

# COMUNICACIONES ZOOLOGICAS DEL MUSEO DE HISTORIA NATURAL DE MONTEVIDEO

Número 56

1949

Volumen III

## A NEW TUBIFICID FROM THE BAY OF MONTEVIDEO

EVELINE DU BOIS-REYMOND MARCUS \*

In May 1944 Professor Ergasto H. Cordero, Montevideo, collected Tubificids in the sand of the beach of Capurro, where the water is brackish, never quite fresh nor quite salt. Entrusted with 38 specimens and 2 cocoons I verified that they belong to a new species of the genus *Monopylephorus* Levinsen (= *Rhizodrilus* Smith). I have the pleasure to name it in honour of Doctor Cordero.

It is the first South American representative of the genus, the former species of which are known from all other continents, where they live on the coast as well as in fresh water.

*Monopylephorus corderoi*, n. sp.

Figures 1-6

The worms preserved in alcohol are colourless, up to 10-11 mm. in length and 0,6 mm. thick. The number of segments is 48-67. The clitellum (d) begins at the level of the setae of segment 10 and extends onto segment 13. All segments are higher and broader than long; the anterior ones are not biannulate. The prostomium is a blunt cone, as broad at the base as it is high or long. The skin that forms fine transverse folds is smooth, without cuticular hairs (*pilosus* Goodrich), papillae or incrustations. Sessile Peritricha of the group Aloricata, that belong to the genus *Rhabdostyla* or *Scyphidia*, are attached to the body, especially to the hind region.

The setae (Fig. 2) are bifid crotchets in all bundles, there are no single-pointed ones as in the posterior part of several other species of the genus. In the anterior segments each bundle contains 4-6 setae, backwards their number diminishes to 3 or 2. Segment 11 has no ventral setae. The length of the setae varies from 70 to 110  $\mu$ . The nodulus lies in the distal third of the shaft. The prongs are of equal length; the distal one is a little thinner than the proximal one in the posterior part of the body.

\* Department of Zoology, Faculty of Philosophy, Sciences, etc. of the University of São Paulo, Brazil. P.O.B. 2926.

The pharynx is short and occupies only the third segment. As described by STEPHENSON (1923, p. 105) for *M. parvus* also the pharynx of the present species is a dorsal, glandular, and sucker-like pouch of the alimentary tube and is suspended to the body wall by strong bundles of muscle fibres (e), as the pharynx of Enechytraeids in STEPHENSON'S diagram (1930, f. 38). The pharyngeal lumen is lined by a high columnar epithelium with long cilia and scarce nuclei. These are numerous in the pharyngeal gland cells (f) that are arranged in four cords dorsally and dorso-laterally. Chromophil cells (c) lie in segment 4-6. I did not find the strands that connect them with the pharynx in *M. limosus* (CHEN 1940, p. 89). After STEPHENSON (1930, p. 85) such a communication does not occur in the Tubificidae.

From segment 5 on the gut is covered with chloragocytes (ch). The intestine (i) is constricted by each septum (s) and widened in the middle of each segment. The anal opening is subterminal. Septum 3/4 is the first well developed. The coelomic amoebocytes are up to 8  $\mu$  in diameter.

The cerebral ganglia form a bilobed brain (b) deeply cleft in front. A layer of muscle fibres is attached to the dorsal surface of the ventral nerve cord (n).

The dorsal vessel runs on the left side of the alimentary tube. The latter is surrounded by a dense network (j) of vessels in segments 7-8 and farther backward. The fine capillaries (k) in segments 2 and 3 are applied to the body wall but do not enter the musculature. The commissures (h) between the dorsal and ventral vessel in segments 6-10 are simple, without the valves and moniliform appearance of *M. pilosus* (GOODRICH 1895, f. 5, 10).

The testes (t) lie on the anterior wall of segment 10 and the ovaries (o) on that of segment 11. Septum 9/10 forms an anterior sperm sac (a) and septum 10/11 a posterior one (p) that extends to segment 16. In one of the examined worms the posterior sperm sac is contained in the ovisac (q), in another the two sacs lie side by side (Fig. 4).

The large male funnels (u) are beset with sperms. The vas deferens penetrates the septum 10/11 and its first section is a narrow (20  $\mu$ ), ciliated tube about 60  $\mu$  in length that bends upwards in segment 11. The following ascending part is 0,4 mm. long and covered with 20  $\mu$  high peritoneal prostatic cells (g). It is 58  $\mu$  in diameter, of which only 6  $\mu$  belong to the lumen. Near the dorsal wall of segment 11 the male duct loses the prostatic cells and turns vertically downwards (te). Its lumen is wider (25  $\mu$ ) in this part, the transverse duct of BENHAM (1915, f. 9, 10), that is provided with outer annular and inner longitudinal muscles. The transverse duct is 0,1 mm. long and separated from the following part by a strong constriction (l). At this constriction the inner epithelium of the transverse duct forms a small plug that somewhat resembles the penis of *Postiodrilus sonderi* Boldt (see MICHAELSEN 1927, fig. 17e). Ventrally to the constriction lies the atrium (v). It is 0.25 mm. long, about 60  $\mu$  in diameter and has no cilia. Its ectal end, the atrial duct (ad) narrows and bends forwards and medially. Coming from the right and left side the atrial ducts open on

two papillae (y) of the spermiducal chamber (x) that lies in the middle of segment 11.

The two pear-shaped spermathecae (r) in segment 10 contain loose sperms and open on the limit between segments 9 and 10 with two pores (rp). These are separated by a distance of 50-60  $\mu$ .

The ovaries lie dorsally to the male ducts. The ovocytes are grouped in clusters of ca. 32 cells each, and several such groups in various stages of growth are contained in the ovisac. The very inconspicuous female funnels are situated on the limit between the segments 11 and 12; the ovisac of septum 11/12 reaches segment 15 or even 17. Of the two present cocoons one contains one and the other (Fig. 6) six eggs.

#### Discussion of *Monopylephorus corderoi*

GOODRICH (1892; 1895) was the first who fully described a species that is congeneric with the present one. The name of the genus, *Vermiculus* Goodrich (1892, p. 474) cannot be preserved, as it is occupied for Nemertines (see BÜRGER 1904, p. 151). After my opinion *Vermiculus* can be substituted by *Monopylephorus* Levinsen (1884, p. 225), a monotypical genus (*M. rubroniveus*). As LEVINSEN'S description is very short, BEDDARD (1895, p. 268, 271) and MICHAELSEN (1900, p. 54) did not accept his genus and considered it a doubtful synonym of *Bothrioneurum* Stole 1886.

*M. rubroniveus* Lev. was found on Kalvebodstrand near Copenhagen, where the salinity is 10-20 per mille. All the six known species of *Bothrioneurum* are fresh water forms (MARCUS 1942, p. 200; DU BOIS-REYMOND MARCUS 1949, p. 5). Therefore the occurrence of a *Bothrioneurum*-species at the original locality of *Monopylephorus rubroniveus* Lev. is highly improbable. Very likely DITLEVSEN (1904, p. 423) is right to consider his gregarious species that is common on Kalvebodstrand as *Monopylephorus rubroniveus* Lev. The organisation of DITLEVSEN'S species agrees with that of GOODRICH'S from the English coast.

I think one is right to assume the specific identity of LEVINSEN'S, GOODRICH'S and DITLEVSEN'S worms. Therewith the type of the genus *Monopylephorus* becomes morphologically and geographically well defined, and MICHAELSEN'S (1900, p. 522) substitution of *Vermiculus* by *Rhizodrilus* Smith (1900, p. 444) is not necessary. The type of *Rhizodrilus*, *Rh. lacteus*, is an inhabitant of North American fresh water. It differs from GOODRICH'S species in setal and vascular characters so far, that NOMURA (1915, p. 43-44) and CHEN (1940, p. 87) maintain *Rhizodrilus* and *Monopylephorus* separated. MICHAELSEN and STEPHENSON who do not approve this separation use the two names in various ways. MICHAELSEN, who introduced (l. c.) *Rhizodrilus* instead of *Vermiculus* and considered *Monopylephorus* a doubtful synonym of *Bothrioneurum*, described (1913 p. 143) a new species from Transvaal as *Monopylephorus africanus*. Later on (1927, p. 14; 1928, p. 105) he turned back to *Rhizodrilus*. STEPHENSON used *Monopylephorus* in two of his important papers on the East Indian Oligochaeta (1917, p. 485;

1923, p. 103) and in the general part of his monograph (1930, p. 19; 85, 86, etc.), but *Rhizodrilus* in the systematic part (p. 752).

Of the older authors MOORE (1905) applied *Monopylephorus*, BENHAM (1909; 1915) *Rhizodrilus*. In later German papers (UDE 1929; KNÖLLNER 1935) MICHAELSEN's last opinion is adopted.

Although the complete bibliography is not available for me, I give the following list of species that were described under the names *Monopylephorus* or *Rhizodrilus*. As I can mention a character for each of the older species that distinguishes it from *M. corderoi*, the latter is well established. Species with hair setae and penis, as f. ex. *Tubifex irroratus* (Verrill) MOORE (1905, p. 384), and *Monopylephorus tichochaetus* Dittl., probably identical with *Postiodrilus sonderi* Boldt (MICHAELSEN 1927, p. 15; UDE 1929, p. 77), have not been considered, though they are sometimes mentioned as *Monopylephorus* or *Rhizodrilus* in the literature.

- (1) *M. africanus* Michaelsen (1913, p. 143) has two spermathecae in segment 9 and penial setae. After STEPHENSON (1917, p. 489) it is doubtful whether this species can be maintained in *Monopylephorus*.
- (2) *M. aucklandicus* (Benham 1909, p. 258). As the species has two male pores (NOMURA 1915, p. 42), CHEN (1940, p. 96) is right to remove it from *Monopylephorus* (or *Rhizodrilus*) and make it the type of a special genus, *Littodrilus*. The second atrium is enclosed in a great muscular sac.
- (3) *M. glaber* Moore (1905, p. 378) differs from *M. corderoi* by united spermathecal pores.
- (4) *M. kermadecensis* (Benham 1915, p. 180) has a single spermathecal pore in the middle of segment 10, and also the male duct differs from that of *M. corderoi*.
- (5) *M. lacteus* (Smith 1900, p. 444) has separate pores of the spermathecae as the new species, but large glands in segment 9, modified ventral setae in segment 9 or in 9 and 10 and a 0,14-0,16 mm. long penial seta in segment 11. The spermathecal pores open dorsally to the level of the ventral setae.
- (6) *M. limosus* (Hatai 1898, p. 103) has a single spermathecal pore.
- (7) *M. parvus* Ditlevsen (1904, p. 427) as well as the species described by MOORE (1905, p. 383) and STEPHENSON (1917, p. 485; 1923, p. 104) under the same name have only one spermatheca. STEPHENSON (1917, p. 488) considered the worms from Chilka Lake and the North American Atlantic coast as certainly identical, but was not sure about their identity with DITLEVSEN's Danish material. As f. ex. the atria unite before opening into the spermidueal chamber in the American and Indian worms, and do not in the Danish ones that liken *M. corderoi* in this detail, STEPHENSON's point of view can be understood. It is true that UDE (1929, p. 76)

unites all forms described as *parvus*, but he did not see any material.

- (8) *M. rubroniveus* Levisen (1884, p. 225), the type of the genus, and after DITLEVSEN (1904, p. 423) identical with *Vermiculus pilosus* Goodrich (1892; 1895), has united spermathecal pores.

## LITERATURE CITED

- BEDDARD, F. E. 1895, A Monograph of the Order of Oligochaeta. XII + 769 pp. Oxford (Clarendon). BENHAM, W. B. 1909, Report on the Oligochaeta. CH. CHILTON, The Subantarctic Islands of New Zealand, v. 1: art. 11, pp. 251-294, t. 10-11. Wellington (N. Z.) (not seen). 191a, Oligochaeta from the Kermadec Islands. Trans. Proc. N. Zeal. Inst. (new issue), v. 47, pp. 174-185. Wellington (N. Z.). BURGER, O. 1904, Nemertini. Das Tierreich (Pr. Akad. Wissensch.) fasc. 20, XVII + 151 pp. Berlin (Friedländer). CHEN, Y. 1940, Taxonomy and faunal relations of the limnic Oligochaeta of China. Contr. Biol. Lab. Sci. Soc. China, Zool. ser., v. 14, pp. 1-132. Shanghai. DITLEVSEN, A. 1904, Studien an Oligochaeten, Zeitschr. wiss. Zool. v. 77, pp. 398-480, t. 16-18. Leipzig. DU BOIS-MARCUS, E. 1949, Further notes on Naidids and Tubificids from Brazil. Com. Zool. Mus. Montevideo, v. 3: no. 51, pp. 1-11, t. 1-2. Montevideo. GOODRICH, E. S. 1892, Note on a new Oligochaete. Zool. Anz., v. 15, pp. 474-476. Leipzig. 1895, On the Structure of *Vermiculus pilosus*. Quart. Journ. Micr. Sci., n. ser., v. 37, pp. 253-267, t. 26-28. London. HATAI, S. 1898, On *Vermiculus limosus*, a new species of aquatic Oligochaeta. Annot. Zool. Japon., v. 2, pp. 103-111. Tokyo. KNÖLLNER, F. H. 1935, Oekologische und systematische Untersuchungen über marine Oligochaeten der Kieler Bucht. Zool. Jahrb. Syst., v. 66, pp. 425-512. Jena. LEVINSSEN, G. M. R. 1884, Systematisk-geografisk Oversigt, etc. Vid. Meddel. Naturh. Foren. 1883, pp. 92-350, t. 2-3. Kjöbenhavn. MARCUS, E. 1942, Sobre algumas Tubificidae do Brasil. Bol. Fac. Fil. Ci. Letr., Zoologia no. 6, pp. 153-254, t. 1-12. São Paulo. MICHAELSEN, W. 1900, Oligochaeta. Das Tierreich (Pr. Akad. Wissensch.) fasc. 10, XXIX + 575 pp. Berlin (Friedländer). 1913, Oligochaeten vom tropischen und südlich subtropischen Afrika. Pars I. Zoologica, fasc. 67 (v. 26), pp. 139-170, t. 19. Stuttgart (not seen). 1927, Oligochaeta. G. GRIMPE, Tierw. Nord- & Ostsee, fasc. VI c, pp. 1-44. Leipzig (Akad. Verlagsges.). 1928, Oligochaeta. W. KÜKENTHAL & TH. KRUMBACH, Handb. Zool., v. 2, part 2; pp. 1(8)-118(8). Berlin & Leipzig (W. de Gruyter). MOORE, J. P. 1905, Some marine Oligochaeta of New England. Proc. Acad. Nat. Sci. Philadelphia, v. 57, pp. 373-399, t. 32-33. Philadelphia; Pa. NOMURA, E. 1915, On the aquatic Oligochaete *Monopylephorus limosus* (Hatai). Journ. Coll. Sci., v. 35 (1913-1915): no. 9, pp. 1-46. Tokyo. SMITH, FR. 1900, Notes on Species of North American Oligochaeta. III. List of Species

found in Illinois, etc. Bull. Illin. State Lab. Nat. Hist., v. 5 (1897-1901), pp. 441-458, t. 39-40. Urbana, Ill. STEPHENSON, J. 1917, Fauna of the Chilka Lake. Oligochaeta (Supplementary Report). Mem. Ind. Mus., v. 5, pp. 483-490. Calcutta. 1923, Oligochaeta. Fauna Brit. India, incl. Ceylon & Burma. XXIV + 518 pp. London (Taylor & Francis). 1930, The Oligochaeta, XVI + 978 pp. Oxford (Clarendon). UDE, H. 1929, Oligochaeta. F. DAHL, Tierw. Deutschl. fasc. 15, pp. 1-132. Jena (G. Fischer).

PLATE I

MONOPYLEPHORUS CORDEROI, n. sp.

1. Lateral view of anterior part; dorsal and ventral vessel not drawn.
2. Seta.
3. Transverse section of pharynx region.
4. Ventral view of reproductive organs.
5. Male duct.
6. Cocoon.

a, anterior sperm sac.      ad, atrial duct.      b, brain.      c, chromophil  
cells.      ch, chloragocytes.      d, clitellum.      e, pharyngeal muscles.      f,  
pharyngeal glands.      g, prostatic cells.      h, hearts of segments 6-10.  
i, alimentary tube.      j, intestinal blood plexus.      k, blood vessel.      l,  
constriction between transverse duct and atrium.      m, mouth.      n, ventral  
nerve cord.      o, ovary.      p, posterior sperm sac.      q, ovisac.      r, sper-  
mathecae.      rp, spermathecal pores.      s, septum.      t, testes.      tc,  
transverse duct.      u, male funnel.      v, atrium.      w, female funnel and  
its opening.      x, spermiducal chamber.      y, papillae of atrial ducts.  
z, setal bundle.      2-13, segments 2-13.

