

# New genera and species of nematodes from southern Chile

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**Abstract.** Two new nematode genera and five new species are described from southern Chile: *Plectus araucanorum* sp. n., *Paramphidelus par* sp. n., *Labronema diversum* sp. n., *Aporcella gibberocaudata* gen. n., sp. n. and *Acunemella torta* gen. n., sp. n. *Aporcella* gen. n. (Aporcelaimidae) resembles the genera *Aporcelaimellus* and *Tubixaba*, but differs from the former mainly by the homogeneous layers of cuticle and not sclerotized vulva, from the latter by the large aperture of stylet and the arrangement of oesophageal nuclei. *Acunemella* gen. n. (Nordiidae) is differentiated from all known genera of the family in having a heavily twisted body shape, small head and unusually long, needle-like stylet. In addition, a list of nematode species described as new from South Chile is given.

During the study of soil samples from South Chile, five nematode species were found that proved to be new to science. Two of them do not fit comfortably into any of the known genera, therefore a new genus is suggested for each. The five nematodes described herein are *Plectus araucanorum* sp. n. of the class Torquentia, *Paramphidelus par* sp. n., *Labronema diversum* sp. n., *Aporcella gibberocaudata* gen. n., sp. n. and *Acunemella torta* gen. n., sp. n. of the class Penetrantia.

The soil samples were collected in southern territories of Chile by Cs. Csuzdi and L. Hufnagel (Eötvös Loránd University, Budapest) in the course of a collecting trip in 2001. The samples were fixed on the site in FAA. After bringing them home, the nematodes were extracted by floating-decanting method, then fixed again and processed to anhydrous glycerine using a slow method. The nematode specimens were studied on permanent glass slides.

Chile, covering an area of 742,000 square kilometres, is one of the most peculiar, interesting and fascinating countries in the world; a true synthesis of all kinds of sceneries as well as of widest geographical and natural conditions. Chile is unique in its extremely elongate and narrow shape – 4300 km long and 175 km wide on the average, i.e. nearly 25 times as long as wide – extending on the western (pacific) coasts of the South American

continent. It has in its territory the highest lake in America (Lago Chungara) located 5000 metres above sea-level, the longest coastline of the South American countries, 8300 kilometres, the giant mountain range of Cordilleras or Andes extending in a length of 4600 km, the most arid desert of the world, Atacama, an area, Antofagasta region, having the most concentrated solar intensity of the Globe (during 360 days of the year), great wild forests, an island zone where one island succeeds another, and the territory, Tierra del Fuego, at the southernmost end of the American continent, in the vicinity of Antarctica.

Owing to the very long extent of the country – from 18 to 56 degrees of the southern latitude, or, in other words, from the tropics to Subantarctic – the climates and other natural conditions are very different in certain regions of Chile. The northern territories belong to the arid (desert) zone, the middle regions have Mediterranean climate, southern Chile is of oceanic influence, and Tierra del Fuego has a Subantarctic character. While in the Atacama Desert no drop of rain has been falling for long decades, in Mid-, and especially in South Chile the precipitation averages are over 2500 mm per year.

In thinking of the natural conditions of Chile, anybody can easily conceive, how multifarious must be the flora and fauna in this country. The

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nematode fauna itself is also composed of a large scale of various forms or taxonomic units. Although our knowledge of the nematode world in Chile is still far from sufficient, we have still some data on it. The first reports on Chilean nematodes had been summarized by Steiner (1943). Subsequently, numerous species, new forms to science as well, have been described or recorded by several authors, mainly North American and European taxonomists. One, Raski should be mentioned by name; he has gained distinction with his 17 publications in the topic. The good fortune gave possibility to the present author as well to study once personally the soil and fresh-water nematodes of this fascinating country.

In summarizing what we know on the Chilean nematode fauna, it appears immediately that the picture in the southern regions strongly differs from that of the northern territories. As might be expected, the nematode fauna of South Chile excels in its richness of rarities. Prior to this paper, not less than 55 new species and 6 new genera have been described in 24 articles from this region. But how far we are still from more intensive investigations! Not going too far, we may suppose so much that every third/fourth nematode species from South Chile will prove to be undescribed. A genus, *Cristamphidelus* Siddiqi & Vinciguerra, 1991, may serve as an example. It is represented by eight species (probably by much more in effect), that have exclusively been discovered in this part of the world. The first and type species of all criconematids, these so fascinating forms of nematodes, was also discovered in southernmost Chile... And we could go on in enumerating the curiosities. This corner of the Globe, with its so unique environmental conditions, will certainly provide still much surprise to science.

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At the end of the present article I give a list of nematode species that have been discovered so far as new to science from South Chile. They represent 20 families. The richest families are Tylenchidae (with 11 species), Criconematidae (with 11 species) and Alaimidae (with 9 species). The richest genera are *Criconema* (with 9 species) and *Cristamphidelus* (with 8 species). Out of the 60 species (55 species described prior to this paper + 5 presently described ones), 8 (13 %) belong to the

class Torquentia, 37 (62 %) to Secernentia and 15 (25 %) to Penetrantia.

## DESCRIPTIONS

### *Plectus araucanorum* sp. n.

(Fig. 1 A-F)

*Holotype female*: L = 0.65 mm; a = 22; b = 4.0; c = 7.6; c' = 5.8; V = 48 %.

*Paratype females* (n = 10): L = 0.55–0.66 mm; a = 20–23; b = 4.0–4.6; c = 6.8–7.6; c' = 5.8–7.6; V = 45–48 %.

Body small and rather stout, at anterior end hardly, at posterior end more strongly tapering, 26–29  $\mu$ m wide at middle. Cuticle very thin. Annulation hardly discernible in most parts of body. Lateral fields narrow and plain. Somatic setae thin and long. Labial region continuous with adjacent body, rounded, 8–10  $\mu$ m wide at the base; lips small, hardly separated. Body at posterior end of oesophagus 2.6–2.9 times as wide as head. Cephalic setae rather back in position, at level of proximal end of cheilostom, thin, 3.0–3.5  $\mu$ m long, about as long as maximal width of buccal cavity. Amphids somewhat hook-like or transverse oval, at level of mid-stoma or a little posterior to that.

Buccal tube 17–20  $\mu$ m long, twice as long as labial width. Anterior part (cheilostom) in its entire length sclerotized, thereupon seemingly longer than in most species of the genus. Oesophageal lumen anteriorly wider than posteriorly. Oesophagus (measured from head end) 140–164  $\mu$ m long, 22–25 % of entire length of body. Isthmus only slightly narrower than corpus. Terminal bulb moderately strong, together with cardiac process 26–35  $\mu$ m long. Rectum nearly equal in length to anal body diameter, with large proximal cells. Distance between posterior end of oesophagus and vulva 0.9–1.1 times as long as oesophagus.

*Female*. Reproductive system typical, amphidelphic. Vulval lips slightly elevated, with small lateral liplets. Genital tract 4–5 body widths long, or occupying 20–23 % of body length. In females possessing no eggs, the reflexed ovaries reach to or over the vulva. Ovaries consisting of few cells. One or two uterine eggs measuring 36–48  $\times$  19–21

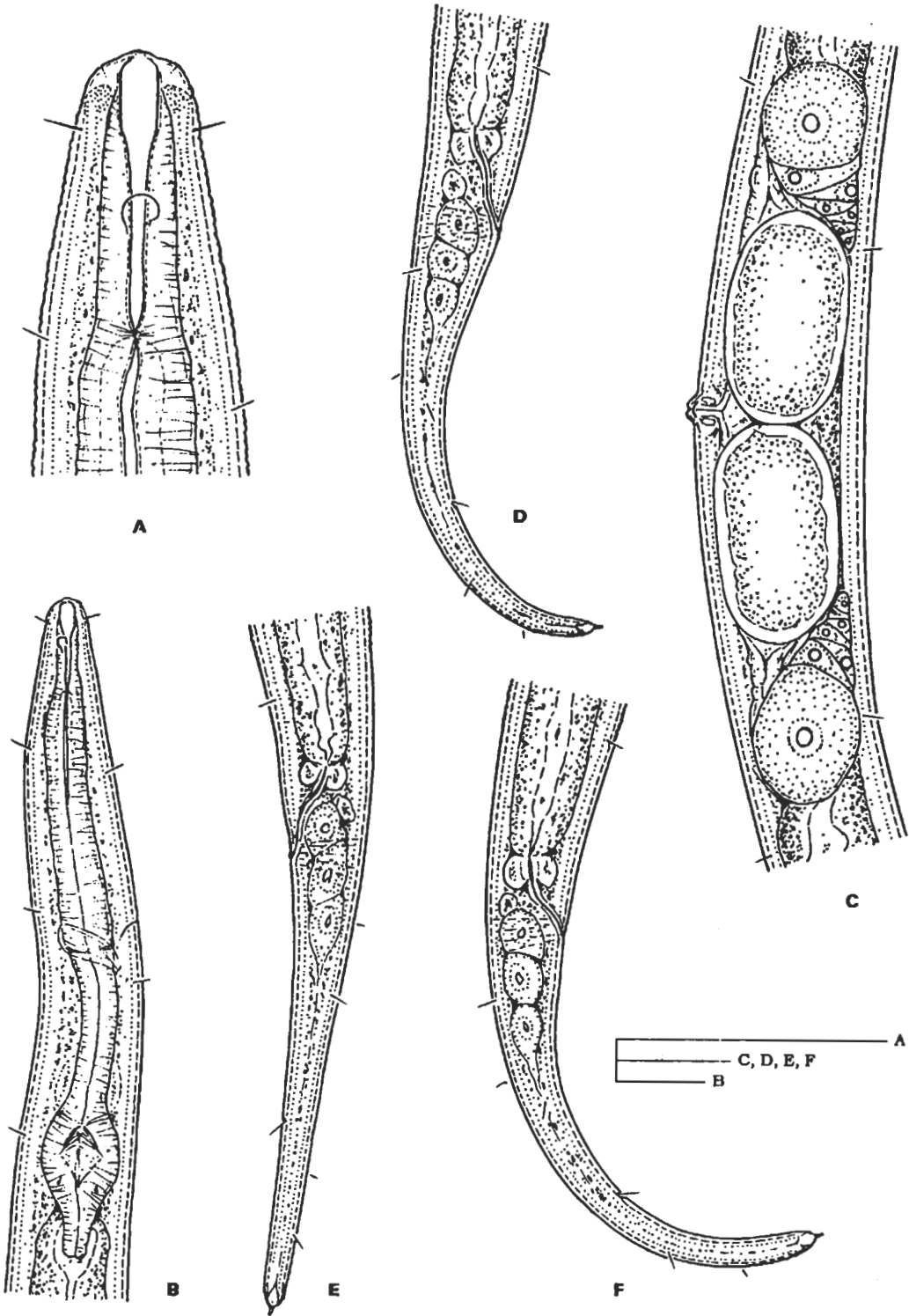


Figure 1. *Plectus araucanorum* sp. n. A: anterior end (cheilostom sclerotized in its entire length); B: oesophageal region; C: female genital apparatus with two eggs; D-F: female tails. (Scale bars 20  $\mu$ m each)

µm or 1.3–1.7 corresponding body diameters. Eggshell smooth. Since no spermatozoa were detected in the uteri of gravid females, the reproduction most probably occurs by automixis.

Vulva–anus distance equal to 2.6–3.0 tail lengths. Tail 80–90 µm, 13–15 % of body length, slender, nearly cylindrical in most part, straight or ventrally arcuate. Caudal glands and terminal spinneret present. Caudal setae thin and long; subterminal seta (spur) relatively far (14–17 µm) from tail tip. Arrangement of caudal setae to be seen in the small table below.

*Arrangement of caudal setae in Plectus araucanorum*

S1	Right-dorsal	10–16 %
S2	Left-dorsal	28–32 %
S3	Right-lateral	36–46 %
S4	Ventral/Left-ventral	58–64 %
S5	Right-dorsal	68–72 %
S6	Left-dorsal	80–84 %

*Male.* Not known.

*Diagnosis:* A small species of the genus, with very finely annulated cuticle, not offset head, thin and posteriorly located cephalic setae, thin and long somatic and caudal setae, amphids levelling with mid-stoma, well sclerotized cheilostom, short rectum, lateral vulval liplets, smooth-shelled eggs, and with slender, nearly cylindrical tail.

*Relationships.* The most significant characters of this new species are the structure of buccal cavity (cheilostom in its entire length sclerotized), the slenderness and posterior location of cephalic setae, the vulva provided with small lateral lips, and the shape and length of tail. Such a combination of morphological structures does not occur in any other representatives of the genus *Plectus*.

The anterior section of stoma within the lip region (cheilostom) is in *Plectus* species either unsclerotized or only shortly sclerotized (appearing as small dots or commas). A full-length sclerotization of cheilostom appears very rare. I observed an entirely sclerotized cheilostom in *Plectus insolens* Andrássy, 1998. Apart from its occurrence – a probably endemic member in the Antarctic fauna – *P. insolens* is larger (0.84–0.96

mm) and slenderer than *P. araucanorum* sp. n., besides, its amphids lie quite posteriorly and its tail is „S“-shaped and so twisted axially that the spur shows a ventral position.

*Plectus araucanorum* sp. n. can be compared with two further species having more or less similar appearance (short and rather stout body, continuous labial region, long and thin cephalic and caudal setae, amphids lying at mid-stoma or posterior to that, elongate tail). They are *Plectus parvus* Bastian, 1865 and *P. opisthocirculus* Andrássy, 1952. Apart from the structure of stoma, the new species differs a) from *P. parvus*: labial region wider (8–10 vs. 6–7 µm), vulva of other shape, tail longer (5.8–7.6 vs. 4–5 anal body widths), vulva–anus distance shorter (2.6–3.0 vs. 3.5–4.0 tail lengths); b) from *P. opisthocirculus*: head wider (8–10 vs. 6–7 µm), cephalic setae obliquely directed (vs. at right angles to body axis), amphids not so far back, buccal tube shorter (2 vs. 2.5–3.0 head diameters) and vulva other shaped.

*Holotype:* Female on the slide No. 14533. *Paratypes:* 18 females. Holotype and paratypes in the collection of the author.

*Type locality and habitat:* Quellón (between 42° and 43° S), Isla de Chiloé, Prov. Chiloé, South Chile, moss from trunk, February 2001 (16 females). Other locality: Chonchi, Isla de Chiloé, Prov. Chiloé, South Chile, soil from around *Juncus* roots, February (3 females).

*Etymology.* The species is named after the largest tribe of aborigines in Chile, the Araucan Indians.

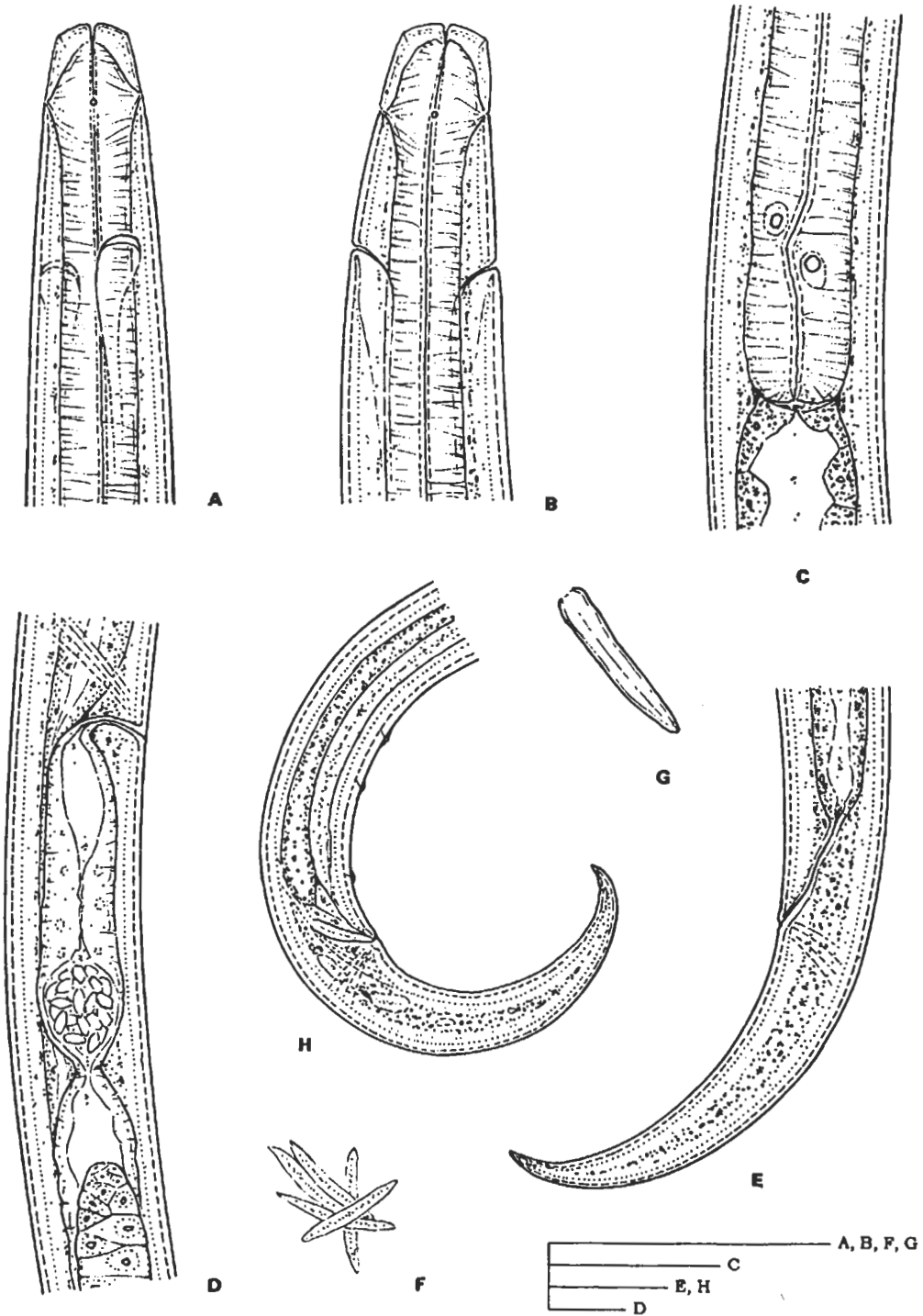
#### *Paramphidelus par* sp. n.

(Fig. 2 A–H)

*Holotype female:* L = 1.86 mm; a = 82; b = 4.8; c = 24; c' = 6.5; V = 39 %.

*Paratype male:* L = 1.82 mm; a = 102; b = 5.0; c = 30; c' = 4.7.

Body extremely slender, 23 µm (female) or 18 µm (male) wide at mid-region, in male more strongly curved in posterior part than in female. Cuticle very thin and smooth. Labial region tall, rounded, 6–7 µm wide at base (a' = 303–310). Lips fused, papillae minute. Body at posterior end of



**Figure 2.** *Paramphidelus par* sp. n. A: anterior end of female; B: anterior end of male; C: posterior end of oesophagus with two nuclei; D: vulval region (spermatheca with „shortened” spermatozoa); E: female tail; F: spermatozoa from the testis; G: spiculum (with weak central line); H: posterior end of male with three precloacal papillae. (Scale bars 20 µm each)

oesophagus 2.7–3.2 times as wide as head. Postlabial sensillae (pits) distinct. Amphidial openings transverse-oval, about as wide as one-third of corresponding body diameter, 16–18  $\mu\text{m}$  or 2.7–3.0 head diameters from anterior end. Mouth cavity minute. Oesophagus 363–386  $\mu\text{m}$  long, 20–21 % of body length, gradually widening posteriorly. Of the oesophageal gland nuclei, the two AS nuclei are distinct, at 15 and 20  $\mu\text{m}$  from posterior margin of oesophagus, respectively. Rectum 1.3 anal body widths long. Distance between proximal end of oesophagus and vulva about as long as oesophagus.

*Female.* Vulva a transverse slit, vagina thin, arcuate. Genital organ opisthodelphic, gonad 20 times as long as body width or 26 % of body length. Preovular uterine sac absent. Ovar reflexed to three-fourth of the distance to vulva. Uterus with spermatheca. No uterine egg. Distance vulva-anus 13 times as long as tail. Tail 78  $\mu\text{m}$ , 4 % of entire length of body, slightly ventrally curved, gradually tapering to the acute terminus.

*Male.* Testis one. Genital tract (from anterior tip of testis to cloaca) 43 times as long as body diameter, occupying 42 % of body length. Spermatozoa fusiform, 7–9  $\mu\text{m}$  long, very densely concentrated in testis.<sup>1</sup> Spicula small, 12  $\mu\text{m}$ , much shorter than one anal body diameter, straight, proximally slightly expanded, distally finely rounded. Three ventromedial papillae, 11, 27 and 36  $\mu\text{m}$  from cloaca, respectively, all before the spicula. Male tail 60  $\mu\text{m}$ , 3.3 % of body length, gradually tapering, ventrally bent, with acute terminus.

*Diagnosis.* A comparatively long and very slender species, with amphids lying three head diameters from anterior end, transverse vulva, opisthodelphic female gonad, short and straight spicula, three supplementary papillae and with comparatively short tail.

*Relationships.* As for length of body, *Paramphidelus par* sp. n. is the third among the representatives of the genus. Under the 19 known (to

species (Andrássy, 2002), two are 2 mm or longer (3.3 mm), the remaining shorter than 1.5 mm. The new species can be distinguished from the two long-sized species as follows. From *P. exilis* (Andrássy, 1962) Andrássy, 1977: body shorter (1.8–1.9 vs. 2.1–2.4 mm), female less slender ( $a = 82$  vs. 104–124), tail shorter (6–7 vs. 10–12 anal body widths) and simply curved (vs. S-shaped); from *P. pahudicola* Gagarin, 1991: body smaller (1.8–1.9 vs. 2.3–3.3 mm), distance between head and amphidial opening shorter (16–18 vs. 22–30  $\mu\text{m}$ ), tail shorter (78 vs. 107–111  $\mu\text{m}$ ) and not so sharply pointed. The males are rare in *Paramphidelus* species, not known in *P. exilis* and *P. pahudicola*.

*Holotype:* Female on the slide No. 14531. *Paratype:* one male.

*Type locality and habitat:* Quellón (between 42–43° S), Isla de Chiloé, Prov. Chiloé, South Chile, soil with roots from a needle wood, February 2001 (one female and one male).

*Etymology.* The species epithet „*par*” (Latin) means: two, or a pair; it refers to the presence of a couple, i.e. two specimens of different sexes.

### *Labronema diversum* sp. n.

(Figs. 3 A–H and 4)

*Holotype female:* L = 2.17 mm; a = 24; b = 3.4; c = 60; c' = 0.7; V = 50 %.

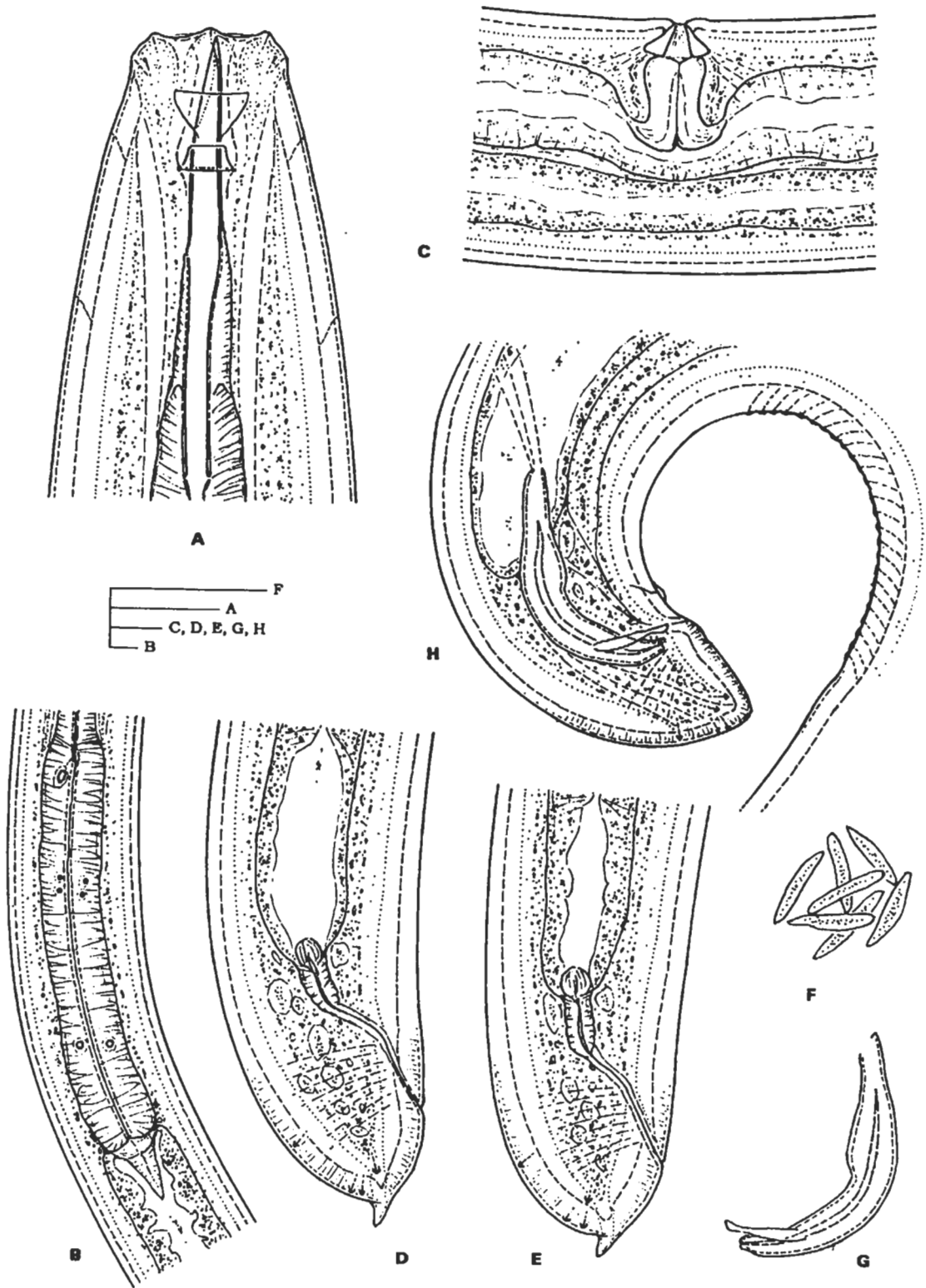
*Paratype female:* L = 2.44 mm; a = 25; b = 3.7; c = 72; c' = 0.8; V = 53 %.

*Paratype males* (n = 4): L = 2.56–2.85 mm; a = 24–26; b = 3.1–4.5; c = 68–72; c' = 0.7.

A rather robust species, males a little longer than females. Diameter 90–105  $\mu\text{m}$  at mid-body. Cuticle thick, 4–6  $\mu\text{m}$ , smooth. Labial region 28–30  $\mu\text{m}$  wide, set off from body by a shallow depression. Lips hardly separate with small papillae. Mouth opening surrounded by six small inner liplets. Body at posterior end of oesophagus 3.0–3.4 times as wide as head ( $a' = 75$ –94). Amphidial openings half as wide as corresponding body.

Odontostyle strong, 38–40  $\mu\text{m}$  long, longer than labial diameter, 6.0–6.6 % of oesophagus length, nearly as thick as cuticle. Aperture occupy-

<sup>1</sup> In the spermatheca of the one (fertilized) female the spermatozoa became shorter and much more ovoid. It seems that this phenomenon may occur in other alaimids as well; e.g. Coomans and Raski (1988) have observed a similar case in *Cristamphidelus* species.



**Figure 3.** *Labronema diversum* sp. n. A: anterior end; B: cylindrus and cardia (oesophageal nuclei seven in number: AS nuclei divided into a small pair each); C: vulval region (vulva longitudinal); D-E: posterior end of two females (tail with peg); F: spermatozoa; G: spiculum and comes (accessory piece); H: posterior end of male (with 25 contiguous ventro-medial supplements). (Scale bars 20  $\mu$ m each)

ing one-third of stylet length. Guiding ring double, at middle of the restricted stylet.

Oesophagus 610–650  $\mu\text{m}$  long, 22–30 % of body length, relatively broad in its anterior part, gradually expanded at 44–48 % of its length. Cylindrus moderately thick. Cardia consisting of a thin disc plus a muscular cone. Rectum equal to 1.3–1.4, prerectum to 1.4–2.2 anal body widths. Distance between posterior end of oesophagus and vulva shorter (0.7–0.9 times) than oesophagus.

Glandularium 294–312  $\mu\text{m}$  long, occupying nearly the half length of oesophagus. Oesophageal gland nuclei very characteristic. Dorsal nucleus (D) large, oval, located at or somewhat posterior to the middle of oesophagus, at 14–16 % of entire length of body. Posterior subventral nuclei (PS) comparatively large, conspicuous, round, at 85–105  $\mu\text{m}$  from posterior end of cylindrus. Anterior subventral nuclei (AS) uncommonly small but discernible; they are „double”: each consisting of two small nuclei lying close, 4–6  $\mu\text{m}$  to each other. This divided appearance of AS nuclei is unusual in dorylaimid nematodes<sup>2</sup>.

*Oesophageal gland nuclei in Labronema diversum*

D = 49–54 %	AS <sub>1</sub> = 25–27 % (a) = 28–29 % (b)
	AS <sub>2</sub> = 26–27 % (a) = 28–30 % (b)
	PS <sub>1</sub> = 66–70 %
	PS <sub>2</sub> = 68–72 %

*Female.* Vulva longitudinal, with conoid sclerotized inner lips. Vagina 48–56  $\mu\text{m}$ , reaching to middle of body diameter. Genital organ amphidelphic, both gonads lying on the right side of body. Anterior gonad 3.3–4.0 times as long as body width or 14–16 % of body length, posterior gonad 4.6–4.8 times as long as body width or 19–20 % of body length. Uterus long, equal to 3–4 body diameters, ovaries short. One mature egg observed, 113  $\times$  50  $\mu\text{m}$ , longer than corresponding width of body. Distance vulva–anus 29–32 times

as long as tail. The latter 34–36  $\mu\text{m}$ , 1.4–1.7 % of body length, digitate: rounded in most part and ending in a rather long, dorsally curved peg. Anal musculature strongly developed, wide.

*Male.* Testes two. Spermatozoa fusiform, 13–15  $\mu\text{m}$  long. Spicula 96–105  $\mu\text{m}$  in curvature, slender, ante- and postcorpus nearly equally long. Comes relatively large, 25–28  $\mu\text{m}$ , more or less bottle-shaped. Prerectum reaching midway of the supplements. Medioventral supplements varying from 23 to 28 in number, small, contiguous, posterior ones well before the spicula. A weak copulatory hump present. Tail short, 34–40  $\mu\text{m}$ , conoid-rounded without digitate tip. Caudal papillae small, five or six pairs.

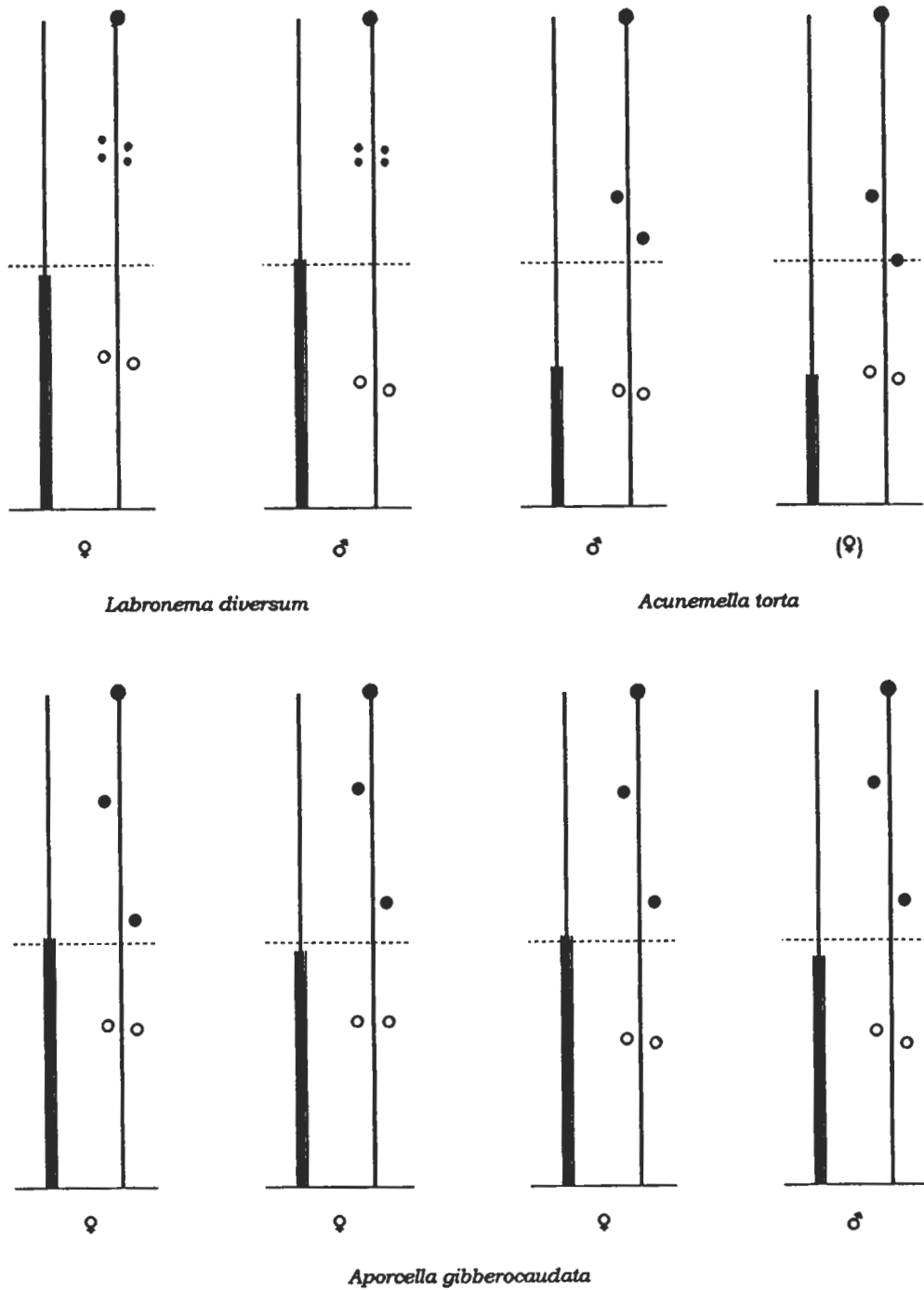
*Diagnosis.* A medium-sized nematode with stout body. Head hardly separated, odontostyle strong, longer than labial width and as thick as cuticle, guiding ring double, anterior subventral oesophageal nuclei small and double, vulva longitudinal, male supplements numerous and contiguous, tail sexually dimorphic: in female digitate, in male rounded.

*Relationships.* *Labronema diversum* sp. n. corresponds well to the general criteria of the genus *Labronema* Thorne, 1939 (shape of labial region and stylet, double guiding ring, longitudinal vulva, short tail, densely arranged supplements) on the one hand, but it shows some characters that are unusual in the genus (structure of oesophageal nuclei, dimorphism in tail shape) on the other hand. Whether the divided appearance of the AS nuclei is a unique phenomenon of the present species, a decision is not possible, because little is known on the glandular map in *Labronema* species. Loof and Coomans (1970) described the position of these nuclei in *L. czernowitziense* (Micoletzky, 1922) Thorne, 1939, and found the AS nuclei undivided as it is general in dorylaimid nematodes.

In the revision of the family Qudsianematidae (Andrássy, 1992), I listed 29 valid species within the genus *Labronema* Thorne, 1939. Since then, nine further species have been described. Apart from the special glandular picture (AS nuclei), *Labronema diversum* sp. n. shares similarities in tail forms with *L. varicaudatum* (Thorne, 1929) Thorne, 1939. There are, however, essential differ-

<sup>2</sup> In a soil sample from Alaska I found quite recently a (new) *Dorylaimus* species that similarly had a small additional nucleus before each anterior sublateral nucleus.





**Figure 4.** Map of oesophageal gland nuclei in *Labronema diversum* sp. n., *Acunemella torta* gen. n., sp. n. and *Aporocella gibberocaudata* gen. n., sp. n. The left column in each pair of figures represents the entire oesophagus with the glandularium (thickened section), the right column represents the glandularium proper with the location of the gland nuclei (D nucleus on the top, AS nuclei black, PS nuclei simple)

ences between them. Thus, the new species differs from the other in the following characteristics: body shorter (2.2–2.8 vs. 3.5–3.6 mm), stylet longer than labial diameter (vs. equal to that), advulval papillae absent, tip of the female tail dorsally bent vs. straight). There are some further *Labronema* species having digitate-subdigitate tail, this shape however occurs in both females and males (no sexual dimorphism), e.g. *L. rapax* Thorne, 1974.

So far, one *Labronema* species, *L. chilense* Andrásy, 1967 has been reported from Chile. This is shorter than the present new species (1.8–1.9 mm), it has a more posterior vulva (in 60 %), the spermatozoa are oval or ovoid, and the female tail is broadly rounded, not digitate. I discovered *L. chilense* in Prov. Valparaiso, Central Chile.

**Remarks.** Similar short dimorphic tails like in *Labronema diversum* sp. n. (mammillate or digitate in female, rounded in male) can be found in some groups of dorylaimid nematodes, namely in the families Dorylaimidae, Aporcelaimidae and Qudsianematidae. Under the so numerous species of the genus *Mesodorylaimus* Andrásy, 1959 (Dorylaimidae), the following ones may be mentioned in this respect: *M. aduncus* Andrásy, 1986, *M. cognatus* Andrásy, 1986, *M. procerus* Andrásy, 1986, *M. recurvus* Andrásy, 1964 and *M. vulneratus* Andrásy, 1986. In the family Dorylaimidae, *Laimydorus centrocerus* (de Man, 1880) Siddiqi, 1969 also shows a similar sexual dimorphism in tail. In the family Aporcelaimidae, some species of *Aporcelaimellus* Heyns, 1965 are characterized by such tail shapes, viz. *A. gertachi* (Meyl, 1956) Heyns, 1965, *A. kikereensis* Baqri & Coomans, 1973, *A. malagasi* Heyns, 1996, *A. paracentrocercus* (De Coninck, 1935) Baqri & Coomans, 1963 and *A. stilus* Kirjanova, 1951. Of the family Qudsianematidae, a species of *Labronema* Thorne, 1939 has a digitate-subdigitate tail in female and a rounded tail in male: *L. varicaudatum* (Thorne, 1929) Thorne, 1939.

In addition to them, two monotypic genera of rather uncertain taxonomic position have been described as showing a similar sexual dimorphism in tails: *Coomansinema* Ahmad & Jairajpuri, 1989 and *Namaquanema* Heyns & Swart, 1993. *Coomansinema dimorphicauda* Ahmad & Jairajpuri, 1989 was placed to the family Dorylaimidae and

the subfamily Thornenematinae. The authors differentiated their genus from *Mesodorylaimus* in the shape of stylet (slightly bent) and the anterior position of the second pair of subventral oesophagus nuclei (at about 55 % of glandularium). *Namaquanema hanki* Heyns & Swart, 1993 was provisionally regarded as belonging to the family Dorylaimidae, subfamily Laimydorinae. This species seems to be close to the representatives of *Laimydorus* and *Mesodorylaimus*, but it differs from them by the non-sclerotized odontophore and the anterior location of the dorsal nucleus (at 47–50 % of oesophagus length).

**Holotype:** Female on the slide No. 14556. **Paratypes:** one female and five males. All are preserved in the collection of the author.

**Type locality and habitat:** Aguas Calientes in Puyehue National Park (between 40° and 41° S), Prov. Osorno, southern Chile, litter from a deciduous forest with bamboo, February 2001.

**Etymology.** The Latin word „*diversum*” (neutral in gender) means: different; here: the tails of sexes are dissimilar.

#### *Aporcella* gen. n.

Aporcelaimidae. Body moderately long, about 2 mm. Cuticle simple, without inner refractive layer. Labial region narrow, strongly offset, lips fused. Odontostyle robust, somewhat longer than head diameter, with large aperture. Guiding sheath fairly thick. Oesophagus heavily muscular, widened anterior to its middle. Nuclei well discernible; AS<sub>1</sub> lying closer to D than to AS<sub>2</sub>. Female genital system amphidelphic, ovaries short, vulva transverse, not sclerotized. Spermatozoa minute, oval. Spicula slenderer than the general dorylaimoid type. Supplements separated, well before the spicula. Tails of both sexes similar, shorter than anal body width, with deep dorsal depression and a large mammillate „peg”

Type and sole species: *Aporcella gibberocaudata* sp. n.

#### *Aporcella gibberocaudata* sp. n.

(Figs. 4 and 5 A–C)

**Holotype female:** L = 2.20 mm; a = 22; b = 3.8; c = 55; c' = 0.5; V = 56 %.

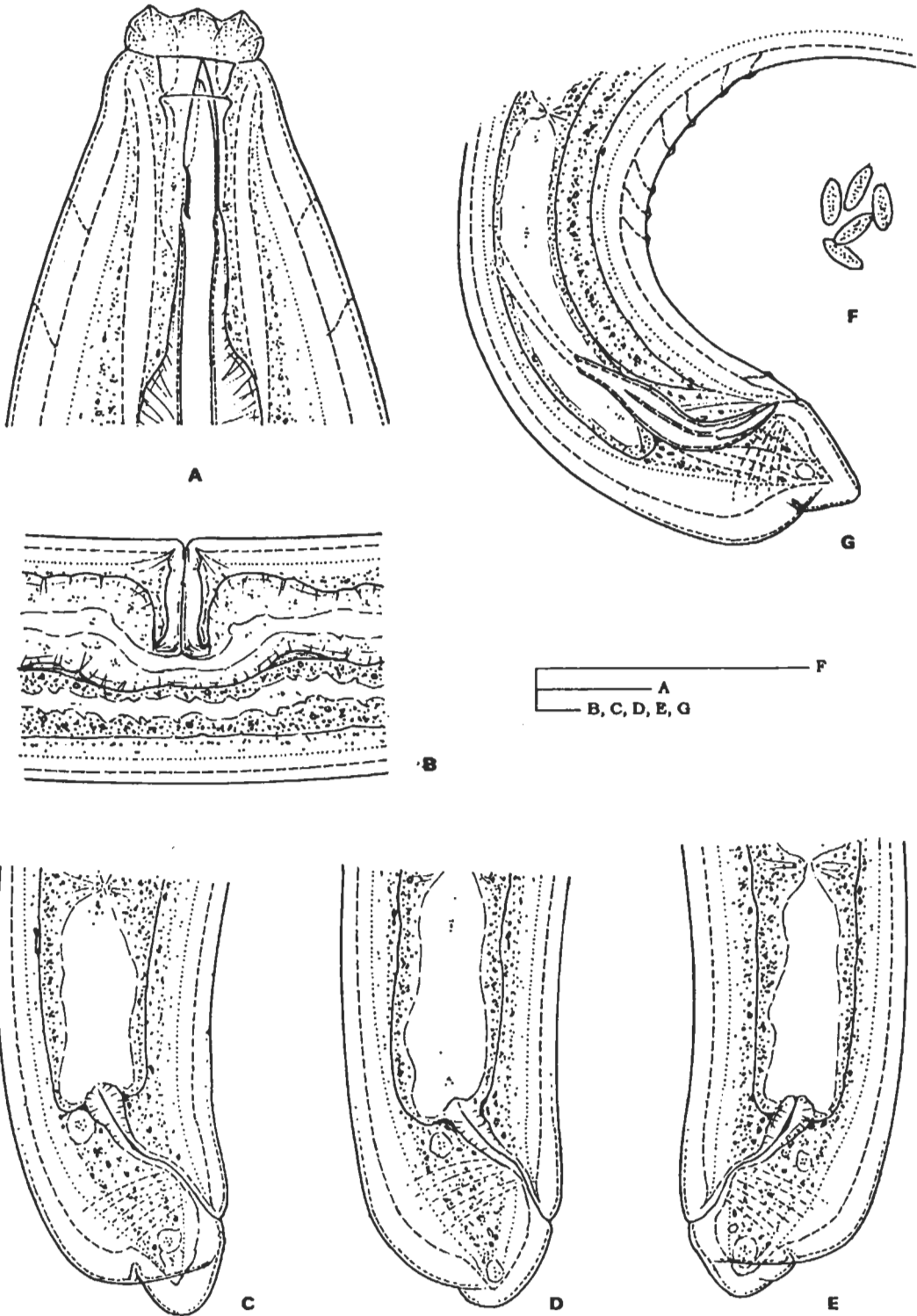


Figure 5. *Aporcella gibberocaudata* gen. n., sp. n. A: anterior end; B: vulval region (vulva transverse, not sclerotized); C-E: posterior end of three females (each tail with dorsal depression and a large peg); F: spermatozoa; G: posterior end of male (with seven ventromedial supplements). (Scale bars 20  $\mu$ m each)

*Paratype females* (n = 4): L = 2.13–2.21 mm; a = 20–23; b = 3.9–4.1; c = 50–74; c' = 0.4–0.5; V = 54–58 %.

*Paratype male*: L = 2.16 mm; a = 22; b = 4.0; c = 43; c' = 0.7.

Body robust, 94–110  $\mu$ m wide at middle. Cuticle smooth, in most part of body 4–6  $\mu$ m on tail thicker. Although it consists of more layers, but none differ in refraction from the other. Lip region 23–25  $\mu$ m wide, clearly separated from adjacent body by a deep constriction, Body at posterior end of oesophagus 3.7–4.2 times as wide as head. Amphid aperture half the corresponding body wide.

Odontostyle short and stout with rather thick walls, 26–29  $\mu$ m, a little longer than labial diameter, only 5 % of oesophagus length. Aperture occupying almost 2/3 of stylet length. Guiding sheath aporcelainid, fairly strong, at the first third of the stylet when retracted. Oesophagus 540–575  $\mu$ m, 24–26 % of body length, heavily muscular in its entire length, gradually widening before its middle (at 43 to 48 %). Cylindrus thick. Cardia short, conoid. Intestine thin-walled, with several small lacunae. Rectum as long as anal body diameter, prerectum 1.4–1.5 times longer.

*Oesophageal gland nuclei in Aporocella gibberocaudata*

D = 49–54 %	AS <sub>1</sub> = 19–22 %
	AS <sub>2</sub> = 43–45 %
	PS <sub>1</sub> = 67–71 %
K = 42–49 %	PS <sub>2</sub> = 68–72 %

Glandularium 260–290  $\mu$ m, nearly half of the oesophagus length. Oesophageal gland nuclei well visible. Dorsal nucleus relatively small, at 12–13 % of total body length. Anterior subventral nuclei far from each other, AS<sub>1</sub> closer to D than to AS<sub>2</sub> (an aporcelainid character). Distance D–AS<sub>1</sub> 48–60  $\mu$ m, distance D–AS<sub>2</sub> 113–132  $\mu$ m. AS nuclei hardly smaller than D. Posterior subventral nuclei (PS) round, somewhat smaller than the anterior ones, located at 72–82  $\mu$ m from posterior margin of cylindrus.

*Female*. Vulva transverse, not sclerotized. Vagina 48–54  $\mu$ m, half as deep as body diameter. Genital tract amphidelphic, extending in 32–37 %

of body length. Anterior gonad on the left side, 3.3–4.0 times as long as body width or 156–127 % of body length, posterior gonad on the right side, 3.4–4.4 times as long as body width or 16–20 % of body length. Uterus long and narrow, ovaries shorter than half-lengths of gonads. Mature eggs not observed. Distance vulva–anus 22–28 times as long as tail. Female tail 30–45  $\mu$ m, 1.3–2.0 % of body length, much shorter than anal body diameter, broadly rounded, strongly depressed on dorsal side with a large hemispheroid extension/peg.

*Male*. Testes paired. Spermatozoa oval, small, 4–5  $\mu$ m. Prerectum beginning at middle of supplemental row. Spicula 105  $\mu$ m along curved axis, slender with long collum and weak venter. Comes 27  $\mu$ m long. Ventromedial supplements 7 in number, the posteriormost larger than the other; posterior three supplements close to each other, other four well spaced. All supplements lying outside the range of the spicula. Male tail 50  $\mu$ m or 2.3 % of body length, similar to female tail, caudal papillae minute, inconspicuous.

*Diagnosis*. Body about 2 mm long, fairly robust, head strongly set-off, lips moderately separated, odontostyle strong with large aperture, oesophagus widened before its middle, gland nuclei as described above, rectum and prerectum short, vulva transverse, not sclerotized, ovaries short, spermatozoa oval, spicula slim, supplements few, mostly separate, before spicula, tail short, dorsally depressed with large mammillate tip.

*Relationships*. *Aporocella gibberocaudata* gen. n., sp. n. undoubtedly belongs to the family Aporocelaimidae. It resembles in many respects the representatives of *Tubixaba* Monteiro & Lordello, 1980, thus, in shape of head, simple cuticle, unsclerotized vulva, short ovaries, slender spicula and separate supplements. It is however smaller (2.1–2.2 vs. 4 to 12 mm), the stylet aperture larger (2/3 vs. 1/3), the nuclear map of oesophagus dissimilar (AS<sub>1</sub> close to D vs. far from D; PS in 2/3 of glandularium vs. unusually anterior, at middle of glandularium) and tail other-shaped.

*Aporocella gibberocaudata* sp. n. also resembles the species of *Aporocelaimellus* Heyns, 1965, but it differs from them in having simple cuticular layers and unsclerotized vulva. (The cuticle consisting of

layers showing dissimilar refraction is a character of first rank in *Aporcelaimellus*; see Andrásy, 2002.)

It is not impossible that some species of the genus *Aporcelaimellus* should be later transferred to *Aporcella*. For instance, *A. parapapillatus* Botha & Heyns, 1990 and *A. pseudospiralis* Botha & Heyns, 1990 seem to be close to the type species of *Aporcella* in more respects: cuticle without refractive layer, aperture longer than 1/2 of stylet, AS<sub>1</sub> relatively close to D, vulva not sclerotized. Of them, the male is known in *A. parapapillatus* only: the spicula are slender, the supplements are, in contrast with *Aporcella gibberocaudata*, contiguous.

*Oesophageal gland nuclei in Aporcelaimellus parapapillatus (after Botha & Heyns, 1990)*

D = 54 %	AS <sub>1</sub> = 26 %
	AS <sub>2</sub> = 50 %
	PS <sub>1</sub> = 70 %
K = 52%	PS <sub>2</sub> = 72 %

*Holotype*: Female on the slide No. 14556. Paratypes: four females and one male. Deposited at the collection of the author.

*Type locality and habitat*: Aguas Calientes in Puyehue National Park (between 40–41° S), Prov. Osorno, southern Chile, litter from a deciduous forest with bamboo, February 2001.

*Etymology*: The species name comes from the Latin: *gibber* = humped, *cauda* = a tail.

*Acunemella* gen. n.

Nordiidae. Body strongly tapering in its anterior region towards the head and spring-likely twisted in its posterior two-thirds. Cuticle smooth. Head practically not separated, lips amalgamated, labial papillae minute. Odontostyle exceptionally long and thin, equal to 8–9 labial diameters. Oesophagus suddenly widening in last third of its length, its anterior section weakly muscular. Dorsal oesophageal nucleus very posterior in position: at 70 % of oesophagus length. Female genital structure uncertain. Testes two, spermatozoa fusiform. Spicula robust. Adcloacal sup-

plements farther from cloaca than usual, ventromedial supplements few, spaced. Tail short, conoid, ventrally arcuate.

Type and only species: *Acunemella torta* sp. n.

*Acunemella torta* sp. n.

(Figs. 4 and 6 A–F)

*Holotype male*: L = 1.57 mm; a = 38; b = 4.0; c = 49; c' = 1.1.

*Paratype male*: L = 1.48 mm; a = 41; b = 3.7; c = 45; c' = 1.1.

*Paratype (young) female*: L = 1.02 mm; a = 35; b = 3.2; c = 30; c' = 1.6.

Body posture upon fixation very characteristic: in anterior third almost straight, strongly tapering towards head, in posterior two-thirds or three-fourth however heavily twisted resembling a spiral-spring. Mid-body 36–40 µm wide. Cuticle smooth, on neck occasionally very finely annulated, 1.5–2.0 µm thick. Head small, practically confluent with body, 5.5–6.0 µm wide, only one-sixth of body diameter at posterior end of oesophagus; a' = 260–270 (!). Lips fused, labial papillae minute. Amphidial opening larger than half a corresponding body width.

*Oesophageal gland nuclei in Acunemella torta*

D = 70–72 %	AS <sub>1</sub> = 37–40 %
	AS <sub>2</sub> = 47–51 %
	PS <sub>1</sub> = 74–80 %
K = 74–78 %	PS <sub>2</sub> = 75–80 %

Odontostyle very long and thin, needle-like, with very narrow but conspicuous lumen; in the holotype male 44 µm, in the other male 53 µm long, 11–13 % of oesophagus length, 7.5 and 9 times as long as labial diameter, respectively. Weekly gradually widened backwards, aperture indistinct, probably quite small. Odontophore simple, not flanged. Guiding ring simple, thin, at the first-fourth of the retracted spear. Oesophagus 390–404 µm long, 25–27 % of body length, hardly muscular in its anterior section, suddenly widening at 62–65 % of its length. Cardia short, conoid. Intestine thin-walled, full with small ball-

like corpuscles. Rectum in the young female 1.3, prerectum 2.2 anal body diameters long. Pre-rectum in males beginning at level of the second or third supplement.

Glandularium 102–116  $\mu\text{m}$  long, only 26–28 % of entire length of oesophagus. Dorsal oesophageal nucleus situated far back, at 70–72 % of entire length of oesophagus, or at 17–18 % of total length of body. AS nuclei nearly equal in size, AS<sub>1</sub> however less conspicuous than its couple. PS nuclei smaller, but well discernible.

*Male.* Testes paired, opposed. Spermatozoa fusiform, 6–8  $\mu\text{m}$ , as long as 1/5–1/6 of body width. Spicula unusually robust, 50–52  $\mu\text{m}$  in curvature, 12–14  $\mu\text{m}$  wide posterior to venter, bluntly rounded on its both tips, with narrow but strongly expressed central line. Comes 12–13  $\mu\text{m}$  long. Adcloacal pair of supplements at a greater distance from cloaca than general in dorylaimid nematodes. Ventromedial supplements four or five, very small, all lying anterior to spicula; supplements 12–14  $\mu\text{m}$  from one another. Male tail conoid, strongly bent ventrally, 33–38  $\mu\text{m}$  long with sharply pointed or finely rounded tip. Three pairs of small caudal papillae discernible.

*Female.* Only an immature specimen of female character (an L4?) was observed. Functional stylet 30  $\mu\text{m}$ , „reserve” stylet 45  $\mu\text{m}$  long. Oesophagus as long as 31 % of body length. Arrangement of gland nuclei in oesophagus quite similar to that of adults. Of the structure of genital primordium, it cannot be settled with certainty if the mature female will become amphi- or monodelphic. Tail 35  $\mu\text{m}$ , ventrally curved. Posterior half of body similarly twisted as in males.

*Diagnosis.* Body rapidly tapering anteriorly and strongly twisted posteriorly. Head not offset, in comparison with mid-body width very small. Odontostyle needle-like, extremely long, possessing a narrow lumen and small aperture. Oesophagus enlarging posteriorly. Dorsal nucleus far posterior. Spicula massive. Supplements few, spaced, anterior to spicula. Tail short, conoid.

*Relationships.* Although adult females are not at disposal, the two male specimens and the preadult, female-like specimen unambiguously verify that 1) this species belongs to the family Nordiidae, 2) it fits into none of the known genera within the family. The long and thin stylet, the far

back expanded oesophagus and the general arrangement of the five oesophageal nuclei all show nordiid characters. (Longidorids have a similar stylet and posteriorly widened oesophagus, the gland nuclei in the oesophagus are however reduced to three.) On the other hand, in virtue of the extremely thin, needle-like stylet, strongly narrowed anterior body, small head, twisted posture of posterior body, robust spicula, position of adcloacal supplements and of the strongly curved short-conoid tail this species cannot be placed in any of the genera described so far.

Under the representatives of the genus *Longidorella* Thorne, 1939 there are a few species possessing very long stylet (up to 5 head diameters), their body is however always robust, much less tapering anteriorly, and never twisted.

*Holotype:* Male on the slide 14544. *Paratypes:* one male and one juvenile. All in the collection of the author.

*Type locality and habitat:* Chonchi in Isla de Chiloé (between 42–43° S), Prov. Chiloé, South Chile, soil around fern roots, February 2001.

*Etymology:* The species epithet „*torta*” (feminine in gender) is from the Latin, and means: twisted.

## NEW NEMATODE SPECIES DISCOVERED IN SOUTHERN CHILE

Those nematode species, 60 in number, are listed here that were discovered in South Chile and described as new to science. New genera are marked with dotted underlining.

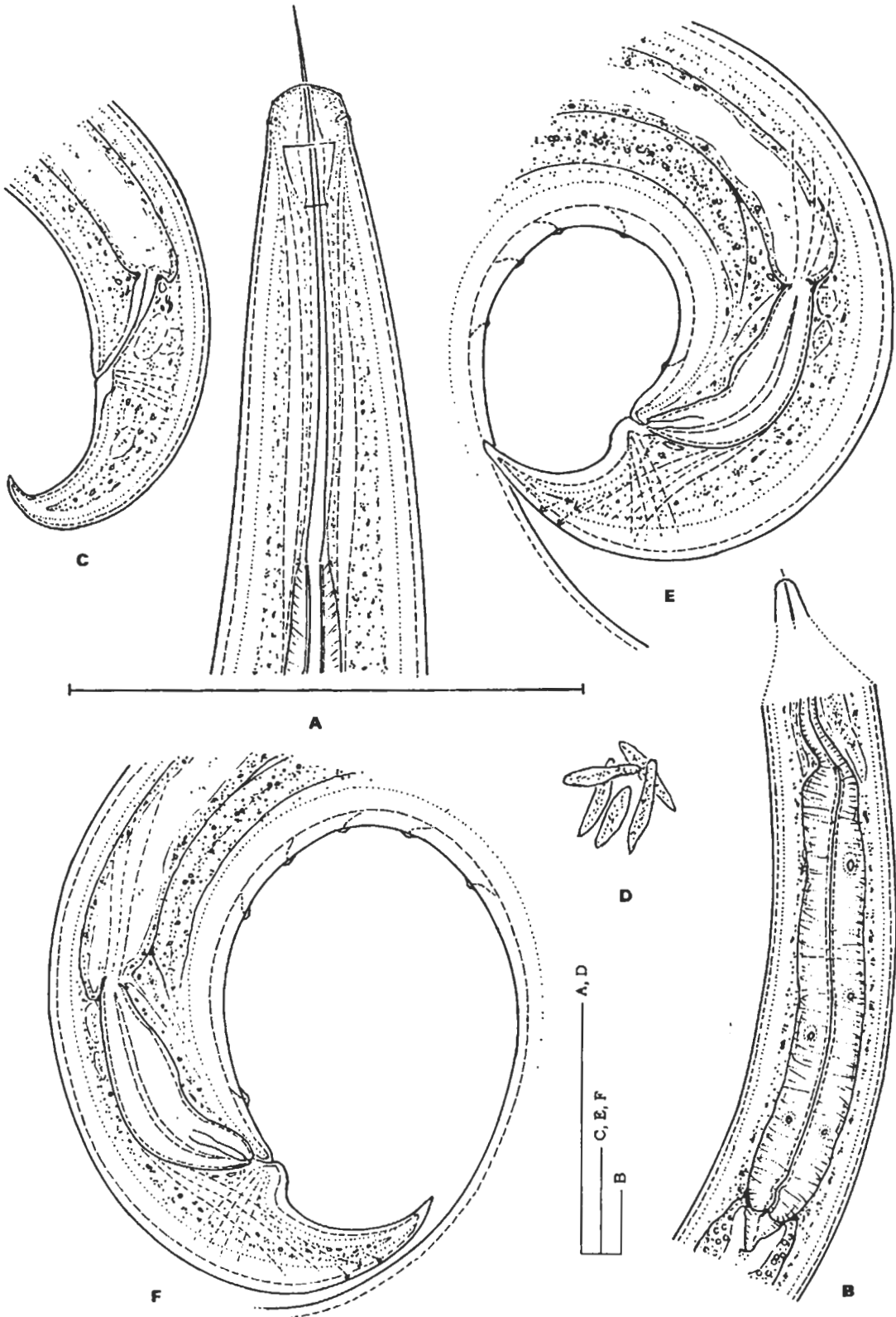
### Class TORQUENTIA

#### Fam. Halaphanolaimidae

*Aphanolaimus chilensis* Raski & Coomans, 1990  
*Aphanolaimus elegans* Raski & Coomans, 1990  
*Aphanolaimus fuegoensis* Raski & Coomans, 1990  
*Aphanolaimus yamari* Raski & Coomans, 1990  
*Paraphanolaimus terrestris* Raski & Coomans, 1991

#### Fam. Plectidae

*Plectus araucanorum* sp. n.



**Figure 6.** *Acunemella torta* gen. n., sp. n. A: anterior end, and body diameter at posterior end of oesophagus; B: oesophageal cylinder with the five gland nuclei, and, in comparison, the anterior end of body; C: tail of a juvenile; D: spermatozoa; E-F: posterior end of two males with four and five ventromedial supplements, respectively (note the heavily twisted posterior body). (Scale bars 20  $\mu$ m each)

Fam. Leptolaimidae

- Chronogaster chilensis* Raski & Maggenti, 1985  
*Leptoplectonema fuegoense* Coomans & Raski, 1991

Class SECERNENTIA

Fam. Cephalobidae

- Cervidellus vinciguerrae* Clausi, 1998  
*Metacrolobus festonatus* Vinciguerra, 1994

Fam. Aphelenchoididae

- Tylaphelenchus yamari* Raski & Valenzuela, 1988

Fam. Tylenchidae

- Filenchus normanjonessi* Raski & Geraert, 1987  
*Filenchus terrestris* Raski & Geraert, 1987  
*Polenchus curvicauda* Raski & Geraert, 1988  
*Basiria uncinata* (Geraert & Raski, 1986) Siddiqi, 2000  
 [Basirienchus u.]  
*Neothada costata* (Geraert & Raski, 1986) Siddiqi, 2000  
 [Basirienchus c.]  
*Malenchus adelinae* (Raski & Geraert, 1987) Siddiqi, 2000  
 [Filenchus a.]  
*Malenchus leiodorus* Geraert & Raski, 1986  
*Malenchus parthenogeneticus* Geraert & Raski, 1986  
*Malenchus williamsi* Geraert & Raski, 1986  
*Ridgeltus elenae* (Geraert & Raski, 1986) Siddiqi, 2000  
 [Basirienchus e.]  
*Zanenichus chilensis* (Raski & Geraert, 1987) Siddiqi, 2000  
 [Filenchus ch.]

Fam. Ecphyadophoridae

- Ecphyadophora caelata* Raski & Geraert, 1986  
*Lelenchus filicaudatus* Raski & Geraert, 1986  
*Chilenchus elegans* (Raski & Geraert, 1986) Siddiqi, 2000  
 [Lelenchus e.]

Fam. Atylenchidae

- Eutylenchus fueguensis* Valenzuela & Raski, 1985

Fam. Tylodoridae

- Cephalenchus chilensis* Raski & Geraert, 1986

Fam. Anguinidae

- Subanguina chilensis* Vovlas, Troccoli & Moreno, 2000  
*Ditylenchus filicauda* Geraert & Raski, 1990  
*Ditylenchus flagellicauda* Geraert & Raski, 1990

Fam. Pratylenchidae

- Pratylenchus australis* Valenzuela & Raski, 1985

Fam. Criconematidae

- Criconema certesi* Raski & Valenzuela, 1986  
*Criconema giardi* (Certes, 1889) Micoletzky, 1925  
 [Dorylaimus g.]  
*Criconema meridianum* (Mehta, Raski & Valenzuela, 1983) Siddiqi, 1986 [Criconemella m.]  
*Criconema navarinoense* Raski & Valenzuela, 1988  
*Criconema neopacificum* (Mehta, Raski & Valenzuela, 1983) Raski & Luc, 1985 [Nothocriconema n.]  
*Criconema orellanai* Raski & Valenzuela, 1988  
*Criconema osornoense* Raski & Valenzuela, 1988  
*Criconema raemispinosum* (Mehta, Raski & Valenzuela, 1983) Siddiqi, 1986 [Seriespinula r.]  
*Criconema velatum* (Mehta, Raski & Valenzuela, 1983) Raski & Luc, 1985 [Bakernema v.]  
*Ogma sagi* Raski & Valenzuela, 1988  
*Ogma terrestre* Raski & Valenzuela, 1986

Fam. Hemicycliophoridae

- Hemicycliophora monticola* Mehta, Raski & Valenzuela, 1983  
*Hemicycliophora macrodorata* Raski & Valenzuela, 1986

Fam. Paratylenchidae

- Paratylenchus fueguensis* Raski & Valenzuela, 1986

Class PENETRANTIA

Fam. Alaimidae

- Paramphidelus par* sp. n.  
*Cristamphidelus acucephalus* (Coomans & Raski, 1988)  
 . Siddiqi & Vinciguerra, 1991 [Etamphidelus a.]



*Cristamphidelus andrassyi* (Vinciguerra & Clausi, 1990) Siddiqi & Vinciguerra, 1991 [*Etamphidelus a.*]  
*Cristamphidelus chilensis* Andrásy, 2002  
*Cristamphidelus fueguensis* (Coomans & Raski, 1988) Siddiqi & Vinciguerra, 1991 [*Etamphidelus f.*]  
*Cristamphidelus magnus* Andrásy, 2002  
*Cristamphidelus subantarcticus* (Vinciguerra & Clausi, 1990) Siddiqi & Vinciguerra, 1991 [*Etamphidelus s.*]  
*Cristamphidelus vinciguerrae* Andrásy, 2002  
*Cristamphidelus yamari* (Coomans & Raski, 1988) Siddiqi & Vinciguerra, 1991 [*Etamphidelus y.*]

Fam. Prismatolaimidae

*Prismatolaimus chilensis* Coomans & Raski, 1988  
*Prismatolaimus novoporus* Coomans & Raski, 1988

Fam. Mononchidae

*Coomansus intestinus* (Vinciguerra & La Rosa, 1990) Andrásy, 1993 [*Clarkus i.*]

Fam. Qudsianematidae

*Labronema diversum* sp. n.

Fam. Aporcelaimidae

*Aporcella gibberocaudata* gen. n., sp. n.

Fam. Nordiidae

*Acunemella torta* gen. n., sp. n.

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