

First record of *Chaetacanthus magnificus* (Polychaeta: Polynoidae) from the northeast coast of Brazil, with an overview of its taxonomic history

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ABSTRACT

Polynoidae is a diverse group of polychaetes known as scale-worms, found in different marine regions. However this rich family is little studied in Brazil, especially along the northeastern coast of the country. We report *Chaetacanthus magnificus*, a first record for the northeastern coast of Brazil, establish this species as valid, differentiating it from other synonyms found in several studies which report polychaetes in Central and South America. The polychaetes found by Project Algae of Paraíba are in the collection of Laboratory of Marine Invertebrates Paulo Young, Universidade Federal da Paraíba, Brazil.

KEY WORDS

Polychaetes, Polynoidae, scale-worm, South America, new record.

RESUMEN

Polynoidae es un grupo diverso de poliquetos conocidos como gusanos-escamosos, que se encuentra en diferentes regiones marinas. Sin embargo, esta diversa familia es poco estudiada en Brasil, especialmente a lo largo de la costa noreste del país. Reportamos *Chaetacanthus magnificus*, primer registro para la costa noreste de Brasil, establecida esta especie como válida, diferenciándola de otros sinónimos encontrados en varios estudios que reportan poliquetos en América Central y del Sur. Los poliquetos encontrados por el Proyecto Algas de Paraíba están en la colección del Laboratorio de Invertebrados Marinos Paulo Young, Universidad Federal da Paraíba, Brasil.

PALABRAS CLAVE

Polychaetes, Polynoidae, gusanos escamosos, América del Sur.

The polynoids constitute a peculiar group of scale-worms inhabiting marine habitats from intertidal zones to the deep-sea (Ruff, 1995), from warm waters such as the tropical seas of northeastern Brazil (Nonato & Luna, 1970) to cold waters as in Alaska (Hartman, 1948), and can withstand hydrothermal vents (Pettibone, 1983; 1984; 1989). These worms are widely distributed along the entire marine realm, where they find food and shelter for their survival. This group was recorded for the Brazilian coast in the works of Morgado and Amaral (1981), Amaral and Nonato (1982), and Amaral et al. (2012), totaling approximately 151 records.

Among the records of that diverse family from Brazil, the species *Chaetacanthus magnificus* Grube, 1876 was the first record of the genus for the South Atlantic in the work of Nonato (1981), where one specimen was

collected in the tidal zone in Ubatuba, São Paulo. This species was recorded later from the Brazilian coast by Amaral and Nonato (1982) and Amaral et al. (2012). Herein, it is the target for the first report from the northeast coast of Brazil, where efforts to identify the fauna of polychaetes are still scarce.

Other occurrences of this species are from Central and South America: Mexico-Pacific coast, Panama-Atlantic coast, Ecuador, Colombia, and Brazil (Treadwell, 1914; Monro, 1928; Hartman, 1938; 1939; Allen, 1957; Perkins & Savage, 1975; Fauchald, 1977; Laverde-Castillo, 1986; Salazar-Vallejo, 1990; 1996; Salazar-Vallejo et al., 2004; Salazar-Silva, 2006; Hernández-Alcántara et al., 2008). As well as recording the species, we discuss the synonymy of *C. magnificus*, discuss characters that distinguish this species from the remaining species of the genus, and remark

on the necessity of revising some of the type specimens in *Chaetacanthus*.

Taxonomic History

Seidler (1922) transferred *Iphione magnifica* Grube, 1875 to *Chaetacanthus magnificus* (Grube, 1876). The establishment of the new genus *Chaetacanthus* Seidler, 1923 was justified by the presence of branchiae on the dorsal part of the parapodia, located especially on the elytra and cirrhopores, and structures of chitin present in center of the elytrae, characters that did not occur in the closest genera such as *Iphione* (Kinberg, 1856) and *Lepidonotus* (Leach, 1816). Besides, the notochaetae are different from the notochaetae found in the genus *Lepidonotus*. Seidler also emphasized the differences between *Chaetacanthus* and *Euphione*, clarifying some existing doubts about the validity of these two genera. He further indicated that *Lepidonotus* (*Physalidonotus*) *barbatus* (Augener, 1910) is not a synonym of *C. magnificus*.

Nowadays, three more species are known besides the type species of *Chaetacanthus*: *C. pilosus* (Treadwell, 1937), *C. barbatus* (Augener, 1910) and *C. pomareae* (Kinberg, 1856).

Some records lead us to doubt the validity of a few type specimens in the genus. Seidler (1923) questioned some identifications. He reports that Augener (1910) described a specimen with 35mm in length, with characters of *C. magnificus*, but argued that this specimen was too big to belong to this species, commenting that size interferes with body rigidity. Hartman (1939) also refers to a questionable identification of a single specimen from the North Pacific in the same work by Augener. Thus, the synonymization of *Lepidonotus* (*Physalidonotus*) *barbatus* with *C. barbatus* by Augener may also be questioned under these circumstances.

Another suggested synonym of *C. magnificus* is *Polynoe branchiata* Treadwell (1901). Curiously, the identification card of *P. branchiata* in the Smithsonian Institution (IZ WRM 16008, card-USNM 16008), identified by Treadwell, bears comments by Dr. Marian H. Pettibone that the specimen may belong to *C. magnificus*.

Hartman (1938) reports another synonym for *Chaetacanthus magnificus*. She informs us that Treadwell considered *Lepidonotus pilosus* from the south of the Gulf of California a synonym of *C. pilosus*, because the specimen has branchiae on the elytrhopores, a heavy ornamentation of the scales, and chaetae typical of *C. magnificus*.

Hernández-Alcántara et al. (2008) also report *Lepidonotus pilosus* as a synonym of *Chaetacanthus magnificus*. However, Salazar-Silva (2006) reiterated that *C. pilosus*

was synonymized with *C. magnificus* by Hartman (1939) (Holotype ZMB 1059), but after a comparison between *C. pilosus* and the holotype of *L. pilosus* (AMNH 3531), she remarked that there are sufficient differences among the two species to justify their validity. In the same work Salazar-Silva puts *Lepidonotus panamensis* Hartman, 1939 (cited as *Lepidonotus pomareae panamensis* Hartman, 1939 but raised to species rank by Hartman (1948)) into the synonymy of *C. pilosus*, stating that both species have the same characters.

This affirmation of Salazar-Silva makes a revision of the type specimens of species of *Chaetacanthus* necessary, because *L. panamensis* (Hartman, 1939) is also a synonym of *C. pomareae* and Salazar-Vallejo (1990) illustrates differences in the parapodia between *L. panamensis* and *C. magnificus*, which support the suggestion that there remain important differences between the genera *Lepidonotus* and *Chaetacanthus*.

Another genus that approaches *Chaetacanthus* is *Euphionella* Monro, 1936, which has saccular branchiae among its parapodia, as well as coriaceous and well ornamented elytrae (Amaral & Nonato, 1982). However, *Euphionella* has dorsal expansions on the chaetigers without scales, but may have an ornamentation known as "pseudo-elytrae" (Rozbaczyl et al., 2005:76. Figs. 3-1).

On the basis of the above comments, we believe that the synonyms established previously for *C. magnificus* were based on the similarities of the lepidonotinoid prostomium in *Chaetacanthus*, *Euphione*, *Iphione* and *Lepidonotus*, as well as on similarities of their chaetae and in the ornamentation of their elytrae. The taxonomic confusions among these genera remains due to the absence of taxonomic revisions within the family Polynoidae, particularly for the genus *Lepidonotus*. Notwithstanding, the works of Salazar-Silva (2006) and Amaral and Nonato (1982) support with taxonomic discussions and illustrations that the differences among *C. magnificus* and the remaining genera are valid. Even though they all show a lepidonotinoid prostomium, *Chaetacanthus* may be clearly distinguished by the presence of digitiform branchiae among the parapodia and by the disposition of the chitinous plates in the center of the elytrae in *C. magnificus*.

METHODOLOGY

Specimens were collected from various locations on the coast of Paraíba (S Atlantic, Brazil), during the Algae Project of Paraíba (1981-1982). The dredged material was collected at stations 63, 69, 84 and 87 (Fig. 1). After sorting, the animals were preserved in alcohol 70%, and

observed under stereomicroscopes, while parapodia and scales were examined under a compound microscope. All drawings were done with a camera lucida mounted to the stereomicroscope.

Photos were taken with a camera mounted on the stereomicroscope (Leica M205c; camera DFC295). Taxonomic keys were used from the available literature for the identification of species. The nomenclature of the segments and appendages follow the terms in the descriptions of Tebble and Chambers (1982), Hanley and Burke (1991), Ruff (1995), and Imajima (1997). All the specimens are deposited in Coleção de Invertebrados Paulo Young, Universidade Federal da Paraíba, Brazil, under the acronym (POLY-UFPB).

Systematics

Family Polynoidae Kinberg, 1856

Subfamily Lepidonotinae Willey, 1902

Genus *Chaetacanthus* Seidler, 1923

Chaetacanthus magnificus Grube, 1876

Iphione magnifica Grube, 1876: 51

Polynoe branchiata Treadwell, 1901: 186, Figs. 5-7.

Lepidonotus (Physalidonotus) barbatus Augener, 1910: 244-246, Figs. 4-6.

Lepidonotus pilosus Treadwell, 1937: 141-143, Figs. 1-7

Lepidonotus panamensis Hartman, 1939: 44-46, Pl. 6, Figs. 70-77. (as *L. pomareae panamensis*)

Main references

Seidler, 1924: 97-98, Fig. 14, Monroe, 1928: 558, Hartman, 1939: 28; 1948) (Trinidad; type-species).

Diagnosis

Body stout, with 25 chaetigerous segments. Digitiform branchiae among the parapodia. Elytra with polygonal or spherical chitinous structures.

Material examined

POLY-UFPB 05, 09 and 799, 6°50'S; 34°42'W, in 30m; St. 63; POLY-UFPB 98, 6°29'S; 34°48'W; St. 87; POLY-UFPB 03, 97, 99, 101 and 102, 6°46'S; 34°47'W, in 18m; St. 69. POLY-UFPB 04, 6°33'S; 34°54'W, in 14m; St. 84.

Description

Body robust, elliptical in cross section, with 4,7 cm in length, including palps and pygidial cirri. Width 1,2 cm, including chaetae; 25 chaetigers. Prostomium bilobed, with two pairs of eyes; anterior pair dorsolateral, near widest portion of prostomium, posterior pair near basis of prostomium, converging towards the midline, close to the nuchal fold (Fig. 2). Median antenna slightly longer than lateral antennae, both having a subdistal inflation, culminating abruptly in a sharp point; cylindrical ceratophores, median antenna with ceratophores larger than lateral antennae, antennae and tentacular cirri with two dark brown rings close to inflation. A pair of large palps, slightly longer than median antenna, culminating in a fine point, with eight transverse rows of papillae, from its base to the apex.

Tentacular segment with two pairs of cylindrical tentaculophores, with three chaetae on the anterodorsal bases. Buccal cirri larger than following ventral cirri, pharynx with nine pairs of papillae and two pairs of maxillary jaws.

Parapodia biramous, glabrous and strong, with dorsal cirrus of same shape as the middle antenna. Notopodia

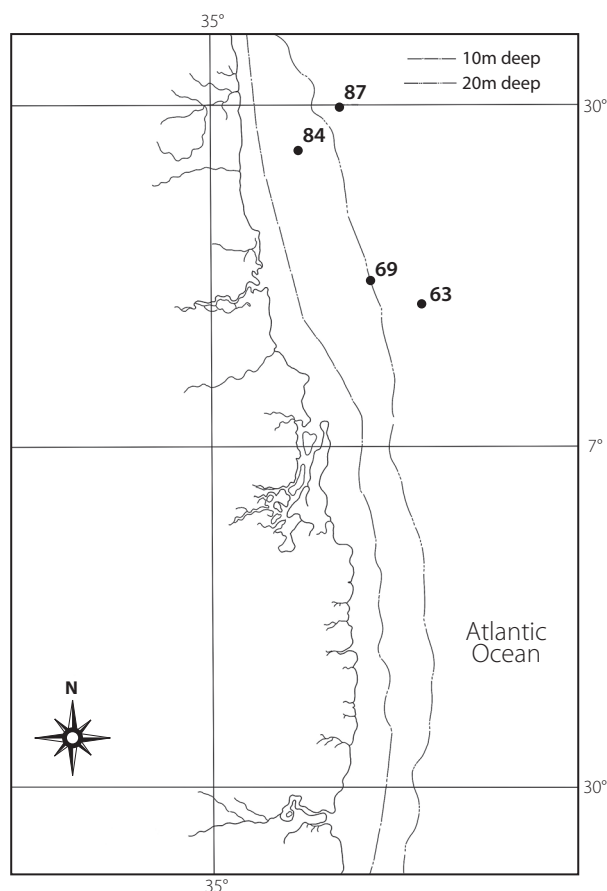


FIG. 1. Map of the coast of the State of Paraíba - Brazil, showing four localities where *C. magnificus* was collected (St. 63, 69, 84, 87).

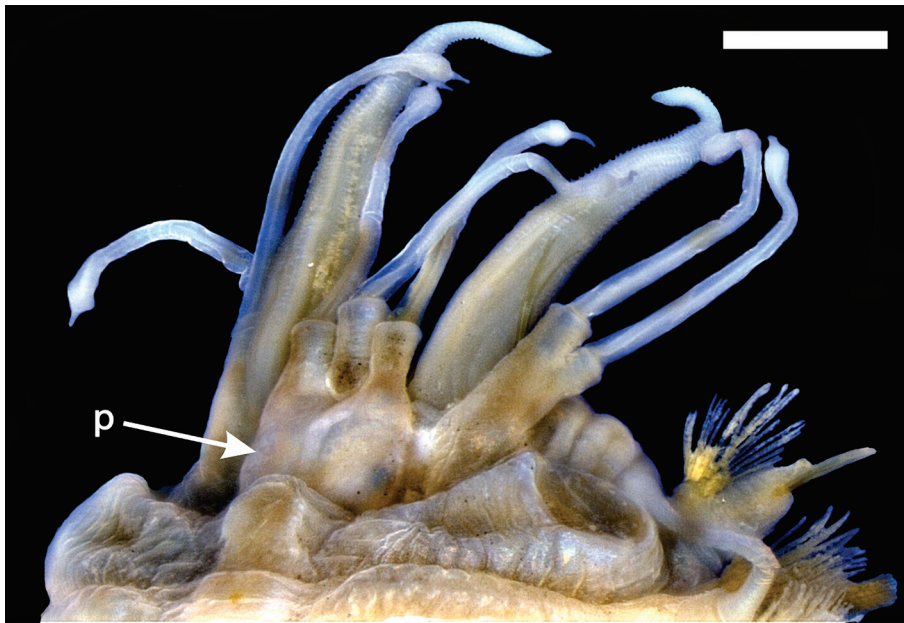


FIG. 2. Anterior end of *C. magnificus*, showing the bilobed prostomium, with two pairs of eyes, antennae and palps (p = prostomium). Scale bar: (1mm).

Color version of this photograph and the following, available at:
<http://investiga.uned.ac.cr/revistas/index.php/cuadernos/index>.



FIG. 3. Parapodia of *C. magnificus*, showing the saccular branchiae of digitiform aspect on median chaetigerous segments (b = branchiae). Scale bar: (1mm).

short, on anterior face of neuropodium, notochaetae with spinous rows of fine serrations along convex edge. Neuro-podia big, neurochaetae more numerous than notochaetae, with teeth in subdistal inflation. Branchiae among parapodia with digitiform aspect (Fig. 3), located near to elythrofores.

12 pairs of elytrae, broad, leathery, in the center of which there are refractive polygonal or spherical chitinous structures (Fig. 4). Elytrae with papillae in the margin. Surface conspicuously ornamented, with micro and macro-tubercles. There is a group of papillae in internal side of margin (close to midline of body (Figs. 5-6)).

Nephridial papillae cylindrical, starting from chaetiger six. Ventral cirri conical, ending in fine tips. Two pairs of anal cirri, identical to median antenna in shape and ventral pigmentation.

Habitat

In all reports reviewed, *Chaetacanthus magnificus* was found on the continental shelf between 5 and 197m deep. On the coast of Paraíba, specimens were collected from 12-30m, on rocks and soft bottoms. At Praia do Francês, State of Alagoas, Brazil they occurred in corals and among stones.

Distribution

Amphiameric: Great Caribbean, East Pacific and Brazil (South Coast) (Fauchald, 1977; Amaral & Nonato, 1982).

Remarks

The specimens examined vary in size, from 2 to 5 cm. The description and drawings in the work of Amaral and Nonato (1982) are identical to those of specimens of this new report. We further report a group of papillae in the internal margin of the elytrae, which were illustrated but not described by those authors. This character should be used for comparison within the genus *Chaetacanthus*.

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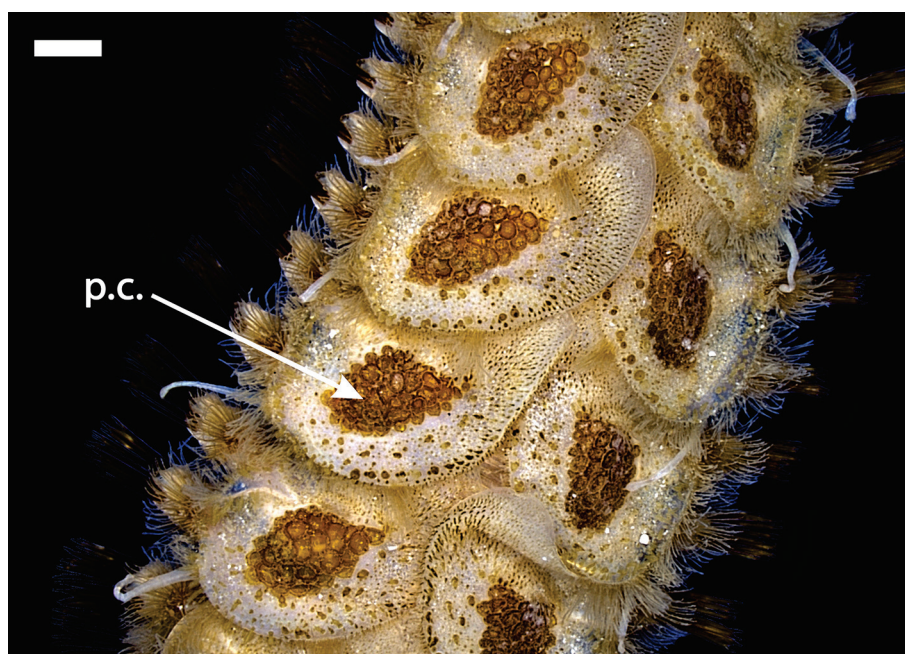


FIG. 4. Elytra of *C. magnificus* from median chaetigers, showing in the center the polygonal structures or plates of chitin (p.c. = plate of chitin), Scale bar: (1mm).

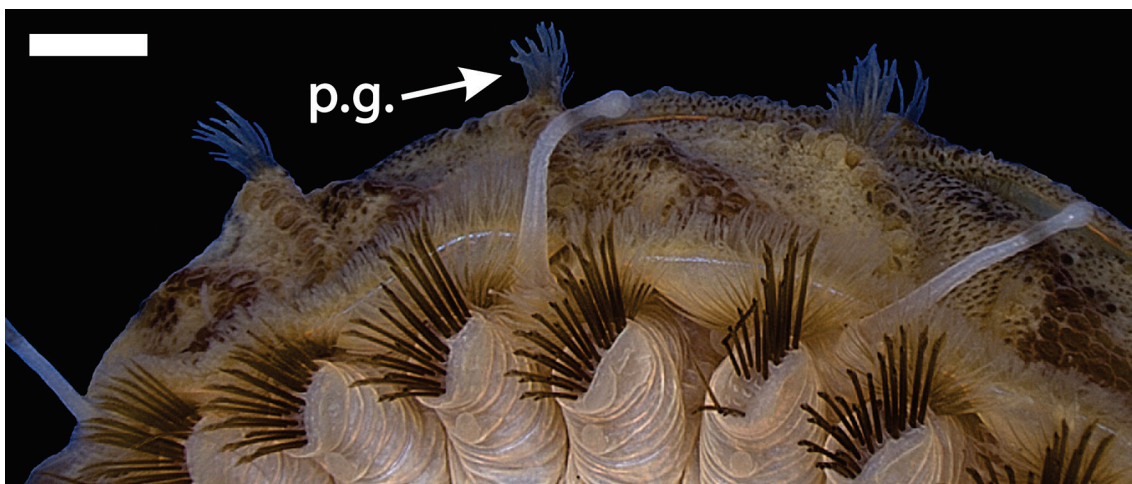


FIG. 5. Median chaetigerous segments of *C. magnificus* (lateral view), showing a group of papillae on border of elytra (p.g. = papillae group). Scale bar: (1mm).

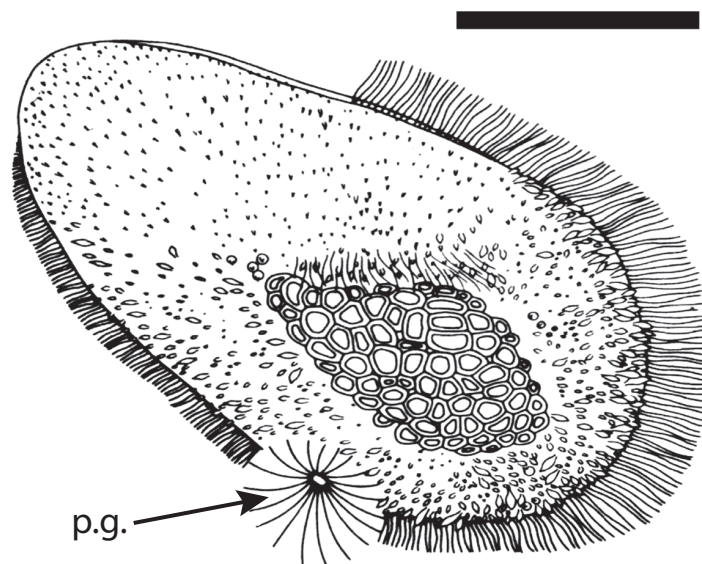


FIG. 6. Right elytra, group of papillae (p.g. = papillae group) modified from Amaral & Nonato, 1982. Scale bar: (2mm).

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