



First record of achaetous *Marionina* Michaelsen, 1890 (Annelida: Clitellata: Enchytraeidae) in the southern Atlantic

ALESSANDRO L. PRANTONI¹, MAIKON DI DOMENICO² & PAULO C. LANA¹

¹ Laboratório de Bentos, Centro de Estudos do Mar, Universidade Federal do Paraná, Av. Beira Mar, s/n, zip code 83255-976, Pontal do Sul, PR, Brazil.

² Instituto de Biologia Universidade Estadual de Campinas - Unicamp - Cidade Universitária Zeferino Vaz Rua Monteiro Lobato, 255, zip code 13083-970, Campinas, SP, Brazil

Email: aprantoni@gmail.com

Short note

Marionina Michaelsen, 1890 is a polyphyletic enchytraeid genus represented by about 100 nominal species (Rota et al., 2008). When the genus was originally described in 1889, it got a preoccupied name, *Marionina*, which was corrected into *Marionina* one year later by Michaelsen himself. According to the ICZN (1999: Art. 60.3), a new replacement name has its own author and date. Thus, the correct nomenclature of the genus should be *Marionina* Michaelsen, 1890 (Rota et al., 2008).

Marionina has marine and non-marine species (Erséus et al. 2010). The former may be found in tidal debris, on mangrove aerial roots, in clean sandy beaches, in sublittoral sediments, and on rocky shores (Healy & Coates 1999). Some of the marine species are unusual in that they lack chaetae, and are grouped under the name “achaetous *Marionina*” (Matamoros et al. 2012). The first published description of an achaetous *Marionina* occurred under the name *Michaelsena achaeta* Hagen, 1954, a taxon later augmented and transferred to *Marionina* by Lasserre (1964). Two other achaetous taxa are currently named: *Marionina arenaria* Healy, 1979, and the former subspecies *Marionina achaeta nevisensis* Righi & Kanner, 1979, later raised to species status as *Marionina nevisensis* by Coates (1983). A comprehensive review of the diversity of “achaetous *Marionina*” was recently performed by combining morphological and molecular data (Matamoros et al. 2012). According to these authors, specimens of achaetous *Marionina* from a number of worldwide localities (Caribbean, Australia and northern Europe) make up a monophyletic grouping comprised of 11 separately evolving lineages, which could be assigned to seven different morphotypes. Only two of these morphotypes could be identified as nominal taxa, *M. nevisensis* Righi & Kanner, 1979 sensu lato and *Marionina nothachaeta* [= *M. achaeta* sensu Lasserre, 1964]. Based on segment numbers, Matamoros et al. (2012) suggested that *Marionina arenaria* and *M. achaeta* sensu Hagen (1954) may be the same species. *M. arenaria* are only available for study at the Natural Museum of Ireland (Natural History Division) in Dublin (NMI). The only *Marionina* species reported from the southern Atlantic are *Marionina cana* Marcus, 1965 and *Marionina nea* Marcus, 1965, both endowed with chaetae (Prantoni et al. in press).

Individuals of *Marionina* without chaetae were collected in July 2012 in an intertidal pond, in bottoms made up by gravel, shell fragments, and coarse sand, close to the rocky promontory of the Ponta do Baleeiro beach, Municipality of São Sebastião, São Paulo State, southeastern Brazil (23°49.689' S; 45° 25.392' W). The site is exposed to waves, and local salinity is around 35 PSU (Figure 1).

Four individuals were analyzed, two of which were mature and devoid of chaetae. Besides being achaetous, they were identified as *Marionina* based on the following diagnostic characteristics: 31–42 segments; total length between 3.6 and 5.5 mm; cuticle thickness between 2 and 3 µm; prostomium conical, wider than long; clitellum diameter of 168 µm, annular in XII–XIII, with glandular cells arranged in transverse lines; seminal vesicle unilateral; dorsal anterior blood vessel bifurcated in III or IV; coelomocytes dispersed, irregular and egg-shaped, with cytoplasm filled with small grains; sperm funnels (Figure 2).

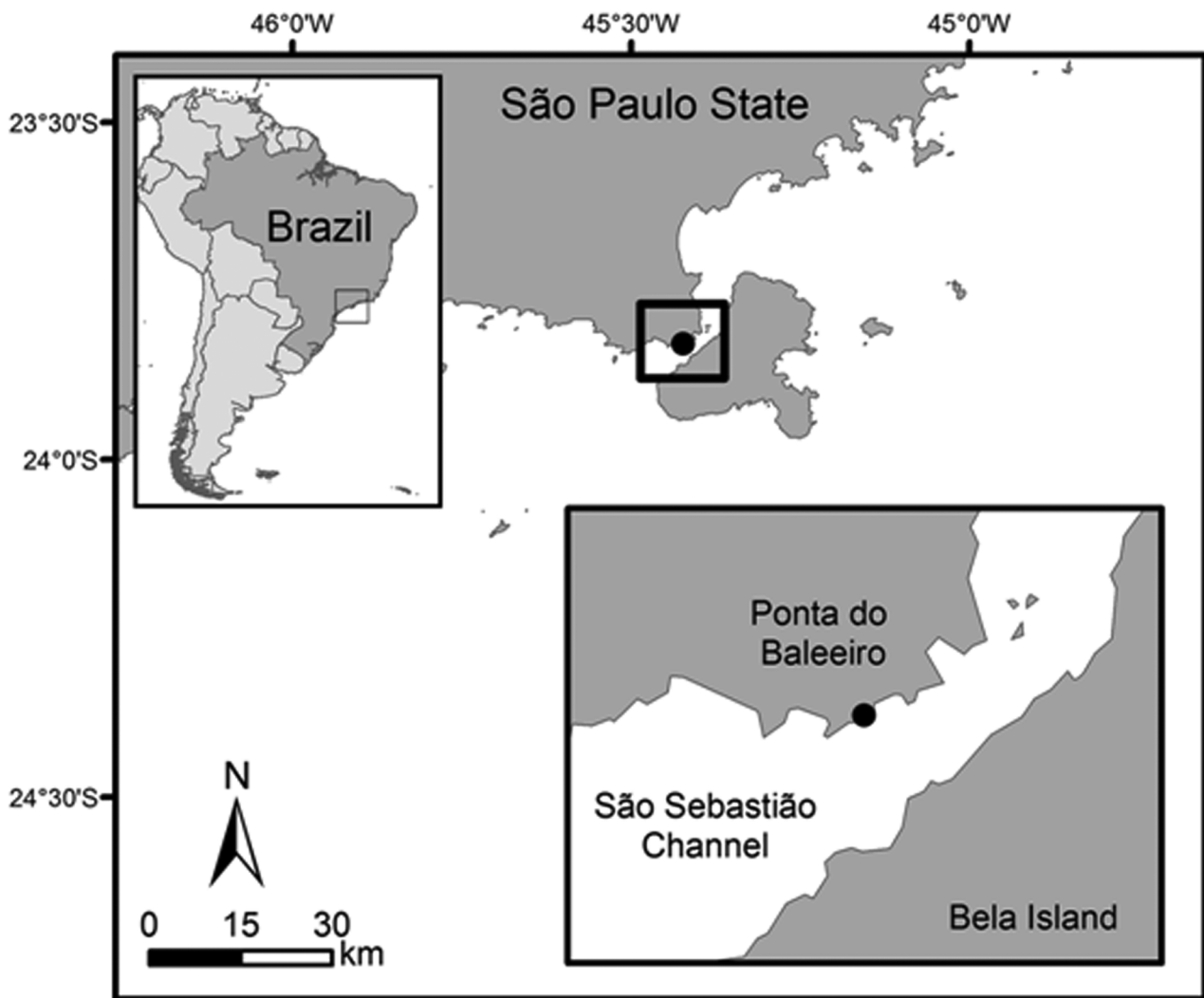


FIGURE 1: Collection site of achaetous *Marionina* in southern Brazil.

This is the first record of an achaetous *Marionina* for the southern Atlantic. The animals collected in São Paulo appear morphologically indistinguishable from *M. nevisensis* Righi & Kanner, 1979 described from Nevis Island in the Caribbean. However, it is possible that *M. nevisensis* as recognized or described subsequently by a number of different authors (Coates, 1983; Erséus, 1990; Erséus et al., 1990; Coates, 1990; Coates & Stacey, 1993; Healy & Coates, 1999) is a complex of globally distributed cryptic species (Matamoros et al. 2012). Further study of the Brazilian specimens is still necessary, including analyses of characters from DNA sequences, and observations with transmission and scanning electron microscopy.

The examination of additional characters will be essential to test whether the shared morphological characteristics are homologous, or whether they represent environmentally convergent adaptations.

Matamoros et al. (2012) suggested that all tropical lineages (e.g., from Central America and Oceania) of achaetous *Marionina* seem to constitute a monophyletic group that originated from ancestors living in temperate climate regions. However, they have also suggested that more extensive sampling, especially in the temperate regions, might reveal a different evolutionary history.

While reporting a new geographical record of achaetous *Marionina*, we emphasize the scarcity of studies on the fauna of brackish-water and marine oligochaetes in the southern Atlantic. Indeed, only 13 of the approximately 600 described species of marine and brackish-water oligochaetes have been reported from Brazil, almost all of them known only from their type localities. A systematic survey of the group in the southern and southeastern Brazil will likely reveal a much higher diversity, considering the variety of regional habitats.

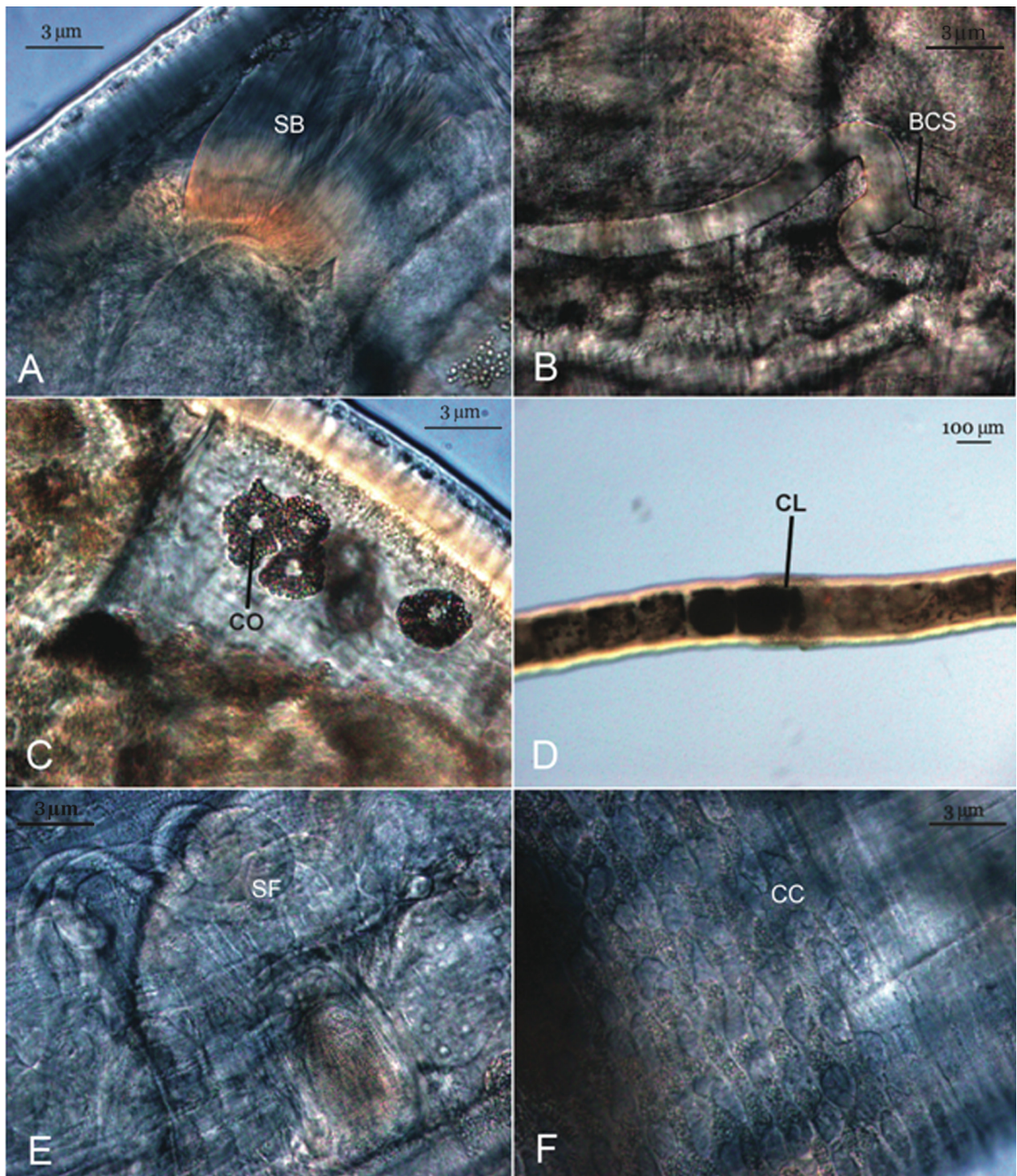


FIGURE 2: Anatomy of the achaetous *Marionina* from Sao Paulo. (A) a bundle of sperm, SB, covering the sperm funnel; (B) bifurcated anterior dorsal blood vessel, BCS; (C) coelomocytes, CO; (D) clitellum, CL; (E) vas deferens; (F) clitellar cells, CC.

Acknowledgements

We thank the Graduate Programme in Coastal and Oceanic Systems (Center for Marine Studies – Universidade Federal do Parana) and CAPES for financially supporting the first author. Our thanks to Alvaro Migotto, Gustavo Fonseca, Fabiane Gallucci, and all the staff of the Center of Marine Biology (CEBIMAR) from São Paulo University for their extensive help, Christer Erséus and Adrian Pinder for their encouragement. Leonardo Sandrini Neto prepared the map of the study area and Karin Hoch Fehlauer Ale assisted with translation from Portuguese version of the paper to English.

References

- Coates, K.A. (1990) Marine Enchytraeidae (Oligochaeta, Annelida) of the Albany area, Western Australia. *In*: Wells, F.E., Walker, D.I., Kirkman, H. & Lethbridge, R., (Eds), *The Marine Flora and Fauna of Albany, Western Australia*. Western Australian Museum, Perth, pp. 13–41.
- Coates, K.A. (1983) New records of marine *Marionina* (Oligochaeta, Enchytraeidae) from the Pacific Northeast, with a description of *Marionina klaskisharum* sp. nov. *Canadian Journal of Zoology*, 61, 822–831.
<http://dx.doi.org/10.1139/z83-108>
- Coates, K.A. & Stacey, D. (1993) The marine Enchytraeidae (Oligochaeta, Annelida) of Rottnest Island, Western Australia. *In*: Wells, F.E., Walker, D.I., Kirkman, H. & Lethbridge, R., (Eds), *The Marine Flora and Fauna of Rottnest Island, Western Australia*. Western Australian Museum, Perth, pp. 391–414.
- Erséus, C. (1990) Marine Oligochaeta of Hong Kong. *In*: Morton, B., (Eds), *Proceedings of the Second International Marine Biological Workshop: The Marine Flora and Fauna of Hong Kong and Southern*. Hong Kong University Press, Hong Kong, pp. 259–335.
- Erséus, C., Rota, E., Matamoros, L. & De Wit, P. (2010) Molecular phylogeny of Enchytraeidae (Annelida, Clitellata). *Molecular Phylogenetics and Evolution*, 57, 849–858.
<http://dx.doi.org/10.1016/j.ympev.2010.07.005>
- Erséus, C., Daoyuan, S., Yanling, L. & Bin, S. (1990) Marine Oligochaeta of Jiaozhou Bay, Yellow Sea coast of China. *Hydrobiologia*, 202, 107–124.
<http://dx.doi.org/10.1007/bf00027096>
- Hagen, G. (1954) *Michaelsena achaeta* nov. sp., ein neuer mariner Oligochaet aus der Kieler Bucht. *Faunistische Mitteilungen aus Norddeutschland*, 1, 12–13.
- Healy, B. (1979) Three new species of Enchytraeidae (Oligochaeta) from Ireland. *Zoological Journal of the Linnean Society*, 67, 87–96.
- Healy, B. & Coates, K. A. (1999) Finding enchytraeid oligochaetes in hot climates: species occurrence on the shores of Bermuda. *Hydrobiologia*, 406, 111–117.
- Lasserre, P. (1964) Notes sur quelques oligochètes Enchytraeidae, presents dans les plages du Bassin d' Archacon. *Procès Verbaux des Séances de La Société Linnéenne de Bordeaux*, 101, 87–91.
- Matamoros, L., Rota, E & Erséus, C. (2012) Cryptic diversity among the achaetous *Marionina* (Annelida, Clitellata, Enchytraeidae). *Systematics and Biodiversity*, 10: 4, 509–525.
<http://dx.doi.org/10.1080/14772000.2012.723640>
- Michaelsen, W. (1890) *In*: Pfeffer, G. Die niedere, Thierwelt des antarktischen Ufergebietes. Die internationale Polarforschung 1882–1883. *Die Deutschen Expeditionen und ihre Ergebnisse* (5) 2, (17), 455–574.
- Prantoni, A.L., Di Domenico, M. & Lana, P.C. (in press). A taxonomic overview of marine and estuarine oligochaetes from Brazil. *Marine Biodiversity*.
- Righi, G. & Kanner, E. (1979) Marine Oligochaeta (Tubificidae and Enchytraeidae) from the Caribbean Sea. *Studies of the Fauna of Curaçao and other Caribbean Islands*, 58, 44–68.
- Rota, E., Matamoros, L. & Erséus, C. (2008) In search of *Marionina* (Clitellata: Enchytraeidae): a taxonomic history of the genus and re-description of the type species *Pachydriilus georgianus* Michaelsen, 1888. *Italian Journal of Zoology*, 75, 417–436.
<http://dx.doi.org/10.1080/11250000801930433>