TWO NEW SPECIES OF THE GENUS *Gadila* GRAY, 1847 (MOLLUSCA, SCAPHOPODA, GADILIDAE) FROM BRAZILIAN COAST.

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ABSTRACT

This paper presents the description of two new species of the Scaphopoda, *Gadila longa* n. sp. and *Gadila robusta* n. sp. The material studied was collected in oceanographic expeditions by the research ship *Natureza*, from the Northeast Brazil Coastal Fishery Resource Management and Research Center – CEPENE, between 1999 and 2001, along the continental slope from Maranhão to Bahia (02º01'71"S e 40º52'04"W a 12º01'71"S and 37º26'97"W), northeastern Brazil, in depths between 93 and 690m. *Gadila longa* is distinguished from *G. robusta* by the general shell morphology and smaller lateral diameter. These two new species are similar with *G. cobbi* Lamprell & Healy, 1998, and *G. desaintlaurentae* Scarabino, 1995, from the Pacific Ocean, although shell morphology discrepancies are sufficient to recognize them as different species.

Key words: Brazil, continental slope, new species, taxonomy.

RESUMO

Este artigo apresenta as descrições de duas novas espécies de Scaphopoda, *Gadila longa* n. sp. e *Gadila robusta* n. sp. O material estudado foi coletado em expedições oceanográficas pelo navio de pesquisa *Natureza*, realizadas pelo CEPENE – Centro de Pesquisas e Gestão de Recursos Pesqueiros do litoral Nordeste, no período de 1999 e 2001, ao longo do talude continental entre o Maranhão e a Bahia (02º01'71"S e 40º52'04"W a 12º01'71"S and 37º26'97"W), Nordeste do Brasil, em profundidades variando entre 93 e 690m. O estudo foi realizado no Laboratório de Invertebrados Marinhos e Limnéticos da Universidade Federal Rural de Pernambuco – UFRPE, Brazil. *Gadila longa* difere de *Gadila robusta* pela morfologia geral da concha e pelo menor diâmetro lateral. Estas duas novas espécies são similares a *G. cobbi* Lamprell & Healy, 1998, and *G. desaintlaurentae* Scarabino, 1995, ambas do oceano Pacifico, contudo as diferenças morfológicas das conchas são suficientes para diferenciar as espécies.

Palavras chaves: Brasil, novas espécies, talude continental, taxonomia.

Introduction

Gadila was described by Gray (1847) as a subgenus of *Cadulus* Philippi, 1844. This taxonomic arrangement was adopted by several authors: Henderson (1920), Turner (1955), Emerson (1962), Abbott (1974), Rios (1985, 1994) and Scarabino (1980). In recent studies, the subgenus *Gadila* was raised to genus-level (Diaz & Puyana 1984; Rios 1994; Scarabino 1995; Lamprell & Healy 1998, Steiner & Kabat 2001) mainly because of two morphologic characters when compared with of the genus *Cadulus*: a smooth apical orifice, without slits or lobes, and the slenderness of the shells (Henderson 1920).

According to Steiner & Kabat (2004), the genus *Gadila* is represented by 65 species, widely distributed in all the world's oceans. This genus ranges from the Cretaceous to the Recent and is characterized by small to medium-sized shells, which are curved, smooth, and white, looking translucent when fresh and shiny when dead. Maximum diameter is in the anterior third of the shell, with the ventral side regularly curved, and the dorsal side sigmoidal in section. The genus has a simple apex. The oral and apical sections are different (Scarabino 1995).

The genus G*adila* is represented in the Brazilian waters by three species: *Gadila acus* (Dall, 1879), distributed from Amapá to Bahia, *Gadila braziliensis* (Henderson, 1920), range Rio de Janeiro to Argentina, and *Gadila dominguensis* (Orbigny, 1842), which occurs along the northern and northeastern coast (Rios 1994).

MATERIALS AND METHODS

The material studied was collected in oceanographic expeditions by the research ship *Natureza*, from the Northeast Brazil Coastal Fishery Resource Management and Research Center (CEPENE), between 1999 and 2001, along the continental slope from Maranhão to Bahia (02º01'71"S and 40º52'04"W to 12º01'71"S and 37º26'97"W), northeastern Brazil, in depths between 93 and 690 m.

The identification of the material was based on the analysis of shell morphology through published illustrations and descriptions according to Lamprell & Healy (1998), Scarabino (1995), and Rios (1994). Only empty shells were studied.

The morphometric data of the shells were measured according to Shimeck (1989), Absalão *et al*. (2005), and Caetano & Absalão (2005), and included: total length (LTot); maximum shell diameter (Wm); length from the most anterior position of the ventral aperture of the shell to the wildest portion of the shell (LWm); the maximum arc (arc); length from the ventral aperture to the place of maximum arc (Larc); the interior ventral aperture width (ApW) and the interior dorsal aperture width (AaW) (Fig.1).

SYSTEMATICS

Class Scaphopoda Bronn, 1862
Order Gadilida Starobogatov, 1974
Family Gadilidae Stoliczka, 1868
Genus *Gadila* Gray, 1847
Gadila longa n. sp. (Fig. 2)

Type material: Holotype: LIMUFRPE 10.71; Paratypes: MNRJ 10.482 [1]; MZUSP 53.076 [1]; LIMUFRPE 10.711[3].

Type locality: Northeastern Brazil, Rio Grande do Norte, 04º51'02"S, 37º12'37"W, XI.2001, Stn. 22, 206m.

Distribution: Only know from the type locality.

Etymology: From the Latin *longa.*

Description: Shell length to 11mm, moderately curved, white opaque; anterior and posterior apertures dorsoventrally depressed. Apex simple. Preapical callus with lumen circular. Shell smooth.

Measurements – Holotype: Ltot 11mm; Wm 2mm; LWm 1.8mm; Arc 2mm; Larc 3mm; ApW 0,40mm; AaW 1.2mm.

Comparisons: *G. longa* is most similar in shape to *G. brycei* Lamprell & Healy, 1998 from Indian Ocean: Western Australia (Lamprell & Healy, 1998; Steiner & Kabat, 2004) and *G. carlessi* Lamprell & Healy, 1998 from Northern Queensland, Australian (Lamprell & Healy, 1998; Steiner & Kabat, 2004). In *G. longa* the preapical callus is present, but is absent in *G. brycei* and *G. carlessi*; shell moderately curved (almost straight in *G. carlessi* and well curved in *G. brycei*); sculpture absent, smooth (fine transverse growth lines in *G. carlessi* and *G. brycei*) and aperture profile (dorsoventrally depressed in *G. carlessi* and oblique in *G. brycei*).

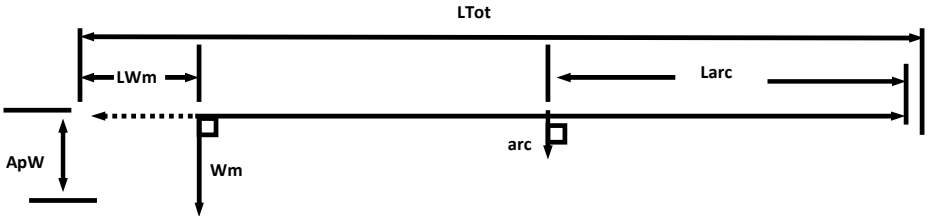

Figure 01. Sketch illustration to show measures taken of shell of Scaphopoda. Abbreviations: total length (LTot); maximum shell diameter (Wm); length from the most anterior position of the ventral aperture of the shell to the wildest portion of the shell (LWm); the maximum arc (arc); length from the ventral aperture to the place of maximum arc (Larc); the interior ventral aperture width (ApW) and the interior dorsal aperture width (AaW) (modified of Shimek, 1989).

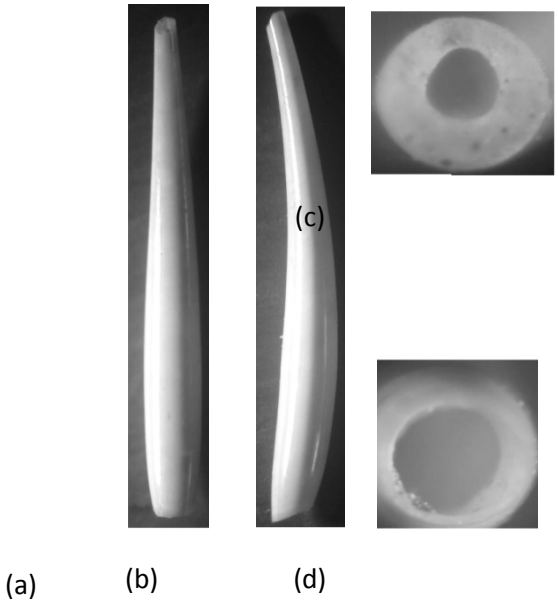

Figure 2. *Gadila longa* n. sp., Holotype LIMUFRPE 10.71 (11mm) (a) dorsal view, (b) lateral view, (c) posterior aperture (0,40mm), (d) anterior aperture (1,20mm).

Gadila robusta n.sp. (Fig. 3)

Type Material: Holotype LIMUFRPE 10.72; Paratype MNRJ 10.483 [1]; MZUSP 53.077 [1]; LIMUFRPE [11].

Type locality: Northeastern Brazil, Rio Grande do Norte, 04º51'00S, 35º06'46"W, XI.2001, Stn. 23, 01 specimen , 460m.

Distribution: Western Atlantic: Northeastern Brazil, Rio Grande do Norte, 04º51'00S, 35º06'46"W, XI.2001, Stn. 23, 06 specimens , 460m; Bahia, 12º02'03"S, 37º36'29"W, XII.2001, Stn. 30, 06 specimens, 500m; Rio Grande do Norte, 06°14'04"S, 34°52'33"W, Stn. 26, 01 specimen, 510m.

*Etymology: **from Latin,* robusta.**

Description: Shell length to 8mm, moderately curved, white translucent; anterior and posterior apertures circular-oval, dorsoventrally depressed. Shell curved, with its widest part near of equator of shell. Shell smooth. Apex simple.

Measurements – Holotype: LTot 8mm; Wm 2mm; LWm 1.2mm; Arc 3mm; Larc 4mm; ApW 0,50 mm; AaW 1 mm.

Comparisons: *G*. *robusta* most closely resembles *G*. *cobbi* in shape, but is smaller and without surface fine transverse scratches. *G*. *robusta* also shows some resemblance in profile to the *G*. *desaintlaurentae* Scarabino, 1995 from Indo-Pacific: Philippines, Indonesia and New Caledonia (Scarabino, 1995; Steiner & Kabat, 2004), but is wider and more curved.

Gadila longa differs from *Gadila robusta* in being less curved, be slender, thin and the distance from the anteriormost margin of the dorsal aperture to the point where the arc was measured (Larc) smaller (3,0mm in *G*. *longa*, 4,0mm in *G*. *robusta*).

G. *longa* is superficially similar to *G*. *acus* (Dall, 1889) that occurs in coast of Brazil (Absalão *et al*., 2005; Rios, 1994) but is larger size; apex simple (polygonal in *G*. *acus*); surface smooth (with encircling ring about one third of the shell length from the aperture in *G*. *acus*) and aperture (slightly oblique in *G*. *acus*). *G*. *robusta* can be readily distinguished from other Brazilian *Gadila* species by its wider, well curved, apex simple, aperture oval and smaller size.

Absalão *et al.* (2005) studied six morphometric shell direct measurements of the Gadilidae species *G. acus* (Dall, 1889), *Cadulus parvus* Hendersom, 1920 and *Cadulus tetrachistus* (Watson, 1879) to obtain three morphometric indices in according to proposition of Shimek (1989) and concluded that all six direct measurements were more effective than Shimek's (1989) morphometric indices in discrimination species. The direct measurements have showed a better performance in discriminating these gadilids scaphopods than the morphometric indices main small samples, as ours. So we used only direct measurements in discrimination these two new species.

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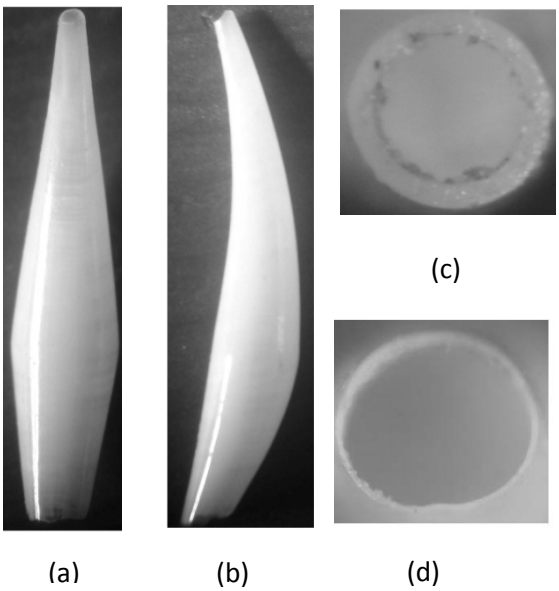

Figure 3. *Gadila robusta* n. sp., Holotype LIMUFRPE 10.72 (8mm) (a) dorsal view, (b) lateral view, (c) posterior aperture (0,50mm), (d) anterior aperture (1mm).

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