparatus, pharynx at its middle expanded, short prerectum, amphidelphic female genital system, transverse vulva, short, more or less conoid or bluntly rounded tail as well as the rarely occurring males clearly characterize it. There is still another very important morphological structure: the two layers of the cuticle are, under optical microscopy, conspicuously different in structure. The outer layer is simple, transparent like in other dorylaimoid genera, the inner layer shows however a different refraction, it is “darker”, not so transparent, very finely radially striated and conspicuously thickened on the tail. Among the Dorylaimoidea only two genera, *Makatinus* HEYNS, 1965 (with 10 species) and the quite recently established *Aporcelinus* ANDRÁSSY, 2009 (with 9 species), possess a similarly structured cuticle. They differ from

Aporcelaimellus: Makatinus by the not or scarcely separated lip region and the unusual arrangement of the adcloacal supplements of males being present in multiple pairs; *Aporcelinus* by the thinner cuticle barely thickened on the tail, presence of a dorsal cardinal lobe, bumpy eggshell, and by the unusually small ventromedial supplements of males arranged continuously with the adanal pair.

The species of *Aporcelaimellus* can be differentiated from one another by their body size, spear length, structure of the vulval labia, and particularly by the shape and length of the tail. Further distinguishing characters can be found in the shape of the labial region, presence or absence of cervical lacunae, position of the pharyngeal gland nuclei, structure of the genital organs, number of the male supplements, etc.

In this article two species of *Aporcelaimellus* are presented which distinctly show the main morphological criteria of the genus, at the same time, however, differ in certain morphological peculiarities from every known species. These new species were found in soil samples in the Americas, one in North America (United States), the other in South America (Ecuador).

MATERIAL AND METHODS

The soil samples were fixed *in situ* in 4 percent formaldehyde solution. The nematodes were isolated in the laboratory by decantation, fixed in formaldehyde again, processed to anhydrous glycerine by a slow evaporation method, and mounted on permanent glass slides. Measurements were taken by an ocular micrometer, curved structures were measured along the medial line. Illustrations were made with the aid of a drawing tube attachment.

DESCRIPTIONS

***Aporcelaimellus salsus* sp. n.**

(Fig. 1 A–G)

Holotype female. L = 1.54 mm; a = 25; b = 3.7; c = 35; c' = 1.3; V = 52 %.

Paratype females (n = 4). L = 1.57–1.88 mm; a = 24–26; b = 3.7–3.9; c = 35–44; c' = 1.2–1.3; V = 46–52 %.

Type specimens. Holotype female on slide No. 15001. Paratypes: three females and two juveniles. They will be deposited at the zoological collection of the Hungarian Natural History Museum, Budapest.

Type habitat and locality. Soil in a cherry orchard on the southern shore of Great Salt Lake, Utah, United States; collected in September 1992 by A. FODOR (Wooster, Ohio, USA).

General characters. Body moderate in size, robust, more or less ventrally curved upon fixation, 61–66 μm wide at its middle region. Cuticle smooth, 2.2–2.8 μm thick on most part of body, and 5–7 μm thick on tail, consisting of the usual two layers of different refraction. Both layers are nearly equally thick on the anterior half of the body, but the inner layer becomes thicker on the posterior region, particularly on the tail. Body pores only in the neck region conspicuous, in other regions obscure. Lip region 19–20 μm wide, offset by a deep constriction, lips large, rounded and separated. Body at posterior end of pharynx 3.1–3.6 times as wide as head. Amphids cup-shaped, half as wide as corresponding body width. Lacuna on neck between cuticle and longitudinal muscle band practically absent.

Odontostyle relatively short, 18–19 μm , nearly as long as labial diameter, aperture occupying three-fifths spear length. Guiding apparatus aporcelaimoid. Pharynx strong, 412–432 μm long, expanded near its middle. Dorsal pharyngeal gland nucleus located at 59–61% of pharynx length or 15–16% of entire length of body. Other nuclei rather inconspicuous; in one female they are located as follows: AS1 = 20%, AS2 = 32%, PS1 = 66% and PS2 = 68%. Glandularium 164–170 μm long.

Female. Amphidelphic with genital branches 2.6–3.2 body widths long or occupying 11–13% of body length each. Anterior branch situated on the right, posterior on the left side of intestine. Vulva a transverse slit with unsclerotized inner lips. Vagina 24–26 μm long, occupying about 40% of corresponding body diameter. Uterus a simple tube; uterus–oviduct junction marked by a sphincter. No uterine eggs observed. Prerectum 3.0–4.5, rectum 1.2–1.3 anal body widths long. Vulva–anus distance equal to 16–23 tail lengths. Tail somewhat longer than anal body width, conical with narrowly rounded tip, 36–46 μm long; its ventral contour straight or slightly convex, its dorsal contour slightly convex. On the tip of the tail, the thin outer layer and the thicker inner layer of the cuticle are separated from each other, and surround a small but distinct lacuna.

Male. Not found.

Diagnosis and relationships. A medium-sized *Aporcelaimellus* species with short odontostyle, pharynx expanded at the mid-region, unsclerotized vulva, relatively long prerectum, conical, dorsally slightly convex tail, and with separated cuticle layers on the tip of tail. Especially the unsclerotized vulva and the shape and structure of the tail characterize this species.

On the basis of the tail shape, the members of the genus *Aporcelaimellus* may be divided into two large groups: species where the dorsal contour of the tail is concave at least near its tip, and those where the dorsal contour is straight or more or less convex (never concave). The new species belongs to the second group. According to the key to *Aporcelaimellus* species by ANDRÁSSY (2002), there are three species in that group which possess an odontostyle shorter than 30 μm as well as an unsclerotized vulva: *A. adriaani* BOTHA et HEYNS, 1990, *A. papillatus* (BASTIAN, 1865) BAQRI & KHERA, 1975 and *A. parapapillatus* BOTHA et HEYNS, 1990. *Aporcelaimellus salsus* sp. n. can be differentiated from all of them by having strongly separated cuticle layers on tail tip. Furthermore, it differs from *A. adriaani* by the longer body (1.5–1.9 vs 1.2–1.5 mm), wider lip region (19–20 vs 12–15 μm), longer odontostyle (18–19 vs 14–16 μm), and by the tail longer than one anal body diameter ($c' = 1.2\text{--}1.3$ vs $0.9\text{--}1.1$, or 36–44 vs 21–30 μm). It differs from *A. papillatus* (as redescribed by THORNE & SWANGER 1936, and DE BRUIN & HEYNS 1992) by the shorter body (1.5–1.9 vs 2.1–2.8 mm), wider lip region (19–20 vs

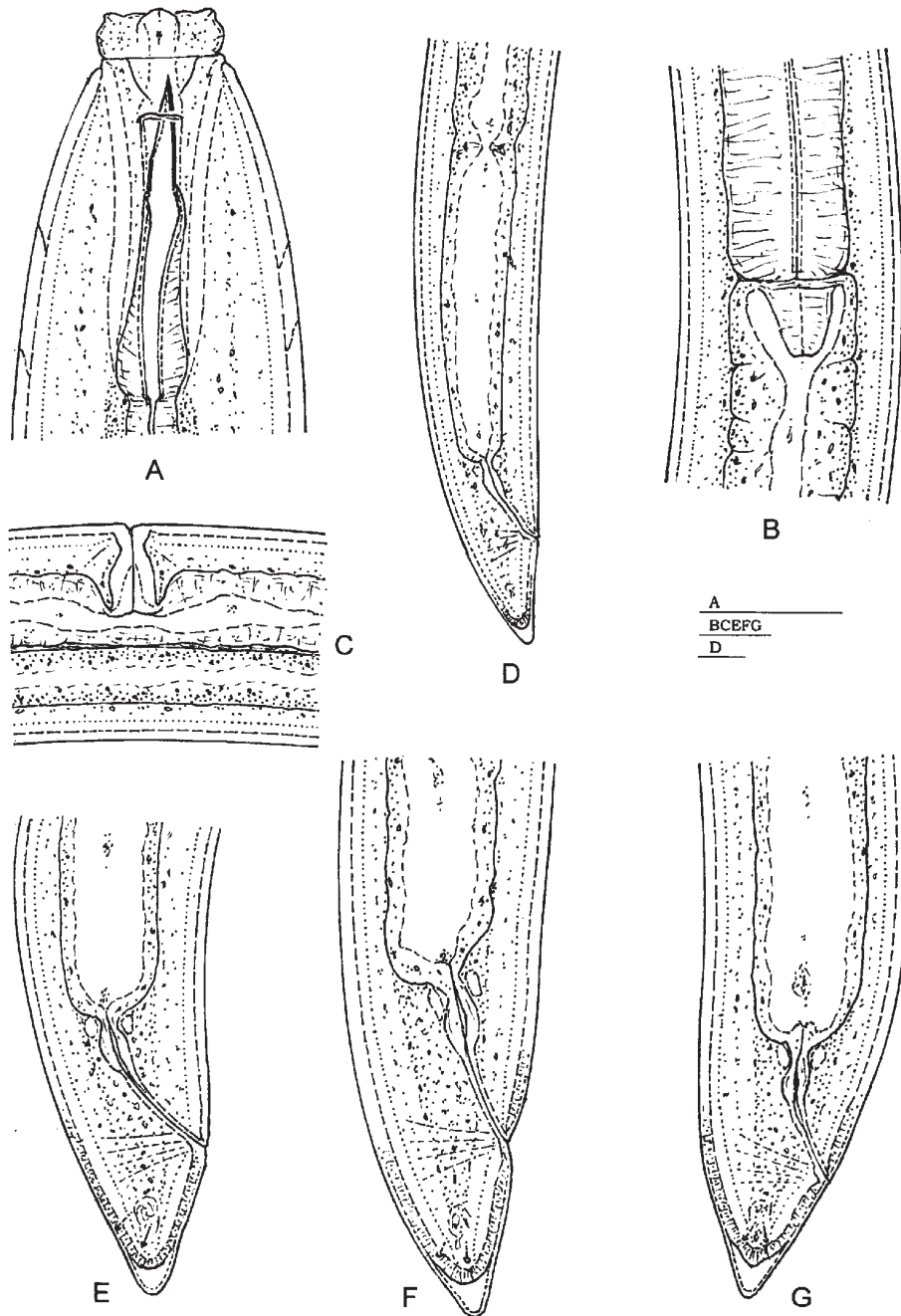


Fig. 1. *Aporcelaimellus salsus* sp. n.: A = anterior end, B = cardial region, C = vulval region, D = female posterior end, E–G = female tail variations. (Scale bars 20 μ m each)

15–17 μm), longer odontostyle (18–19 vs 14–16 μm) and longer tail ($c' = 1.2\text{--}1.3$ vs 0.8–1.0, or 36–46 vs 24–33 μm). Finally, it differs from *A. parapapillatus* by the shorter (1.5–1.9 vs 2.1–2.8 mm) and thinner body (61–66 vs 65–83 μm) and longer tail ($c' = 1.2\text{--}1.3$ vs 0.8–1.0).

Another species, *Aporcelaimellus proximus* (THORNE et SWANGER, 1936) LOOF and COOMANS, 1970 should be mentioned. Quite recently, ÁLVAREZ-ORTEGA and PEÑA-SANTIAGO revised some *Aporcelaimellus* species described by THORNE and SWANGER in 1936. Although their paper is still under printing and will appear in the next year (2010), the authors gave me permission to compare my *Aporcelaimellus salsus* sp. n. with the above-mentioned *A. proximus* as revised by them. They studied specimens of the collection of THORNE labelled “Provo, Utah” as locality, meanwhile the American authors mentioned “Salem, Utah” as type locality. (These two cities are at a distance of about 25 km from each other.) Therefore, it is possible that the specimens investigated by the Spanish authors did not come from the type population (of the type locality). The matter becomes more complicated by that TJEPKEMA, FERRIS and FERRIS (1971) already studied *Aporcelaimellus proximus* specimens of THORNE’s collection originated from “Salem, Utah”, the type locality. Well, the animals of TJEPKEMA and co-authors and those of ÁLVAREZ-ORTEGA and PEÑA-SANTIAGO differed in one important structure from each other: “Vulval labia with triangular sclerotized pieces” (by TJEPKEMA *et al.* 1971), respectively, “Pars refringens (= vulval labia in the former sense) not well differentiated, lacking any distinct sclerotization” (by ÁLVAREZ-ORTEGA & PEÑA-SANTIAGO). Supposing that both observations were correct, the specific identity of the “Provo” and “Salem” populations appears to be somewhat uncertain.

The present new nematode, *Aporcelaimellus salsus* sp. n. resembles the “two” species in both measurements and several morphological characters. However, it clearly differs from the typical *A. proximus* as characterized and/or illustrated by THORNE and SWANGER as well as TJEPKEMA *et al.* in having unsclerotized vulval labia and special structure of the tail and caudal cuticle. On the other hand, it is not impossible that the animals of ÁLVAREZ-ORTEGA and PEÑA-SANTIAGO with unsclerotized vulval labia are conspecific with *A. salsus* sp. n. Only the caudal structures of them seem to be different. This question remains unsettled for the moment.

Etymology. The species epithet *salsus* (Latin) means salty or salted, and refers to the type locality, Great Salt Lake in Utah, United States.

Aporcelaimellus acaudatus sp. n.

(Fig. 2 A–G)

Holotype female. L = 2.32 mm; a = 22; b = 4.0; c = 126; c' = 0.3; V = 50 %.

Paratype females (n = 4). L = 2.22–3.10 mm; a = 22–25; b = 3.8–4.5; c = 122–150; c' = 0.2–0.3; V = 47–52 %.

Type specimens. Holotype female on slide No. 14983. Paratypes: 4 females and 4 juveniles. They will be preserved in the zoological collection of the Hungarian Natural History Museum, Budapest.

Type habitat and locality. Soil with grass roots, Olmedo, Prov. Pichincha, Ecuador; collected in April 1971 by J. BALOGH (Budapest).

General characters. Large species with body more or less ventrally curved and 95–128 µm wide at middle. Cuticle smooth, 3–5 µm thick in most regions and 12–15 µm thick on tail terminus, consisting of the usual two layers of different refraction. Lip region offset by a deep constriction, 20–21 µm wide, narrower than adjoining body. Lips rounded, moderately separated. Body at posterior end of pharynx 4–5 times as wide as head. Cervical lacunae between cuticle and longitudinal muscle band not roomy. Amphids cup-shaped with apertures occupying half width of corresponding body.

Odontostyle 23–24 µm long with aperture occupying half its length. Guiding apparatus aporcelaimoid. Pharynx 552–625 µm long, gradually widened at its middle. Distance between posterior end of pharynx and vulva as long as or slightly longer than oesophagus itself. Dorsal pharyngeal nucleus located at 60–63% of pharynx length or 15% of total body length. Other gland nuclei inconspicuous. Glandularium 346–350 µm long. Cardia simple, conoid.

Female. Amphidelphic. Genital branches about equal in length, comparatively short, each 2.2–3.0 body widths long or occupying 10–14% of body length. Vulva a transverse slit with well-sclerotized inner lips. Vagina 36–42 µm long, distinctly shorter than half corresponding body diameter. Uterus a simple tube. Sphincter present in uterus–oviduct junction. Two females possessed a uterine egg each, 95–110 × 48–66 µm; eggshell smooth. No sperm found in the uteri. Rectum as long as 0.8–1.1, prerectum as 1.1–1.7 anal body widths. Distance vulva–anus 56–76 times as long as tail. Tail exceedingly short with unusually broad terminus, 15–25 µm, shorter than one-third anal body diameter, on its terminus with very thin outer but heavily thickened inner layer of cuticle.

Male. Not found.

Diagnosis and relationships. A large-sized *Aporcelaimellus* species with moderately long odontostyle, strongly sclerotized vulva, short prerectum, short genital branches, and unusually short, broadly terminated tail with strongly thickened inner cuticle.

As for the size and shape of the tail, this new species differs from all of its congeners. Such a short (practically almost non-existent) tail can occur in two *Aporcelaimellus* species: *A. krygeri* (DITLEVSEN, 1928) HEYNS, 1965 and *A. duhouxi* (ALTHERR, 1963) BAQRI & KHERA, 1975. The new species clearly differs from them by the shape of the tail which is not rounded, but plump and broadly truncated at its terminus.

Etymology. The species epithet *acaudatus* comes from the Latin meaning tailless, and refers to the almost missing tail.

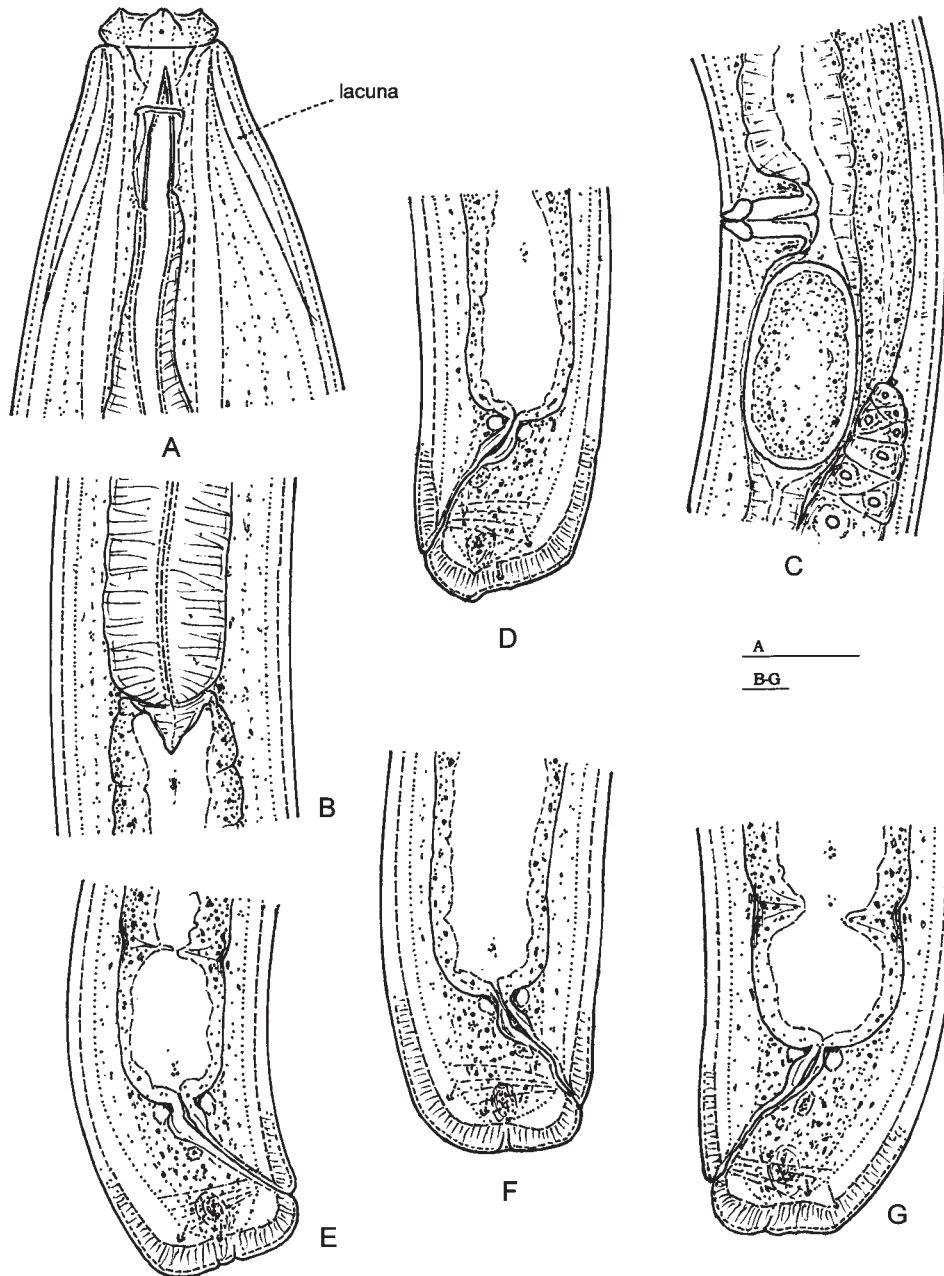


Fig. 2. *Aporcelaimellus acaudatus* sp. n. A: anterior end; B: cardial region; C: vulval region; D–G: female tail variations. (Scale bars 20 μ m each)

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