

# Studies on the genus *Aporcelaimellus* Heyns, 1965 (Dorylaimida: Aporcelaimidae) - material studied by Thorne and Swanger in 1936 but not named

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Accepted for publication 24 April 2010

**Summary.** The identity of four species of *Aporcelaimellus sensu lato* studied, but not originally described, by Thorne and Swanger in 1936 are analysed and discussed on the basis of studies on the material deposited in Thorne's collection. *Dorylaimus papillatus* is described and illustrated, and provisionally considered to be a valid species since it is distinguishable from *A. obtusicaudatus* by the vagina, which is without *pars refringens*. The material labelled as *Dorylaimus perfectus*, often regarded as a synonym of *A. obtusicaudatus*, consists of two males very similar to those described for *Labronema goodeyi*, and seven females certainly belonging to *A. obtusicaudatus*; measurements and illustrations of these specimens are provided. One male labelled as *Dorylaimus paraobtusicaudatus* is *Metaporcelaimus romanicus*; it is described in detail and illustrated. Part of the material originally described as *Dorylaimus propinquus* is actually *Aporcelaimellus waenga*, of which new data, including detailed description, measurements and illustrations, are provided; in addition, *Aporcelaimellus laevis* is regarded as a junior synonym of *A. waenga*.

**Key words:** *Aporcelaimellus*, *Aporcelaimellus laevis*, *Aporcelaimellus papillatus*, *Aporcelaimellus waenga*, description, *Dorylaimus perfectus*, identity, *Metaporcelaimus romanicus*, morphology, new synonym, taxonomy.

This is the second in a series of papers devoted to studying species of the genus *Aporcelaimellus sensu lato*. For more detailed information about the rationale and the objectives of this work the reader is referred to the first contribution on the matter (Álvarez-Ortega & Peña-Santiago, 2010).

In their classical monograph on dorylaimid nematodes, Thorne and Swanger (1936) described several new as well other known species currently classified under *Aporcelaimellus*. The taxa originally described by the American authors were treated in our first paper; those not formally named in 1936 are discussed here.

## MATERIAL AND METHODS

The material studied, deposited at the USDA Nematode Collection, was available to the authors by courtesy of Dr. Z. Handoo. The specimens are preserved in five permanent glycerin slides (the technique used for preparing

and mounting nematodes is described in Thorne and Swanger, 1936), and placed on 76 × 26 mm aluminium slides to allow handling. The information included on the labels of each slide and the specimens they contain is summarised in Table 1. Additionally, Fig. 1 displays the original labels and disposition of nematodes in every slide.

All the specimens supposedly belonging to the genus *Aporcelaimellus* in acceptable condition were studied using a light microscope. Morphometrics included De Man's indices and most of the usual measurements. The location of the pharyngeal gland nuclei is expressed according to Loof and Coomans (1970). Some of the best preserved specimens were photographed with a Nikon Eclipse 80i microscope and a Nikon DS digital camera. Raw photographs were edited using Adobe® Photoshop® CS. Drawings were made using a *camera lucida*.

The species are presented as originally labelled on the corresponding slide.

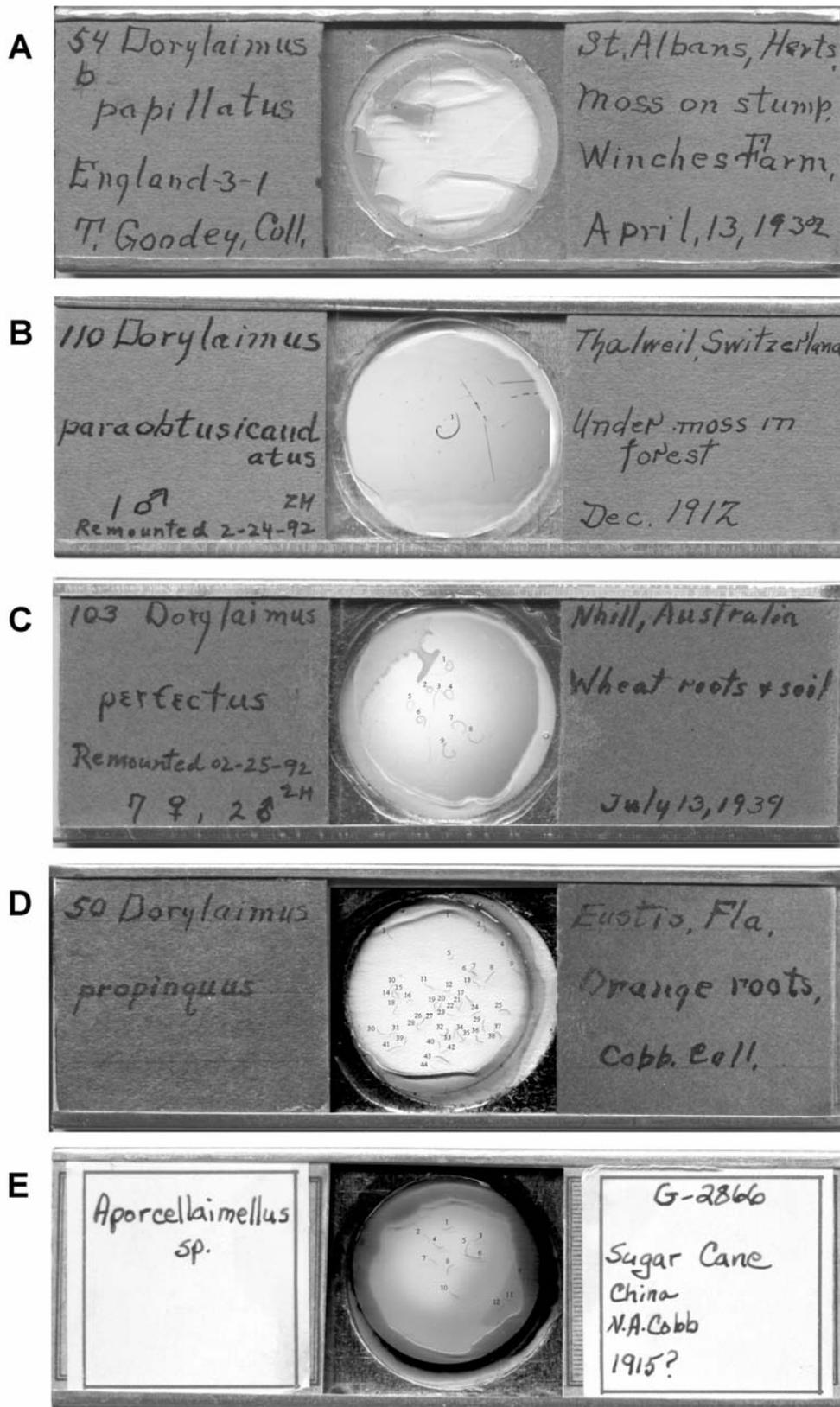


Fig. 1. Slides studied with their labels. A: *Dorylaimus papillatus*; B: *D. paraobtusicaudatus*; C: *D. perfectus*; D: *D. propinquus*; E: *Aporcellaimellus* sp.

**Table 1.** Origin and content of the slides studied.

Slide label		Locality and habitat	Date	Specimens contained
54b	<i>Dorylaimus papillatus</i> 12 spec.	St. Albans, Herts. (U.K.) Moss on stump, Winches farm.	April 13, 1932	<i>Aporcelaimellus papillatus</i> : 11 females and 1 male.
110	<i>Dorylaimus paraobtusicaudatus</i> 1 spec.	Thalweil, Switzerland Under moss in forest	December 1912	<i>Metaporcelaimus romanicus</i> : 1 male.
103	<i>Dorylaimus perfectus</i> 9 spec.	Nhill, Australia Wheat roots and soil	July 13, 1939	<i>Aporcelaimellus obtusicaudatus</i> : 7 females <i>Labronema</i> sp.: 2 males.
50	<i>Dorylaimus propinquus</i> 44 spec.	Eustis, Florida (USA) Orange roots		<i>Aporcelaimellus waenga</i> : 3 females and 11 juv. <i>Aporcelaimellus propinquus</i> : 2 females, 5 males, and 17 juv. Non <i>Aporcelaimellus</i> : 1 male and 5 juv.
G-2866	<i>Aporcelaimellus</i> sp. 12 spec.	China Sugar Cane	1915	<i>Aporcelaimellus waenga</i> : 1 female and 11 juv.

## DESCRIPTIONS

### *Dorylaimus papillatus* Bastian, 1865 (Fig. 2; as *Aporcelaimellus papillatus*)

**Nomenclature.** The original species described by Bastian was transferred to *Eudorylaimus* Andr ssy, 1959 by Andr ssy (1959) and later to *Aporcelaimellus* by Baqri and Khera (1975). The material of *D. papillatus* studied by Thorne and Swanger was considered to belong to *Aporcelaimellus obtusicaudatus* by De Ley *et al.* (1993), but it is herein separated from this and provisionally regarded as conspecific with Bastian's population (see remarks).

**Material examined.** Eleven females, one male and four juveniles, mounted on slide "54b *Dorylaimus papillatus*"; in bad condition.

**Measurements.** See Table 2; as *Aporcelaimellus papillatus*.

**Adult.** Moderately slender to slender nematodes of medium size, 2.43-3.08 mm long. Body cylindrical, tapering towards both extremities, but more so towards the anterior end. Habitus curved ventrad after fixation, especially in posterior body region, J-shaped. Cuticle not well observed due to bad condition of specimens. Lateral chord 6-14  $\mu\text{m}$  wide at mid-body, occupying 8-15% of the corresponding body diameter. Body pores inconspicuous. Lip region offset by constriction, but its precise morphology difficult to observe because the cuticle is often lost; lips apparently rather separated. Amphids not observed. Cheilostom nearly cylindrical, lacking any differentiation. Odontostyle typical of the genus, 4.1-4.8 times as long as wide, and 0.62-0.77% of body length;

aperture 14.5-17.0  $\mu\text{m}$  long or occupying about four-fifths (77-85%) its length. Guiding ring plicate. Odontophore linear, rod-like, 2.0-2.3 times as long as odontostyle. Anterior region of pharynx enlarging very gradually; basal expansion 6.1-7.6 times as long as wide, 3.2-4.6 times as long as body diameter, and occupying 51-55% of total neck length; pharyngeal gland nuclei located as follows: DN = 58-62, S<sub>1</sub>N<sub>1</sub> = 68-72, S<sub>1</sub>N<sub>2</sub> = 79-81, S<sub>2</sub>N = 90-92. Nerve ring located at 174-206  $\mu\text{m}$  from anterior end or 31-34% of total neck length. Cardia conical, 17.5 x 13.0  $\mu\text{m}$  (n=1); its junction to pharyngeal base surrounded by a ring-like structure. Prerectum 3.4-4.9, rectum 1.0-1.4 anal body widths long.

**Female.** Genital system didelphic-amphidelphic; both branches equally and well developed, the anterior 310-446  $\mu\text{m}$  and the posterior 303-450  $\mu\text{m}$  long. Ovaries large, reflexed, usually reaching and surpassing the sphincter level, even reaching vulva; the anterior 313-321  $\mu\text{m}$ , the posterior 290-343  $\mu\text{m}$  long; oocytes arranged first in two or more rows, then in a single row. Morphology of genital tract not well observed. Oviduct 117-188  $\mu\text{m}$  long or 1.2-2.2 times the corresponding body diameter; it consists of slender part with prismatic cells and a poorly to moderately developed *pars dilatata*. Oviduct-uterus junction surrounded by a sphincter. Uterus a simple tube, 111-131  $\mu\text{m}$  or 1.3-1.5 times the corresponding body diameter. Uterine egg ovoid, 100-117 x 50-68  $\mu\text{m}$ , 1.5-2.2 times as long as wide. Vagina extending inwards about 24  $\mu\text{m}$  (n = 2) or one-fourth of body diameter; *pars proximalis* 16 x 11  $\mu\text{m}$  (n = 1); *pars refringens* apparently absent; *pars distalis* 8  $\mu\text{m}$  long. Vulva a pre-equatorial, transverse slit. Tail rounded conoid, slightly more straight in its ventral side, but other details obscure (see remarks).

**Male.** Genital system diorchic, with opposite testes. Ventromedian supplements not observed due

to bad condition of the only available specimen. Spicules somewhat curved ventrad, about 4.8 times as long as wide. Lateral guiding pieces about 26  $\mu\text{m}$  long, 8.8 times as long as wide. Tail similar to that of female, but more straight ventrally.

**Diagnosis.** *Aporcelaimellus papillatus* is characterised by its body 2.43-3.08 mm long, lip region offset by constriction, odontostyle 19-24  $\mu\text{m}$  long with aperture occupying 77-85% of total length, neck 555-649  $\mu\text{m}$  long, pharyngeal expansion 288-349  $\mu\text{m}$  long or 51-55% of total neck length, female genital system amphidelphic, uterus 111-131  $\mu\text{m}$  or 1.3-1.5 times the corresponding body diameter, *pars refringens vaginae* (?) absent,  $V = 45-50$ , female tail convex conoid to rounded (31-43  $\mu\text{m}$ ,  $c = 60-87$ ,  $c' = 0.8-1.1$ ), spicules 73  $\mu\text{m}$  long, and eight widely spaced ventromedian supplements, the posteriormost at level of anterior end of spicules.

**Relationships.** Assuming that *pars refringens vaginae* is absent (see remarks) and in having body more than 2.40 mm long, *A. papillatus* resembles *A. maximus* Rahman, Jairajpuri, Ahmad & Ahmad, 1986, *Metaporcelaimus oceanicus* Andr ssy, 2001 and *A. shamini* Ahmad, 1995. It differs from *A. maximus* in its smaller size (*vs*  $L = 3.37-3.96$ ), larger odontostyle aperture (*vs* about half its length), shorter pharyngeal expansion (*vs* 63-66% of total neck length), more anterior vulva (*vs*  $V = 51-54$ ), and male present (*vs* absent). From *M. oceanicus* in its longer odontostyle (*vs* 16-18.5  $\mu\text{m}$ ), shorter pharyngeal expansion (*vs* about three-fifths of total neck length), more anterior vulva (*vs*  $V = 51-55$ ), shorter and more rounded tail (*vs* 61-74  $\mu\text{m}$ ,  $c' = 1.4-1.8$ , conical), and males known (*vs* unknown). And from *A. shamini* in its shorter uterus (*vs* 202-215  $\mu\text{m}$  long), more anterior vulva (*vs*  $V = 59-61$ ), and shorter tail (*vs*  $c' = 1.3-1.6$ ).

**Distribution.** According with the label on Thorne's slide, the material herein studied was collected from moss on stump, in Winches farm, St. Albans, Herts, UK, by T. Goodey on April 13, 1932.

**Remarks.** The material studied is not in good condition, and this is the reason why some morphological features are not described in detail. The cuticle is lacking in many specimens, especially at level of lip region and tail. Descriptions of vagina and vulva should be taken with caution because, lacking the cuticle, the interpretation of these structures is problematic. The *pars refringens vaginae* is apparently absent, since no refractive piece has been observed. Thorne and Swanger (1936) illustrate the tail being convex-conoid to rounded, but, lacking the cuticle, it looks more conical in the material herein studied. There is no doubt that the specimens examined are the same that were studied by the American authors, and the

above description agrees perfectly with that provided by them.

A different question is whether this material is conspecific with that described by Bastian (1865) from UK, Berks, Broadmoor, although no significant difference is found with his simple, original description:  $L = 2.54$ ,  $b = 4.0$ , stylet (certainly odontostyle plus odontophore) 51  $\mu\text{m}$  long, tail 38  $\mu\text{m}$  long. De Ley *et al.* (1993) considered that the material described by Thorne and Swanger (*op. cit.*) belongs to *A. obtusicaudatus*. The re-examination of the material studied by Thorne and Swanger has revealed that *pars refringens vaginae* is certainly absent, and this is a major difference with *A. obtusicaudatus*; thus, this material is, with the due caution, provisionally regarded as belonging to *A. papillatus*.

Bütschli (1873) reported *Dorylaimus papillatus*, but Thorne and Swanger (1936) considered this record did not belong to the true *papillatus*. Figure 1a of Bütschli apparently shows a female with distinct *pars refringens vaginae*, which might be better placed in *A. obtusicaudatus*.

De Man (1876) also reported *Dorylaimus papillatus* from The Netherlands, but, later, the same author (1880, 1884) considered this material to be *A. obtusicaudatus*.

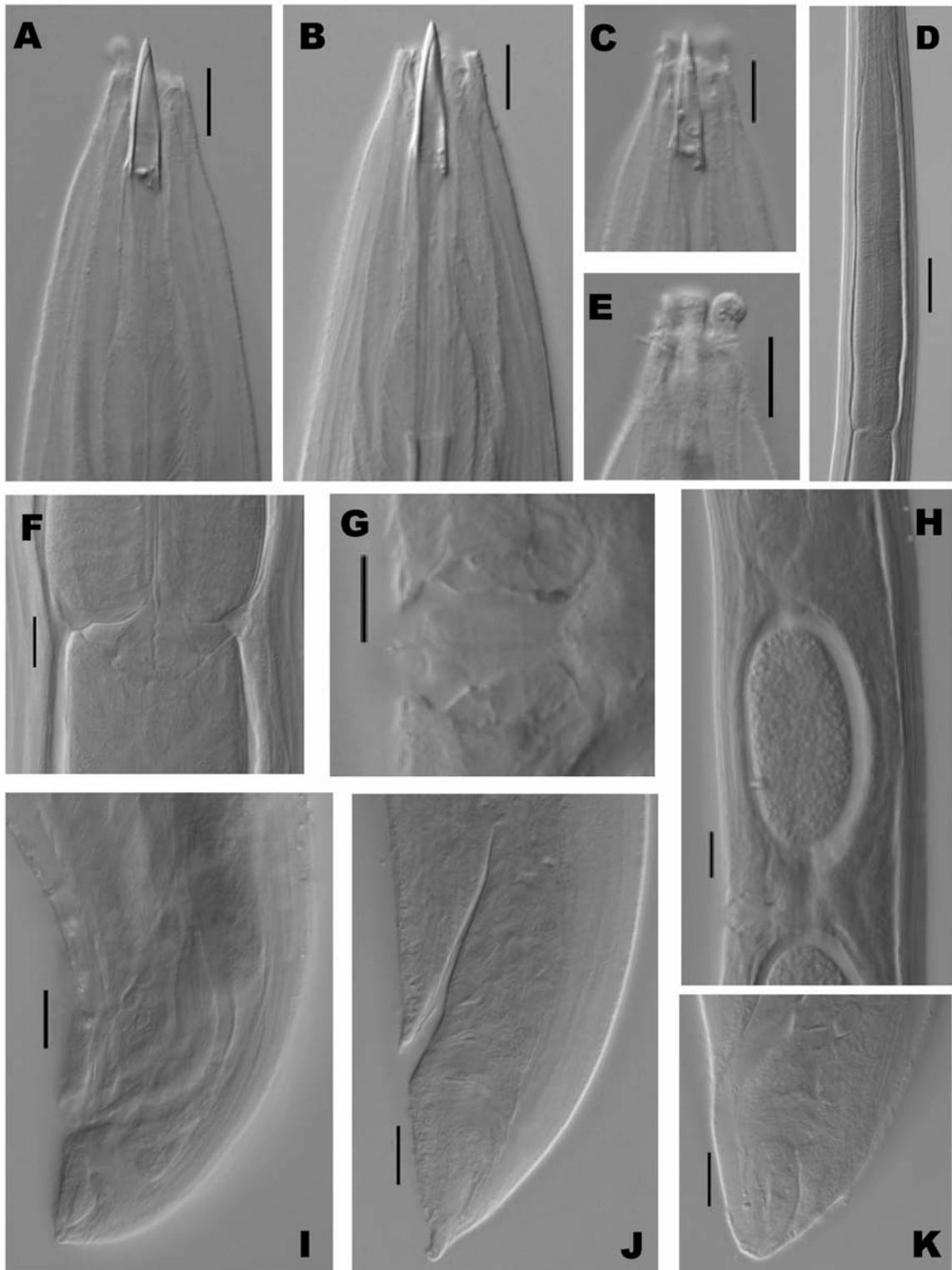
De Bruin & Heyns (1992) identified as *A. papillatus* two females and two males from South Africa, but some doubts exist on the identity of this material due to significant differences with the material herein examined, some of which have already been mentioned by the South African authors, including longer (*vs*  $L = 2.12-2.23$ ) and more stout (*vs*  $a = 40-43$ ) body, longer odontostyle (*vs* 14-16  $\mu\text{m}$ ) with larger aperture (*vs* 53-57% of total length), longer neck (*vs* 460-510), shorter uterus (*vs* *ca.* twice the body diameter, according with original illustration), longer spicules (*vs* 57-61  $\mu\text{m}$ ), and higher number (*vs* five) of ventromedian supplements.

Cobb (1893) described *Dorylaimus domus Glauci* from Pompeii (Italy), but available information on this species is extremely poor. Thorne and Swanger (1936) synonymised it with *A. papillatus*, but De Ley *et al.* (1993) regarded it as *species inquirendae*. Taking into account that nothing is known about odontostyle nature (no illustration was provided in the original description of the species), it should be better considered as a *species incertae sedis*.

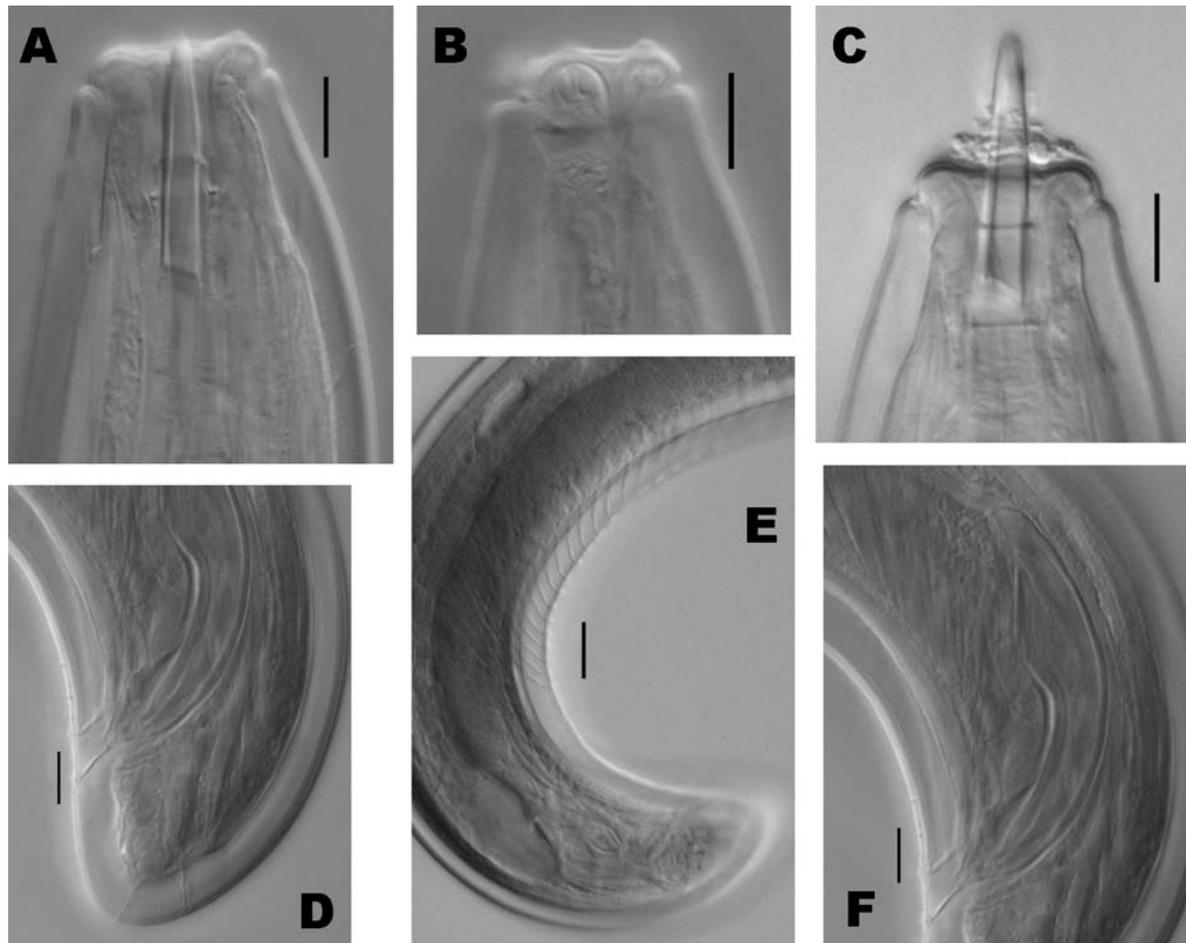
### *Dorylaimus perfectus* Cobb, 1893

(Figs. 3 & 4; as *Aporcelaimellus obtusicaudatus* and *Labronema* sp., see remarks)

**Nomenclature.** The original species described by Cobb was regarded as a junior synonym of



**Fig. 2.** *Aporcelaimellus papillatus* (Bastian, 1865) Baqri & Khera, 1975. A, B: Anterior region; C: Lip region in median view; D: Pharyngeal expansion; E: Lip region in surface view; F: Pharyngo-intestinal junction; G: Vagina; H: Uterine egg; I: Male tail and spicules; J, K: Female tail. (Scale bars: A-C, E-G, I-K = 10  $\mu$ m; D = 50  $\mu$ m; H = 20  $\mu$ m).



**Fig. 3.** *Labronema* sp. (male). A, C: Anterior region in median view; B: Lip region in surface view; D: Tail; E: Posterior body region; F: Spicules. (Scale bars: A-D, F = 10  $\mu$ m; E = 20  $\mu$ m).

*Dorylaimus obtusicaudatus* by Micoletzky (1922), and as a subspecies of the same species by Schneider (1937). In discussing its identity, De Ley *et al.* (1993) concluded that both taxa are “distinguishable ... on the basis of original description, but re-examination desirable”. The material herein studied of *D. perfectus* belongs to (see remarks) two different species, namely *Aporcelaimellus obtusicaudatus* and *Labronema* sp.; meanwhile the true identity of the original *D. perfectus* remains obscure.

**Material examined.** Seven females and two males, mounted on slide “103 *Dorylaimus perfectus*”, collected from wheat roots and soil, in Nhill, Victoria, Australia, on (according to the slide label) July 13, 1939.

**Measurements.** See Table 2, as *Aporcelaimellus obtusicaudatus* and *Labronema* sp.

**Remarks.** Cobb (1893) described this species on the basis of one female and several males

collected from soil about the roots of banana plants in Fiji Islands on July, 1891, but the same author stated that he was “not perfectly certain that the male and female here described together really belong to one and the same species”. The males in question were described as having “about twenty-three innervated closely approximated low papillae”, an unusual feature within the genus *Aporcelaimellus*.

In their monograph, Thorne and Swanger (1936) included the original description by Cobb, but, apparently, they did not examine Cobb’s original material or any new material. As mentioned above, the slide herein studied, belonging to Thorne’s collection, dates from 1939, but the American authors either never studied this slide or did not publish their observations. The re-examination of the specimens mounted on Thorne’s slide has revealed new relevant data.

**Table 2.** Morphometric data of *Aporcelaimellus papillatus* (Bastian, 1865) Baqri & Khera, 1975, *A. obtusicaudatus* (Bastian, 1865) Altherr, 1968 and *Labronema* sp. Measurements in  $\mu\text{m}$  (except L, in mm), and in the form: mean  $\pm$  standard deviation (range).

Species Population		<i>A. papillatus</i> St. Albans, UK		<i>A. obtusicaudatus</i> Nhill, Australia	<i>Labronema</i> sp. Nhill, Australia
Character	n	11 ♀♀	♂	7 ♀♀	2 ♂♂
L		2.79 $\pm$ 0.20 (2.43-3.08)	2.96	2.48 $\pm$ 0.13 (2.26-2.64)	2.53, 2.40
a		31.0 $\pm$ 2.8 (27.2-34.3)	?	28.6 $\pm$ 2.3 (26.5-32.2)	30.3, 31.3
b		4.6 $\pm$ 0.2 (4.2-4.9)	?	4.5 $\pm$ 0.4 (4.0-5.0)	4.9, 5.3
c		73.6 $\pm$ 8.0 (60.2-87.4)	?	66.4 (n=1)	94.3, 91.5
c'		1.0 $\pm$ 0.1 (0.8-1.1)	?	0.8 (n=1)	0.6, 0.7
V		48 $\pm$ 2 (45-50)	-	49.3 $\pm$ 2.0 (46.7-51.6)	-
Lip region diam.		?	?	18.2 $\pm$ 0.6 (17.5-19.0)	21.5, 20.5
Odontostyle length		19.7 $\pm$ 0.5 (19.0-20.5)	24	20.2 $\pm$ 1.0 (19.5-22.0)	29.0, 28.5
Odontophore length		40.6 $\pm$ 1.6 (38-43)	45	23.9 $\pm$ 2.3 (20.5-25.5)	27.5, 26.5
Guiding ring from ant. end		?	?	10.2 $\pm$ 1.1 (9.5-12.0)	17.5, ?
Neck length		604 $\pm$ 40.2 (555-649)	?	566.9 $\pm$ 35.4 (530-619)	519, 451
Pharyngeal expansion length		323 $\pm$ 25.6 (288-349)	?	293.4 $\pm$ 28.3 (268-346)	261, 232
Diam. at neck base		79.3 $\pm$ 6.4 (73-90)	?	77.0 $\pm$ 5.0 (71-84)	73, 69
at midbody		91.0 $\pm$ 8.4 (79-100)	?	86.9 $\pm$ 7.9 (77-97)	84, 77
at anus		38.4 $\pm$ 2.6 (35.5-44.0)	?	46.0 $\pm$ 0.7 (45-47)	42, 39
Prerectum length		156 $\pm$ 17.3 (130-183)	?	106.3 $\pm$ 23.2 (84-139)	90, 119
Rectum length		45.8 $\pm$ 4.0 (40-50)	?	50.5 $\pm$ 1.5 (49-51)	58, 60
Tail length		37.3 $\pm$ 3.4 (31.5-42.5)	?	39 (n=1)	27.0, 26.5
Spicule length		-	73	-	73, 62
Ventromedian supplements		-	?	-	22, 19

The seven females and the two males are not con-specific, since the two males (Fig. 3) belong to the genus *Labronema*: cuticle at level of odontostyle very thick, with very distinct dorsal and ventral body pores, and on tail it is typically two-layered, with very thin outer layer and very thick inner layer; odontostyle strong, with comparatively thicker walls, about 1.4 times than lip region width, and aperture hardly reaching one-half its length; and there are 19-22 contiguous ventromedian supplements. On the other hand, the females (Fig. 4) fit the typical *Aporcelaimellus* pattern.

Lacking their corresponding females, the precise identity of the males is problematic, but there is evidence that allow a first approximation. They are near identical to those described for *Labronema goodeyi* by Altherr & Delamare-Deboutteville (1972) from Massachusetts, USA (but also reported from Russia and Ethiopia, according to Andrassy, 1991), from which they can be separated by minor differences as shorter odontostyle (28-29 vs 30  $\mu\text{m}$ ) and neck ( $b = 4.9-5.3$  vs  $b = 3.9-4.1$ ). Concerning the identity of the male material described by Cobb as belonging to *Dorylaimus perfectus*, it is very similar to the two males of Thorne's collection since

its ratios and morphometrics, calculated from Cobb's original description, are:  $L = 2.35$ ,  $a = 26.4$ ,  $b = 4.9$ ,  $c = 71$ ,  $c' = 0.7$ ; lip region 19  $\mu\text{m}$  wide, neck 477  $\mu\text{m}$  long, tail 33  $\mu\text{m}$  long, spicules about 70  $\mu\text{m}$  long, and 23 contiguous ventromedian supplements out the range of spicules; then, only minor differences are noted between Cobb's material and the specimens herein studied. Nevertheless, the two males belonging to Thorne's collection do not show any indication of the existence of large unicellular glands in neck region, a remarkable feature of *Dorylaimus perfectus*, but totally unknown in dorylaims, which was mentioned and illustrated by Cobb (see also comments by De Ley *et al.*, 1993). In consequence, it is impossible to clarify definitively the identity of the male of *Dorylaimus perfectus* described by Cobb, but, it certainly belongs to *Labronema* and probably is con-specific with Thorne's specimens, very close to *L. goodeyi*.

Concerning the females (Fig. 4), both general morphology and morphometry perfectly fit the re-description of *Aporcelaimellus obtusicaudatus* (Bastian, 1865) Altherr, 1968 provided by De Ley *et al.* (1993). The only female of *Dorylaimus perfectus*

measured by Cobb does not differ significantly from *A. obtusicaudatus* in its ratios and morphometrics:  $L = 2.58$ ,  $a = 20.8$ ,  $b = 3.9$ ,  $c = 66$ ,  $V = 54$ ,  $c' = 0.7$ , lip region 26  $\mu\text{m}$  wide, neck 660  $\mu\text{m}$  long, and tail 39  $\mu\text{m}$  long. Nevertheless, the question of the existence of large unicellular glands in the neck region remains unsolved.

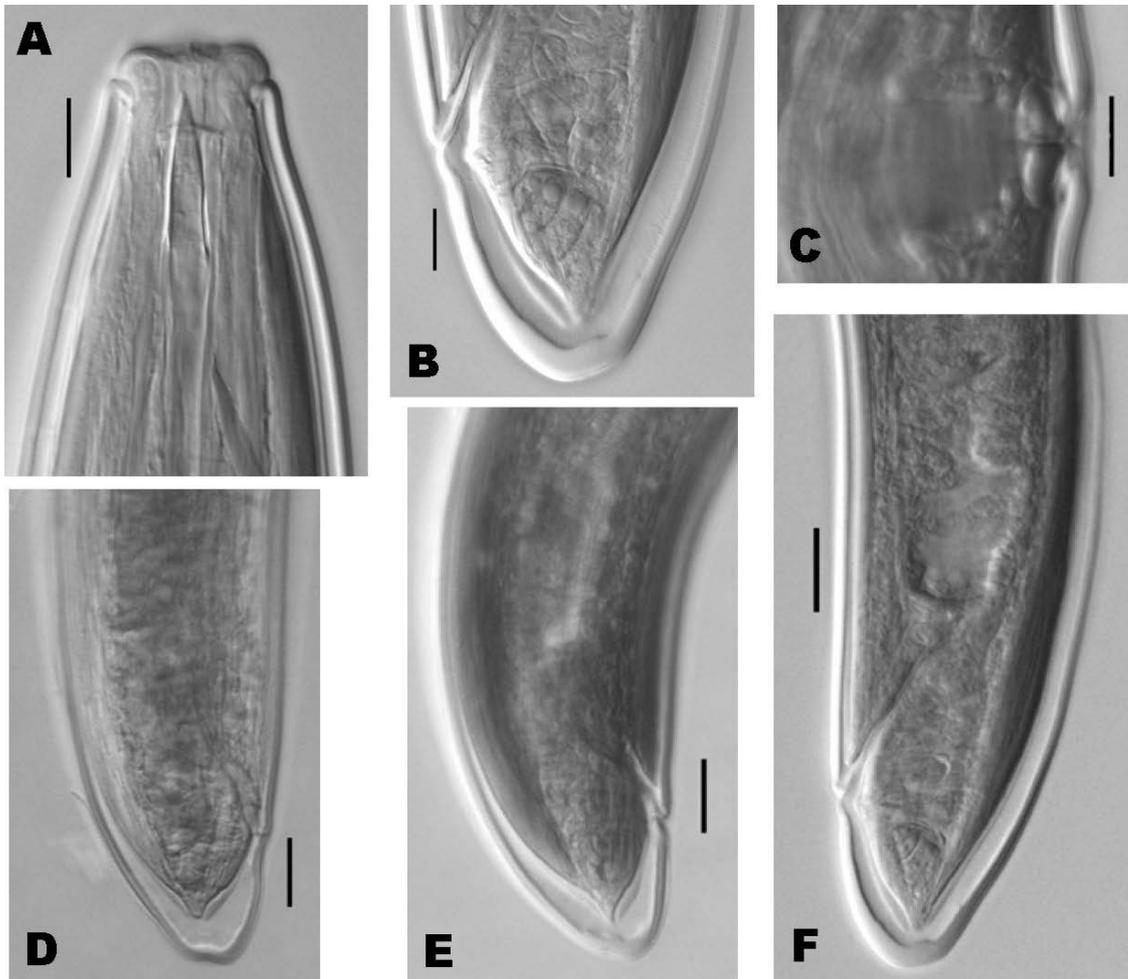
***Dorylaimus paraobtusicaudatus* Micoletzky, 1922**  
(Fig. 5; as *Metaporcelaimus romanicus*)

**Nomenclature.** The original species described by Micoletzky was transferred to *Eudorylaimus* by Andr ssy (1959), later to *Aporcelaimellus* by Andr ssy (1986) and, more recently, retained under *Eudorylaimus* also by Andr ssy (2002). The only male specimen labelled by Thorne and Swanger as *D. paraobtusicaudatus* is herein identified (see remarks) as *Metaporcelaimus romanicus* (Popovici, 1978) Andr ssy, 2001.

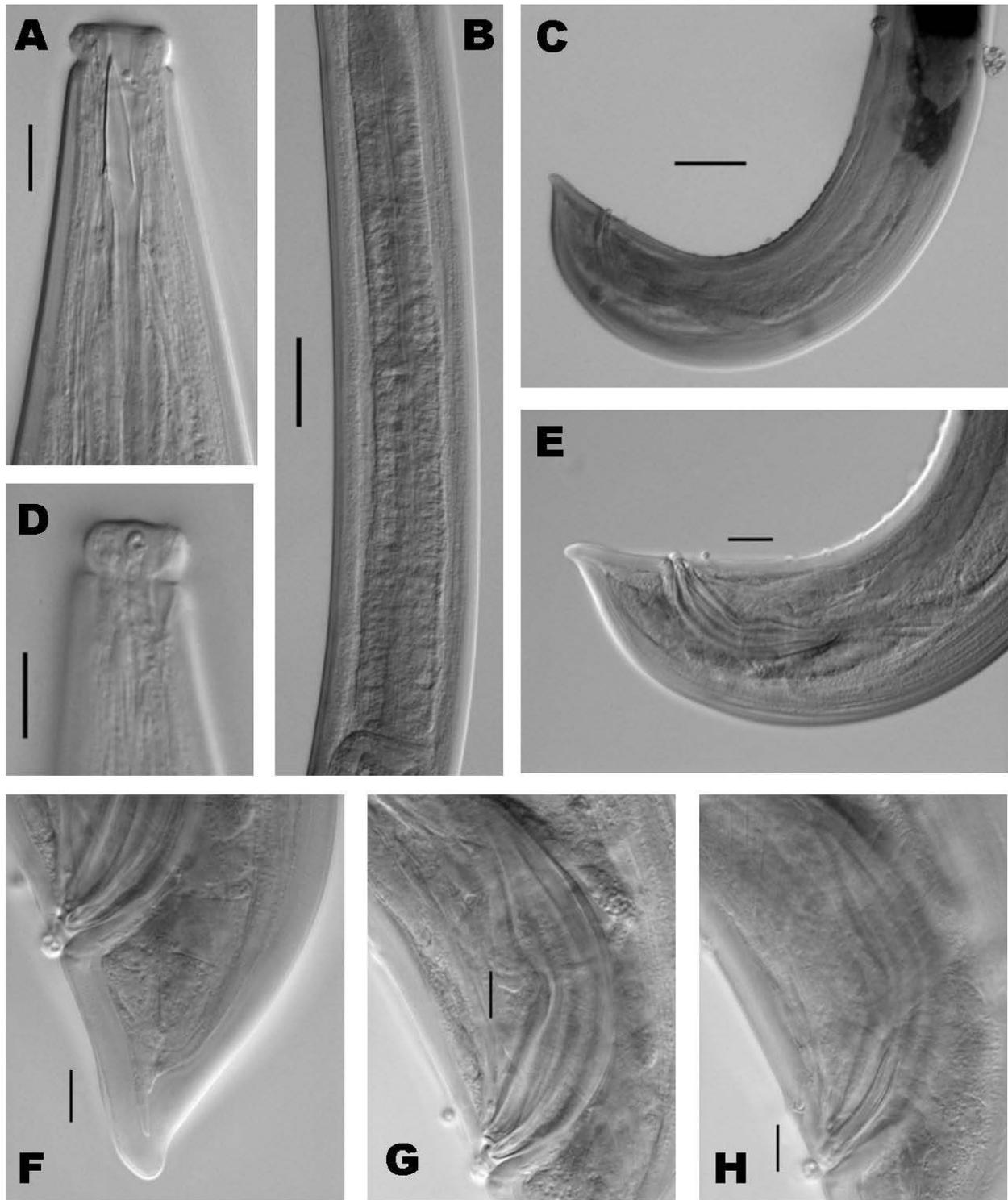
**Material examined.** One male, mounted on slide “110 *Dorylaimus paraobtusicaudatus*”; in acceptable condition.

**Measurements.** See Table 3; as *Metaporcelaimus romanicus*.

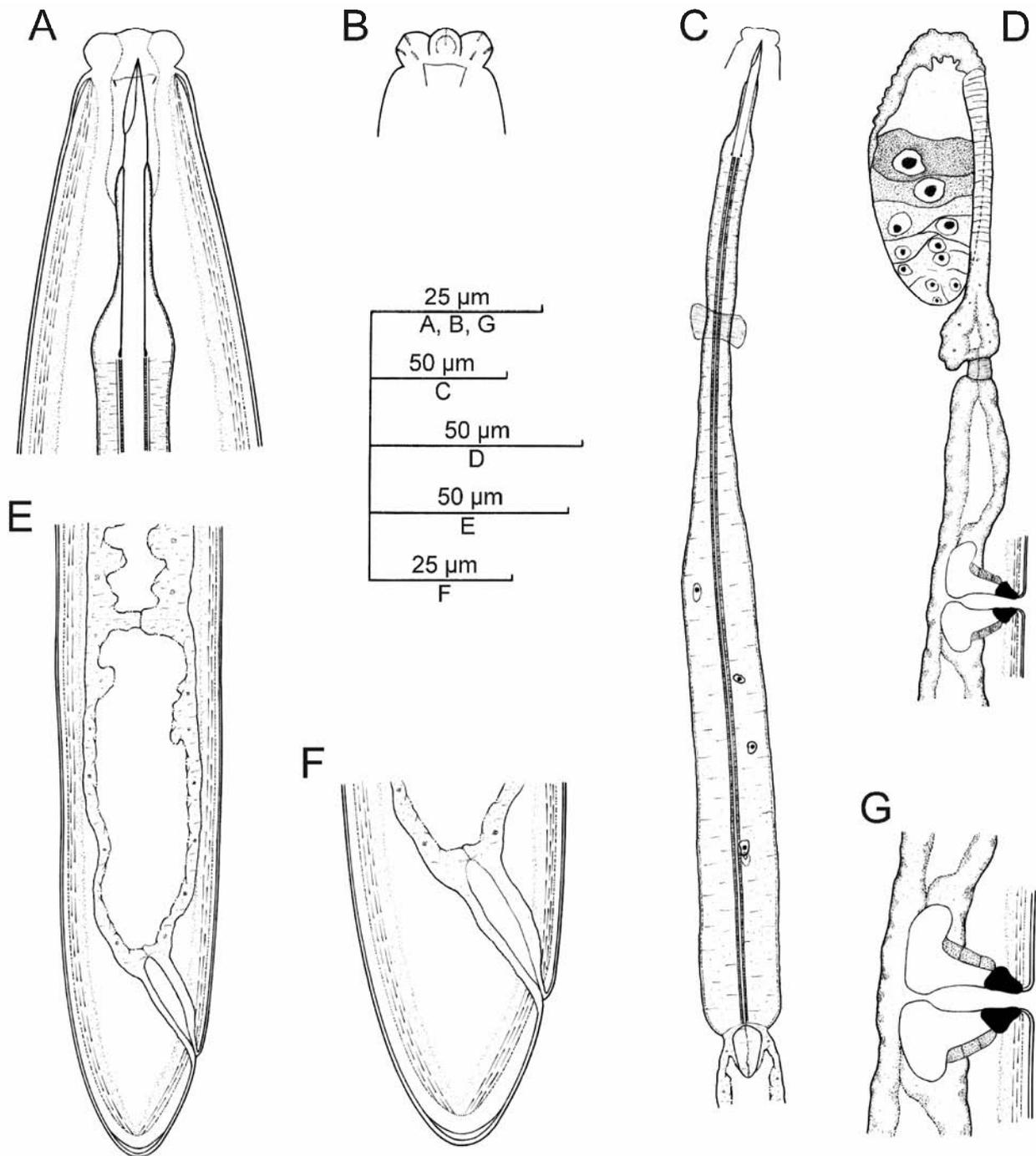
**Male.** Slender nematode of medium size, 3.07 mm long. Body cylindrical, tapering towards both extremities, but more so towards the anterior end. Habitus curved ventrad after fixation, especially in posterior body region, G-shaped. Cuticle 2  $\mu\text{m}$  at anterior region, 3  $\mu\text{m}$  in mid-body and 5.5  $\mu\text{m}$  on tail. Lateral chord width about one-seventh of body diameter at neck base. Body pores inconspicuous. Lip region offset by constriction, 2.6 times as wide as high and about one-fifth (18%) of body diameter at neck base; lips apparently separated. Amphid fovea funnel-shaped, its aperture 8  $\mu\text{m}$  or hardly more than half (55%) of lip region diameter.



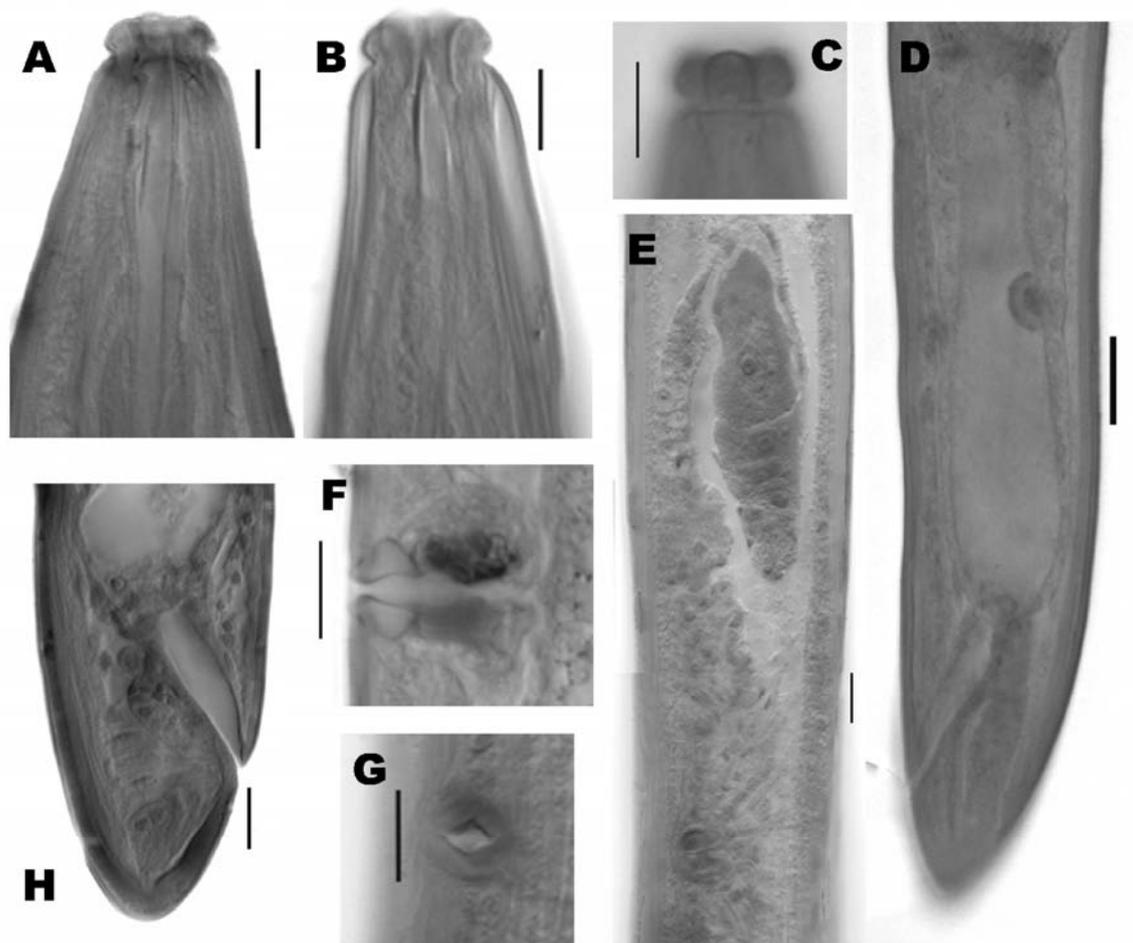
**Fig. 4.** *Aporcelaimellus obtusicaudatus* (Bastian, 1865) Altherr, 1968 (female). A: Anterior region; B: Tail; C: Vagina; D-F: Posterior body region. (Scale bars: A-C = 10  $\mu\text{m}$ ; D-F = 20  $\mu\text{m}$ ).



**Fig. 5.** *Metaporcelaimus romanicus* (Popovici, 1978) Andr ssy, 2001 (male). A: Anterior region; B: Pharyngeal expansion; C, E: Posterior body region; D: Lip region in surface view; F: Tail; G, H: Spicules. (Scale bars: A, D, F-H: 10  $\mu$ m; B, C, E = 20  $\mu$ m).



**Fig. 6.** *Aporcelaimellus waenga* (Yeates, 1967) Peña-Santiago & Ciobanu, 2008 (female). A: Anterior region; B: Lip region in surface view; C: Pharyngeal region; D: Anterior genital branch; E: Posterior region; F: Tail; G: Vagina.



**Fig. 7.** *Aporcelaimellus waenga* (Yeates, 1967) Peña-Santiago & Ciobanu, 2008 (female). A, B: Anterior region; C: Lip region in surface view; D: Posterior body region; E: Anterior genital branch; F: Vagina; G: Vulva in frontal view; H: Tail. (Scale bars: A-C, F-H = 10  $\mu$ m ; D, E =20  $\mu$ m).

Cheilostom nearly cylindrical, lacking any differentiation. Odontostyle typical of the genus, 4.7 times as long as wide, 1.3 times the lip region width and 0.57% of body length; aperture 12.5  $\mu$ m long or occupying about 71% its length. Guiding ring plicate, situated at 8  $\mu$ m or about one-half of lip region diameter from anterior end. Odontophore linear, rod-like, 1.8 times as long as odontostyle. Anterior region of pharynx enlarging very gradually; basal expansion 9.0 times as long as wide, 4.8 times as long as body diameter, and occupying 57% of total neck length. Pharyngeal gland nuclei located as follows: DN = 48, S<sub>1</sub>N<sub>1</sub> = 59, S<sub>1</sub>N<sub>2</sub> = 71, S<sub>2</sub>N = 88. Nerve ring situated at 197  $\mu$ m from anterior end or 28% of total neck length. Cardia conical, as long as wide; its junction to pharyngeal base apparently surrounded by a ring-like structure. Prerectum 3.9, rectum 1.7 anal body widths long. Genital system diorchic, with opposite

testes. In addition to the adcloacal pair, situated at 14  $\mu$ m from cloacal aperture, there is a series of 12 ventromedian supplements regularly and widely spaced, the posteriormost one lying within the range of spicules and at 40  $\mu$ m from adcloacal pair; ventromedian supplements 16-21  $\mu$ m apart. Spicules somewhat curved ventrad, about 4.9 times as long as wide. Lateral guiding pieces about 24.5  $\mu$ m long, 7.1 times as long as wide. Tail conical with rounded terminus, ventrally almost straight, dorsally convex but with a slight dorsal concavity at the end; inner core of tail extending along its terminal part, so that the hyaline portion is very short, about 9  $\mu$ m long. Caudal pores two pairs, one nearly dorsal, at the middle of tail; another lateral, at the posterior half of tail.

**Distribution.** According to the label on Thorne's slide, the material herein studied was collected

“under moss in forest”, in Thalweil, Switzerland, in December, 1912.

**Remarks.** The label of the slide 110 of Thorne’s collection indicates it contains one male of *Dorylaimus paraobtusicaudatus*. Available information of this species (for instance, see Thorne & Swanger, 1936; Kirjanova, 1951; Altherr, 1952; Andrásy, 1952; Bongers, 1988) is of poor quality, sometimes contradictory, and does not allow its characterisation. However, it is obvious that the male specimen herein examined does not belong to *D. paraobtusicaudatus* since the body is larger (*vs* *L* up to 2.00 mm in all the records of *paraobtusicaudatus*), and the tail is longer (*vs* less than 40 µm long) and with different appearance (*vs* more conoid, lacking a terminal projection of the inner core). Nevertheless, this male is identical to that reported for *M. romanicus* (see Popovici, 1978; Andrásy, 2001), a species described from Carpathian Mountains, and an indication that the species might be spread in Central Europe.

Thorne and Swanger (1936) either did not study this male or did not publish their results, because

they apparently incorporated the original data by Micoletzky in their monograph.

***Dorylaimus propinquus* Thorne & Swanger, 1936**  
(Figs. 6 & 7; as *Aporcelaimellus waenga*)

**Nomenclature.** See first contribution of the series and remarks below.

**Material examined.** Three females, mounted on slide “50 *Dorylaimus propinquus*”, and one female mounted on slide relabelled “G-2866 *Aporcelaimellus* sp.”. Both slides certainly belong to N.A. Cobb’s collection, and are deposited with Thorne’s collection. The specimens are not in good condition, apparently were stained and now appear pink coloured.

**Measurements.** See Table 3; as *Aporcelaimellus waenga*.

**Female.** Moderately slender to slender nematodes of medium size, 1.31-1.71 mm long. Body cylindrical, tapering towards both extremities,

**Table 3.** Morphometric data of *Metaporcelaimus romanicus* (Popovici, 1978) Andrásy, 2001 and *Aporcelaimellus waenga* (Yeates, 1967) Peña-Santiago & Ciobanu, 2008. Measurements in µm (except L, in mm), and in the form: mean ± standard deviation (range).

Species	<i>M. romanicus</i>		<i>A. waenga</i>	
	Population	Thalweil, Switzerland	Eustis, Florida	China
Character	n	♂	3 ♀♀	♀
L		3.07	1.46 ± 0.22 (1.31-1.71)	1.62
a		32.7	28.8 ± 2.2 (26.3-30.4)	37.5
b		4.4	3.4 ± 0.2 (3.2-3.6)	4.0
c		68.3	54.4, 60.7 (n=2)	68.0
c'		1.0	0.8, 1.0 (n=2)	0.9
V		-	56.1 ± 1.2 (54.9-57.4)	55.3
Lip region diam.		14.5	14.8 ± 1.3 (13.5-16.0)	13
Odontostyle length		18.5	17, 18 (n=2)	17.5
Odontophore length		31.5	25, 31 (n=2)	?
Guiding ring from ant. end		8	7.0, 9.5 (n=2)	?
Neck length		706	430.2 ± 45.9 (390-480)	407
Pharyngeal expansion length		401	223.5 ± 32.5 (195-259)	197
Diam. at neck base		83	48.3 ± 4.5 (43-51)	42
at midbody		94	50.7 ± 7.3 (43-58)	43
at anus		47	29.9 ± 1.5 (29.0-31.5)	26
Prerectum length		182	95.9 ± 25.2 (79-125)	110
Rectum length		79	38.3 ± 7.0 (31-44)	32.5
Tail length		45	24-28 (n=2)	24
Spicules length		87	-	-
Ventromedian supplements		12	-	-

but more so towards the anterior end. Habitus curved ventrad after fixation, especially in posterior body region, C-shaped. Cuticle 1.0, 1.5 (n=2)  $\mu\text{m}$  at anterior region, 1.0-1.5  $\mu\text{m}$  at midbody and 1.5-2.0  $\mu\text{m}$  on tail. Lateral chord 5.5, 9.5  $\mu\text{m}$  (n=2) wide at midbody, occupying 13, 16% of body diameter. Body pores inconspicuous. Lip region offset by very deep constriction, 2.4-3.1 times as wide as high and one-fourth to one-third (26-35%) of body diameter at neck base; lips separated, with scarcely protruding papillae. Amphid fovea funnel-shaped, its aperture 6.5-7.0  $\mu\text{m}$  or two-fifths to one-half (41-48%) of lip region diameter. Cheilostom nearly cylindrical, lacking any differentiation. Odontostyle typical of the genus, 4.4-4.9 times as long as wide, and 1.1-1.3% of body length; aperture 11-12  $\mu\text{m}$  long or occupying about two-thirds (67-69%) its length. Guiding ring plicate. Odontophore linear, rod-like, 1.5, 1.8 (n=2) times as long as odontostyle. Anterior region of pharynx enlarging very gradually; basal expansion 6.2-7.0 times as long as wide, 4.3-5.0 times as long as body diameter, and occupying 48-54% of total neck length. Pharyngeal gland nuclei located as follows: DN = 57-61, S<sub>1</sub>N<sub>1</sub> = 67-69, S<sub>1</sub>N<sub>2</sub> = 74-77, S<sub>2</sub>N = 83-86; DN quite posterior and S<sub>2</sub>N comparatively anterior. Nerve ring situated at 130-150  $\mu\text{m}$  from anterior end or 31-34% of total neck length. Cardia conical, 19-22 x 12.5-15.5  $\mu\text{m}$ . Genital system didelphic-amphidelphic; both branches equally and poorly developed, the anterior 93-164  $\mu\text{m}$  and the posterior 90-170  $\mu\text{m}$  long. Ovaries of variable length, usually not surpassing the sphincter level; the anterior 53-153  $\mu\text{m}$ , the posterior 55-170  $\mu\text{m}$  long; oocytes arranged first in two or more rows, then in a single row. Oviduct 47-72  $\mu\text{m}$  long or 1.1-1.7 times the corresponding body diameter; it consists of slender part with prismatic cells and a poorly developed *pars dilatata*. Oviduct-uterus junction marked by a sphincter. Uterus a simple, short tube, 29-51  $\mu\text{m}$  or 0.6-1.0 times the corresponding body diameter. Uterine egg not observed. Vagina extending inwards 12.5-19.0  $\mu\text{m}$  or one-third (29-36%) of body diameter, in the four specimens examined appearing dilated; *pars proximalis* 11, 12 (n=2) x 9.5-12  $\mu\text{m}$ ; *pars refringens* 2, 3.5 x 5, 6.5  $\mu\text{m}$  (n=2) and with a combined width of 7.0, 10.5  $\mu\text{m}$ ; *pars distalis* short, about 1.5, 2  $\mu\text{m}$  long. Vulva a post-equatorial, oval, transverse slit. Prerectum 2.7-4.3, rectum 1.1-1.5 anal body widths long. Tail convex conoid. Caudal pores two pairs, one lateral, at the middle of tail, another subdorsal, more posterior.

**Diagnosis** (based on present specimens). This species is characterised by its body 1.31-1.71 mm

long, lip region offset by very deep constriction and 13-16  $\mu\text{m}$  wide, odontostyle 17-18  $\mu\text{m}$  long with aperture occupying 67-69% of its length, neck 390-480  $\mu\text{m}$  long, pharyngeal expansion 195-259  $\mu\text{m}$  long or 48-54% of total neck length, uterus a simple tube 29-51  $\mu\text{m}$  or 0.6-1.0 times the corresponding body diameter long, *pars refringens vaginae* present,  $V = 55-57$ , tail convex conoid (24-28  $\mu\text{m}$ ,  $c = 54-68$ ,  $c' = 0.8-1.0$ ), and male unknown.

**Distribution.** Three females collected around orange roots, Eustis, Florida, USA; and one female found in sugar cane field, China in 1915.

**Remarks.** In our previous paper on *Aporcelaimellus* species (Álvarez-Ortega & Peña-Santiago, 2010), we mentioned that three females of the material originally identified as *Dorylaimus propinquus* by Thorne and Swanger (1936), and later re-described by Tjepkema *et al.* (1971) as *Aporcelaimellus propinquus*, were not conspecific with this taxon. Their detailed study revealed that they belong to *A. waenga*, which was originally described as type species of *Takamangai* Yeates, 1967, a genus with an intricate taxonomic history (for details see Peña-Santiago & Ciobanu, 2007, 2008) that is currently regarded as a junior synonym of *Aporcelaimellus*. Type material of *A. waenga* was recently re-examined by Peña-Santiago and Ciobanu (*op. cit.*), although its bad condition did not enable a detailed description to be made, but it was confirmed as belonging to the genus *Aporcelaimellus*. Orselli and Vinciguerra (2000) reported it from coastal dunes in Italy.

*Aporcelaimellus laevis* Tjepkema, Ferris & Ferris, 1971 is very similar to *A. waenga*, but the two species were never compared, certainly because the later was classified in that time under other genus. The above description fits very well the original one of *A. laevis*, with the exception of minor differences, such as narrower lip region (13-16 vs  $17.6 \pm 0.5$   $\mu\text{m}$  in *A. laevis*), longer odontostyle aperture (about two-thirds vs  $54 \pm 1\%$  its length), and slightly shorter female tail ( $c' = 0.7-0.9$  vs  $c' = 0.9-1.1$ ). *Aporcelaimellus laevis* was originally described from several localities in Indiana, and later reported from India (Ahmad & Jairajpuri, 1982; Ahmad, 1995; Rahaman & Ahmad, 1995) and Italy (Orselli & Vinciguerra, 2000, 2005), but only Ahmad and Jairajpuri (*op. cit.*) and Ahmad (*op. cit.*) provided additional measurements that do not differ significantly from those given in this contribution. As conclusion, *A. laevis* should be regarded as a junior synonym of *A. waenga*, this becoming a widely, probably worldwide, distributed species.

## ACKNOWLEDGEMENT

The authors are especially grateful to Dr Z. Handoo (Beltsville, MD, USA) who provided Thorne's material deposited at the USDANC. They also thank the financial support received from Spanish 'Ministerio de Educación y Ciencia' for the project entitled "Fauna Ibérica: Nematoda, Dorylaimoidea (excepto Longidoridae)" (ref. CGL2007-66786-C08-08). The first author is a pre-doctoral student in the University of Jaén, also supported by the same project.

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**S. Álvarez-Ortega and R. Peña-Santiago.** Изучение рода *Aporcelaimellus* Heyns, 1965 (Dorylaimida: Aporcelaimidae) по материалу, исследованному, но не идентифицированному Торном и Свангером в 1936.

**Резюме.** На основании переисследования материала из коллекции Торна проведено определение материала по четырем видам *Aporcelaimellus sensu lato*, изученного, но не описанного Торном и Свангером в 1936 году. Приведено описание и иллюстративный материал для *Dorylaimus papillatus*, который рассматривается как валидный вид, поскольку легко отличим от *A. obtusicaudatus* по отсутствию *pars refringens* в вагине. Материал с этикеткой «*Dorylaimus perfectus*», часто рассматриваемый как синоним *A. obtusicaudatus*, состоит из двух особей самцов, напоминающих по строению самцов, описанных для *Labronema goodeyi*, и семи самок, относящихся, несомненно, к *A. obtusicaudatus*. Даны измерения и иллюстративный материал для этих экземпляров. Один самец, этикетированный как *Dorylaimus paraobtusicaudatus*, представляет собой *Metaporcelaimus romanicus*. Приводится детальное описание и иллюстрации для этого вида. Часть материала, описанного изначально как *Dorylaimus propinquus*, в действительности представляет собой *Aporcelaimellus waenga*, для которого предложено детальное описание, измерения и иллюстративный материал. Кроме того, *Aporcelaimellus laevis* рассматривается как младший синоним *A. waenga*.

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