



Marine Rhabdozoela (Platyhelminthes, Rhabditophora) from Uruguay, with the description of eight new species and two new genera

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Abstract

An overview of the marine rhabdozoel fauna of Uruguay is given. Eight species, new to science, are described and discussed. Two of these, *Acirrostylus poncedeleoni* n.g. n.sp. and *Polliculus cochlearis* n.g. n.sp. could not be placed in any existing genera. *A. poncedeleoni* n.g. n.sp. can be recognized from other Cicerinidae Meixner, 1928 by the fact that there is only one ovovitellarium and by the lack of a cirrus in the male atrium. *P. cochlearis* n.g. n.sp. is characterized by the fact that there is only one testis and vas deferens, a unique situation within the Dalyelliidae Graff, 1905. Apart from these two species, six other new species are described: *Cheliplana triductibus* n.sp. and *C. uruguayensis* n.sp. (Karkino-rhynchidae Meixner, 1928), *Carcharodorhynchus viridis* n.sp. (Schizorhynchidae Graff, 1905), *Baicalellia forcipifera* n.sp. (Provorticidae Beklemischew, 1928) and *Vauclusia multistriata* n.sp. and *Coronhelmis mimosa* n.sp. (Promesostomidae Den Hartog, 1964). All these species can be recognized from their congeners by the detailed structure of the genital organs in general, and the copulatory organ in particular. For four known species of Dalytyphloplanida Willems, 2006 new data are given: *Ceratopera axi* (Riedl, 1954) Den Hartog, 1964 (Trigonostomidae Graff, 1905), *Lurus evelinae* Marcus, 1950 (Luridae Sterrer & Rieger, 1990), *Byrsophlebs caligulachaena* (Ehlers & Ehlers, 1981) Karling, 1985 (Byrsophlebididae Graff, 1905) and *Oneppus lacus* Marcus, 1954 (Placorhynchidae Meixner, 1938). The occurrence of one new species of Polycystididae Graff, 1905 and the possible occurrence of *Cheliplana firmata* Brunet, 1968 and *Proschizorhynchus atopus* Marcus, 1950 are also mentioned.

Key words: turbellaria, Kalyptorhynchia, Dalytyphloplanida, Uruguay, taxonomy, new taxa, new records

Introduction

Although the turbellarian fauna of South America has recently received some attention, very little is known. Moreover, recent literature almost exclusively focuses on the freshwater turbellaria (e.g. Amato *et al.* 2005, 2006; Brusa *et al.* 2003; Brusa 2006a; Brusa & Damborenea 2000; Curino & Cazzaniga 1993; Damborenea & Cannon 2001; Moretto 1996; Noreña-Janssen 1995; Noreña *et al.* 2005a, b, 2006a, b; Noreña-Janssen & Faubel 1996; Volonterio 2007). Only Marcus (1945a, b, 1946, 1948, 1949, 1950, 1951, 1952, 1954), du Bois-Reymond Marcus (1958), Brusa (2006b), Brusa *et al.* (2006), Ponce de León & Mañé-Garzón (1979) and Ponce de León (1984) have examined and described a large number of marine species from localities in southern Brazil, Uruguay and Argentina. Only a minority of these species (38; see table 1) belong to the rhabdozoels. Apart from the studies mentioned above, no other work has been done on marine rhabdozoels from this region.

TABLE 1. Rhabdocoels with known localities from the Atlantic coast of South America.

DALYTYPHLOPLANIDA		
Graffillidae	<i>Nyrgulgas evelinae</i> Marcus, 1954	Estuario do rio Itanhaen, Brazil
	<i>Paravortex mesodesma</i> Brusa, Ponce de León & Damborenea, 2006	Playa de La Coronilla, La Coronilla, Rocha, Uruguay
Luridae	<i>Lurus evelinae</i> Marcus, 1950	Baía de Santos, Brazil
Provorticidae	<i>Daelja secuta</i> Marcus, 1951	Cananea, Brazil
	<i>Kalya gabriellae</i> Marcus, 1951	Santos, São Vicente, Guarujá, Brazil
	<i>Pogaina suslica</i> (Marcus, 1951) Marcus, 1954	Ilha de São Sebastião, Brazil
	<i>Pogaina tifa</i> Marcus, 1954	Ilha de São Sebastião, Brazil
Umagillidae	<i>Anoplodium evelinae</i> Marcus, 1949	Baía de Santos, ilha das Palmas, ilha de São Sebastião, Brazil
	<i>Collastoma wahlí</i> Ponce de León & Mañé-Garzón, 1979	Puerto Deseado, Argentina
Byrsophlebiidae	<i>Byrsophlebs lutheri</i> (Marcus, 1952) Karling, 1985	Ilha de São Sebastião, São Vicente and Cananea, Brazil
Solenopharyngidae	<i>Artinga evelinae</i> Marcus, 1948	Baía/perto de Santos, ilha das Palmas, Guarujá, Brazil
	<i>Lenopharynx triops</i> Marcus, 1951	Ilha de São Sebastião, Brazil
	<i>Trisaccopharynx pusa</i> (Marcus, 1952) Ehlers, 1972	Ilha de São Sebastião, Brazil
Trigonostomidae	<i>Brinkmanniella augusti</i> Marcus, 1951	Ilha de São Sebastião, Brazil
	<i>Memyla phocanella</i> Marcus, 1952	Porto Novo, perto de Caraguatatuba, Brazil
	<i>Promesostoma scylax</i> Marcus, 1952	Ilha de São Sebastião, Brazil
	<i>Trigonostomum divae</i> Marcus, 1948	Baía de Santos, ilha das Palmas, Brazil
Typhloplanidae	<i>Haloplanella ibla</i> Marcus, 1952	Ilha de São Sebastião, Brazil
	<i>Ruanis pandula</i> Marcus, 1952	Ilha de São Sebastião, Brazil
KALYPTORHYNCHIA		
Cicerinidae	<i>Toia ycia</i> Marcus, 1952	Ilha de São Sebastião, ilha das Palmas, Brazil
Koinocystididae	<i>Itaipusa divae</i> Marcus, 1949	Praía Grande, Baía/perto de Santos, ilha das Palmas, Brazil
	<i>Itaipusa evelinae</i> (Marcus, 1954) Karling, 1980	Ilha de São Sebastião, Baía de Santos, Brazil
	<i>Rhinolasius sartus</i> Marcus, 1951	Cananea, Perto de Caraguatatuba, Brazil
	<i>Utelga deina</i> Marcus, 1949	Baía de Santos, ilha das Palmas, Brazil
Placorhynchidae	<i>Harsa obnixa</i> Marcus, 1951	Cananea, Brazil; Porto Novo (Marcus, 1952), Brazil
	<i>Onepus lacus</i> Marcus, 1954	Itanhaen, Brazil
	<i>Onepus timius</i> Marcus, 1952	Canal de São Sebastião, Brazil
Polycystididae	<i>Acha evelinae</i> Marcus, 1949	Baía de Santos, ilha das Palmas, ilha de São Sebastião, Brazil
	<i>Paraustorhynchus elixus</i> (Marcus, 1954) Karling & Schockaert, 1977	Ilha de São Sebastião, Baía de Santos, Brazil

.....continue

TABLE 1. (continued)

	<i>Paulodora felis</i> (Marcus, 1954) Artois & Schockaert, 1998	Ilha de São Sebastião, Brazil
	<i>Paulodora fredelyna</i> (Marcus, 1948) Schockaert, 1998	Baía de Santos, ilha das Palmas, Brazil
	<i>Paulodora matarazzo</i> Marcus, 1948	Baía de Santos, ilha das Palmas, Brazil
	<i>Polycystis gabriellae</i> (Marcus, 1948) Karling, 1952	Baía/perto de Santos, ilha das Palmas, Guarujá, Brazil
Karkinorhynchidae	<i>Cheliplana asica</i> Marcus, 1952	Porto Novo, Perto de Caraguatatuba, Cananea, Brazil
	<i>Cheliplana targa</i> (Marcus, 1952) Karling, 1983	Baía de Santos, Itanhaen, Brazil
Schizorhynchidae	<i>Proschizorhynchus atopus</i> Marcus, 1950	Ilha de São Sebastião, Brazil
	<i>Schizorhynchoides martae</i> Marcus, 1950	Cananea, Brazil
	<i>Trapichorhynchus tapes</i> Marcus, 1949	Ilha das Palmas, Brazil

In this contribution we give an overview of the marine rhabdocoels collected during a five week stay at the coast of Uruguay. Thirteen species are discussed, eight of which are new to science. Apart from these 13 species, we collected one new species of Typhlopolycystidinae Evdonin, 1977 (Polycystididae, Kalyptorhynchia), which will be described and discussed in a recently submitted monograph of this taxon. Finally, we have also collected material of two species of Karkinorhynchidae, which is not discussed in this paper. Probably this material is of *Cheliplana firmata* Brunet, 1968 and *Proschizorhynchus atopus* Marcus, 1950, but it is in such a poor state that conclusive identification is impossible.

The phylogeny of the Rhabdocoela has been studied recently by Willems *et al.* (2006), who found that the two former rhabdocoel subtaxa “Dalyellioida” Bresslau, 1933 (including the Temnocephalida Blanchard, 1847 and some other symbiotic taxa) and “Typhloplanoida s. l.” (including the Kalyptorhynchia) appeared not to be monophyletic. Rather, they determined that the Rhabdocoela consists of two sister-clades: the Kalyptorhynchia Graff, 1905 and the Dalytyphloplanida Willems *et al.*, 2006 (including the representatives of the former “Dalyellioida” and the “Typhloplanoida s. s.”). Here we will adopt this new classification.

Material and methods

The material was collected during a sampling campaign in July-August 2004 in Uruguay. Most specimens were collected in and around Santa Teresa National Park in eastern Uruguay by Tom Artois, Ernest Schockaert, Niels Van Steenkiste, Rodrigo Ponce de León and Odile Volonterio. Some specimens were collected in southern Uruguay (Playa Ramírez, Montevideo) by Ernest Schockaert.

The animals were extracted from the sediment and algae using the MgCl₂ decantation method (see Schockaert 1996). The specimens were studied alive and afterwards whole-mounted with lactophenol. Specimens intended for sectioning were fixed in marine Bouin's solution, embedded in paraffin, serially sectioned (4 µm sections), and stained with Heidenhain's iron haematoxylin, using erythrosin as counterstain. Hard parts were drawn with the aid of a camera lucida, using Nomarski interference. Drawings without a scale are freehand. Measurements of hard parts are taken axially, unless indicated otherwise. The positions of the gonopore and organs, and the measurements of the pharynx are expressed in percentages of the total body length (distance from the anterior tip of the body).

Holotypes will be deposited in the collections of the Swedish Museum of Natural History (Stockholm) (SMNH). All other material, including paratypes, will be deposited in the collections of the research group Biodiversity, Phylogeny and Population Studies of the Hasselt University (HU).

Abbreviations used in the figures

ac: accessory cirrus; acs: accessory stylet; ag: accessory glands; am: ampullae; ap: adhesive papillae; b: female bursa; bc: bursa copulatrix; bg: basophilic glands; br: brain; bs: seminal bursa; cg: caudal glands; ci: cirrus; co: proboscis cone; di: dilators; de: ejaculatory duct; ds: spermatic duct; e: eye; eg: eosinophilic glands; fd: female duct; fg: female glands; fi: fixators; frg: frontal glands; ga: common genital atrium; gg: prostate glands; gm: glands of Minot; gp: gonopore; i: intestine; ir: integument retractors; m: mouth; ma: male genital atrium; ms: "Manschette"; od: oviduct; oe: esophagus; ov: ovary; p: proboscis; pb: postrostral bulb; pc: prepharyngeal cavity; pg: proboscis glands; ph: pharynx; pl: muscular proboscis plates; pr: protractors; ps: proboscis sheath; re: retractors; rg: rhabdite glands; rs: seminal receptacle; sph: sphincter; st: stylet; stc: statocyst; t: testis; u: uterus; vd: vas deferens; ve: vagina externa; vg: prostate vesicle; vi: vitellarium; vs: vesicula seminalis

Taxonomic account

Kalyptorhynchia Graff, 1905

Eukalyptorhynchia Meixner, 1928

Cicerinidae Meixner, 1928

Acirrostylus poncedeleoni n.g. n.sp.

(Figs. 1–2)

Locality. La Coronilla, Departamento de Rocha, Uruguay (33°54'18.50"S, 53°30'39.30"W). Beach and mouth of the canal near hotel Parque Océanico: sand covered by a thin green layer of organic material, and sand with organic material near a small pool in open contact with the ocean (01/08/2004): type locality.

Material. Observations on a live animal. Two whole mounts, one of which designated holotype (SMNH 7495), and two serially-sectioned specimens, one of which designated paratype (HU no. 400).

Etymology. The genus name refers to the lack of a cirrus and the presence of a stylet. The species is dedicated to Prof. Dr. Rodrigo Ponce de León (Montevideo, Uruguay).

Description. The animal is about 0.5 mm long and has two eyes. The syncytial epidermis is strongly ciliated and ± 2 –3 μm thick in the rostral and caudal part of the animal. In the central part it is ± 1 –2 μm thick. Cilia are ± 2 μm long. Small round to oval nuclei with a diameter half of the epidermis height occur throughout the epithelium. Round rhabdites of a similar size to the nuclei are present in the apical part of the epidermis. They are most numerous on the dorsal side of the animal. The basal membrane is very thin. Circular and longitudinal muscle layers are successively present under the very thin basal membrane.

The proboscis is about 1/6 to 1/7 of the body length long (± 70 –80 μm). The proboscis glands run anteriorly through the muscular bulb to form a girdle of eight coarse-grained eosinophilic glandular ampullae. In between these ampullae, small muscles run from the cone to the peripheral wall of the proboscis. The convex cone is completely filled with a darkly-staining substance, possibly a glandular secretion, although its origin could not be traced. The proboscis bulb is provided with well-developed longitudinal muscles, surrounded by circular muscles. The latter do not surround the glandular girdle. The epithelium of the proboscis sheath lacks cilia. Anteriorly it is membranous and anucleated. Here the sheath is surrounded by small basophilic glands, but whether they empty into the lumen of the proboscis sheath or more frontally is not fully clear. The epithelium of the sheath becomes higher and nucleated near the proboscis bulb, where it is surrounded by circular muscles. These continue for a short distance around the anterior part of the glandular girdle. The different sets of motional muscles are not fully visible in the serial sections. Parts of the protractors run around the proboscis bulb. Relatively thick muscle fibers, which probably function as dilators, insert at the transition zone

between the sheath and the glandular girdle. Fixators insert on the bulbar septum just below the glandular girdle and adhere on the epidermal basal membrane at the same level where the integument retractors insert. The latter were observed dorsally as well as ventrally and run posteriorly to the body wall. Posterior to the proboscis bulb, remnants of the proboscis retractors were visible. Their insertion place could not, however, be verified.

The pharynx rosulatus is situated in the first body half, posterior to the proboscis, brain and eyes. In the serial sections, the pharynx is somewhat shifted rostrally with regard to the position that was observed in the live animal. The mouth is situated at approximately 35%. The pharynx contains eosinophilic and basophilic glands; the exact location of their opening into the pharynx lumen could not be determined. The pharynx bulb is surrounded by a circular muscle layer. These muscles are more developed around the distal part of the bulb. The tube-shaped lumen is lined with a membranous epithelium surrounded by outer circular and inner longitudinal muscles. The membranous epithelium of this lumen is probably ciliated, but this could not be confirmed. The prepharyngeal cavity is also lined with a membranous epithelium and is only surrounded by a circular muscle layer. Glands empty into the oesophagus. A bundle of eosinophilic and basophilic glands is situated caudally from the brain.

The paired testes are located at both ventrolateral sides of the animal. In the serial sections they are situated at approximately 50% of the body length. However, in the live animal they were observed more caudally. A vas deferens leaves from each testis, distally broadening to form a seminal vesicle. Just before entering the copulatory bulb, the vasa deferentia join to form the ejaculatory duct. This ejaculatory duct runs centrally through the prostate vesicle (conjuncta-type copulatory organ; terminology of Karling 1956a). The prostate vesicle contains fine- and coarse-grained eosinophilic prostate glands. Only the fine-grained glands are extracapsular. The prostate vesicle is lined with a membranous, anucleated epithelium and surrounded by an inner circular and an outer longitudinal muscle layer. The outer longitudinal layer continues around the male atrium. Distally the prostate glands and the ejaculatory duct enter the stylet, which is a single-walled, slightly curved tube, 62 μm long. Its proximal end is funnel-shaped, and somewhat asymmetrical. For approximately 2/3 of its length, the stylet forms two lateral, wing-like protrusions, which give the impression of forming a sheath around the stylet. The distal blunt end of the stylet shows a round opening.

The ovary is unpaired and lies in the middle of the body at the dorsal side. The vitellarium runs rostrally to the proboscis and is caudally connected with the ovary to form an ovovitellarium. In the live animal, two lateral branches of this vitellarium were observed. A long oviduct connects the ovary with the female duct. This oviduct is lined with a membranous, anucleated epithelium and not surrounded by muscles. The female duct is strongly widened and surrounded by a longitudinal muscle layer. It is lined with a rather high, degenerated epithelium. Where the female duct enters the common genital atrium, it is surrounded by a weak circular muscle layer.

The elongated bursa enters the common genital atrium. Dorsally, a sphincter divides the bursa into a small, thin-walled proximal part and a broad, muscular distal part. The latter is very darkly stained in the serial sections and apparently lined with a very high epithelium. Where the bursa enters the common genital atrium, it is surrounded by a circular muscle layer and lined with a high epithelium. The rest of the distal bursal part is surrounded by a longitudinal muscle layer. Proximally from the sphincter, two cuticularized spermatid ducts originate. These ducts run towards the ovary and the oviduct, but their exact proximal ends could not be ascertained. A possible connection between the ovary and the proximal part of the bursa could not be observed.

The common genital atrium is surrounded by a circular muscle layer and lined with a membranous, anucleated epithelium. Ventrocaudally the common genital atrium empties into the gonopore, which is surrounded by a sphincter. The caudal body region contains eosinophilic and basophilic caudal glands.

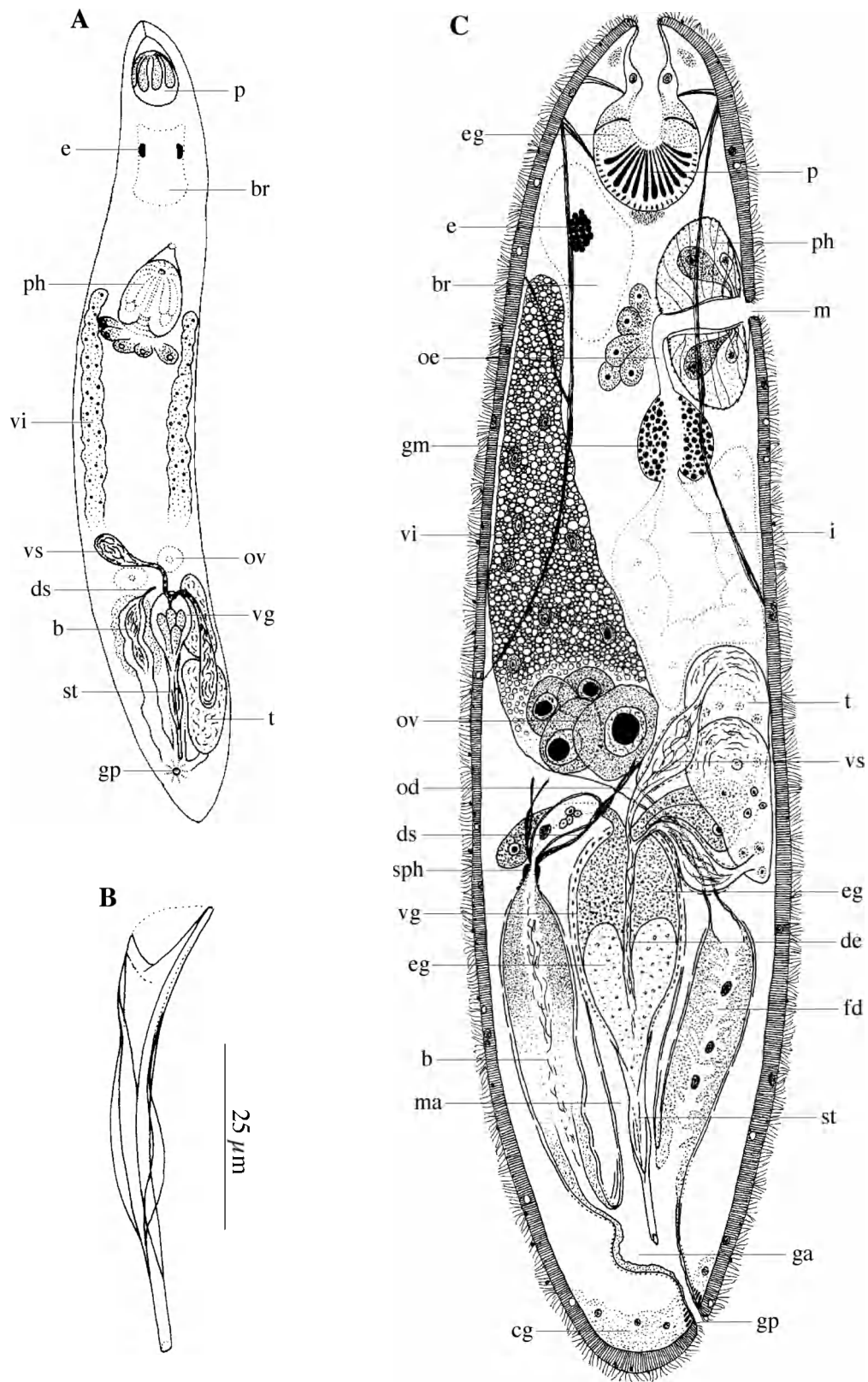


FIGURE 1. *Acirrostylus poncedeleoni* n.g. n.sp. (A) Habitus of a live animal. (B) Stilet from the holotype. (C) Reconstruction of the entire animal from the right side.

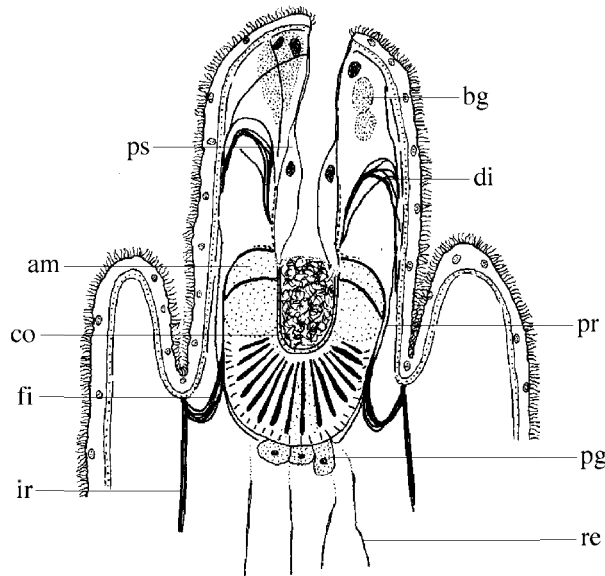


FIGURE 2. *Acirrostylus poncedeleoni* n.g. n.sp. Reconstruction of the proboscis from the right side.

Discussion. The presence of a proboscis without hooks and muscular plates, but with a glandular girdle, places *Acirrostylus poncedeleoni* n.sp. clearly within the taxon Cicerinidae Meixner, 1928. Traditionally, the family Cicerinidae is subdivided into three subfamilies: Cicerininae Meixner, 1928, Nannorhynchidinae Evdonin, 1977, and Xenocicerininae Evdonin, 1977, the last containing a single genus (*Xenocicerina* Karling, 1956). Morphological analyses of sperm (Watson 1998) and proboscis ultrastructure (De Vocht 1992; De Vocht & Schockaert 1999) strongly suggest a monophyletic Nannorhynchidinae. All representatives of Nannorhynchidinae show a reduction of the axonemata in the sperm, similar to the situation found in the Schizorhynchia, which makes them a possible sister group to the Schizorhynchia (Watson 1998, 2001). Moreover, all species within Nannorhynchidinae have eyes with lenses, which is clearly not the case for the other species of Cicerinidae.

Most probably the taxon Cicerininae is not monophyletic, and even not related to the Nannorhynchidinae. The presence of sensory organs associated with the distal belt of the sheath epithelium suggests a close relationship of *Cicerina remanei* Meixner, 1928 with *Psammorhynchus tubulipenis* Meixner, 1938 (Psammorhynchidae Karling, 1956) and *Cytocystis clitellatus* Karling, 1953 (Cytocystididae Karling, 1964) (De Vocht 1990; De Vocht & Schockaert 1999). These taxa possibly form a larger monophyletic group, together with species of *Ethmorhynchus* Meixner, 1928, *Ptyalorhynchus* Meixner, 1938, *Paracicerina* Meixner, 1928, *Xenocicerina* Karling, 1956, Placorhynchidae and Gnathorhynchidae, based on the presence of two sets of proboscis retractors (De Vocht 1992). *Ethmorhynchus*, *Ptyalorhynchus*, *Cicerina* and *Paracicerina* differ from the other taxa within this group by the fact that they all have a nucleo-glandular girdle associated with the proboscis. Species of *Zonorhynchus* Karling, 1952 and *Didiadema* Brunet, 1965 have a nucleo-glandular girdle, but have only one set of proboscis retractors.

Acirrostylus poncedeleoni n.sp. does not have eyes with lenses, which places it outside the Nannorhynchidinae. It clearly differs from the typical species of "Cicerininae" by the lack of nuclei in the glandular girdle. A typical feature of *A. poncedeleoni* n.sp. is the presence of a stylet, a feature which it shares only with some species of *Zonorhynchus*, a taxon traditionally placed within the Cicerininae. However, species of *Zonorhynchus* also have an armed cirrus which is lacking in *A. poncedeleoni* n.sp. The most typical feature of *Acirrostylus* n.g., however, is the fact that there is only one ovovitellarium, a situation that is unique within the Cicerinidae. Moreover, a uterus is completely lacking, which is also very unusual within the Cicerinidae. Some species of Nannorhynchidinae have a well-developed uterus, whereas in the other Cicerininae and

Xenocicerina, the uterus is weakly differentiated, often being no more than a small protrusion of the common genital atrium. All Cicerinidae, except for *Toia* and *Zonorhynchus*, have cuticularized spermatic ducts of variable length, which connect the bursa to the ovovitellaria. Although this connection could not be observed in the Uruguayan species, this is probably also the case for *A. poncedeleoni n.sp.*

From the discussion above it is clear that the species from Uruguay cannot be placed in any of the existing genera, and therefore a new genus is erected. The phylogenetic relationships between the different cicerinid taxa is far from clear, and should be established in a large phylogenetic study.

Diagnosis. *Acirrostylus n.g.*: small taxon of Cicerinidae with a girdle of eight separate eosinophilic glandular proboscis ampullae and two sets of proboscis retractors. Nuclei absent in the glandular girdle. Eyes without lenses. Pharynx in the anterior part of the body. Copulatory organ with stylet, without cirrus. Paired testes and seminal vesicles. Unpaired ovovitellarium. Large bursa composed of a distal and a proximal part separated by a sphincter. Two cuticularized spermatic ducts. Uterus absent. Type species: *A. poncedeleoni n.sp.*

Diagnosis. *Acirrostylus poncedeleoni n.sp.*: provisionally with the same diagnosis as the genus. The stylet is a 62 μm long tube with wing-like, lateral protrusions.

Placorhynchidae Meixner, 1938

Oneppus lacus Marcus, 1954

(Fig. 3)

New locality. Playa Ramírez, Departamento de Montevideo, Uruguay (34°54'58.55"S, 56°10'11.70"W). Beach with numerous holes of invertebrates, upper to lower eulittoral, relatively coarse sand with a large amount of fine fraction (12/08/04); same locality, mid-eulittoral, rather coarse sand from a sheltered area with a large amount of fine fraction (12/08/04); same locality, fine sand with large amounts of detritus from a tidal pool in the lower eulittoral (12/08/04).

Known distribution. Itanhaen, Brazil (Marcus 1954).

Material. One drawing of a live animal. Several whole mounts, some in bad condition, and three serially-sectioned specimens, all of rather poor quality. Original material from *Oneppus lacus* Marcus, 1954: SMNH 95815. Original material from *Oneppus timius* Marcus, 1952: SMNH 95805, SMNH 95806, SMNH 95807, SMNH 95808, SMNH 95809, SMNH 95810, SMNH 95811, SMNH 95812, SMNH 95813, SMNH 95914.

Additional remarks and discussion. The body length of the studied specimens ranges from 0.7 to 0.8 mm. Habitus and internal organisation correspond to those of *Oneppus timius* Marcus, 1952 and *Oneppus lacus* Marcus, 1954 (see Marcus 1952, 1954). However, *O. timius* is normally larger (1.2 mm) than *O. lacus* (0.6 mm).

The syncytial epidermis is ciliated and has a height of 1–2 μm . The cilia are as long as the epidermis is high, and the basal membrane is about $\frac{1}{4}$ of the epidermis height. As already mentioned by Marcus (1952) in the description of *O. timius*, the nuclei in the epithelium of the epidermis are most numerous at both body ends.

The proboscis and the pharynx of the studied individual also correspond completely to those of the species of *Oneppus* described by Marcus (1952, 1954).

The construction of the male system greatly resembles that of *O. lacus* as described by Marcus (1952, 1954). On the serial sections, the ejaculatory duct seems to be slightly sclerotized. However, this could not be confirmed in the whole mounts. Although Marcus (1952, 1954) does not mention it, this could also be observed in one of the original serial sections of *O. timius*, provided by the SMNH. The cirrus of the Uruguayan specimens is armed with hundreds of small spines. In some whole mounts and in one of the serial sec-

tions, a proximal crown of larger spines was clearly observed (arrow in fig. 3C). Distally, the cirrus is armed with very large, curved spines. According to the description given by Marcus (1954) this type of cirrus is also found in *O. lacus*, as opposed to *O. timius*, which has only one, proximal girdle of large spines. For *O. lacus*, only one slide of serial sections of rather poor quality is available, which makes verification of the original material and comparison with the Uruguayan material very difficult.

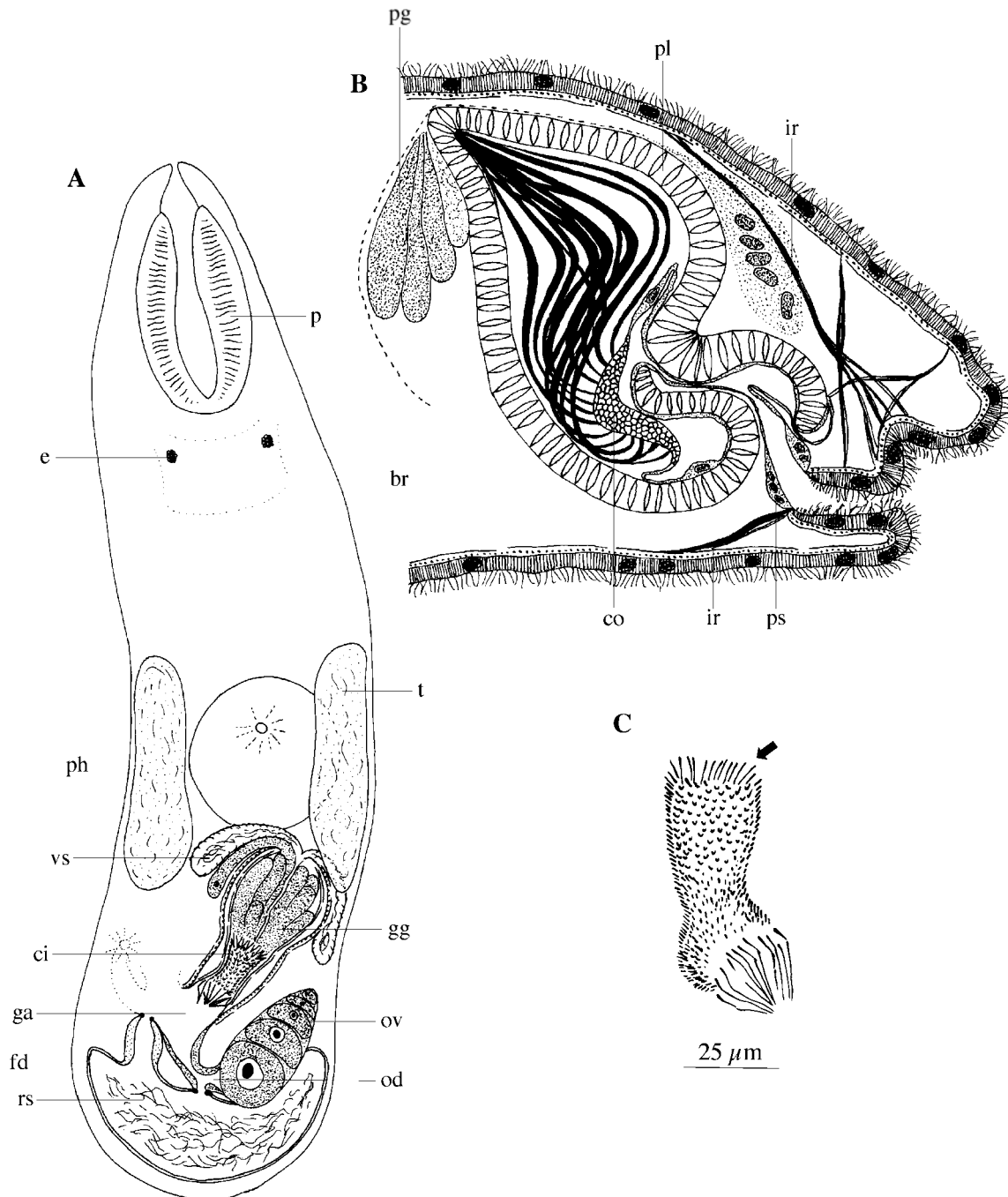


FIGURE 3. *Onieppus lacus* Marcus, 1954 (A) Habitus of a live animal. (B) Reconstruction of the proboscis from the right side. (C) Cirrus (arrow indicates the proximal crown of larger spines).

As far as could be ascertained from the sections of the Uruguayan specimens, the female system is constructed in the same way as in *O. lacus* and *O. timius*. It also seems to have a large separate seminal receptacle, completely filled with sperm, as in *O. timius*. Some uncertainties remain, especially concerning the

ventral part of the female system, which was impossible to reconstruct from the serial sections.

Based on the relative length of the individuals and the construction of the cirrus, the Uruguayan specimens are placed in *O. lacus*. Future study should resolve the problems within this genus.

Schizorhynchia Meixner, 1928

Karkinorhynchidae Meixner, 1928

Cheliplaninae Schilke, 1970

Cheliplana triductibus n.sp.

(Fig. 4)

Locality. Playa Ramírez, Departamento de Montevideo, Uruguay (34°54'58.55"S, 56°10'11.70"W). Mid-eulitoral, rather coarse sand from a sheltered area with a large amount of fine fraction (12/08/04): type locality.

Material. Observations on live animals. Three whole mounts, one designated holotype (SMNH 7496), the rest paratypes (HU no. 401–402) and seven serially-sectioned specimens, three of which designated paratypes (HU no. 403–405).

Etymology. The species epithet refers to the three sclerotized spermatid ducts and muscular ducts connecting the ovary with the bursa. Tres (Lat.): three. Ductus (Lat.): duct.

Description. The body length of the animal varies between 0.7–1 mm. Habitus and internal organisation strongly resemble those of *C. varicauda* Brunet, 1971 (see Brunet 1971).

The epidermis is syncytial and $\pm 2 \mu\text{m}$ thick, with cilia $\pm 2 \mu\text{m}$ long. The basal membrane is $\pm \frac{1}{2}$ of the epidermis height thick. Caudally, a girdle of adhesive papillae surrounds the body.

The proboscis is about 1/8 to 1/10 of the body length long. The two small proboscis halves are 10–12 μm long. Both are armed with a simple, 17–20 μm long hook. Accessory hooks are lacking. The postrostral bulb is $\pm \frac{2}{3}$ of the length of the proboscis ($\pm 20 \mu\text{m}$).

The pharynx is situated in the anterior part of the body. The wall of the prepharyngeal cavity is covered with spines. The pharynx is typically cylindrical and its length is about 1/5 of the body length (± 140 – $220 \mu\text{m}$). The mouth is situated rostrally, at the ventral side, and is surrounded by circular muscles.

The gonads are unpaired. The testis is situated in the anterior part of the body, ventrally from the pharynx. The ovary lies at about $\frac{3}{4}$ of the body length at the left-hand side of the body. The vitellarium is situated dorsally, and extends from just behind the pharynx up to the oviduct. The gonopore lies at 70 %, just behind the external opening of the vagina externa, and is surrounded by a weak sphincter. The common genital atrium is slender, tubular and proximally surrounded by a circular muscle layer. Two types of glands empty into the common genital atrium: eosinophilic glands and, more distally, basophilic glands. Distally from the opening of the basophilic glands, the common genital atrium is surrounded by longitudinal muscles.

Two vasa deferentia leave the testis, and run caudally until halfway past the copulatory organ. Each of them then widens to form a seminal vesicle, which turns 180° and runs back in anterior direction. The seminal vesicles and the vasa deferentia are lined with an anucleated, membranous epithelium, and the seminal vesicles are surrounded by a circular muscle layer. Proximally, both vasa deferentia join to form the ejaculatory duct, which enters the copulatory bulb, and receives prostate secretion (conjuncta-type copulatory organ; terminology of Karling 1956a). The prostate vesicle is surrounded by an inner circular and an outer longitudinal muscle layer. In live animals, the prostate vesicle and ejaculatory duct clearly showed a single winding. The prostate glands are eosinophilic, with the nuclei outside of the prostate vesicle. The prostate vesicle and the ejaculatory duct open into a slender cirrus. The cirrus and the prostate vesicle are surrounded by a muscular septum, which is lined with an inner circular and an outer longitudinal muscle layer (conjuncta-duplex type copulatory organ; terminology of Karling 1956a). The cirrus is 52–76 μm long, with a diameter of about 8 μm .

It is lined with a large number of rows of small, sclerotized teeth, which are all oriented in a distal direction. Just before the cirrus enters the atrium through its anterior wall, it receives a small, armed accessory cirrus, 12–17 μm long and 3–4 μm broad. The cirrus, the accessory cirrus and the common genital atrium are surrounded by a longitudinal muscle layer.

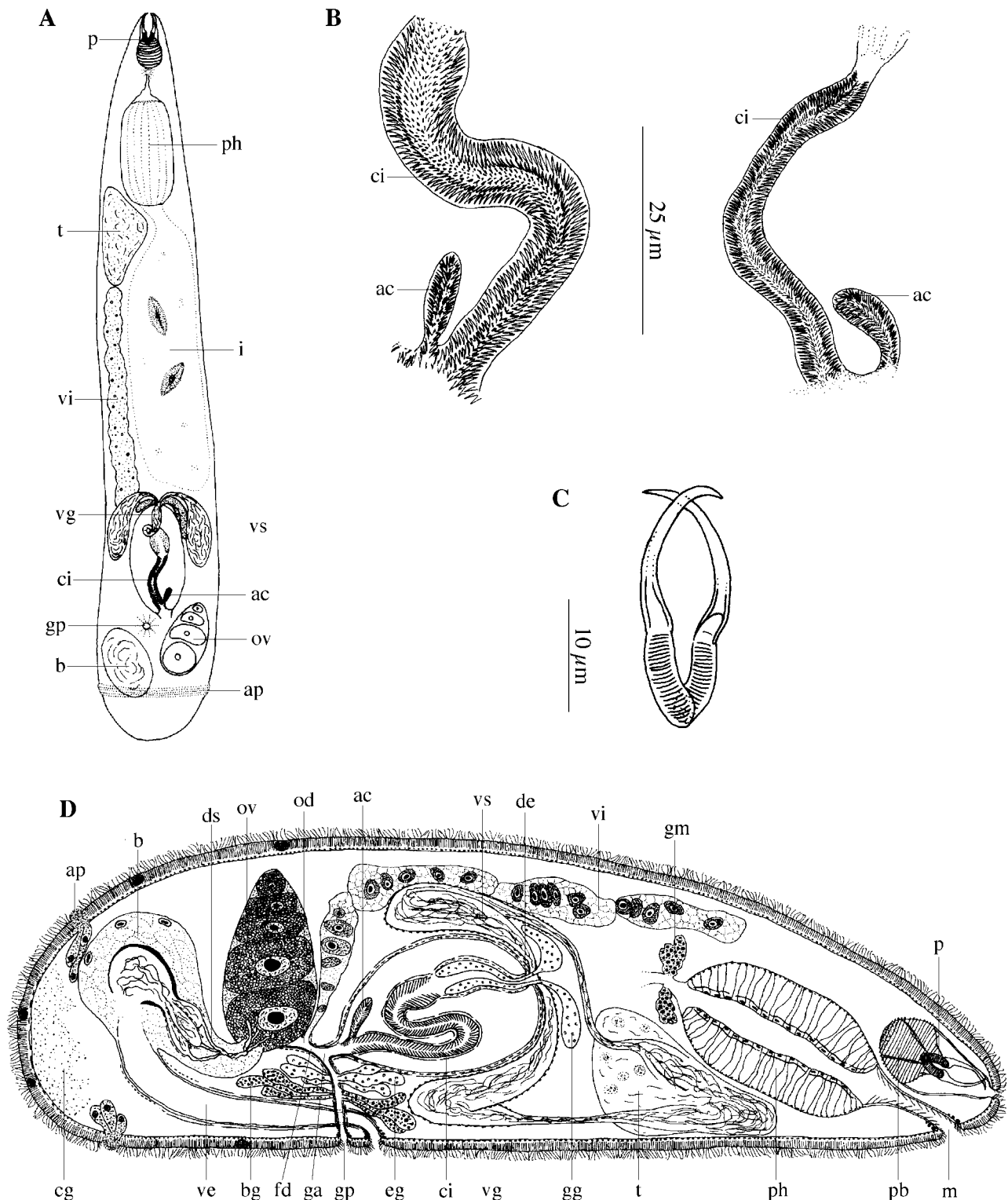


FIGURE 4. *Cheliplana triductibus* n.sp. (A) Habitus of a live animal. (B) Cirrus and accessory cirrus of two different specimens (the left one is from the holotype). (C) Proboscis with teeth. (D) Reconstruction of the entire animal from the right side.

The short oviduct receives the vitelloduct through its dorsal wall, and together they form the very short female duct. This female duct enters the common genital atrium a little caudally from the place where the male genital system enters. A circular muscle layer surrounds the female duct, the oviduct and the most distal part of the vitelloduct. The female duct is lined with an anucleated, membranous epithelium. Caudally from the ovary a large bursa occurs, which contains several compartments with sperm. The female bursa is connected to an external vagina, which is a relatively long duct, lined with a high, anucleated epithelium. Its proximal part is surrounded by circular muscles. This part also contains spermatozoa. The distal part of the vagina is surrounded by longitudinal muscles. The vaginal opening is surrounded by a strongly-developed sphincter. Within the dorso-anterior part of the bursa, three muscular sperm-containing compartments can be observed. From each of these compartments a sclerotized spermatic duct departs towards the ovary. In their middle parts these three ducts are wound around each other, so that they cannot be discerned separately. Near the ovary they diverge again, and enter the ovary as three separate ducts near to the place where the oviduct departs. The spermatic ducts are surrounded by a parenchymatous tissue, which is a continuation of the parenchymatous tissue of the bursa. A uterus is absent.

Discussion. See discussion *Cheliplana uruguayensis* n.sp.

***Cheliplana uruguayensis* n.sp.**

(Fig. 5)

Locality. La Coronilla, Departamento de Rocha, Uruguay (33°54'18.50"S, 53°30'39.30"W). Beach and mouth of the canal near hotel Parque Océanico: flat beach further away from the mouth of the canal, sand with organic material a couple of meters from a small intertidal pool (01/08/2004): type locality.

Material. Observations on a live animal. Three whole mounts, one of which designated holotype (SMNH 7497), another one designated paratype (HU no. 406). Six serially-sectioned specimens, two of which designated paratypes (HU no. 407–408).

Etymology. The species name refers to its occurrence in Uruguay.

Description. The body length of the animal varies between 0.6–0.8 mm. Habitus and internal organisation as in *Cheliplana triductibus* n.sp., except for the construction of the genital system.

From the testis two morphologically dissimilar vasa deferentia depart. One is of the normal construction; thin-walled and distally widening to a seminal vesicle, which is lined with a membranous, nucleated epithelium. The other vas deferens is enlarged and is surrounded by a layer of very thick, longitudinal muscles. It is 190–260 µm long. The seminal vesicle and the modified vas deferens join each other distally to form the ejaculatory duct, which enters the copulatory bulb. The copulatory organ is of the conjuncta-duplex type, as in the other species of *Cheliplana* de Beauchamp, 1927. The prostate vesicle is 120–170 µm long, with a diameter of ± 35 µm, and is surrounded by strongly-developed longitudinal muscles. The prostate secretion and the ejaculatory duct distally enter a short, tubular stylet. This stylet is ± 11 µm long.

The male genital atrium is lined with a membranous epithelium and surrounded by a longitudinal muscle layer. In its distal half, it receives a bundle of basophilic glands. Distally it widens before entering the common genital atrium. This common genital atrium is very broad and relatively long. Proximally it receives some eosinophilic and basophilic glands. The epithelium is high and the common genital atrium is surrounded by longitudinal muscles over its entire length. Distally, it narrows again to broaden a second time just before it reaches the gonopore. This is situated at 80% and surrounded by a sphincter.

The ovary is situated dorsally at the left-hand side and joins the bursa. Proximally it is connected with the vitellarium to form an ovovitellarium. This vitellarium bends from the ovary to the ventral side and extends rostrally up to the level of the testis. The caudally-situated female bursa is connected to the ovary by a broad duct consisting of bursal tissue. A separate spermatic duct was not observed. The bursa contains numerous

optically-clear vacuoles. An external vagina is connected to the bursa and has a thick, sclerotized wall. It widens to a spherical space just proximally from the vaginal opening. The vaginal opening is situated rostrally from the gonopore. At the place where the external vagina enters the bursa, a separate seminal receptacle is also connected to the bursa. This seminal receptacle is elliptical and is surrounded by circular muscles.

Discussion. These two new species can easily be recognized as species of Karkinorhynchidae, as they have a proboscis provided with symmetrical hooks. In representatives of Diascorhynchidae Meixner, 1929, the only other schizorhynch taxon with representatives with armed probosces, the hooks are asymmetrical. A large number of diagnostic features makes it easy to place both new species within the taxon Cheliplaninae (see Karling 1983): presence of a postrostral bulb, presence of only one pair of hooks (also the case in some Karkinorhynchinae), absence of separate lateral glands, lack of eyes (also the case in very few species of Karkinorhynchinae), presence of a single girdle of adhesive papillae (two such girdles in almost all Karkinorhynchinae), anteriorly-situated pharynx mostly cylindrical, directed anteriorly and often with a long, spiny prepharyngeal cavity.

By comparing the features of the two species discussed here with the diagnoses of the genera of the taxon Cheliplaninae, the Uruguayan species clearly belong to the genus *Cheliplana* because of the following features: proboscis hooks without denticles, soft fingerlike side pieces and a cylindrical pharynx with a long spinous cavity. They distinguish themselves from species of *Baltoplana* Karling, 1949 by the fact that *Baltoplana* has paired ovaries and testes, and from species of *Cheliplanilla* Meixner, 1938 because this taxon has crutch-shaped cuticular rods between the proboscis side pieces, proboscis hooks with two pairs of inside denticles, a blind seminal vesicle and an oviform pharynx with a short unarmed cavity (see Karling 1983). They also differ from *Archipelagoplana triplocirro* Noldt & Hoxhold, 1984 because this species lacks a long spinous pharynx cavity and because *A. triplocirro* has two small accessory cirri (see Noldt & Hoxhold 1984). Karling (1983) considered the number of testes as an unreliable generic character and by consequence placed all representatives of the genus *Rhinipera* Meixner, 1928 (one testis) within the genus *Cheliplana* (two testes), a view we follow here.

Cheliplana triductibus **n.sp.** stands unique within the genus because of the combined presence of three sclerotized spermatic ducts and one smaller accessory cirrus. In *C. hiemalis* Brunet, 1968, *C. pacifica* Noldt & Hoxhold, 1984, *C. piriformis* Brunet, 1968, *C. pusilla* Brunet, 1968, *C. schilkei* Noldt, 1989 and *C. targa* (Marcus, 1952) Karling, 1983, there is only one sclerotized spermatic duct between the bursa copulatrix and the ovary (see Brunet 1968; Karling 1983; Noldt & Hoxhold 1984, Noldt 1989). *C. varicauda* Brunet, 1971 has a comparable female and male system to *C. triductibus* **n.sp.**, but its three spermatic ducts are only slightly sclerotized and the muscular proximal parts contain a spherical nucleus. In the male system, *C. varicauda* lacks the smaller accessory cirrus. Also the extremely long caudal part, posterior to the genital system, is lacking in the new species (see Brunet 1971). Accessory cirri are also present in *C. textilis* Jouk & De Vocht, 1989, but they have two blind accessory cirri that are lined with small spines in the posterior part and even on one side (see Jouk & De Vocht 1989). Only very recently, Ax (2008) described a new species of *Cheliplana* from brackish water habitats along the French Atlantic coast and the Baltic Sea, with a very similar copulatory organ. This species, *C. deverticula* Ax, 2008, has also a winding prostate vesicle and ejaculatory duct, and a slender, armed cirrus (75 µm long) with a single small, armed accessory cirrus (17 µm long). However, nothing is known about the female system of this species. Awaiting more material of *C. deverticula* and a description of its female system, the Uruguayan specimens are provisionally placed within a new species. If the female system would prove to be identical, *C. triductibus* **n.sp.** should be synonymized with *C. deverticula*.

Cheliplana uruguayensis **n.sp.** differs from all other species of *Cheliplana* by the presence of two different seminal vesicles, a character shared with the genus *Cheliplanilla*, although in the latter the modified seminal vesicle ends blindly. This new species mostly resembles *C. targa*. Similarities are found in the female system as well as in the male genital system: one testis situated ventrally from the pharynx; a seminal vesicle

with a well-developed muscular wall; a very muscular prostate vesicle that distally ends in a short, tubular stylet, and a syncytial bursa containing vacuoles. In contrast to *C. targa*, which has only one seminal vesicle, *C. uruguayensis* n.sp. has two seminal vesicles. Moreover, *C. uruguayensis* n.sp. differs from *C. targa* by having a non-muscular vas deferens, eosinophilic and basophilic glands opening into the common genital atrium, and by lacking a sclerotized spermatid duct.

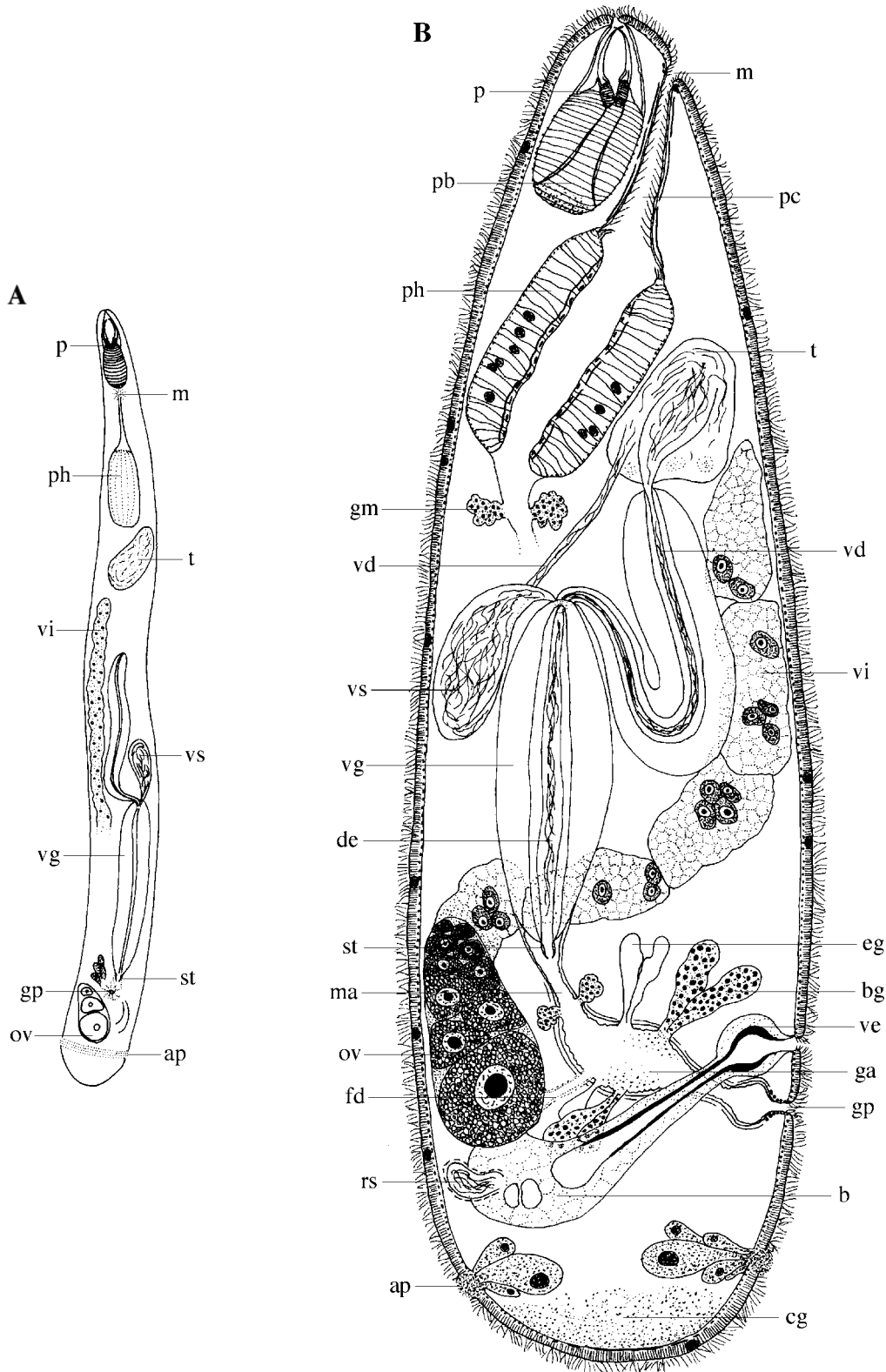


FIGURE 5. *Cheliplana uruguayensis* n.sp. (A) Habitus of a live animal. (B) Reconstruction of the entire animal.

Diagnosis. *Cheliplana triductibus n.sp.*: species of *Cheliplana* with unpaired male and female gonads. Proboscis 30 μm long and consisting of 11 μm -long proboscis hooks, 19 μm -long proboscis halves and a 20 μm -long postrostral bulb. Without accessory denticles in the proboscis. Two seminal vesicles. Muscular prostate vesicle followed by a 64 μm -long cirrus with uniform teeth (3–4 μm long). Small, armed, lateral accessory cirrus with a length of 15 μm at the distal end of the cirrus. Short female duct. Vagina externa connected with a syncytial bursa. Three cuticularized spermatic ducts and muscular ducts connect the ovary with the bursa.

Diagnosis. *Cheliplana uruguayensis n.sp.*: species of *Cheliplana* with unpaired male and female gonads. Proboscis 23 μm long, consisting of 8 μm -long proboscis hooks, 16 μm -long proboscis halves and a 23–25 μm -long postrostral bulb. Accessory denticles absent in the proboscis. Two different seminal vesicles, of which one is a modified vas deferens surrounded by strongly-developed, longitudinal muscles. Both seminal vesicles are connected with the testis. Long, longitudinally muscular prostate vesicle ($\pm 150 \mu\text{m}$ long). Short tubular stylet (11 μm long). Vagina externa with cuticularized wall connected with a syncytial bursa containing vacuoles. Elliptic seminal receptacle filled with spermatozoa.

Schizorhynchidae Karling, 1950 (sensu Graff, 1905)

Carcharodorhynchus viridis n.sp.

(Fig. 6)

Locality. La Coronilla, Departamento de Rocha, Uruguay (33°54'18.50"S, 53°30'39.30"W). Beach and mouth of the canal near hotel Parque Océanico: sand covered by a thin green layer of organic material and sand with organic material near a small pool in open contact with the ocean (01/08/2004): type locality.

Playa Cerro Chato, Parque Nacional de Santa Teresa, Departamento de Rocha, Uruguay (33°59'6.34"S, 53°31'48.81"W). Coarse superficial sand between rocks (20/07/2004).

Playa las Achiras, Parque Nacional de Santa Teresa, Departamento de Rocha, Uruguay (33°59'5.00"S, 53°31'54.79"W). Sand of a steeply declining beach close to the waterline (26/07/2004).

Material. Observations on a live specimen. Three whole mounts, one of which designated holotype (SMNH 7498), another one designated paratype (HU no. 409).

Etymology. The species epithet refers to the colour of the live animal. *Viridis* (Lat.): green

Description. *Carcharodorhynchus viridis n.sp.* is 1–1.4 mm long and has a vivid green colour. The animal lacks eyes and adhesive papillae were not observed. The pharynx rosulatus has a diameter of $\pm 75 \mu\text{m}$ and is at 65% of the body length. The epidermis contains a large number of elliptical rhabdites with an average length of 2–3 μm , especially at the rostral side. The proboscis is slightly asymmetrical with one half somewhat larger than the other one, and measures 55–71 μm . In all whole mounts, only one field of denticles was observed on the largest proboscis half. However, in one specimen, denticles were also present on the transition from the larger to the smaller proboscis half. The denticles are not in rows, but randomly distributed in an oblong field. All denticles are uniform.

About eight testes were observed in the live animal, although the precise number could not be determined. They are in one row, which extends rostrally from the pharynx. Two seminal vesicles are situated just behind the pharynx. The apparently very muscular copulatory apparatus is 55 μm long and contains at least two different types of prostate secretion. The hard parts of the male copulatory organ consist of a 7 μm -long stylet, surrounding a 12–15 μm -long cirrus. The stylet is an asymmetrical tube, which is distally backfolded to form a second tube that surrounds the distal part of the cirrus. The teeth of the cirrus are spirally-implanted and are longer at the proximal and distal ends. The male genital duct is large and very muscular. The female system could not be observed in the live animal nor in the whole mounts.

Discussion. Based on the general organisation and the morphology of the proboscis, this species can eas-

ily be placed within the genus *Carcharodorhynchus* Meixner, 1938. All representatives of this genus are slender, lack eyes and have a proboscis that is armed with denticles, usually in two fields on the sides of the proboscis halves. They have paired gonads (paired ovaries, vitellaria and one to eight pairs of testes). The male copulatory organ has a cirrus or a stylet. Sometimes both structures are present.

The structure and armament of the proboscis are uncertain as reliable diagnostic characters for the different species. Fields of denticles on the sides of both the proboscis halves are present in all species. Consequently two U-shaped batteries of denticles are formed. Sometimes the denticles are placed in rows, sometimes randomly. Only the form, size and density of the denticles can differ distinctly. Thus the observation of only one field of denticles in the whole mounts of the Uruguayan animals probably gives an incomplete picture of the armament of the proboscis, especially because in the live animals fields of denticles were observed on both proboscis halves. Further, the species belonging to this genus can be grouped into a group of species with asymmetrical proboscis halves and species with symmetrical proboscis halves. Also the construction of the male copulatory organs (either a cirrus, a stylet or both) is remarkably similar when the different species are compared. This may suggest that the number of species currently recognised might be reduced after a thorough revision of this genus.

Carcharodorhynchus viridis **n.sp.** differs from all but one of the other species of this genus by the structure of the male copulatory organ. Together with *C. involutus* Jouk & De Vocht, 1989, it is the only species where the stylet surrounds the cirrus (see Jouk & De Vocht 1989). In other species where both a cirrus and a stylet are present, this stylet is always found within the cirrus. *C. viridis* **n.sp.** differs from *C. involutus* because the cirrus is longer than the stylet while in *C. involutus* the reverse is true.

Diagnosis. *Carcharodorhynchus viridis* **n.sp.**: species of *Carcharodorhynchus* with a bright green colour. Slightly asymmetrical, armed proboscis with a length of 55–71 μm . A 7 μm -long stylet consisting of an asymmetrical tube, which distally bends inwards to form a second tube that distally surrounds a 12–15 μm long cirrus. Spirally-implanted cirrus teeth that are longer distally and proximally.

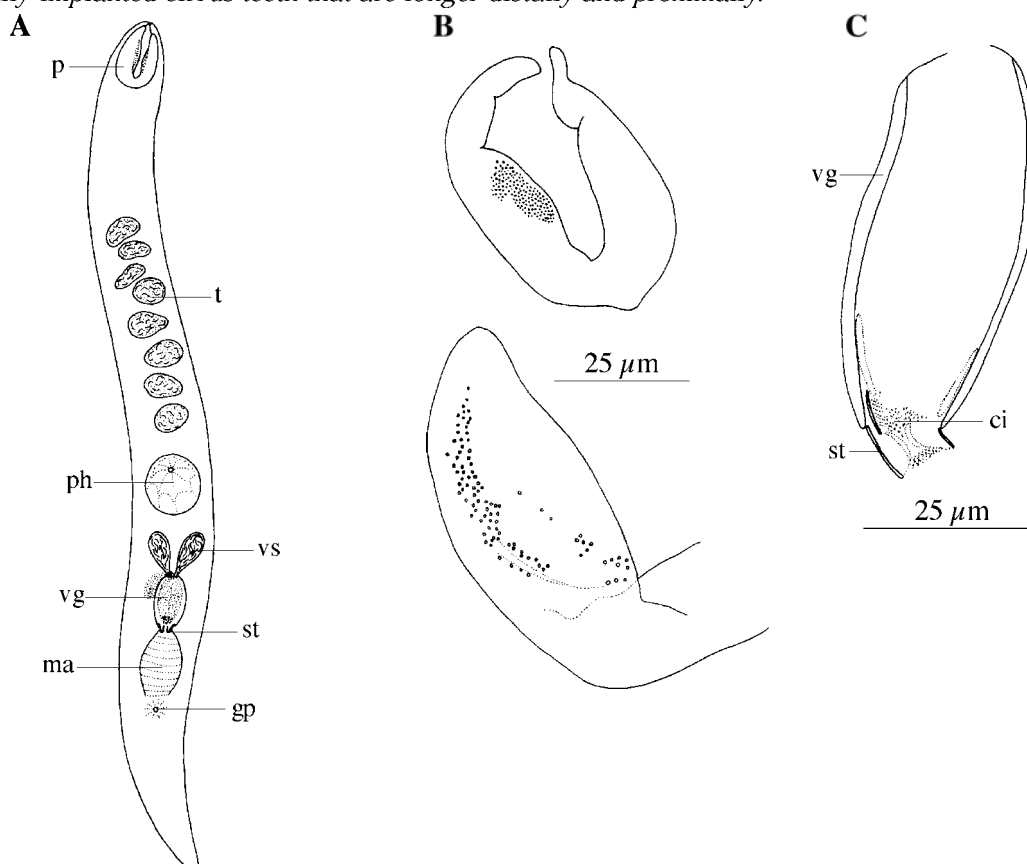


FIGURE 6. *Carcharodorhynchus viridis* **n.sp.** (A) Habitus of a live animal. (B) Proboscis of two different specimens. (C) Copulatory apparatus with cirrus and stylet (from the holotype).

Dalytyphloplanida Willems *et al.*, 2006

Provorticidae Beklemischew, 1928

Kirgisellinae Luther, 1962

Baicalellia forcipifera n.sp.

(Figs. 7, 8A)

Locality. La Coronilla, Departamento de Rocha, Uruguay (33°54'18.50"S, 53°30'39.30"W). Beach and mouth of the canal near hotel Parque Océanico: sand covered by a thin green layer of organic material and sand with organic material near a small pool in open contact with the ocean (01/08/2004): type locality.

Material. Observations on a live animal. Three whole mounts, one of which designated holotype (SMNH 7499), another one designated paratype (HU no. 410). Nine serially-sectioned specimens, of which seven designated paratypes (HU no. 411–417). Unfortunately one of the better whole mounts, originally intended to be designated as the holotype and shown in fig. 7B (lower figure), was lost. Another whole mount was chosen as the holotype.

Etymology. The species name refers to the pincers-shaped stylet. Forceps (Lat.): pincers. Ferre (Lat.): to carry.

Description. The body length of the animal varies between 0.5–0.7 mm. The internal organisation does not differ from the other species of the taxon *Baicalellia* Nasonov, 1930 (see Nasonov 1930, 1932; Luther 1962; Ax 1995).

The anteriorly-situated pharynx doliiformis lacks tentacle-like structures. The copulatory bulb is surrounded by a thick, inner, spirally-running to circular muscle layer and outer longitudinal muscles. The prostate vesicle is also surrounded by longitudinal muscles. Distal to the copulatory bulb, a pincers-shaped stylet is present. It consists of a common base from which two separate, curved arms depart. The longest of these arms is 44–49 µm long and hollow. It is filled with the prostate secretion that proximally enters the stylet. The shortest arm is 20–27 µm long and seems to be an accessory outgrowth of the longer arm's wall. From the base to the distal apex of the longest arm, the stylet measures 54–59 µm. The base of the stylet has a proximal rim and is connected to the copulatory bulb.

The male atrium fits tightly around the stylet. Distally it opens into the common genital atrium. The bursa copulatrix is a sack-shaped protrusion of the common genital atrium and is filled with spermatozoa. It runs dorsally from the male atrium and has a very broad connection with the common atrium. In consequence, differentiation between the bursa copulatrix and the common atrium is not always clear. The bursa copulatrix and the male genital atrium are lined with a relatively high, anucleated epithelium and surrounded by a weakly-developed circular muscle layer. The gonopore is at about 75% and surrounded by a sphincter.

The female duct enters the common genital atrium through its caudal wall. At the place of entry, a strong sphincter is present. This female duct is relatively short and broad, lined with a high, nucleated epithelium and surrounded by a strongly-developed circular muscle layer. The lumen is filled with spermatozoa. Proximally, both oviducts and a bundle of eosinophilic glands enter the female duct. The oviducts are very short and lined with a membranous epithelium. Ventrally from the oviducts, a seminal bursa opens into the female duct through a sphincter. The seminal bursa is spherical to club-shaped and has a fairly long bursal stalk. It is lined with a membranous epithelium. The bursa contains sperm, which are thinner and less darkly-stained than the sperm found elsewhere in the animal. A uterus is absent.

Discussion. This species can easily be placed within the taxon *Baicalellia* Nasonov, 1930, as it shows diagnostic characters of this taxon: paired gonads, with the testes rostrally connected to each other, and ovaries fused with vitellaria to form two ovovittellaria.

Almost all of the 17 species of *Baicalellia* have a tubiform to funnel-shaped prostate stylet, which is

straight or curved. Apart from *Baicalellia forcipifera* **n.sp.**, only two other species have a stylet with a lateral outgrowth: *B. canadensis* Ax & Armonies, 1987 and *B. anchoragensis* Ax & Armonies, 1990. In *B. anchoragensis* the stylet is short and broad, and the outgrowth has a little spine of its own. In *B. canadensis* the stylet is somewhat longer and less sturdy, and the outgrowth is a simple, relatively short spine. In *B. forcipifera* **n.sp.** both the stylet and the outgrowth are long and very slender, giving it its typical pincer-like shape.

Nasonov (1930) describes the seminal bursa as a seminal receptacle and a phagocytic organ that serves to resorb redundant sperm. Ax (1954, 2008), Luther (1918, 1921) and Marcus (1946) use the name seminal bursa, while Ax & Armonies (1990) keep to syncytial tissue. According to Nasonov (1930) the strongly-thickened, syncytial epithelial wall of this organ contains vacuoles with sperm in various degrees of disintegration.

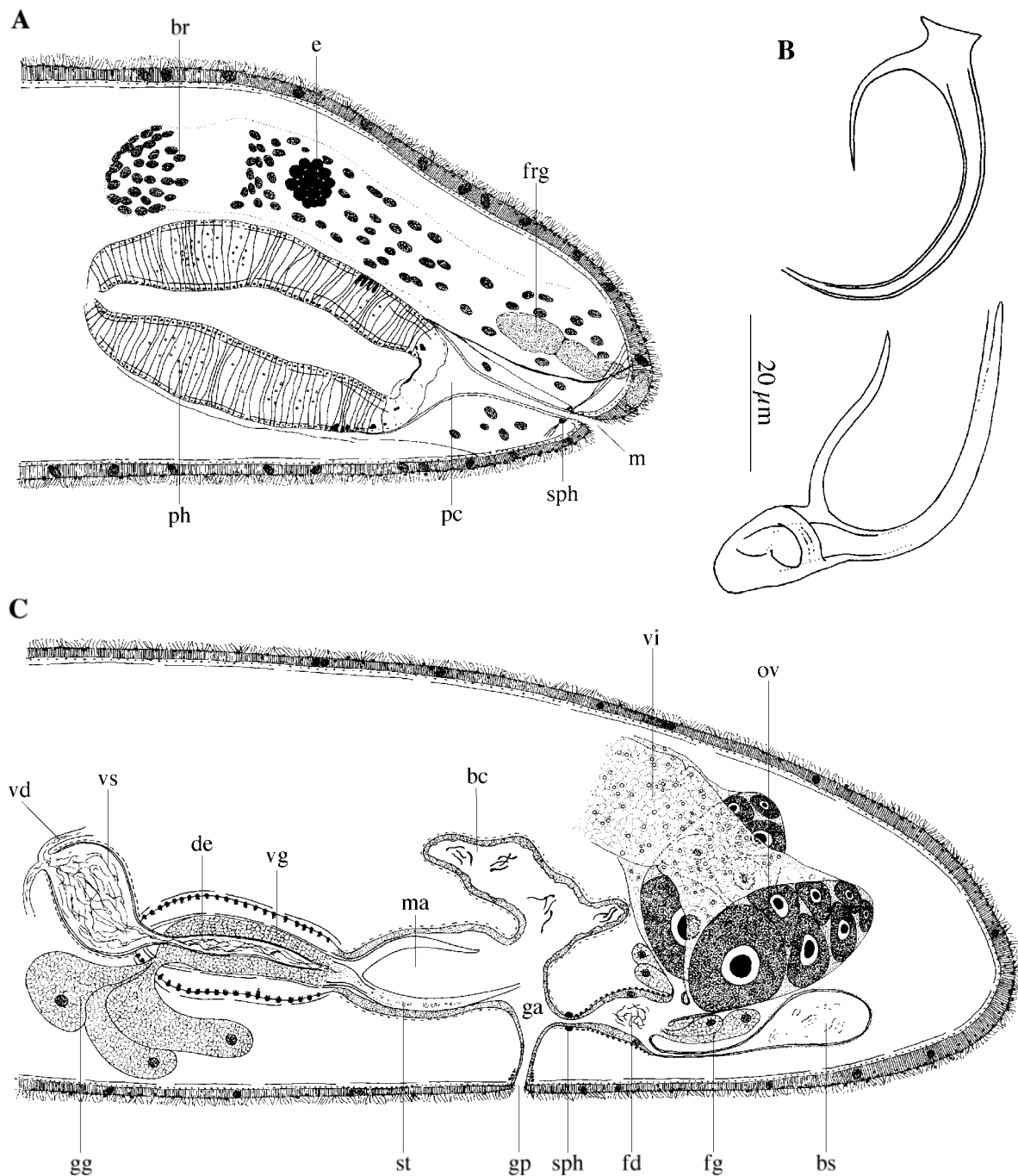


FIGURE 7. *Baicalellia forcipifera* **n.sp.** (A) Reconstruction of the anterior body part from the right side. (B) Stylet (upper from the holotype). (C) Reconstruction of the atrial organs from the left side.

The existence of such vacuoles is confirmed by Ax (1954), Ax & Armonies (1990), Luther (1921), Marcus (1946) and Joffe & Selivanova (1988). In *Baicalellia forcipifera* n.sp. only a very thin epithelium without vacuoles was observed. However, the lumen of the seminal bursa contains disintegrating sperm. The base of this organ is surrounded by a sphincter. This has also been observed in nearly all species except for *B. canadensis*, *B. evelinae* Marcus, 1946 and *B. groenlandica* Ax, 1995. The opening and position of this organ in the genital system vary from species to species, as discussed by Ax & Armonies (1990) for *B. posieti* Nasonov, 1930, *B. seawardensis*, *B. anchoragensis* and *B. brevituba* (Luther, 1921) Nasonov, 1930. In the other species, the seminal bursa is always situated between, ventrally or dorsally from the ovovitellaria. In *B. canadensis*, a seminal bursa (indicated as seminal receptacle by Ax & Armonies 1987) was only observed as an appendage of the copulatory bursa. This makes the placement of this species within the genus *Baicalellia* uncertain (see Ax & Armonies 1987).

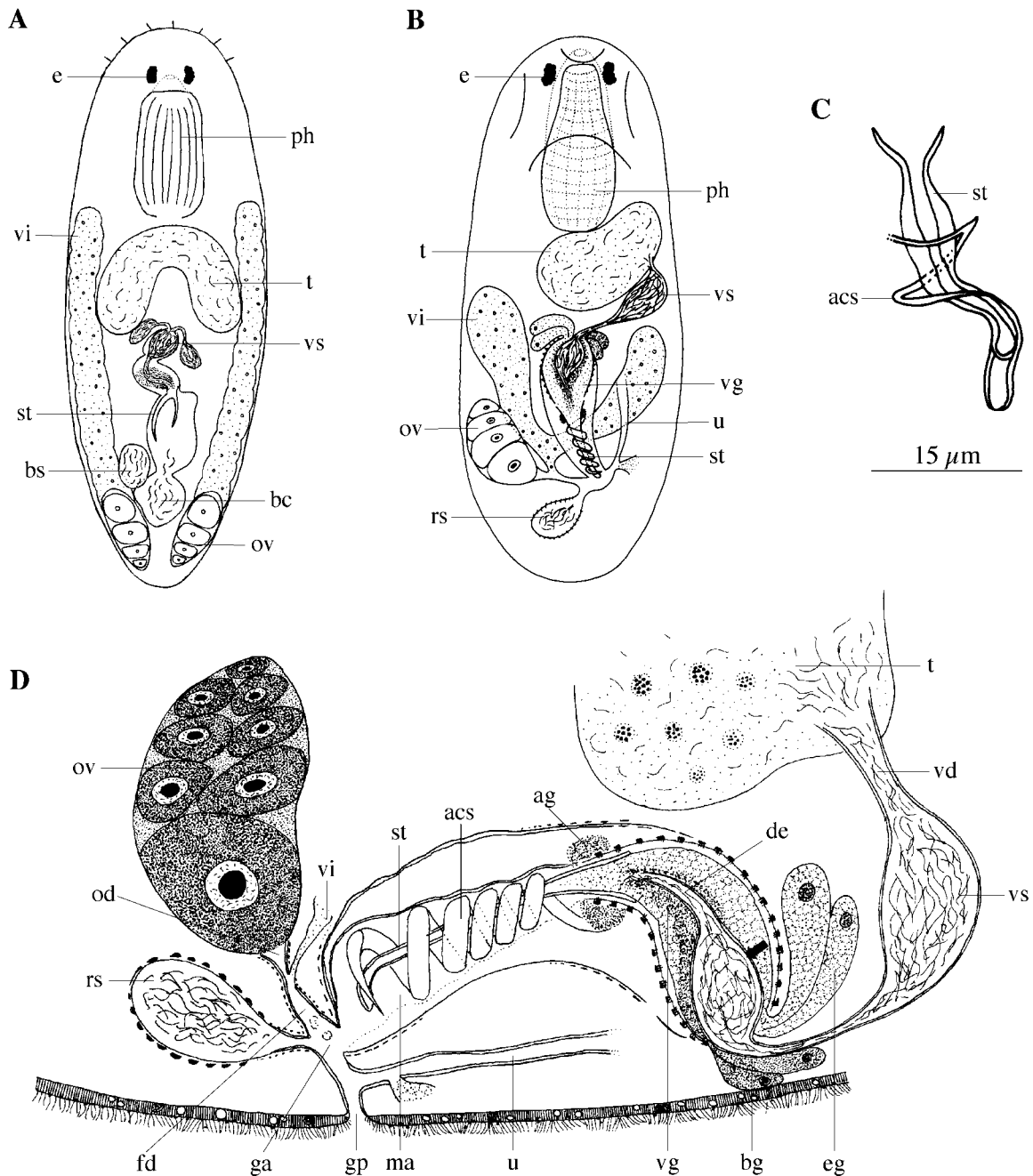


FIGURE 8. *Baicalellia forcipifera* n.sp. (A) Habitus of a live animal. *Polliculus cochlearis* n.g. n.sp. (B) General organisation of an animal based on serial sections. (C) Stylet and accessory stylet (from the paratype). (D) Reconstruction of the atrial organs from the right side (arrow indicates intracapsular seminal vesicle).

In *Baicalellia forcipifera* **n.sp.** the female duct is clearly separated from the genital atrium by a strongly-developed sphincter. This is a somewhat unusual situation in *Baicalellia*, where the female duct is mostly very short, even considered part of the common genital atrium. Only Ax & Armonies (1987, 1990) use the term “female duct” as such, but in *B. forcipifera* **n.sp.** it is unusually long, even compared with that of *B. canadensis*, where it is also clearly separated from the common genital atrium by a strong sphincter. This feature, together with the construction of the seminal bursa and the form of the stylet, clearly shows that the material from Uruguay belongs to a new species.

Diagnosis. *Baicalellia forcipifera* **n.sp.**: species of *Baicalellia* with a ± 54 – 59 μm -long, slender stylet, carrying a ± 20 – 27 μm -long, slender spine. Stylet and outgrowth together have the shape of pincers. Female duct long, clearly delimited, with a nucleated epithelium and surrounded by a strongly-developed, circular muscle layer. Seminal bursa without vacuoles and containing disintegrated sperm.

Dalyelliidae Graff, 1908

Polliculus cochlearis **n.g. n.sp.**

(Figs. 8B–8D)

Locality. La Coronilla, Departamento de Rocha, Uruguay ($33^{\circ}54'18.50''\text{S}$, $53^{\circ}30'39.30''\text{W}$). Beach and mouth of the canal near hotel Parque Océanico: sand covered by a thin green layer of organic material and sand with organic material near a small pool in open contact with the ocean (01/08/2004): type locality.

Playa Cerro Chato, Parque Nacional de Santa Teresa, Departamento de Rocha, Uruguay ($33^{\circ}59'6.34''\text{S}$, $53^{\circ}31'48.81''\text{W}$). Sand a couple of meters from the waterline (± 30 cm deep) (31/07/2004).

Material. Two whole mounts, one of which designated paratype (HU no. 418). Two serially-sectioned specimens, of which one designated holotype (SMNH 7500).

Etymology. The genus name refers to the French fairy tale Hop o' My Thumb (French: Le Petit Poucet) written by Charles Perrault. *Polliculus* (Lat.): little thumb. The species name refers to the screw-shaped accessory stylet. *Cochlea* (Lat.): snail shell.

Description. This species is remarkably small, the entire body length being no more than 0.4 mm. The syncytial epidermis is ± 2 μm high, strongly ciliated and contains vacuoles. The cilia are about 1–3 μm high. The diameter of the vacuoles varies from 1–2 μm . The basal membrane is about 1/6 of the epidermis height thick. Round to oval nuclei, with a diameter of ± 2 μm , are scattered throughout the epithelium. Small basophilic rhabdites, with a diameter of less than 1 μm , are situated apically in the epidermal epithelium of the ventral side and the rostral part.

The mouth lies in the anterior part of the body. It is surrounded by a weak sphincter. The frontal pharynx doliiformis is exceptionally large and elongated, and measures about 1/3 of the total body length. The distal half of the pharynx is narrower than the proximal half. The prepharyngeal cavity is lined with an anucleated, membranous epithelium and surrounded by a longitudinal muscle layer. The oesophagus is surrounded by the glands of Minot. The brain lies dorsally from the pharynx, with two eyes situated in front of it.

The gonads are unpaired. The testis lies just behind the pharynx and is situated at the right-hand side of the animal. A broad vas deferens leaves the testis and widens distally to form a seminal vesicle. Both the vas deferens and the seminal vesicle are lined with a membranous epithelium. There are no muscles surrounding these structures. The seminal vesicle proximally penetrates the prostate vesicle, which is surrounded by strongly-developed circular muscles (conjuncta-type copulatory organ; terminology of Karling 1956a). Proximally in the prostate vesicle, the vas deferens remains very broad to form an intracapsular seminal vesicle (arrow in fig. 8D). Basophilic and eosinophilic prostate glands are present. The nuclei-containing parts of these glands are situated extracapsularly.

The stylet is a long, hollow tube with a length of 25–27 μm . It bends distally and ends in an asymmetrical, distally-widening apex. The proximal part is funnel-shaped. It receives the ejaculatory duct and the prostate secretion. Around the tubular stylet, an accessory stylet with an axial length of 41–52 μm is present. This accessory stylet is spirally-wound around the stylet proper. In the holotype and live animals, these proximal windings are close to each other, while the distance between these two stylets increases distally. The last distal winding ends in a sharp point at about the same level as the distal end of the stylet proper. In the paratype, the distal part of the accessory stylet is partly unwound and runs next to the stylet. Proximally, this accessory stylet receives the secretion of about four accessory glands that lie around the narrowed, distal part of the copulatory bulb. Dorsally from the stylets, a membranous epithelium connects to the prostate vesicle; it is lacking ventrally. This is probably the epithelium of the male genital atrium. This male genital atrium and the prostate vesicle are in their turn surrounded by another membranous epithelium that is proximally and distally encompassed by a well-developed, circular muscle layer (conjuncta-duplex type copulatory organ; terminology of Karling 1956a). The male genital atrium is at the left-hand side of the animal. Rostrally, it opens into the small common genital atrium, which is lined with an anucleated, membranous epithelium.

The female duct enters the caudal wall of the common atrium. It is relatively short, lined with a membranous epithelium and surrounded by a circular muscle layer. Small clumps of sperm are observed in the distal part of the female duct, which proximally receives the oviduct and the vitelloduct. The oviduct is also lined with an anucleated, membranous epithelium and surrounded by circular muscles. The single ovary is at 60% of the body length and lies roughly in the middle. Laterally, two vitellaria are present. These run rostrally at both sides of the pharynx and have a widened distal part. Distally, they join and open into the female duct through a common vitelloduct. An oviform seminal receptacle enters the common atrium caudally. This organ contains many sperm and is surrounded by a strongly-developed circular muscle layer. Its distal part is narrower, lined with a membranous epithelium and surrounded by a weak circular muscle layer.

Between the male atrium and the gonopore a uterus also enters the common atrium. The gonopore is situated at about 75% on the ventral side.

Discussion. The combined presence of the following features: one ovary, paired vitellaria, a frontal pharynx and a gonopore in the posterior part of the body, suggests the placement of *Polliculus cochlearis* n.sp. in the Dalyelliidae.

Polliculus cochlearis n.sp. clearly differs from every other species of dalyelliids in having only one testis and one vas deferens. In all other dalyelliids there are two. Moreover, the vas deferens of *P. cochlearis* n.sp. forms a relatively large extracapsular vas deferens. Apart from this species, extracapsular seminal vesicles, one on each vas deferens, only occur in very few species: *Gieysztoria dodgei* (Graff, 1911) Ruebush & Hayes, 1939, *Microdalyellia armigera* (Schmidt, 1861) Gieysztor, 1938, *Microdalyellia fusca* (Fuhrmann, 1894) Gieysztor, 1938 and *Jensenia angulata* (Jensen 1878) Graff, 1882 (see Luther 1955). In *Halammovortex* Karling, 1943, the vasa deferentia join in an unpaired, extracapsular seminal vesicle. None of these genera, however, has a muscular septum around the conjuncta-duplex type as does *P. cochlearis* n.sp.

Within the Dalyelliidae, Luther (1955) distinguishes four types of stylet: the *Microdalyellia* (= *armigera*)-type, the *Gieysztoria* (= *rubra*)-type, the *Castrella*-type and the *Axiola*-type (*Axia*-type in Luther 1955). The *Microdalyellia*-, *Gieysztoria*- and *Castrella*-types all consist of a common base on which a group of spines is implanted. The *Axiola*-type, in contrast, is a tubular stylet. It is found uniquely within the marine genus *Axiola* Luther, 1957. The stylet of *Polliculus cochlearis* n.sp. thus could be considered as of the *Axiola*-type. The presence of an accessory stylet, however, is unique within the Dalyelliidae.

Polliculus cochlearis n.sp. also differs from all other species of Dalyelliidae by the lack of a so-called bursa copulatrix. This structure is a well-developed protrusion of the common genital atrium where sperm is also stored (Luther 1955). Only in *Vaillantella algerica* Luther, 1955, is it rather indistinct. Another unique characteristic of *P. cochlearis* n.sp. is the presence of a distinct uterus, opening in the rostral wall of the common genital atrium and with clear uterine glands. Such a uterus occurs in several rhabdocoels, but is lacking in

all other species of Dalyelliidae, where the uterus is formed by a distal widening of the female duct (Luther 1955). These considerable differences clearly warrant the erection of a new genus for the species from Uruguay.

Five genera of dalyelliids are known that are exclusively marine: *Alexlutheria* Karling, 1956, *Axiola* Luther, 1957, *Beauchampiola* Luther, 1957, *Halammovortex* Karling, 1943 and *Jensenia* Graff, 1882. Two other taxa, *Gieysztoria* Ruebush & Hayes, 1939 and *Microdalyellia* Gieysztor, 1938, mainly include fresh water species, but also contain a number of species that occur in brackish habitats. The other known genera, *Austrodalyellia* Hochberg & Cannon, 2002, *Castrella* Fuhrmann, 1900, *Dalyellia* Gieysztor, 1938, *Fulin-skiella* Gieysztor & Szynal, 1939, *Sergia* Nasonov, 1923, *Vaillantiella* Luther, 1955 and *Varsoviella* Gieysztor & Wiszniewski, 1947, only occur in fresh water.

Diagnosis. Polliculus *n.g.*: *Dalyelliidae* with pharynx in the first body half. Unpaired testis and ovary. Paired vitellaria. Vas deferens widened to an extracapsular seminal vesicle. Eosinophilic and basophilic prostate glands with extracapsular, nuclei-containing parts. Copulatory bulb with intracapsular seminal vesicle, prostate vesicle and male genital atrium with stylet. Screw-shaped accessory stylet wound around a long tubular stylet. Accessory stylet receives the secretion of four extracapsular accessory glands. Short female duct surrounded by circular muscles. Ovipositor seminal receptacle. Copulatory bursa absent. With distinct uterus. **Type species:** *Polliculus cochlearis n.sp.*

Diagnosis. *Polliculus cochlearis n.sp.*: provisionally, the same diagnosis as the genus. Stylet with a length of $\pm 26 \mu\text{m}$. Accessory stylet $\pm 47 \mu\text{m}$ long.

Luridae Sterrer & Rieger, 1990

Lurus evelinae Marcus, 1950

(Figs. 9A–9B)

New locality. Playa del Barco, Parque Nacional de Santa Teresa, Departamento de Rocha, Uruguay ($33^{\circ}59'52.12''\text{S}$, $53^{\circ}32'6.51''\text{W}$). Coarse-grained sand just in between the dunes and the water line, up to 30 cm deep (16/07/2004).

Playa Grande, Parque Nacional de Santa Teresa, Departamento de Rocha, Uruguay ($34^{\circ}1'55.17''\text{S}$, $53^{\circ}32'10.86''\text{W}$). Between filiform, rather large brown algae from rocks exposed to heavy wave action (18/07/2004).

Known distribution. Baía de Santos, São Paulo, Brazil (Marcus, 1950).

Material. Observations on a live individual. Two whole mounts (one without a stylet). Type material from *Lurus evelinae* Marcus, 1950: SMNH 95803, SMNH 95804.

Discussion. The Uruguayan specimens clearly belong to the taxon Luridae Sterrer & Rieger, 1990. Typical of this taxon is the fact that the overall organisation resembles that of the Provorticidae and that a polyli-thophoric statocyst is present (Marcus 1950; Faubel *et al.* 1994; Sterrer & Rieger 1990; Sterrer 1992).

Based on the morphology of the stylet (a spirally-winding tube, two turns), the Uruguayan specimens can be classified in *Lurus evelinae* Marcus, 1950 (see Marcus 1950). The specimens measure 0.3 mm. The stylet has an axial length of 165 μm . Since no whole mounts are available in the material from Brazil, the length of the stylet is estimated based on the figure drawn by Marcus (1950). Axially they measure 140 μm .

Although Sterrer & Rieger (1990) already mentioned some clear differences between *Lurus evelinae* Marcus, 1950 and all other species of Luridae, it was Faubel *et al.* (1994) who divided the monogeneric taxon Luridae into *Lurus* Marcus, 1950 (one species: *L. evelinae*) and *Luriculus* Faubel *et al.*, 1994 (four species: *L. australiensis* Faubel *et al.*, 1994, *L. castor* Sterrer & Rieger, 1990, *L. minos* Sterrer, 1992, and *L. tyndareus* Sterrer & Rieger, 1990). *Lurus evelinae* stands unique because it has paired (sometimes coalescing) testes and vasa deferentia, separate ovaries and vitellaria, and a clear differentiation between the seminal vesicle and the

prostate vesicle. All other species of Luridae have a single testis, one median vas deferens, ovovitellaria and a combined seminal vesicle and prostate vesicle. Therefore they were transferred to the new genus *Luriculus* (see Faubel *et al.* 1994; Marcus 1950; Sterrer & Rieger 1990). One species, *Lurus pollux* Sterrer & Rieger, 1990, remains a *species inquirenda*. Although *L. pollux* has only a single testis, one medioventral vas deferens and a seminal vesicle inside the copulatory bulb, Faubel *et al.* (1994) did not place it in *Luriculus* because vitellaria have not been observed. Besides the stylet, no other confirmative features could be observed in the live specimens of *L. evelinae* from Uruguay. The single testis could well be two coalescing testes and no vasa deferentia were seen. However, ovaries and vitellaria seemed rather separate.

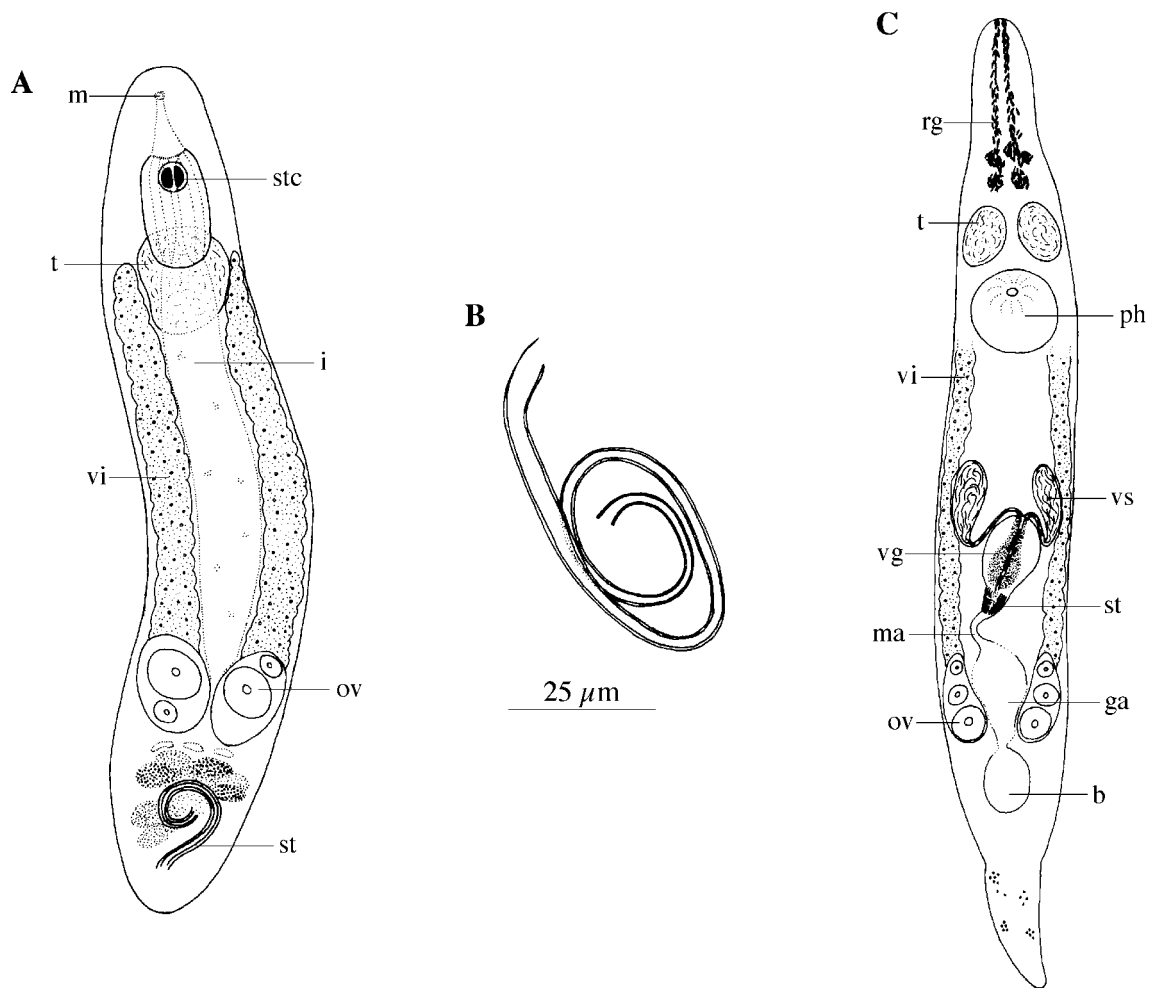


FIGURE 9. *Lurus evelinae* Marcus, 1950 (A) Habitus of a live animal. (B) Stylet. *Vaclusia multistriata* n.sp. (C) Habitus of a live animal.

As was discussed by Marcus (1950) and Sterrer & Rieger (1990), *Lurus evelinae* apparently always has two statoliths, whereas all other species of Luridae mostly have a variable number of statoliths (see Sterrer & Rieger 1990; Sterrer 1992): two to four in *L. castor*, two to five in *L. pollux* and three to four in *L. tyndareus* and *L. minos*. *L. australiensis* always has a constant number of three intracapsular and three extracapsular statoliths. In the whole mounts of the specimens from Uruguay, the statoliths were not visible. Only two statoliths were observed in the specimen that was studied alive. This seems to confirm the observations by Marcus (1950), which were made on serial sections, and were therefore doubted by Sterrer (1992).

After *Luriculus minos* (see Sterrer 1997), *Lurus evelinae* is the second species of Luridae to be reported from outside its type locality.

Promesostomidae Den Hartog, 1964

Vauchlusia multistriata n.sp.

(Figs. 9C, 10)

Locality. La Coronilla, Departamento de Rocha, Uruguay (33°54'18.50"S, 53°30'39.30"W). Beach and mouth of the canal near hotel Parque Océanico: sand covered by a thin green layer of organic material and sand with organic material near a small pool in open contact with the ocean (01/08/2004): type locality.

Material. Observations on one live animal. One whole mount, designated holotype (SMNH 7501). Two serially-sectioned specimens, of which one designated paratype (HU no. 363).

Etymology. The species name refers to the many internal ridges of the stylet. Multus (Lat.): many. Striatus (Lat.): striated.

Description. Slender, 0.5 mm long animal. Eyes absent. The habitus is characterized by division of the body into three zones: a slender, rostral part where rhabdite glands occur ($\pm 1/5$ of the body length), a middle part where all organs are situated ($\pm 3/5$ of the body length), and a caudal part, which consists of a clearly-delimited, small tail with an epidermis containing many more rhabdites than the rest of the body ($\pm 1/5$ of the body length).

The ciliated epidermis is cellular and has a height of about 3 μm . The basal membrane is very thin. The cilia measure about 3 μm . In the rostral part of the body, two different kinds of rhabdite glands occur. The first type produces long, lancet-shaped, basophilic rhabdites with a length of 8–10 μm , the other type produces smaller, oval, eosinophilic rhabdites with a length of about 2–3 μm . Both kinds of glands extend from above the brain to the rostral body end, where they empty. Caudally from the pharynx, dispersed eosinophilic rhabdite glands occur, which empty in the epidermis. The largest concentration of these rhabdite glands is situated behind the genital system in the caudal body part. The length of the oval, eosinophilic rhabdites that are secreted by these glands varies between 2–4 μm . The epidermis of the caudal region is completely filled with these rhabdites.

The mouth is situated at about 40%. The organisation and structure of the pharynx is identical with that of *Vauchlusia conica* Willems *et al.*, 2004 (see Willems *et al.* 2004).

The gonads are paired. The two round testes are situated ventrally, just in front of the pharynx and at both sides of the body. The seminal vesicles are rather small and have an anucleated, membranous epithelium. They are not surrounded by muscle layers. When entering the prostate vesicle, both vasa deferentia join to form a ductus ejaculatorius, which runs centrally through the prostate vesicle. Centrally, this prostate vesicle contains coarse-grained, eosinophilic glands, which are surrounded by fine-grained eosinophilic glands. All glands together take up about half of the total volume of the prostate vesicle. Both the fine-grained and coarse-grained eosinophilic glands have extracapsular nuclei-containing parts, and penetrate the prostate vesicle together with the ejaculatory duct. The prostate vesicle is surrounded by thick, inner circular muscles and outer longitudinal muscles. Distally, the prostate vesicle is connected with a conical and thin-walled stylet. This stylet has a length of 45 μm . Proximally, it is 21 μm broad at its broadest, distally up to 4 μm . The inner side of this stylet is ornamented with a large number of ridges that are oriented in three different directions. For the first 17 μm , the ridges run lengthways, the next 7 μm they run transversely and the last 21 μm again lengthways. The male genital atrium is surrounded by circular muscles and is lined with an anucleated, membranous epithelium, as is the common genital atrium. The common gonopore is situated at about 70%.

The ovaries lie caudally from the gonopore and together with the more rostrally-situated vitellaria, they form long ovovitellaria, which stretch dorsolaterally at both sides beyond the testes. The oviducts are very short, and open in the long, very muscular female duct, which caudally enters the common genital atrium. It is lined with a high, anucleated epithelium and surrounded by a circular muscle layer, which is very well developed in the proximal half. Distally, it is slightly swollen and some nuclei are seen in the somewhat higher epi-

thelium of the transition zone between the female duct and the common genital atrium. Moreover, the distal half of the female duct is surrounded by a peripheral, longitudinal muscle layer. The female bursa is spherical and lined with a nucleated, membranous epithelium. It contains a great deal of sperm in the lumen. A broad bursal stalk connects the bursa with the proximal end of the female duct. Its epithelium is very high and shows many glands. Where it enters the bursa, a sphincter is present. In the proximal part of the female duct, sperm and a glandular secretion were observed. Eosinophilic and basophilic female glands enter this part of the female duct. A uterus is lacking.

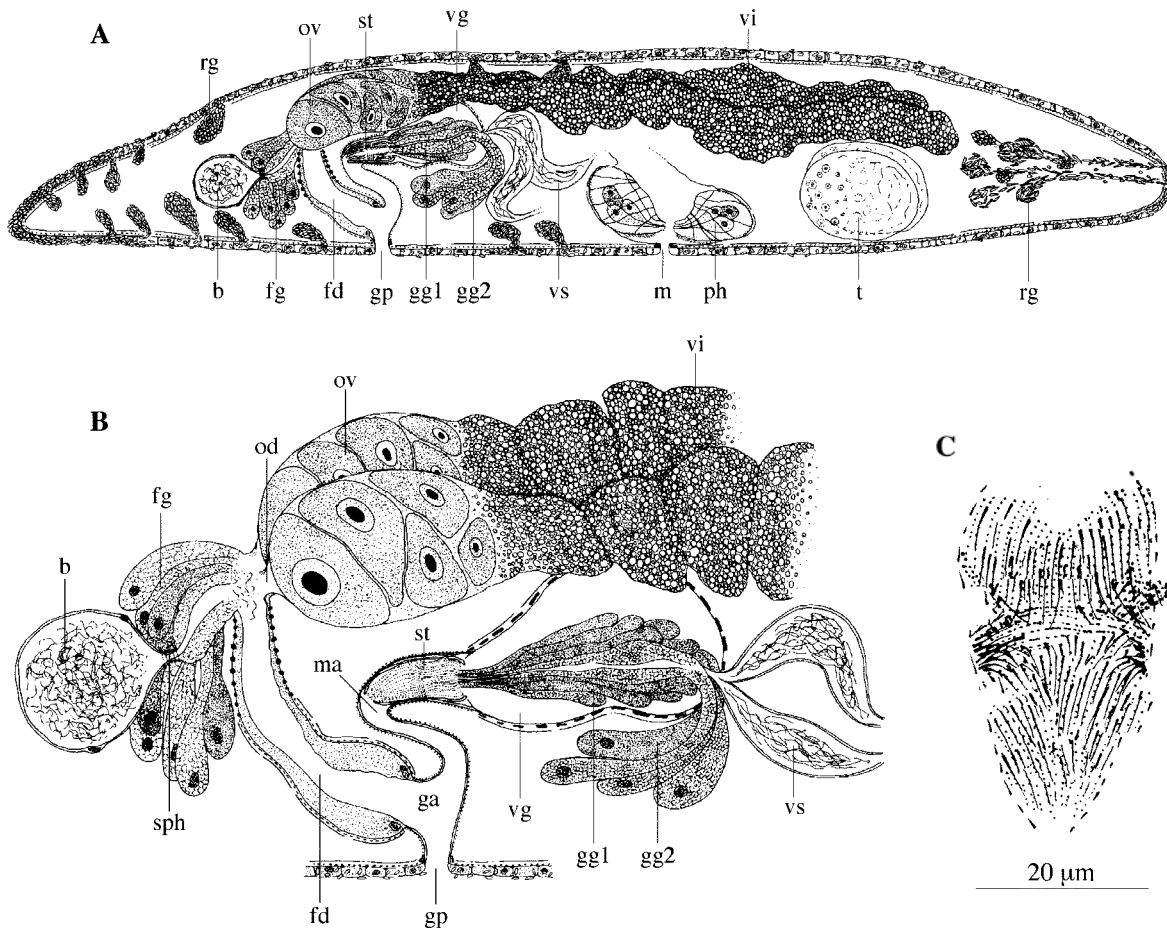


FIGURE 10. *Vaclusia multistriata* n.sp. (A) Reconstruction of the entire animal. (B) Reconstruction of the atrial organs. (C) Stylet with internal ridges (from holotype).

Discussion. The species described here can easily be placed in the taxon *Vaclusia* Willems *et al.*, 2004 because of the combined presence of the following characters (see Willems *et al.* 2004): pharynx in the middle of the body, paired testes and seminal vesicles, spherical prostate vesicle and two types of glandular secretions, conical stylet with different internal ridges, a long male atrium, paired ovovitellaria, a long muscular female duct with a swollen distal part, and the presence of a female bursa and female glands. The construction of the pharynx and the position of the testes are comparable with those of *V. conica* Willems *et al.*, 2004, the only other representative of the taxon, although in *V. multistriata* n.sp. the pharynx is situated somewhat more anteriorly.

A first important difference between the two species occurs in the size of the stylet and the pattern of its ridges. Although *Vaclusia conica* is almost three times as long as *V. multistriata* n.sp., its stylet is smaller than the stylet of *V. multistriata* n.sp. The exact structure of the stylet in *V. conica* could not be ascertained, but it apparently has about eight spirally-running and striated ridges (Willems *et al.* 2004). In contrast, the

stylelet of *V. multistriata* **n.sp.** has many ridges, transverse as well as longitudinal. Secondly, the prostate glands of *V. conica* take up the full volume of the prostate vesicle, which is not the case in *V. multistriata* **n.sp.** Another difference is the presence of a bursal stalk with a glandular epithelium between the bursa and the female duct in *V. multistriata* **n.sp.** In *V. conica*, the bursa links up directly with the proximal part of the female duct through a sphincter. Finally, *V. conica* has an inversion of the muscle layer in the transition zone between the common genital atrium and the male atrium.

Some of the features that are unique to *Vauclusia conica* were mentioned in the original diagnosis of this genus by Willems *et al.* (2004), but now these features should be removed from this diagnosis.

Amended diagnosis (after Willems et al. 2004). Vauclusia: Promesostomidae with the pharynx in the middle of the body. Paired testes and seminal vesicles. Spherical prostate vesicle with two types of secretions. Conical stylelet with several internal ridges. Paired ovovitellaria. Very long, muscular female duct. Distal part of the female duct swollen. Female bursa and female glands present. Male atrium long.

Diagnosis. Vauclusia multistriata **n.sp.**: species of Vauclusia with a 45 μm -long stylelet with many internal ridges that run lengthways proximally and distally, and transversely in between. Prostate glands only fill a portion of the prostate vesicle. Duct with glandular epithelium between the bursa and the female duct.

Brinkmaniellinae Luther, 1948

Coronhelmis mimosa **n.sp.**

(Figs. 11A–11B)

Locality. Playa la Moza, Parque Nacional de Santa Teresa, Departamento de Rocha, Uruguay (33°58'30.02"S, 53°31'50.89"W). Beach north of the observation tower: coarse sand near the stairs at about 8 m from the rocks (24/07/2004): type locality.

Material. Observations on a live animal. Four whole mounts, one designated as the holotype (SMNH 7502) and one designated paratype (HU no. 420), two of poor quality.

Etymology. The species name refers to the opening and closing movements of the stylelet as observed on the live animal. These movements are reminiscent of those of the leaves of the plant genus *Mimosa*.

Description. The animal is ± 0.5 – 0.6 mm long. The pharynx lies in the middle of the body. The general organisation of the genital system (based on observations on a live animal) does not differ from other species of the genus *Coronhelmis* Luther, 1948 (see Ax 1951, 1994; Ehlers 1974; Luther 1948).

The stylelet is 15–17 μm long ($m = 16$ μm ; $n = 3$) and 12–15 μm ($m = 14$ μm ; $n = 3$) broad. It consists of a proximal, thin-walled, 7–9 μm -long part [called “Manschette” by Luther (1948)] and a distal ring of 4–5 μm -long spines. The proximal part has a number of grooves of ± 4 μm long that run lengthways. In the central part of the stylelet of one of the whole mounts, a reticulate structure was observed, possibly caused by the unevenness of the stylelet wall. In the live animals, we observed opening and closing movements of the ring of spines.

Discussion. This species has all diagnostic characters of the genus *Coronhelmis* (see Luther 1948): the presence of a bursa copulatrix and a copulatory organ with a stylelet that consists of a proximal part or “Manschette” and a distal ring of spines. An overview of the diagnostic characters of all species described was given by Willems *et al.* (2005b: table 1).

From this table it is immediately clear that *Coronhelmis mimosa* **n.sp.** is a relatively small species of *Coronhelmis*, of which the representatives are normally around 1 mm long. In *C. mimosa*, the ratio “Manschette” to entire stylelet length is $\pm 1/2$. Only in *C. cuypersi* Willems *et al.*, 2005, *C. lutheri* Ax, 1951, *C. novaecaledoniae* Willems *et al.*, 2005 and *C. subtilis* Ax, 2008, is a comparable ratio found. Of these four species, the stylelets of *C. cuypersi*, *C. lutheri* and *C. subtilis* have more than 30 spines. The number of spines in *Coronhelmis mimosa* could not be ascertained, but presumably amounts to 10–15, a number comparable to

that found in *C. novaecaledoniae*. However, the stylet is proportionally much wider in *C. novaecaledoniae* (width/length = 1.5) than in *C. mimosa* (width/length = 0.9). The proximal grooves and the central, reticulate structure can not with certainty be considered part of the stylet, but are not mentioned in other species. Because of the above-cited differences from the other species of the genus *Coronhelmis*, the Uruguayan specimens are considered to belong to a new species.

Unfortunately, the whole mount with the reticulate structure in the central part of the stylet was not well conserved. Another whole mount was chosen as the holotype.

Diagnosis. *Coronhelmis mimosa* **n.sp.**: *small species of Coronhelmis with a 15–17 µm-long and 12–15 µm-broad stylet that consists of a proximal “Manschette” with a length of 7–9 µm and a distal ring of 4–5 µm-long spines. Possibly vertical grooves in the proximal part and a reticulate structure in the central part.*

Byrsophlebidae Graff, 1905

Byrsophlebs caligulachaena (Ehlers & Ehlers, 1981) Karling, 1985 (Fig. 11C)

syn. *Maehrenthalia caligulachaena* Ehlers & Ehlers, 1981

New locality. Playa Grande, Parque Nacional de Santa Teresa, Departamento de Rocha, Uruguay (34°1'55.17"S, 53°32'14.52"W). On algae (*Corallimorpha* sp.) in intertidal pools (18/07/2004).

Known distribution. Egedesminde, Greenland (Levinsen 1879); White Sea, Solovki Islands, Russia (Sabussow 1900); Plymouth Sound, United Kingdom (Gamble 1893); Port Erin, Man Island (Jameson 1896); Jekaterinhafen and Bergen, Norway (Graff 1905; Luther 1936); Tomales Bay, California, USA (Karling 1985).

Material. Observations on a live animal. One whole mount.

Discussion. The examined animal is very small and measures only 0.3 mm in the whole mount. The parenchym has a vivid red colour. Although the form of the stylet is not completely clear in the whole mount, it seems to be a funnel-shaped, oblong tube with a length of $\pm 25\text{--}30\ \mu\text{m}$ and a distally-bent apex. The vasa deferentia are very broad near the pharynx and narrow caudally from the pharynx to strongly widen again as seminal vesicles laterally from the copulatory apparatus. These broad seminal vesicles fuse before penetrating the copulatory apparatus as one single broad seminal vesicle. In the live animal, two larger organs were observed caudally from the copulatory bulb. These are possibly a bursa and seminal receptacle.

Karling (1985) reviewed the taxonomy and systematics of the Byrsophlebidae, in which he recognized four genera. These four genera are separated based on clear characters, but in practice sections are often needed to assess these characters. All species of *Maehrenthalia* Graff, 1905 and *Byrsophlebs* Jensen, 1878 have a female bursa, a structure that can normally be seen in the live animal. Such a bursa is lacking in species of *Maehrenthaliella* Karling, 1985 and *Parabyrsophlebs* Karling, 1985. *Byrsophlebs* differs from *Maehrenthalia* by the following features: a globular-oviform copulatory bulb with two layers of strong spiral muscle fibres, a female duct with a seminal receptacle and bursa without terminal resorptive vesicle. *Maehrenthalia*, on the contrary, has a cylindrical copulatory bulb with a single layer of strong spiral muscle fibres, a female duct without a seminal receptacle and a bipartite bursa consisting of a uterus and terminal resorptive vesicle (Karling 1985).

The stylet observed in the live specimen from Uruguay mostly resembles that of *Byrsophlebs caligulachaena*. Although the red colour is only found in *Maehrenthalia agilis* (Levinsen, 1879) Graff, 1905, the tip of the stylet of *M. agilis* is more pointed and curved, than that of *B. caligulachaena*, which is shoe-shaped as in the Uruguayan specimen (see Ehlers & Ehlers 1981; Karling 1985). Therefore the Uruguayan

specimens are provisionally considered as *Byrsophlebs caligulachaena*. Also the possible presence of a seminal receptacle (see above) suggests that the species found belongs to the taxon *Byrsophlebs* rather than *Mae-hrenthalia*.

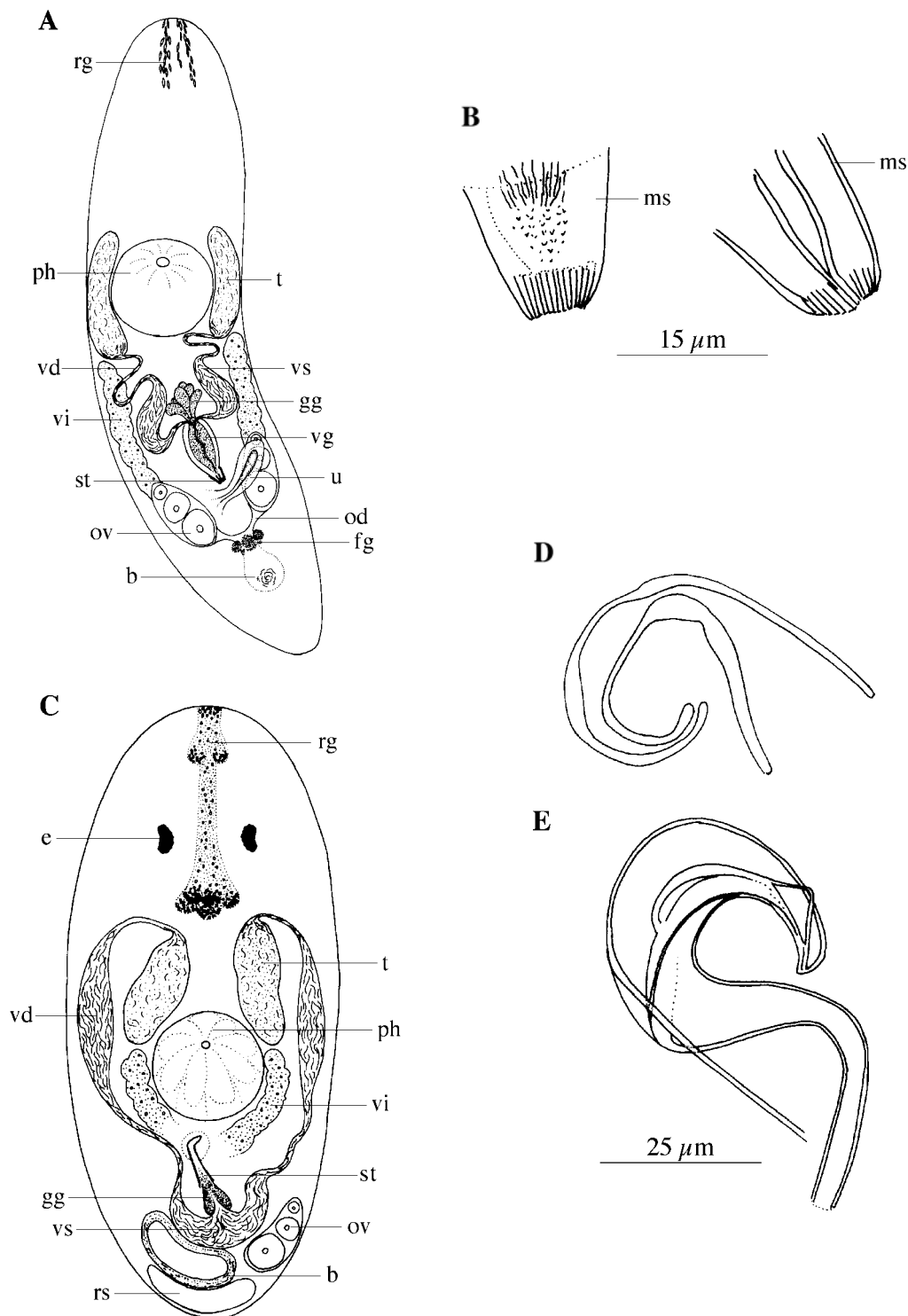


FIGURE 11. *Coronhelmis mimosa* n.sp. (A) Habitus of live animal. (B) Stylet (right one from holotype). *Byrsophlebs caligulachaena* (Ehlers & Ehlers, 1981) Karling, 1985 (C) Habitus of live animal. *Ceratopera axi* (Riedl, 1954) Den Hartog, 1964 (D) Bursal appendage. (E) Stylet.

Trigonostomidae Den Hartog, 1964 (sensu Graff, 1905)

Ceratopera axi (Riedl, 1954) Den Hartog, 1964

(Figs. 11D–11E)

syn. *Proxenetes axi* Riedl, 1954

syn. *Ceratopera bifida* Ehlers & Ax, 1974

New locality. Playa Cerro Chato, Parque Nacional de Santa Teresa, Departamento de Rocha, Uruguay (33°59'6.34"S, 53°31'48.99"W). Between algae (mostly filiform brown algae) on exposed rocks, between small brown algae on top of very flat, isolated rocks, partly embedded in sand (20/07/2004).

Known distribution. Gulf of Naples and Sicily (Riedl 1954); Galapagos Islands (Ehlers & Ax 1974); Falkland Islands and California (Karling 1986); Weddell Sea and La Réunion (Artois *et al.* 2000), New South Wales, Australia (Willems *et al.* 2004); Kerguelen (Willems *et al.* 2005a); New Caledonia (Willems *et al.* 2005b).

Material. Observations on a live specimen. Two whole mounts.

Discussion. The stylets of the Uruguayan specimens measure 86–90 µm, when measured axially and the bursal appendage is 56–64 µm long. Both structures, especially the stylet, are small compared to known measurements of this species: stylet between 70–180 µm, bursal appendage between 67–117 µm (see Willems *et al.* 2004, table 1; Willems *et al.* 2005a, b). Only in the specimens of the Galapagos Islands (Ehlers & Ax 1974), is the bursal appendage also less than 70 µm. Because the variation in the size of the stylet is relatively large, it is possible that we are dealing with a species complex (see Willems *et al.* 2005a, b). However, this should be examined in the future by a thorough morphological (and molecular) analysis.

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