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Editorial: diversity of marine meiofauna on the coast of Brazil

Gustavo Fonseca · Jon Norenburg ·
Maikon Di Domenico

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Abstract After a first bout of primarily taxonomical effort, meiofauna studies in Brazilian waters remained virtually neglected until the 1990s. At the end of the last century, taxonomical and ecological studies on meiofauna taxa were again published regularly, especially for Nematoda and Copepoda. In this issue, 18 new species are described and ten species are redescribed from seven Phyla. The five ecological articles cover the spatial distribution of forams and amoeba in a lagunar system, the meiofauna associated with biogenic structures, the relationship between nematodes and granulometry, and the response of sandy-beach meiofauna to a natural, short-term pulse of diatoms. All these contributions show the potential of the Brazilian coast for revealing new species and testing small to large-scale hypotheses about ecological processes.

Keywords Brazil · Ecology · Marine · Meiofauna · New species · Taxonomy

The main objectives of this editorial are to share the motivation that led us to organize this special issue and summarize the major findings of each article. Thus, instead of organizing an extensive literature review on the topic, we give an overview of

the progress of marine meiofauna studies at the Brazilian coast using key researchers and publications as examples.

The diversity of meiofauna taxa on the Brazilian coast has been investigated since the beginning of the last century (e.g. Cobb 1920). Early studies were points in space and time, and were devoted to the description of new species. In the middle of the last century (1940–60) there was a sudden increase in the number of meiofauna studies worldwide. In Brazil, this was led by the prolific meiofaunal species descriptions and systematic reviews of Ernest Marcus and Eveline du Bois-Reymond Marcus (Medeiros 1987; Corrêa 1991). Together they published more than 220 scientific papers. Considering only the marine meiofauna, they described an enormous number of species and genera belonging to Platyhelminthes (Proseriata and Rhabdozoa), Acoela (formerly included in Platyhelminthes), Mollusca (Opisthobranchia), Tardigrada, and Annelida (including polychaetes and oligochaetes) (e.g. Du Bois-Reymond 1943; 1946; 1947; 1948; 1950; 1953; 1955; 1957; 1958; Marcus 1946, 1947; Marcus and Du Bois-Reymond 1951; 1954a; 1954b; 1955; 1956; 1957). Diva Diñiz Corrêa, a former student and subsequent colleague of Ernest and Eveline Marcus, published several papers on the taxonomy of *Otocyphlonemertes* (Nemertea) (Corrêa 1948, 1949, 1950, 1953, 1957) and was for many years the leading authority on the group. During the same period, there was a series of papers by foreign researchers on specific taxonomic groups of Brazilian meiofauna, such as Nematoda (Gerlach 1954, 1957; Meyl 1956), Kinorhyncha (Gerlach 1956), Isopoda (Remane and Siewing 1953), Amphipoda (Siewing 1953), Harpacticoida (Jakobi 1953; Jakobi 1954; Jakobi and Loyola e Silva 1962), Acari (Schuster 1962), Ostracoda (Hartmann 1955, 1956), and Annelida (Siewing 1954; Gerlach and Siewing 1956; Westheide 1974).

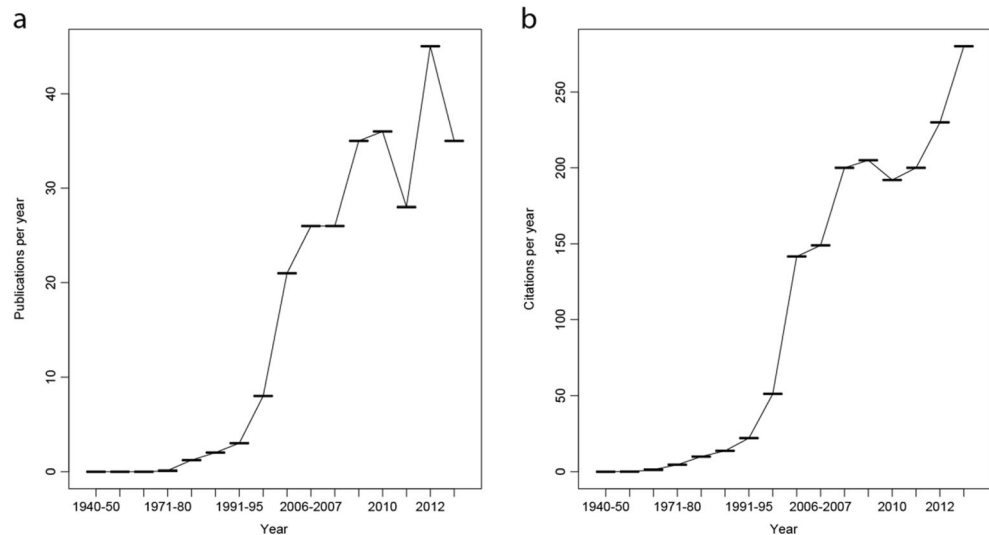
After this first bout of primarily taxonomical effort, meiofauna studies remained virtually neglected in Brazilian waters until the 1990s. In the end of the last century taxonomical

G. Fonseca (✉)
Departamento de Ciências do Mar, Universidade Federal de São Paulo, Av. Alm Saldanha da Gama 89, Santos, SP 11030-400, Brazil
e-mail: gfonseca@unifesp.br

J. Norenburg
Department of Invertebrate Zoology, Smithsonian National Museum of Natural History, Washington, DC 20560, USA

M. Di Domenico
Zoological Museum “Prof. Dr. Adão José Cardoso”, Biological Institute, University of Campinas (UNICAMP), R Charles Darwin s/n, Bloco N, P.O. Box 6109, 13083-863 Campinas, SP, Brazil
e-mail: maik2dd@gmail.com

Fig. 1 Citation metrics retrieved from Google Scholar using the terms “meiofauna” or “meiobenthos” and further refining for country “Brazil”: **a)** number of publications per year; **b)** number of citations per year



and ecological studies on meiofauna taxa again were published regularly (e.g. Todaro & Rocha 2004, 2005, Hooze & Rocha 2006, Amaral & Nalin 2011, Andrade et al. 2011, Dal Zotto et al. 2013), especially for Nematoda and Copepoda (Carvalho et al. 1992; Corbisier 1993, 1999; Esteves et al. 1997; Esteves and Genevois 1997; Genevois and Bezerra 1997; Kihara and Rocha 2009; Lotufo and Rocha 1993; Netto et al. 1999a, b; Santos et al. 1999). According to the ISI Web of Knowledge and Google Scholar, it is only in the last decade that publications on meiofauna by Brazilian authors have been published consistently every year among ISI journals as well as in “gray” literature (Fig. 1a). Today Brazilian production of meiofauna studies is still modest, up to 14 articles/year amongst ISI journals and around 40 articles/year amongst all literature (Google Scholar), but the number of citations is doubling every four years (Fig. 1b), which is aided by increasing electronic searches and access to literature in the last decades.

It should be noted that much of the taxonomical work was focused on the southeastern coast of Brazil, and especially the state of São Paulo. Given the extensive and very heterogeneous coastline shaped by mangroves, salt marshes, exposed and protected sandy beaches, bays, estuaries, rocky shores, coral

reefs, islands, and an extensive continental shelf, the Brazilian coast has tremendous potential for revealing new species and testing small- to large-scale hypothesis about ecological processes. Brazilian researchers still are in the beginning stages of this endeavour and continue to benefit significantly from international collaborations and expertise, especially in view of the global deficit of taxonomic expertise for meiofauna. In order to promote such an exchange between Brazilian and international researchers, the workshop “Taxonomy and diversity of marine meiofauna – Brazil” was organized in October 2012. The workshop was very successful and nine articles in this special issue are from material collected during this event. The other six articles are contributions of individual researchers. The articles in this special issue cover two major themes: taxonomy and ecology of meiofauna.

Taxonomy

In this issue there are ten taxonomical articles covering seven distinct major taxa: Gastrotricha (Hochberg 2014; Araújo et al. 2014), Kinorhyncha (Sørensen 2014), Nematoda (Bezerra et al.

Table 1 Number of new and re-described species (N sp.) in this special issue

	Taxon	N sp.	Reference
New species	Gastrotricha	2	Araújo et al. 2014; Hochberg 2014
	Kinorhyncha	3	Sørensen 2014
	Nematoda	2	Bezerra et al. 2014
	Platyhelminthes: Proseriata	9	Curini-Galetti 2014
	Rhabdocoela	2	Reygel et al. 2014
Re-description	Mollusca: Gastropoda	1	Jörger et al. 2014
	Platyhelminthes: Proseriata	7	Curini-Galetti 2014
	Annelida: Polychaeta	2	Di Domenico et al. 2014

2014; Venekey et al. 2014), Oligochaeta (Prantoni et al. 2014), Polychaeta (Di Domenico et al. 2014), Platyhelminthes (Curini-Galetti 2014; Reygel et al. 2014), and Mollusca (Jörger et al. 2014). In total, 18 new species are described and 10 species are re-described (Table 1). Additionally, Prantoni et al. give an updated list of valid oligochaete species for the Brazilian coast, and Venekey et al. make a detailed review at the species level on a typical marine nematode family, the Xyalidae. In this study Venekey et al. also present a list of nematode species registered along the Brazilian coast and a brief discussion on the types of habitat in which Xyalidae species occur.

Ecology

Among the five ecological articles, one article deals with foraminifera and amoeba from lagunar systems composed of several interconnected lagoons (Leipniz et al. 2014). Although the whole system is connected, they showed that each lagoon has a particular set of species, regulated by a different set of environmental factors. Two articles deal with the underexplored field of meiofauna associated with biogenic structures. Corrêa et al. (2014) describe the macro- and meiofauna associated with carapaces of sea turtles and conjecture on potential ecological processes structuring these associations. Ataíde et al. (2014) describe the particularities of the fauna associated with sandy reefs built by the polychaete *Sabellaria*. Both studies show that biogenic structures are characterized by specific meiofauna taxa.

Two studies have an experimental design. Fonseca et al. (2014) test specifically whether nematode species richness increases with sediment mean grain size. They reject this hypothesis and show that along the sediment spectrum, each genus has a distinct optimum distribution at a relative narrow grain size. Netto and Meneghel (2014) tested the response of sandy beach meiofaunal organisms to a natural short-term (1 day) pulse of diatoms. They observed a simultaneous increase of meiofauna organisms inhabiting the intertidal zone, where most of the diatoms accumulated, and a subsequent decrease. The proposed mechanism is that sandy beach meiofauna is very mobile, enabling it to rapidly use this one-day window of opportunity.

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