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ARQUIVOS DO MUSEU NACIONAL

Nunquam aliud natura, aliud sapienta dicit
Juvenal, 14, 321
In silvis academi quoerere rerum,
Quamquam Socraticis madet sermonibus
Ladisl. Netto, *ex Hor*

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RIO DE JANEIRO
Julho/Setembro
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APRESENTAÇÃO

Este número dos *Arquivos do Museu Nacional* apresenta os resultados de um esforço integrado de levantamento da biodiversidade de crustáceos e poliquetas do Atol das Rocas, o único atol do Atlântico Ocidental e a primeira Reserva Biológica Marinha da Costa Brasileira. Este volume é dedicado postumamente a Paulo Secchin Young que, além de ser o idealizador deste projeto, foi também o Curador da Coleção de Crustacea do Museu Nacional de 1992 até sua morte em 31 de maio de 2004 com 44 anos de idade. Paulo foi um dos mais importantes nomes da carcinologia brasileira, tendo sido o editor do *Catalogue of Crustacea of Brazil*, também publicado pelo Museu Nacional. Sua contribuição para a ciência é representada não apenas por seus artigos e capítulos de livros, mas também pela orientação de diversos alunos de pós-graduação em todos os grupos de crustáceos. Inspirou também diversos estudantes e colegas de outros grupos taxonômicos nos campos da sistemática e biologia marinha. Paulo manteve sempre um grande entusiasmo pelo trabalho de campo, desenvolvendo projetos e expedições nas mais diversas localidades e tinha forte preocupação com o desenvolvimento das coleções taxonômicas e da sistemática de invertebrados no Brasil. Mais detalhes sobre sua vida e sua carreira podem ser encontrados em um obituário publicado em 2006 no *Journal of Crustacean Biology* (vol. 26, número 2, pp. 158-261).

Paulo Secchin Young
1960 - 2004

FOREWORD

This issue of *Arquivos do Museu Nacional* presents the results of an integrated effort concerning the survey of the biodiversity of crustacean and polychaetes from Rocas Atoll, the only atoll in the Southwestern Atlantic and the first Marine Biological Reserve in the Brazilian Coast. This volume is posthumously dedicated to Paulo Secchin Young who, besides being the idealizer of this project, was the Curator of the Crustacea Collection of Museu Nacional from 1992 until his death in 31 May 2004 at the age of 44 years. Paulo was one of the most important names in Brazilian carcinology being the editor of the *Catalogue of Crustacea of Brazil*, also published by the Museu Nacional. His contribution to science is represented not only by his papers and book-chapters, but also in training several graduate students in all crustacean groups. He also inspired several students and colleagues from other taxonomic groups in the fields of systematics and marine biology. Paulo maintained a strong enthusiasm for fieldwork, developing projects and surveys in several distant locations and always with a concern in the development of taxonomic collections and increase of the knowledge of invertebrate systematics in Brazil. More details of his career and life are provided in an obituary published in 2006 in the *Journal of Crustacean Biology* (vol. 26, issue 2, pp. 158-261).

Cristiana Serejo
Paulo Cesar de Paiva
Editores

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THE ROCAS ATOLL, BRAZIL: A PRELIMINARY SURVEY OF THE CRUSTACEA AND POLYCHAETE FAUNA [1]

(With 4 figures)

PAULO CESAR PAIVA [2]
PAULO SECCHIN YOUNG [3]
CARLOS ALEJANDRO ECHEVERRÍA [4]

ABSTRACT: Among the oceanic islands in the Brazilian coast, Rocas Atoll is special since it is the only atoll in the Southern Atlantic and is the first Marine Biological Reserve of the Brazilian Coast. The atoll elliptical ring (3.7 to 2.5km) has a shallow central lagoon surrounded by a large reef plateau flat composed mainly of coralline algae. Despite its ecological importance the crustacean and polychaete fauna of Rocas Atoll is still poorly known with only 34 and 17 species, respectively, recorded. For this reason, an integrate effort with the aim of assessing the marine biodiversity of this Atoll was developed, through samples of reef and sedimentary environments. Results of this effort are here presented.

Key words: Rocas Atoll. Crustacea. Polychaeta. Oceanic Islands. Brazil.

RESUMO: O Atol das Rocas, Brasil: análise preliminar da fauna de crustáceos e poliquetas.

Entre as ilhas oceânicas da costa brasileira, o Atol das Rocas se destaca por ser o único atol do Atlântico Sul e a primeira Reserva Biológica Marinha da costa brasileira. O anel elíptico do atol (3,7 a 2,5km) apresenta uma laguna central circundada por um grande platô recifal composto principalmente de algas calcárias. Apesar de sua importância ecológica, a fauna de crustáceos e poliquetas do Atol das Rocas ainda é pouco conhecida, com apenas 34 e 17 espécies, respectivamente, registradas. Por essa razão, foi realizado um esforço integrado com o objetivo de avaliar a biodiversidade marinha deste Atol através de coletas em ambientes recifais e sedimentares. Os resultados deste esforço são aqui apresentados.

Palavras-chave: Atol das Rocas. Crustacea. Polychaeta. Ilhas Oceânicas. Brasil.

INTRODUCTION

Oceanic islands are remarkable environments owing to their high diversification (MARGALEF, 1980) usually having a higher endemism when compared with nearby environments. Such endemism is more pronounced in nearshore areas since these islands are geographically isolated from the adjacent continental shelves. Variations in the degree of endemism are a function of life history strategies, mainly the duration of the larval phase and dispersion capacity (SCHELTEMA, 1992). In this way, several polychaete species with short-phase larvae and brooding crustaceans, mainly peracaridans (*e.g.* amphipods, isopods, tanaidaceans, and cumaceans) from shallow water are more likely to present a high degree of insular endemism. Furthermore, oceanic islands presents lower levels of species richness owing to their geographic isolation and the restricted area of their near shore zones, as predicted by the theory of island biogeography (MCARTHUR & WILSON, 1967). Nevertheless, some tropical oceanic islands have a high cover of reefs in their subtidal and intertidal habitats, an environment that can hold a great diversity of associated fauna, mainly cryptic organisms (BOUCHET *et al.*, 2002). Furthermore, oceanic islands environments, especially those from tropical regions, are much vulnerable to human impacts owing to their low resilience capacity (CHOWN *et al.*, 1998). Besides, such environments are many times subjected to predatory tourism and others economical-industrial activities.

The composition of the Brazilian marine benthic fauna, mainly regarding the northern and eastern coast, is still poorly known. Moreover, records are restricted to surveys conducted in the intertidal zone, inner continental shelf and some coastal

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islands (Lana, *et al.* 1996). Hence, owing to the restricted knowledge, nothing can be said about previous environmental impacts in Brazilian oceanic islands and, for future assessments, more studies of their fauna are required.

Among the Brazilian oceanic islands, *i.e.*, Fernando de Noronha, Trindade, Rocas Atoll, and São Pedro & São Paulo Archipelago, Rocas Atoll has a special interest since it is the only atoll in the Southwestern Atlantic and was the first Marine Biological Reserve in the Brazilian Coast. Nowadays, besides scientific research, no activities are allowed in the Atoll.

Study Area

The Rocas Atoll is located approximately 250km off the Brazilian northeastern coast between 03°45' and 03°56'S and 33°37' and 33°56' W and 145km west of Fernando de Noronha Archipelago. It is located at the top of a seamount which reaches a depth of ca. 25 meters from the surface, and belongs to the Fernando de Noronha Chain, part of the Fracture Zone of Fernando de Noronha.

The Atoll frame is composed mainly of coralline algae (over 60%), being mainly *Porolithon* cf. *pachydermum* (Gherardi & Bosence, 2005), vermetid gastropods and hermatypic corals, the latter represented mainly by *Siderastrea stellata* (Kikuchi, 1994), although with a relatively small contribution (less than 10% of the reef frame). Gherardi & Bosence (1999) showed the contribution of several genera of encrusting coralline algae in the atoll construction and latter described the reef growth patterns during the late Holocene sea-level changes (Gherardi & Bosence, 2005). Among the massive corals that contributed to the atoll formation, *Siderastrea stellata* strongly dominates, however, nowadays this species is restricted to wave protected areas. Present patterns of distribution of hermatypic corals and other cnidarians can be assessed in Echeverria *et al.* (1997).

The Atoll elliptical ring has the largest diameter of 3.7km and the smallest about 2.5km, with a large and shallow inner lagoon and a large plateau or reef flat (Fig.1) surrounding it (Kikuchi, 1994). Predominant winds and currents runs from east to west direction almost all the time, and in this way the atoll presents a constantly wave exposed side (east side) and a protected side (west side). On the west side there are two sandy islands (Cemitério Island and Farol Island; Figs.1-2). The distribution of cnidarian's species are clearly influenced by these patterns probably due to sediment and detritus accumulation on the west side (Echeverria *et al.*, 1997).

During the high tide, the entire Atoll is covered by the sea water except the two islands mentioned before. During the low tide, the reef top flat is uncovered, and several pools are exposed. These pools are constituted by depressions on the reef flat, and vary from few meters to more than 150m in length, varying from 0.5m to more than 7m in depth. Usually its bottoms are constituted by carbonatic sand. The lateral walls of these pools constitute an interesting habitat, and usually bear a relatively high diversity, including cnidarians (Echeverría *et al.*, 1997), sponges (Moraes *et al.*, 2006), macroalgae (Villaça *et al.*, 2006) and mollusks (Gomes *et al.*, 2006). Names and localization of these pools are presented in table 1.

Water temperature inside the atoll may increase up to 39°C during low tides and sunny days in small pools, and the median temperature outside of atoll is 27°C (25,5° to 28°C) (Kikuchi & Leão, 1997). Precipitation is irregularly distributed along the year varying from 183mm to 2663mm per month (Kikuchi, 2002), with no other source of fresh water in the whole Atoll. The Rocas Atoll region receives the South Equatorial current originated from west coasts of Africa with a velocity varying from 30cm/s to 60cm/s (Richardson & McKee, 1984; Silveira *et al.*, 1994). Tides are semi-diurnal reaching maximum amplitude in neap tides of 2.4m (Kikuchi, 1994).

In order to assess the marine biodiversity fauna of the Brazilian oceanic islands, especially of Crustacea and Polychaeta, we developed the project 'Biodiversity of the Brazilian Oceanic Islands: Crustacea and Polychaeta.' This project was conducted with the financial and logistic support of the Federal University of Rio de Janeiro (UFRJ) and the Brazilian Environmental Agency (IBAMA) by means of the Biological Reserve of Rocas Atoll, which is coordinated by Maurizélia de Brito Silva.

Hence, for both taxonomic groups (Crustacea and Polychaeta), the present study will improve the number of species referred for the Rocas Atoll. Besides the new records, new taxa are likely to be discovered and a rise in the degree of endemism is also expected after these surveys.

Main goals of this project are:
(1) To provide a preliminary inventory of the crustacean and polychaete fauna of the Rocas Atoll.

(2) Assess the degree of endemism of these taxa for the Rocas Atoll and, secondarily, for the Brazilian oceanic islands.

(3) Provide detailed descriptions of crustaceans and polychaetes species, which will help on species identification for ecological and biological studies.

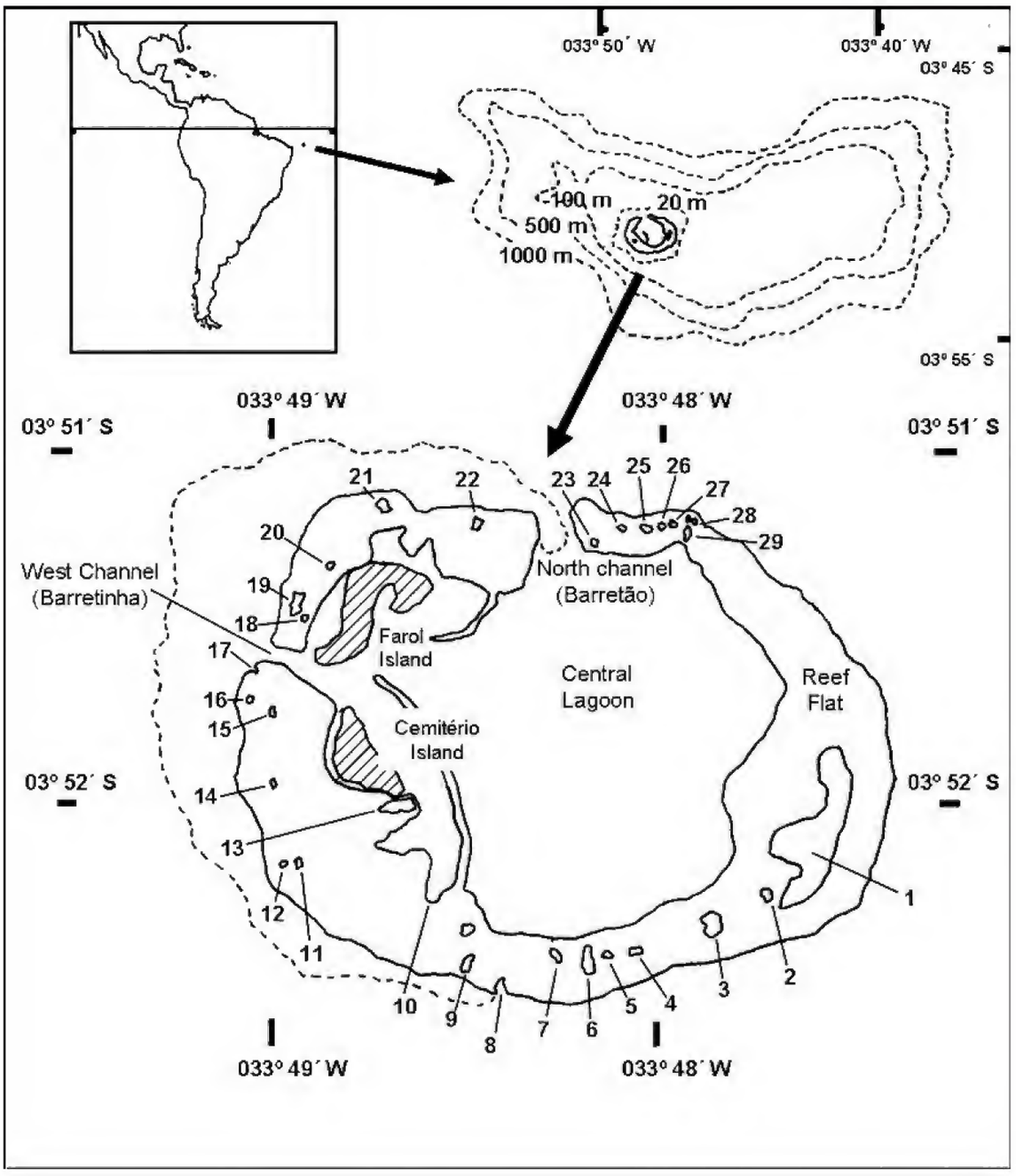

Fig.1- Map of the Rocas Atoll localized in the Southwestern Atlantic, showing general morphology of the reef, localization of the two islands, the central lagoon, channels and the principal pools over the reef flat. Number refers to the pools, where the geographic coordinates can be found in table 1 (redrawn from ECHEVERRÍA *et al.*,1997).

Fig.2- View of Farol Island from the Lighthouse.

MATERIAL AND METHODS

Surveys

Collections of crustaceans and polychaetes under the scope of the project were obtained in three expeditions to the Biological Reserve of Rocas Atoll with the duration of ca. 40 days each. Two or three persons were involved in collecting benthic samples of crustacean and polychaetes during field work. All expeditions occurred during the years of 2000 and 2001 in: (1) September/October 2000; (2) December, 2000 and January 2001, and (3) November/ December 2001.

Expeditions to Rocas Atoll initiated with a 24 hours boat trip (260km) from Natal (Rio Grande do Norte State) to Rocas Atoll. The trip aboard of the 40 feet sailing boat 'Delícia' as well as lodging in Rocas Atoll (Fig.3) were both provided by IBAMA, responsible for the Marine Biological Reserve of Rocas Atoll.

Sampling

Samples were taken at three different environments as (1) main lagoon (0-2m depth), (2) tidal pools (0-7m depth), and (3) external sublitoral area (10-18m depth) (Fig.1). Localization and names of individual tidal pools are given in figure 1 and table 1. In each of these locations, both hard and soft-bottom were sampled. Biological substrates as algae and sponges (Fig.4) were sampled for assessing its associated fauna.

In coralline bottoms, two procedures were used: (1) directly removal of specimens after manual fragmentation of the coralline mass, or (2) extraction by suffocation after maintaining coralline fragments in closed dark buckets under sunlight for ca. 2 hours. Floating specimens were them removed using forceps and hand nets, being fixed in 10% formalin (polychaetes) or 70% alcohol (crustaceans) and further preserved in 70% alcohol (polychaetes and crustaceans).

TABLE 1. Geographic coordinates of the reef flat pools from Rocas Atoll cited in figure 1 (GPS measured).

POOL NUMBER	LAT. / LONG.	UNOFFICIAL NAME
01	03° 52,28' S / 033° 47,65' W	Piscina das Rocas
02	03° 52,28' S / 033° 47,68' W	-
03	03° 52,31' S / 033° 47,87' W	-
04	03° 52,42' S / 033° 48,06' W	-
05	03° 52,45' S / 033° 48,16' W	-
06	03° 52,43' S / 033° 48,24' W	Piscina das Âncoras (Anchors Pool)
07	03° 52,42' S / 033° 48,30' W	Piscina das Tartarugas (Turtles Pool)
08	03° 52,46' S / 033° 48,43' W	Salão
09	03° 52,46' S / 033° 48,55' W	-
10	03° 52,30' S / 033° 48,48' W	Piscina das Correntes
11	03° 52,18' S / 033° 49,08' W	-
12	03° 52,17' S / 033° 49,07' W	-
13	03° 51,96' S / 033° 49,14' W	-
14	03° 51,94' S / 033° 49,10' W	-
15	03° 51,74' S / 033° 49,09' W	-
16	03° 51,70' S / 033° 49,50' W	-
17	03° 51,61' S / 033° 49,14' W	Falsa Barreta Channel
18	03° 51,50' S / 033° 48,10' W	-
19	03° 51,39' S / 033° 48,40' W	-
20	03° 51,32' S / 033° 48,60' W	-
21	03° 51,17' S / 033° 48,75' W	-
22	03° 51,30' S / 033° 48,56' W	-
23	03° 51,25' S / 033° 48,19' W	-
24	03° 51.26' S / 033° 48.11' W	-
25	03° 51.29' S / 033° 48.01' W	-
26	03° 51.20' S / 033° 48.00' W	-
27	03° 51.19' S / 033° 47.96' W	-
28	03° 51.28' S / 033° 47.91' W	-
29	03° 51.18' S / 033° 47.92' W	-

Names included are not exhaustive.

Sediment samples were taken using cylindrical cores (diameter=100mm, 250mm depth, *ca.* 0.008m^2). Core samples were taken manually (8 to 10 replicates) in tidal-pools and main lagoon or diver-operated in the outside part of the Atoll. Sediment was then submitted to an elutriation procedure in a 15 L bucket with the suspension being sieved in a 0.5mm mesh-size, fixed in 10% formalin and transferred posteriorly to 70% ethanol. All collected material where subsequently sent to specialists with a compromise of studying and publishing results in a special volume dedicated exclusively to this project. All the Crustacea material is deposited at Museu Nacional/UFRJ and the Polychaeta material is deposited at the Instituto de Biologia/UFRJ.

RESULTS AND DISCUSSION

CRUSTACEA OF ROCAS ATOLL

All the records of crustaceans from Rocas Atoll are

Fig.3- Lodging in Rocas Atoll; fig.4- Paulo Secchin Young with a collected sponge of the genus *Ircinia*.

from scattered samples at the region without any general sampling program. Most of the records are from common large-bodied decapods that are found mostly on intertidal areas found in the surveys of COELHO (1965, 1967), COELHO & RAMOS (1972), COELHO & KOENING (1972), and FAUSTO-FILHO (1980). Besides decapods, only two amphipods (KRAPP-SCHICKEL & RUFFO, 2000; SEREJO, 2004), and one cirriped were recorded (YOUNG, 1998). Up to this survey, a total of 34 crustacean species were recorded to the whole Rocas Atoll (Tab.2). Since there is a clear bias toward intertidal large-bodied decapods it is likely that this number is underestimated regarding the actual biodiversity of crustaceans from Rocas Atoll. This

underestimation was circumvented through a specific program for collecting also small-bodied crustaceans in subtidal and cryptic intertidal environments for both soft and coralline bottoms. Results from this survey increased the number of referred crustaceans species to 55 (Tab.2), an increment of 62%. It must be stated that such increment did not represent all collected crustaceans in this survey since some speciose groups, such as Alpheidae and Brachyura (except Majiidae), were not still studied.

TABLE 2. Crustacean species recorded for the Rocas Atoll according to COELHO (1965, 1967) COELHO & RAMOS (1972), COELHO & KOENING (1972), FAUSTO FILHO (1980), YOUNG (1998), KRAPP-SCHICKEL & RUFFO (2000), SEREJO (2004), SENNA & SEREJO (2005, 2007), and this survey. Species in bold are those referred for the first time to Rocas Atoll.

TAXA
Class Maxillopoda
Infraclass Cirripedia
Superorder Thoracica
Order Sessilia
Family Poecilasmatidae
Ceratoconcha floridana (Pilsbry, 1931)
Family Lepadidae
***Lepas anatifera* Linnaeus, 1758**
Family Pyrgomatidae
***Octolamis lowei* (Darwin, 1852)**
Superorder Hoplocarida
Order Stomatopoda
Family Gonodactylidae
Gonodactylus austrinus Manning, 1969
Gonodactylus oerstedii Hansen, 1895
Gonodactylus spinulosus Schmitt, 1924
Family Pseudosquillidae
Pseudosquilla ciliata (Fabricius, 1787)
Superorder Eucarida
Order Decapoda
Infraorder Caridea
Family Alpheidae
Alpheus amblyonyx Chace, 1972
Alpheus bouvieri A. Milne Edwards, 1878
Alpheus cristulifrons Rathbun, 1900
Alpheus floridanus Kingsley, 1878
Alpheus normanni Kingsley, 1878
Synalpheus sanctithomae Coutière, 1909
Synalpheus townsendi Coutière, 1909
Family Palaemonidae
***Periclimenaeus caraibicus* Holthuis, 1951**
***Brachycarpus biunguiculatus* (Lucas, 1846)**
***Leander tenuicornis* (Say, 1818)**
Family Processidae
Processa brasiliensis Christoffersen, 1979
Processa fimbriata Manning & Chace, 1971
Family Disciadidae
***Discias serratirostris* Lebour, 1949**
Family Rhynchocinetidae
***Cinetorhynchus rigens* (Gordon, 1936)**
Infraorder Palinura
Family Palinuridae
Panulirus echinatus Smith, 1869
Infraorder Anomura
Family Galatheidae
Munida spinifrons Henderson, 1885
Family Diogenidae
Dardanus venosus H. Milne-Edwards, 1848
Clibanarius antillensis Stimpson, 1859
Clibanarius tricolor (Gibbes, 1850)
***Calcinus tibicen* (Herbst, 1791)**
***Paguristes tortugae* Schmitt, 1933**
Family Porcellanidae
***Pachycheles riisei* (Stimpson, 1858)**
Infraorder Brachyura
Family Majidae
Aepinus septemspinosus (A. Milne-Edwards, 1879)
***Chorinus heros* (Herbst, 1790)**
***Macrocoeloma concavum* Miers, 1886**
***Microphrys bicornutus* (Latreille, 1825)**
Mithraculus forceps (A. Milne-Edwards, 1875)
Mithrax hemphilli Rathbun, 1892
Mithrax verrucosus H. Milne-Edwards, 1832
***Nemausa acuticornis* (Stimpson, 1871)**
***Pitho lherminieri* (Schramm, 1867)**
Podochela brasiliensis Coelho, 1972
Family Xanthidae
Actaea acantha (A. Milne-Edwards, 1834)
Banareia palmeri (Rathbum, 1894)
Cataleptodius floridanus (Gibbes, 1850)
Family Grapsidae
Grapsus grapsus (Linnaeus, 1758)
Plagusia depressa (Fabricius, 1775)
Family Gecarcinidae
Gecarcinus lagostoma H. Milne-Edwards, 1835
Family Cryptochiridae
Troglocarcinus corallicola Verrill, 1908
Family Calappidae
Calappa gallus (Herbst 1803)
Superorder Peracarida
Order Amphipoda
Family Melitidae
Quadrimaera cristianae Krapp-Schickel & Ruffo, 2000
***Quadrimaera chaelata* Senna & Serejo, 2007**
***Quadrimaera rocasensis* Senna & Serejo, 2007**
Family Talitridae
Talorchestia tucurauna (Müller, 1864)
Family Ingolfiellidae
***Ingolfiella rocaensis* Senna & Serejo, 2005**
Superorder Peracarida
Order Isopoda
Family Olibrinidae
***Olibrinus antennatus* (Budde-Lund, 1902)**
Family Philosciidae
Littorophiloscia culebrae (Moore, 1901)
Family Platyarthridae
***Niambia squamata* (Budde-Lund, 1885)**
Family Porcellionidae
***Porcellionides pruinosus* (Brandt, 1833)**

Polychaeta of Rocas Atoll

Polychaetes from Rocas Atoll were also referred from scattered samples from large oceanographic expeditions that sampled mainly off Rocas Atoll, such as the Calypso Expedition of 1966 (Rullier & Amoureux, 1979). More recently, some surveys conducted specifically on the Biological Reserve also recorded some polychaetes species (*e.g.*, Netto *et al.* 1999; Neves & Omena, 2003). Despite the ecological approach of the majority of these studies, new records were given for both the Rocas Atoll, Brazilian oceanic islands or even for the whole Brazilian coast. New species and detailed descriptions were also provided for specific taxa from Rocas Atoll (Santos & Lana, 2001, 2003). Even though Netto *et al.* (1999) recognized 38 species of 22 families for the whole Atoll, only five were nominated in the paper. Thus, besides all above effort, up to now only 17 species of polychaetes were recorded to the Rocas Atoll (Tab.3). This number is far from what should be expected for an environment composed of both reef and sedimentary habitats, which is likely to support a much higher diversity of polychaete species (Paiva, 2005). This survey increased the number of refered species to 26, an increment of 53%. Only three families of polychaetes were still studied from the collection of this survey, a taxonomic effort that represents only 13% of the families already recorded by Netto *et al.* (1999) for the whole Atoll. Thus an exponential increase in the number of polychaetes referred to the whole Atoll is expected after studying all collected families.

TABLE 3. Polychaete species recorded for the Rocas Atoll according to Netto *et al.* (1999), Neves & Omena (2003), Rullier & Amoureux (1979), Santos & Lana (2001, 2003), and this survey.

Taxa	
Class Polychaeta	***Nereis panamensis* Fauchald, 1977**
Subclass Palpata	*Nereis trifasciata* (Grube, 1878)
Order Aciculata	***Nereis* sp.**
Suborder Amphinomida	***Perinereis floridana* Ehlers, 1868**
Family Amphinomidae	*Platynereis magalhaensis* Kinberg, 1866
Eurythoe complanata (Pallas, 1766)	Order Canalilpalpata
Hermodice carunculata (Pallas, 1766)	Family Saccocirridae
***Linopherus* cf. *canairensis* (Langerhans, 1881)**	*Saccocirrus papillocercus* Bobretzky, 1872
Suborder Phyllodocida	Suborder Spionida
Family Phyllodicidae	Family Spionidae
Eteone heteropoda Hartman, 1951	*Spio pettiboneae* Foster, 1971
Family Syllidae	Suborder Cirratulida
Branchiosyllis oculata (Elhers, 1887)	Family Cirratulidae
Haplosyllis spongicola (Grube, 1855)	*Caulleriella* cf. *alata* (Southern, 1914)
Pionosyllis gesae Perkins 1981)	Suborder Flabelligerida
Syllis (Ehlersia) cornuta Rathke, 1843	Family Acrocirridae
Typosyllis variegata (Grube, 1860)	*Macrochaeta clavicornis* (Sars, 1835)
Family Nereididae	Suborder Sabellida
Ceratocephale rocaensis Santos & Lana, 2001	Family Sabellidae
Ceratonereis mirabilis Kinberg, 1866	***Bispira melanostigma* (Schmarda, 1861)**
***Ceratonereis* cf. *singularis* Treadwell, 1929**	***Bispira* sp.**
***Ceratonereis* longicirrata Perkins, 1980**	*Notaulax occidentalis* (Baird, 1865)
***Neanthes acuminata* Ehlers, 1868**	?*Hypsicomus elegans* (Webster, 1884)

Species in bold are those referred for the first time to Rocas Atoll.

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CIRRIPEDIA (CRUSTACEA) FROM ROCAS ATOLL [1]

(With 5 figures)

PAULO S. YOUNG [2, 3]

ABSTRACT: This study redescribes three cirripeds in three different families from Rocas Atoll. *Ceratoconcha floridana* (Poecilasmatidae) is a species previously recorded from Rocas Atoll; whilst *Lepas anatifera* (Lepadidae) and *Octolasmis lowei* (Pyrgomatidae) are new records. *Ceratoconcha floridana* is distributed in the Western Atlantic and the remaining two species are cosmopolitan; all three species were previously recorded from Brazilian waters.

Key words: Cirripedia. Rocas Atoll. *Ceratoconcha. Lepas. Octolasmis.*

RESUMO: Cirripedia (Crustacea) do Atol das Rocas.

Este estudo redescreve três cirripédios do Atol das Rocas, que pertencem a três famílias diferentes. *Ceratoconcha floridana* (Poecilasmatidae), é uma espécie já registrada para o Atol das Rocas; enquanto que *Lepas anatifera* (Lepadidae) e *Octolasmis lowei* (Pyrgomatidae) são novos registros. *Ceratoconcha floridana* se distribui no Atlântico Ocidental e as demais espécies são cosmopolitas; todas as três espécies foram previamente registradas em águas brasileiras.

Palavras-chave: Cirripedia. Atol das Rocas. *Ceratoconcha. Lepas. Octolasmis.*

INTRODUCTION

Rocas Atoll has a low diversity of cirripeds, following the general pattern observed on tropical islands (NEWMAN, 1960; YOUNG, 1995). Only *Ceratoconcha floridana* (Pilsbry, 1931) has been recorded from Rocas Atoll, living on the hermatypic coral *Mussismilia hispida* (Verrill, 1902) (YOUNG, 1988). During recent field trips, two more species were sampled, which are presented below, but no coral-barnacles were found living on the corals. The infestation of these barnacle species appears to be related to coral health or stress; in high turbidity and polluted waters, corals are usually highly infested by coral barnacles, but infestations almost disappear in clear waters. The latter is the case of the corals from Rocas Atoll. No other intertidal barnacles, lithotryids or conopeans were found on the atoll. All material is deposited in the collection of the Museu Nacional, Rio de Janeiro, which is abbreviated as MNRJ. Abbreviations used as follows: tl = total length; cl = capitular length.

Family Lepadidae Darwin, 1852
Genus *Lepas* Linnaeus, 1758
Lepas anatifera Linnaeus, 1758
(Fig.1)

Lepas anatifera Linnaeus, 1758:668.

Lepas anatifera – DARWIN, 1852:73, pl.1, fig.1, 1a-c.

Material examined – Rocas Atoll, pool, fixed on buoys, C.S.Serejo & M.C.Rayol, coll. 02/11/2001, 11 specimens, tl: – 20.6 to 44.0 (31.2) mm, MNRJ 18911.

Diagnosis – Plates smooth or delicately striated (Fig.1). Carina forked basally. Umbonal tooth on right scutum. One filamentary appendage at base of cirrus I and another basally.

Remarks – This is a common, cosmopolitan species usually found attached to floating objects and sometimes large pelagic animals. With more sampling, probably other species of *Lepas* and *Dosima* will be found occasionally. *Lepas anatifera* has been recorded from Paraíba to Rio Grande do Sul along the Brazilian coast (YOUNG, 1990; 1998).

Family Poecilasmatidae Annandale, 1909
Genus *Octolasmis* Gray, 1825
Octolasmis lowei (Darwin, 1852)
(Figs.2-4)

Dichelaspis Lowei Darwin, 1852:128, pl.2, fig.8.
Dichelaspis darwini – WELTNER, 1897:241.
Octolasmis lowei – LACOMBE, 1977:11; YOUNG, 1990:646, figs.3e-h, 4; 1998:266.

[1] Submmited on August 8, 2005. Accepted on February 9, 2007.
[2] *In memoriam.*
[2] Correspondencce to Cristiana S. Serejo: csserejo@acd.ufrj.br.

Material examined – Rocas Atoll, pool, fixed on branchiae of *Panulirus echinatus* Smith, 1869, P.S.Young, P.C.Paiva & A.A.Aguiar, coll. 18/oct/2000, 3 specimens, tl(cl): 4.0 (1.7) to 5.0 (2.1) mm, MNRJ 18912.

Description – Capitulum (Fig.2) slightly compressed, sub-triangular, covered by thin cuticle. Capitular plates reduced, conspicuous below cuticle. Aperture protuberant, 1/3 length of occludent margin. Peduncle nude, slightly longer than capitulum, covered by thin cuticle,. Tergum with inverted V-shape, umbo subapical, forming lid distally; occludent arm shorter, half width of carinal arm. Scutum occludent arm slightly wider and 1.5 times length of basal arm; both arms forming angle of 70°. Carina curving continuously, apex reaching half height of tergum; basally forked; basal arms short, about half length of and situated below level of basal arm of scutum. Gap between basal arms of scutum and carina.

Labrum (Fig.3a) slightly bullate, with eight large, acute teeth. Palp (Fig.3a) large, paddle-like, with several simple setae on inner margin. Mandible (Fig.3b) with five teeth, third to fifth with subsidiary cusps; distance between first and second teeth three times distance between second and third; lower angle bifid. Maxilla I (Fig.3c) with anterior border irregular, with a small notch above middle, with 3 large, strong stout setae above notch and 9 large to small stout setae below. Maxilla II (Fig.3d) rectangular, anterior margin straight, covered by numerous simple setae; papilla of maxillary gland not projecting.

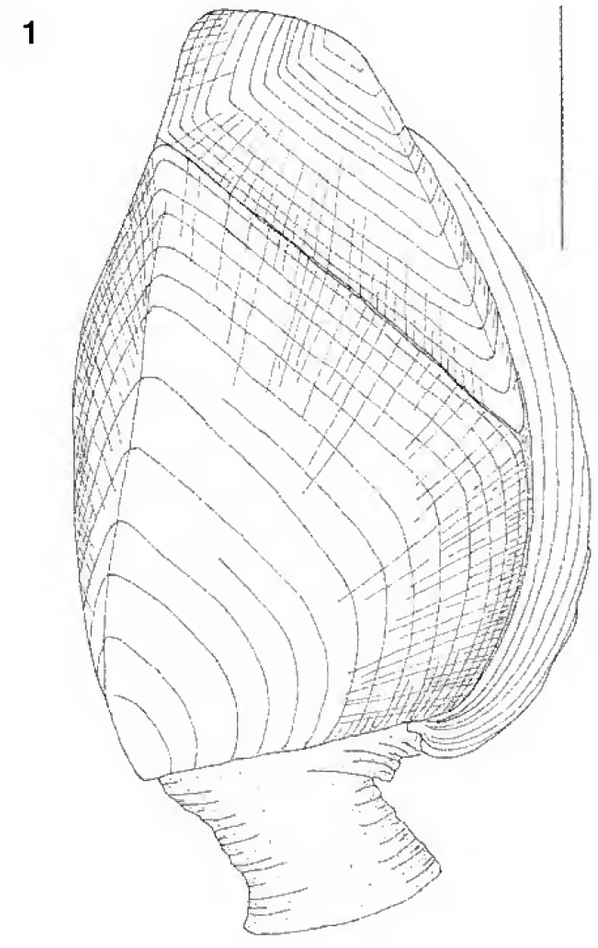

Fig.1- *Lepas anatifera* Linnaeus, 1758, MNRJ 18911, right lateral view. Scale bar = 1mm.

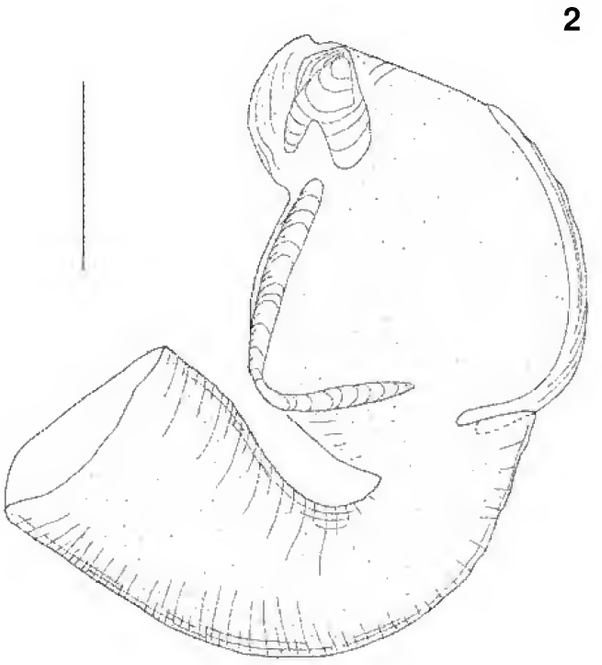

Fig.2- *Octolasmis lowei* (Darwin, 1852), MNRJ 18912, right lateral view. Scale bar = 1mm.

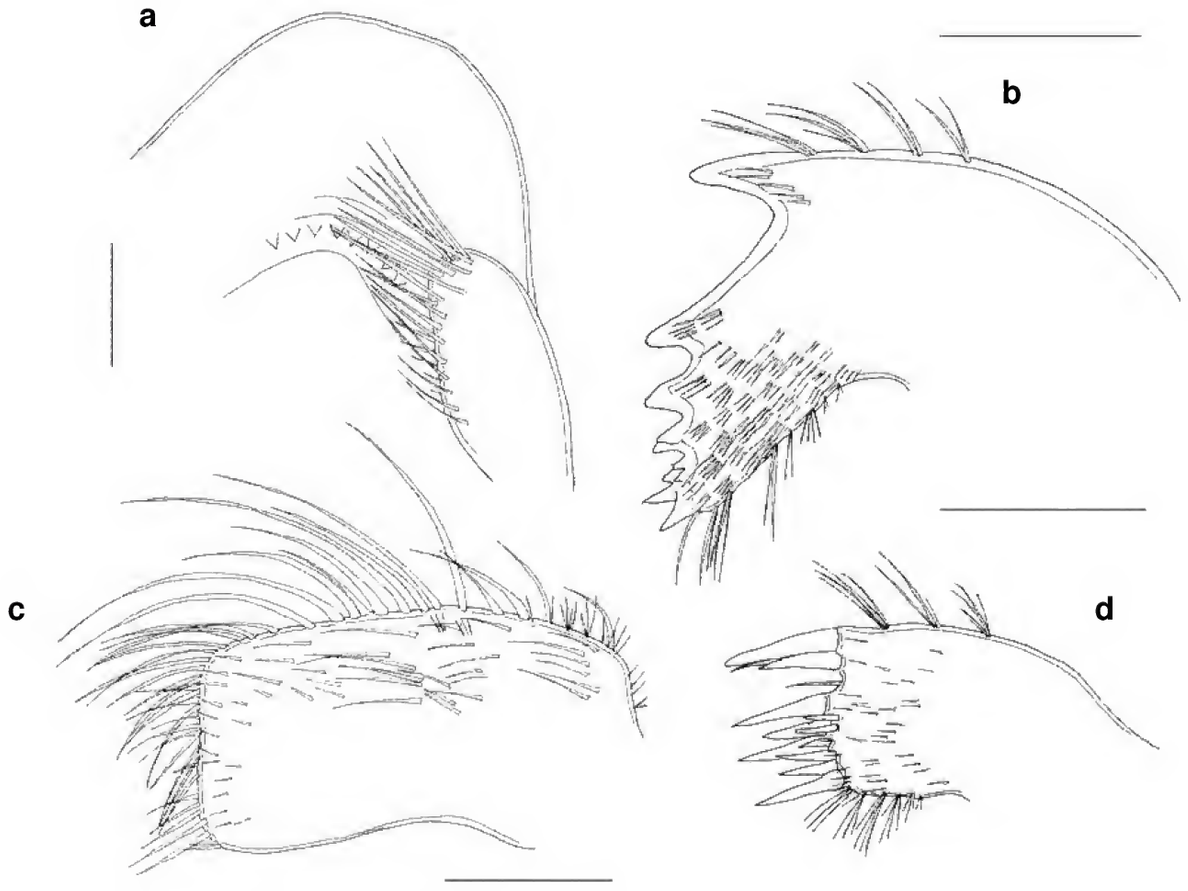

Fig.3- *Octolasmis lowei* (Darwin, 1852), MNRJ 18912. (a) labrum and palp; (b) mandible; (c) maxillae I; (d) maxilla II. Scale bars = 0.1mm.

Cirrus I (Fig.4a) with anterior ramus slightly smaller than posterior ramus. Cirrus II to VI with equal, long rami (Fig.4b). Median article of cirrus VI (Fig.4c) about 2 times longer than wide, 10 pairs of simple setae on anterior margin, 4 setae on posterior angle. Setal-article ratio about 4:1. Caudal appendage (Fig.4d,) unarticulated, a little longer than coxopodite of cirrus VI, with several long setae on mid-distal margin. Penis (Fig.4b, e) annulose, long, covered by setulae, longer distally; with a small terminal languet. Number of articles of cirri I-VI and caudal appendage is presented in table 1.

Remarks: *Octolasmis lowei* was originally described associated with a brachyuran crab from Madeira Island (Darwin, 1852) and has since been reported from several localities in the Atlantic Ocean. Several other species of *Octolasmis* have been described from the Atlantic (Fillipi, 1861a, b; Coker, 1902; Causey, 1960), many of which have since been considered synonyms of *O. lowei.* Due to the simple capitular structure and reduced opercular plates of *Octolasmis,* there is a great confusion on the validity of the various species.

Based on the description of Darwin (1852), some distinctions could be observed in the Rocas specimens. Therefore, they were compared with some *O. lowei* specimens collected from Madeira Island for a better comparison. The following distinctions were observed (Tab.2). The relative position of the distal points of the basal arms of the scutum and carina is very conspicuous and may separate them, but the smaller specimen examined from Madeira do not have these points superposing, which may suggest that it may change during development. Thus, only the characters of the appendages can be proved to be stable and may separate them as distinct species.

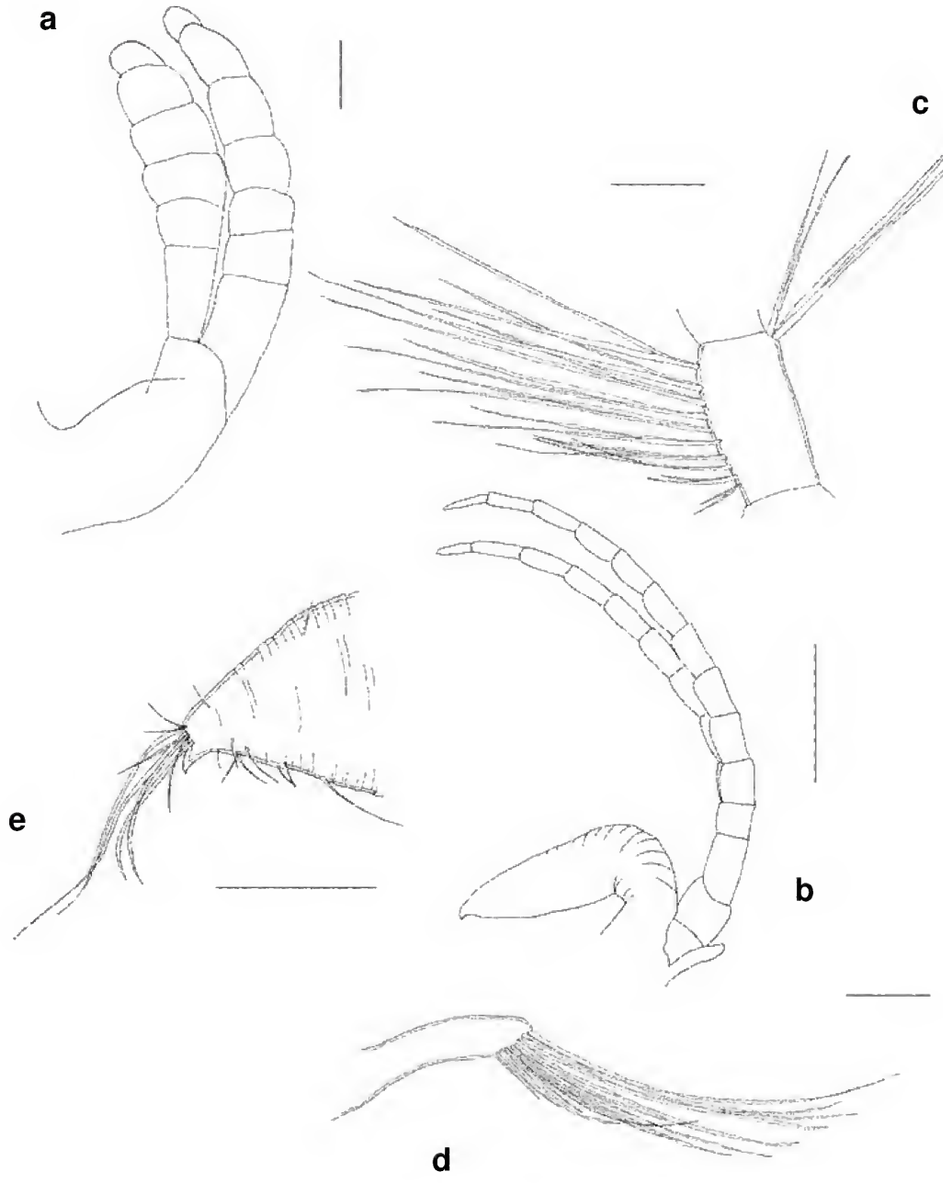

Fig.4- *Octolasmis lowei* (Darwin, 1852), MNRJ 18912. (a) cirrus I; (b) cirrus VI, caudal appendage and penis; (c) median article of cirrus VI; (d) caudal appendage; e) penis. Scale bars (a, c, d, e) = 0.1mm, scale bar (b) = 0.5mm.

TABLE 1. Number of articles for rami of cirri I-VI of *Octolasmis lowei* (Darwin, 1852).

	CI	CII	CIII	CIV	CV	CVI
RC	5/6	12/12	12/11	11/11	11/11	12/11
LC	6/7	12/12	12/11	11/11	11/11	11/11

(CI-VI) cirri I to VI; (RC) right cirri; (LC) left cirri.

YOUNG (1990) recorded *O. lowei* from the Brazilian coast, from Espírito Santo to Rio Grande do Sul states. With more sampling in the northern area of Brazil, this species probably will have its distribution expanded. *Octolasmis lowei* appears to be associated with several distinct groups of decapod crustaceans and was found on *Panulirus echinatus* Smith, 1869 at Rocas Atoll. Along the Brazilian coast it has been recorded on the branchiae of *Libinia spinosa* H. Milne Edwards, 1834, *Portunus spinicarpus* (Stimpson, 1871), *P. spinimanus* Latreille, 1819, *Callinectes* spp., *Hepatus pudibundus* (Herbst, 1785), and on unidentified Majidae (YOUNG, 1990).

Family Pyrgomatidae Gray, 1825
Genus *Ceratoconcha* Kramberger-Gorjanovic, 1889
Ceratoconcha floridana (Pilsbry, 1931)
(Fig.5)

Creusia spinulosa var. 4 Darwin, 1854:378, pl.14, fig.6i-k.
Pyrgoma floridanum Pilsbry, 1931:81, figs.1-5.
Ceratoconcha floridanum – YOUNG & CHRISTOFFERSEN, 1984:240, figs.2a-c, 3, 5-6 (with synonymy); YOUNG, 1988:362.
Ceratoconcha floridana – YOUNG, 1998:275.

Material examined – Rocas Atoll, C.B.Castro, coll. 21/mar/1982, 1 specimen on *Mussismilia hispida* (Verrill, 1902), tl: 31.2mm, MNRJ 1715.

Diagnosis – Shell (Fig.5a) partially to totally immerse in coral, with about 24 to 36 external ribs. Scutum (Fig.5b, c) about as wide as high; adductor ridge narrow, slightly prominent, never joining articular ridge; articular ridge covering almost all tergal margin. Tergum (Fig.5d, e) with furrow wide; spur usually curved, as wide as its distance from basi-scutal angle and 1/3 the height of tergum (YOUNG & CHRISTOFFERSEN, 1984:247).

Remarks – *Ceratoconcha floridana* is known from the West Atlantic living on several species of hermatypic corals, especially those from *Faviina* (YOUNG & CHRISTOFFERSEN, 1984). Previously, this species was recorded by one specimen from Rocas Atoll associated with *Mussismilia hispida* (Verrill, 1902) (YOUNG, 1988). Despite finding several *M. hispida* colonies, we were not able to collect any specimen of *C. floridana*. The figures presented refer to the previously known specimen (Fig.5).

TABLE 2. Comparison between Madeira Island and Rocas Atoll specimens of *Octolasmis lowei* (Darwin, 1852).

	MADEIRA SPECIMENS	ROCAS ATOLL SPECIMENS
Distal points of basal arms of scutum and carina	most superposing, except juveniles	not superposing
Relative calcification of capitular plates	more calcified	less calcified
Distal point of carina	reaching almost apex of tergum	reaching half length of tergum
Labrum	with several small, sharp teeth	with few (8) large, sharp teeth
Mandible	with obtuse teeth with few subsidiary cusps	sharp with several subsidiary cusps
Penis	with lateral protuberance distally	with a sharp terminal languet distally
Caudal appendage.	with long setae in two tufts, one mid-distal other below	with only mid-distal tuft of setae

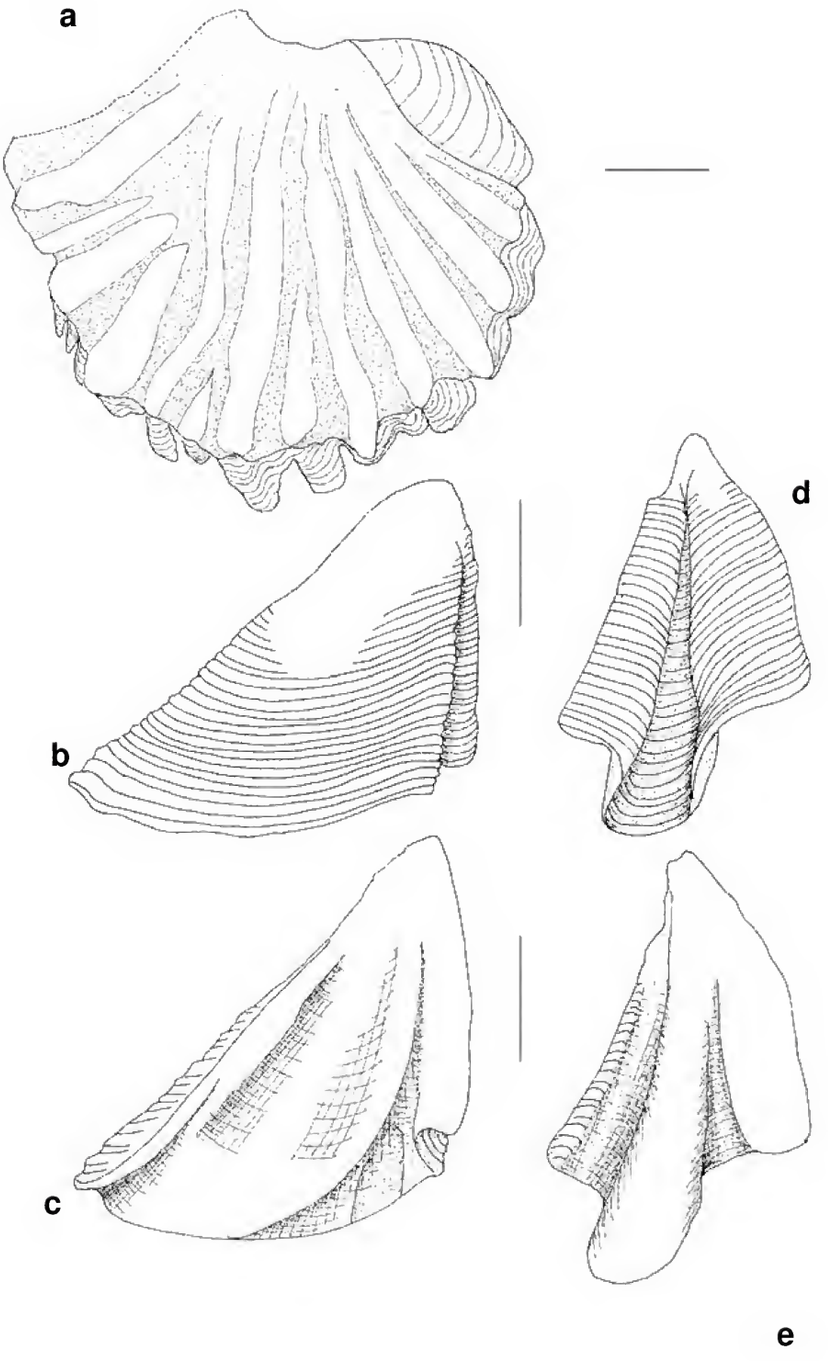

Fig.5- *Ceratoconcha floridana* (Pilsbry, 1931), MNRJ 1715. (a) rostrum, external view; (b-c) scutum, external and internal views; (d-e) tergum, external and internal views. Scale bars = 1mm.

NOTE

This manuscript has been finished by Cristiana Serejo (Museu Nacional - Rio de Janeiro) since Paulo Young has passed away on 31th May, 2004 in a tragic car accident.

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FIRST OCCURRENCE OF *PACHYCHELES RIISEI* (STIMPSON, 1858) (CRUSTACEA: GALATHEOIDEA: PORCELLANIDAE) IN ROCAS ATOLL, BRAZIL [1]

(With 1 figure)

DEMARQUES R. DA SILVA JUNIOR [2]
PAULO S. YOUNG [3]

ABSTRACT: The present work redescribes *Pachycheles riisei* based on material from intertidal lagoons at Rocas Atoll, Brazil. This is the first record of *P. riisei* for Rocas Atoll, species previously found from Florida, Caribbean Sea, and Brazil (Paraíba to São Paulo, Fernando de Noronha and Trindade Isl.).

Key words: Porcellanidae. *Pachycheles riisei*. Rocas Atoll.

RESUMO: Primeira ocorrência de *Pachycheles riisei* (Crustacea, Porcellanidae) no Atol das Rocas Brasil.

O presente estudo redescreve *Pachycheles riisei* com base no material coletado em poças de maré no Atol das Rocas, Brasil. Este é o primeiro registro de *P. riisei* para o Atol das Rocas, espécies anteriormente encontrada na Florida, Mar do Caribe e Brazil (Paraíba to São Paulo, Fernando de Noronha and Trindade Island).

Palavras-chave: Porcellanidae. *Pachycheles*. Atol das Rocas.

INTRODUCTION

The knowledge of the porcellanid fauna of Brazilian oceanic islands is scarce. Only two species have been recorded in this habitat: for Fernando de Noronha Archipelago, *Petrolisthes marginatus* (Stimpson, 1859) and *Pachycheles riisei* (Stimpsom, 1858), the latter also occurring in Trindade Island (Coelho & Ramos, 1972; Veloso, 1998). At this time, no porcellanid species have been recorded in Rocas Atoll. Even islands with rich and large reef structures do not provide adequate habitats for some Porcelanidae species (Werding, 1984). Forty-five species of porcelanids have been recorded for tropical Western Atlantic and, among these species, nineteen for Brazil.

This study redescribes specimens of *Pachycheles riisei* from Rocas Atoll, a species usually found among calcareous algae or along the fringes of small intertidal lagoons within the Atoll. This species is widely distributed throughout the Western Atlantic, including several oceanic islands (Haig, 1956; Werding, 1984; Veloso & Melo, 1993, Werding *et al.*, 2003).

The carapace width (cw) was measured at its widest section and the reported specimens were deposited in the crustacean collection of Museu Nacional, Rio de Janeiro (MNRJ).

Pachycheles riisei (Stimpson, 1858) (Fig. 1)

Pisosoma riisei Stimpson, 1858:228.

Pachycheles riisei – Rathbun, 1900:146; Rodrigues-da-Costa, 1956:3; Coelho, 1963:54; Coelho & Ramos, 1972:172; Werding, 1984:6; Coelho *et al.*, 1990:26; Veloso & Melo, 1993:178; Veloso, 1998:401; Melo, 1999:240.

Material examined – Brazil, Rocas Atoll, Pools. P.S.Young and P.C.Paiva coll. 01/I/2001, 1♂, 2 ovigerous ♀ with eggs, cw: 41-51mm, MNRJ 19150; P.S.Young and P.C.Paiva coll. 26/X/2000, 3♂ and 2♀, one ovigerous, cw: 56-61mm, MNRJ 19161; P.S.Young and P.C.Paiva coll. 07/X/2000, 1♂, cw: 30mm, MNRJ 19153; P.S.Young and P.C.Paiva coll. 25/X/2000, 7♂ and 4♀, one ovigerous, cw: 14-46mm, MNRJ 19152.

Diagnosis – Carapace smooth, front depressed and trilobate with medium lobe finely serrated; outer angle of orbit pronounced into a spine. Chelipeds

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without ornamentation, propodus carenate extending externally to fixed finger delimited by a sulcus; carpus with distal margin trilobate and lateral margin crenulated with a distal spine; merus with a triangular structure on the antero-distal angle. Telson with five plates. Males lacking pleopods.

Description – Carapace (Fig.1a) convex in a front to back direction, medium surface smooth and lateral surface slightly striated; anterior margin depressed, trilobate, medium lobe finely serrated; lateral walls of the carapace incomplete, anterior portion with a large piece and posterior with smaller pieces separate by membranous inter-space from anterior portion (Fig.1b-d). Basal antennal article short, not pronounced forward, movable segments with free access to the orbit. Second antennal article three times longer than the first. Third article followed by a long flagellum with approximately eighty segments. Outer orbital angle pronounced into a spine. Chelipeds (Fig.1a) strong and broad, subequal in size. Both fingers unarmed.

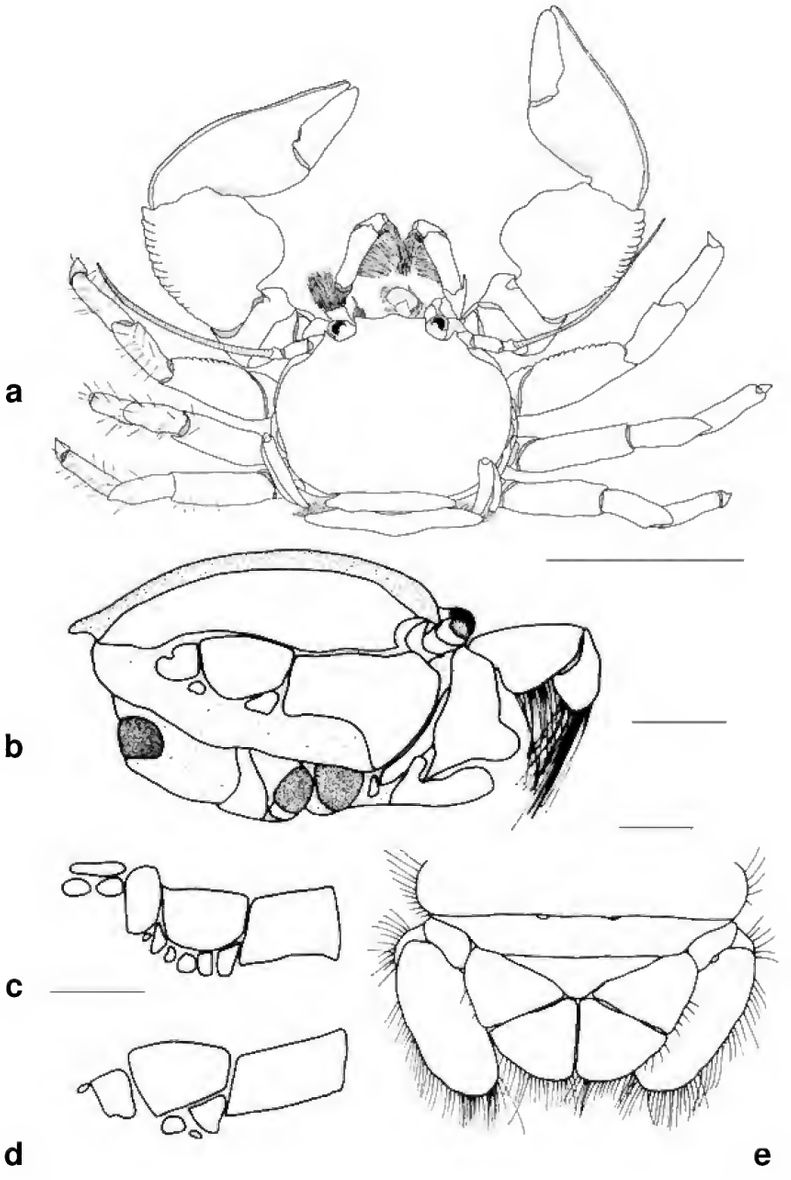

Fig.1- *Pachycheles riisei* (Stimpson, 1858), MNRJ 19150: (a) habitus, dorsal view; (b) habitus, lateral view; (c-d) pleural plates, lateral view of other specimens; (e) telson. Scale bars: a = 0.5cm; b-e = 0.1cm.

Propodus with a longitudinal sulcus delimitating a carina on outer margin; carpus with three lobes on distal margin and lateral margin crenulated with a distal spine; merus with large triangular lamellae projected anteriorly on inner margin. Walking legs (Fig.1a) covered by numerous thick setae, especially from carpus to dactylus. Telson (Fig.1e) with five plates. Male lacking pleopods.

Coloration – Carapace and chelipeds slightly pinkish on top. Lateral angle and outer angle of orbit white. Basal antennal article light brown. Walking legs with white stripes, ventral portion lighter than dorsal.

Distribution – *Pachycheles riisei* occurs from Florida to the Caribbean Sea and along the Brazilian coast, from Paraíba to São Paulo and also in the oceanic islands as Fernando de Noronha (VELOSO, 1998), Trindade (COELHO & RAMOS, 1972) and Rocas Atoll (present study).

Habitat – an intertidal species living under stones, in cavities of calcareous algae and among coral reefs (VELOSO, 1998).

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NEW RECORDS OF THE FAMILY MAJIDAE (CRUSTACEA, BRACHYURA) TO THE ROCAS ATOLL, BRAZIL [1]

(With 11 figures)

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ABSTRACT: Eight species of Majidae were sampled in the Rocas Attol: *Chorinus heros*, *Macrocoeloma concavum*, *Microphrys bicornutus*, *Mithraculus forceps*, *Mithrax verrucosus*, *Nemausa acuticornis*, *Pitho lherminieri* and *Podochela brasiliensis*. Of these species, *C. heros, M. concavum, P. lherminieri,* and *P. brasiliensis* are new records for the Rocas Attol. *Podochela brasiliensis* is the only Brazilian endemic species of Majidae found in Rocas Atoll, and *M. verrucosus,* in Brazil, is only recorded in the oceanic islands of Fernando de Noronha and Rocas Atoll. Two other species, *Aepinus septemspinosus* and *Mithrax hemphilli,* that were previously known to the region were not found during this study.

Key words: Crustacea. Brachyura. Majidae. Rocas Atoll.

RESUMO: Novos registros da família Majidae (Crustacea, Brachyura) para o Atol das Rocas, Brasil.

Foram coletadas oito espécies de Majidae no Atol das Rocas: *Chorinus heros*, *Macrocoeloma concavum*, *Microphrys bicornutus*, *Mithraculus forceps*, *Mithrax verrucosus*, *Nemausa acuticornis*, *Pitho lherminieri* e *Podochela brasiliensis*. Destas, *C. heros, M. concavum, P. lherminieri* e *P. brasiliensis* são registradas pela primeira vez para o Atol das Rocas. *Podochela brasiliensis* é a única espécie endêmica do Brasil de Majidae encontrada no Atol das Rocas, e *M. verrucosus,* no Brasil, ocorre apenas nas ilhas oceânicas de Atol das Rocas e Fernando de Noronha. Outras duas espécies, *Aepinus septemspinosus* e *Mithrax hemphilli*, que já eram previamente conhecidas para a região, não foram encontradas durante este estudo.

Palavras-chave: Crustacea. Brachyura. Majidae. Atol das Rocas.

INTRODUCTION

Spider crabs (family Majidae) are a widespread marine family. Although most diverse in the Pacific, they can be found world-wide except near Antarctica. Most species live from intertidal areas to the continental shelf except for a few species that live at depths of 200m or more. Peculiar to the family Majidae among brachyuran crabs is decorating (also called masking), the deliberate attachment of pieces of debris or sessile marine organisms to the hooked setae of the exoskeleton, but this behavior can be absent in large crabs or those that live at great depths, on sand or in narrow crevices (Wicksten, 1993).

Only six species of Majidae have been recorded to Rocas Atoll: *Aepinus septemspinosus* (A.Milne-Edwards, 1879), *Microphrys bicornutus* (Latreille, 1825), *Mithraculus forceps* (A.Milne-Edwards, 1875), *Mithrax hemphilli* Rathbun, 1892, *Mithrax verrucosus* H.Milne Edwards, 1832, and *Nemausa acuticornis* (Stimpson, 1871) (Coelho, 1969, 1971; Coelho & Ramos, 1972). This work intends to identify and briefly describe the species of this family found in Rocas Atoll, during a sampling program between October 2000 and November 2001.

The length of carapace (cl) was measured on the median line, from the anterior to posterior margin, including rostrum. The width of carapace (cw) was measured at the widest part. The studied specimens are deposited at the Crustacea collection of the Museu Nacional, Rio de Janeiro (MNRJ). Abbreviations: (AAA) A.A.Aguiar; (CRT) C.R.Tavares; (CSS) C.S.Serejo; (DM) D.Moraes; (FBP) F.B.Pitombo; (GN) G.Nunan; (MCR) M.C.Rayol; (NM) N.Magalhães; (PCP) P.C.Paiva; (PSY) P.S.Young; (RB) R.Barroso; (SNB) S.N.Brandão.

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SYSTEMATIC SECTION

Family Majidae Samouelle, 1819
Genus *Chorinus* Latreille, 1823
Chorinus heros (Herbst, 1790)
(Fig.1)

Cancer heros Herbst, 1790:pl.42, fig.1.

Chorinus heros – Rathbun, 1925:305, fig.101, pl.107, pl.246, figs.3-5; Abele & Kim, 1986:44, 549, fig.b; Melo, 1996:254.

Material examined – Rocas Atoll, no detailed locality, GN and DM coll. 22/Nov/1982, 1♀ , cl: 48.5mm, cw: 26.8mm, MNRJ 4673; 3°51,680'S - 33°49,601'W, 19m, PSY, PCP and AAA coll. 16/Oct/2000, 6♂ , cl: 2.6-4.0mm, cw: 1.6-2.3mm, MNRJ 17484.

Description – Two long rostral horns, with simple and curved setae, and with lateral margin denticulated (Fig.1a). Carapace oval, anterior third deflexed with some short truncate or long spines; one large preorbital spine curved and directed forward, and two smaller spines posterior to preorbital; one hepatic spine posterior to orbital, and one gastric spine posterior to hepatic; posterior two thirds smooth (Fig.1a); cervical and cardiac grooves present, but not well defined. Antennae 2 thin and long, basal article with a spine on distal margin and a truncate spine on lateral proximal margin (Fig.1b). Third maxilliped with simple setae on lateral margin of its articles (Fig.1c). One truncate spine on anterolateral angle of bucal cavity, and one between lateral proximal margin of antennae 2 and anterolateral angle of bucal cavity. Chelipeds with some setae, without hiatus between fingers (Fig.1d). Pereopods 2-5 setose.

Habitat – Found between seaweed and sponges.

Distribution – East coast of the USA, Gulf of Mexico, Antilles, Venezuela, and Brazil - from Ceará to Bahia (Melo, 1996); Rocas Atoll (new occurrence).

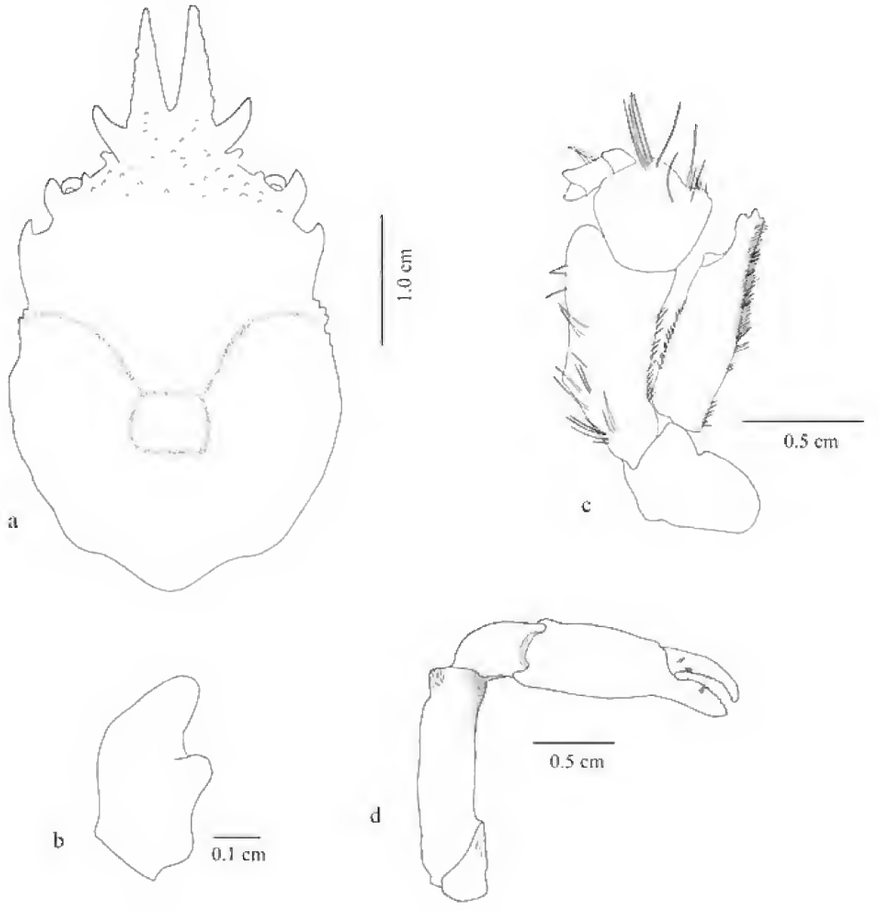

Fig.1- *Chorinus heros* (Herbst, 1790). MNRJ 4673, ♀ , cl: 48.5mm, cw: 26.8mm. a) Carapace, dorsal view; b) Left antenna 2, basal article; c) Left maxilliped 3, ventral view; d) Left cheliped, dorsal view.

Genus *Macrocoeloma* Miers, 1879
Macrocoeloma concavum Miers, 1886
(Fig.2)

Macrocoeloma concava Miers, 1886:79, pl.10, figs.2-2b.

Macrocoeloma concavum – Rathbun, 1925:487, pl.170, fig.3, pl.171, fig.3; Coelho & Ramos, 1972:218; Melo, 1996:216.

Material examined – Rocas Atoll, no detailed locality, PSY, PCP and AAA coll. 16/Oct/2000, 1♀ (juvenile), cl: 9.1mm, cw: 7.6mm, MNRJ 17481; PSY, PCP and AAA coll. 23/Oct/2000, 1♂, cl: 2.3mm, cw: 2.2mm, MNRJ 17483; FBP and RB coll. 03/Jan/2001, 1♂, cl: 2.6mm, cw: 1.9mm, MNRJ 17482; 3°51,680'S, 33°49, 604'W, 9m.

Description – Two long, acute rostral spines, divergent and curved upward (Fig.2a). Carapace, hepatic region concave; lateral angle with one spine; intestinal and cardiac regions with one spine each, three truncate spines on gastric, one on urogastric, and one on branchial regions (Fig.2a); lateral margin of the body with some small, truncate spines to pterigostomial region. Body and legs covered by short setae, and some long and curved setae (Fig.2a). Tubular orbits with a preorbital spine directed forward and a postorbital spine directed laterally (Fig.2a). Basal article of antennae 2 with an anterior spine (Fig.2b). Inner lateral margin of ischium of third maxilliped setose, with some small spines (Fig.2c). Chelipeds covered with very small spines; a proximal truncate spine on palm; fingers 1/2 of length of propodus; palm with approximately the same size of merus; merus with one distal spine and two truncate spines, one distal and one proximal (Fig.2d).

Habitat – Found between seaweed, calcareous algae, and sponges.

Distribution – Antilles and Brazil - from Maranhão to Bahia, Fernando de Noronha (Melo, 1996); Rocas Atoll (new occurrence).

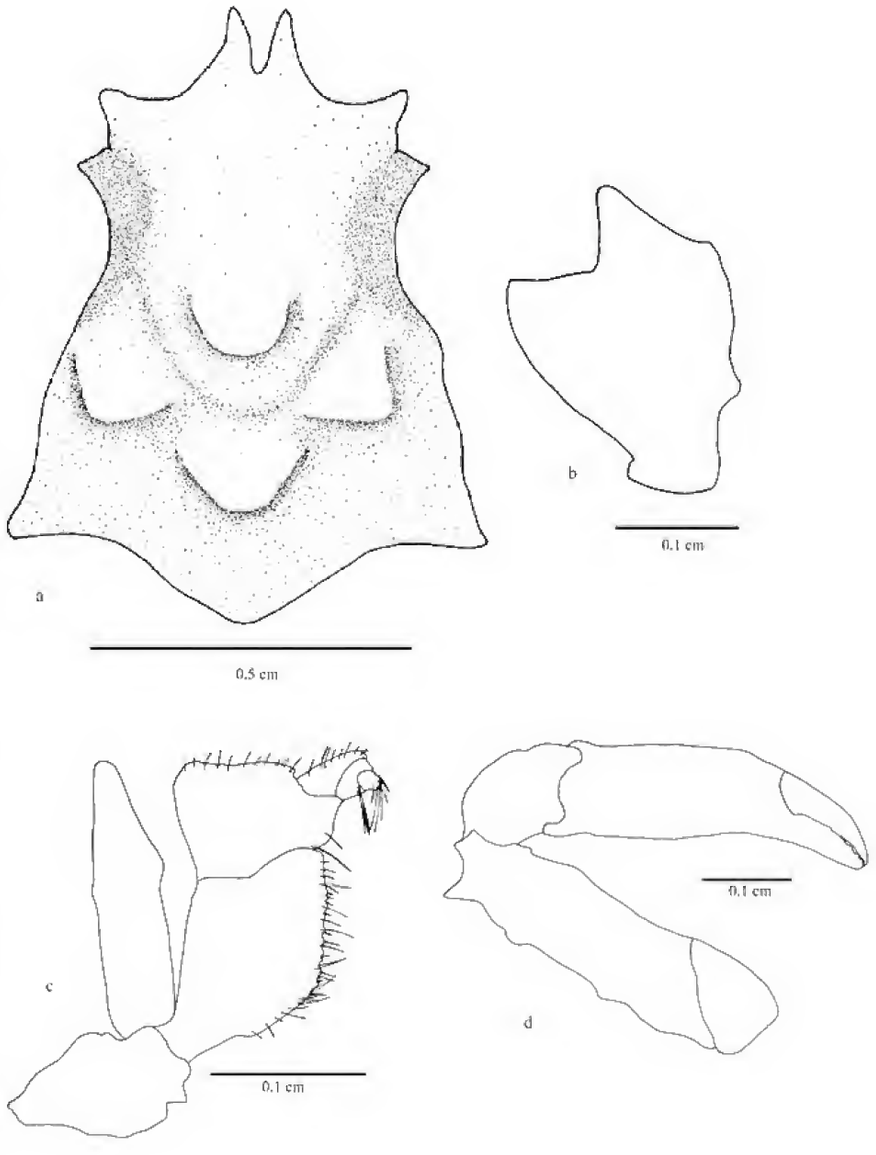

Fig.2- *Macrocoeloma concavum* Miers, 1886. MNRJ 17481, juvenile ♀, cl: 9.1mm, cw: 7.6mm. a) Carapace, dorsal view; b) Rigth antenna 2, basal article; c) Rigth maxilliped 3, ventral view; d) Left cheliped, dorsal view.

Genus *Microphrys* H.Milne Edwards, 1851
Microphrys bicornutus (Latreille, 1825)
(Fig.3)

Pisa bicornuta LATREILLE, 1825:141.

Microphrys bicornutus – RATHBUN, 1925:489, pl.175; COELHO, 1969:237; COELHO, 1971:141; COELHO & RAMOS, 1972:216; WILLIAMS, 1984:330, fig.266; ABELE & KIM, 1986:46, 521, figs.d-e; MELO, 1996:224.

Material examined – Rocas Atoll, Pools, PSY, PCP and AAA coll. 05/Oct/2000, 1♀ , cl: 15.2mm, cw: 12.9mm; 2♂ , cl:15.4-19.2mm, cw: 11.9-16.4mm, MNRJ 16655; PSY, PCP and AAA coll. 07/Oct/2000, 1♀ (juvenile), cl: 5.4mm, cw: 4.0mm; 1♂ , cl: 2.3mm, cw: 2.1mm, MNRJ 17516; PSY, PCP and AAA coll. 10/Oct/2000, 1♀ (juvenile), cl: 5.9mm, cw: 4.8mm; 2♂ , cl: 3.2-4.9mm, cw: 3.0-3.7mm, MNRJ 17511; PSY, PCP and AAA coll. 14/Oct/2000, 5♂ , cl: 5.9-12.8mm, cw: 4.1-10.8mm, MNRJ 17513; PSY, PCP and AAA coll. 17/Oct/2000, 2♀ (ovigerous), cl: 14.9-18.8mm, cw: 12.7-16.4mm; 1♂ , cl: 17.5mm, cw: 15.1mm, MNRJ 16659; PSY, PCP and AAA coll. 18/Oct/2000, 1♀ (ovigerous), cl: 9.1mm, cw: 6.9mm; 1♀ , cl: 6.7mm, cw: 5.2mm; 1♂ , cl: 5.6mm, cw: 4.2mm, MNRJ 16658; PSY, PCP and AAA coll. 25/Oct/2000, 2♂ , cl: 19.4-23.5mm, cw: 16.1-20.1mm; 3♀ (ovigerous), cl: 11.5-16.6mm, cw: 10.2-14.9mm, MNRJ 16650; PSY, PCP and AAA coll. 27/Oct/2000, 1♂ , cl: 8.7mm, cw: 7.0mm, MNRJ 16660; PSY, PCP and AAA coll. 20/Oct/2000, 1♀ (ovigerous), cl: 9.3mm, cw: 7.6mm; 4♂ , cl: 5.6-8.7mm, cw: 3.5-7.4mm, MNRJ 17510; PSY, PCP and AAA coll. Oct/2000, 1♂ , cl: 12.5mm, cw: 9.5mm, MNRJ 17154; FBP and RB coll. 21/Dec/2000, 2♂ , cl: 2.5-4.4mm, cw: 2.0-4.1mm, MNRJ 17518; FBP and RB coll. 24/Dec/2000, 1♂ , cl: 4.8mm, cw: 3.8mm, MNRJ 17517; FBP and RB coll. 28/Dec/2000, 1♀ , cl: 9.3mm, cw: 7.8mm, MNRJ 17509; FBP and RB coll. 30/Dec/2000, 1♀ , cl: 7.5mm, cw: 5.8mm, MNRJ 17153; FBP and RB coll. 02/Jan/2001, 2♀ (ovigerous), cl: 8.4-15.4mm, cw: 7.0-14.4mm; 1♂ , cl: 8.5mm, cw: 6.1mm, MNRJ 17157; SNB, CRT and NM coll. 01/Jul/2001, 1♂ , cl: 19.8mm, cw: 17.1mm, MNRJ 17508; SNB, CRT and NM coll. 02/Jul/2001, 1♀ (juvenile), cl: 5.4mm, cw: 4.1mm, MNRJ 16663; SNB, CRT and NM coll. 03/Jul/2001, 1♂ , cl: 24.2mm, cw: 20.7mm, MNRJ 16665; SNB, CRT and NM coll. 04/Jul/2001, 1♀ (ovigerous), cl: 12.2mm, cw: 10.5mm, MNRJ 16661; SNB, CRT and NM coll. 12/Jul/2001, 2♂ , cl: 12.4-18.4mm, cw: 9.8-15.5mm; 1♀ (ovigerous), cl: 10.1mm, cw: 8.2mm, MNRJ 16664; CSS and MCR coll. 18/Oct/2001, 1♀ (juvenile), cl: 3.5mm, cw: 6.6mm, MNRJ 16662; CSS and MCR coll. 20/Oct/2001, 1♀ (ovigerous), cl: 11.8mm, cw: 9.9mm, MNRJ 16653; CSS and MCR coll. 22/Oct/2001, 2♂ , cl: 11.1-12.5mm, cw: 9.1-10.7mm, MNRJ 16652; CSS and MCR coll. Oct/2001, 1♂ , cl: 18.5mm, cw: 15.6mm, MNRJ 17514; Inner Laguna, FBP and RB coll. 18/Dec/2000, 1♀ (juvenile), cl: 9.1mm, cw: 7.2mm; 3♂ , cl: 3.6-11.9mm, cw: 2.7-9.9mm, MNRJ 16657; FBP and RB coll. Dec/2000, 1♀ , cl: 13.0mm, cw: 10.9mm, MNRJ 17505; CSS and MCR coll. 07/Nov/2001, 3♀ (juveniles), cl: 6.3-9.6mm, cw: 4.3-7.4mm, MNRJ 16656; 3°51,751'S, 38°48,066'W, PSY, PCP and AAA coll. 05/Oct/2000, 10♀ (juveniles), cl: 5.3-15.0mm, cw: 3.6-13.0mm; 4♂ , cl: 7.4-9.8mm, cw: 1.3-7.4mm, MNRJ 16654; no detailed locality, PSY, PCP and AAA coll. 05/Oct/2000, 3♂ , cl: 2.7-4.2mm, cw: 1.7-3.0mm, MNRJ 17507; PSY, PCP and AAA coll. 16/Oct/2000, 1♀ (juvenile), cl: 9.2mm, cw: 7.6mm, MNRJ 17158; PSY, PCP and AAA coll. 23/Oct/2000, 1♂ , cl: 5.7mm, cw: 4.1mm, MNRJ 17506; PSY, PCP and AAA coll. Oct/2000, 3♂ , cl: 8.1-17.1mm, cw: 5.6-15.1mm; 1♀ (juvenile), cl: 13.0mm, cw: 10.3mm; 1♀ (ovigerous), cl: 14.2mm, cw: 11.9mm; 2♀ , cl: 13.2-14.3mm, cw: 10.6-12.0mm, MNRJ 16651; PSY, PCP and AAA coll. Oct/2000, 1♀ (juvenile), cl: 4.7mm, cw: 3.4mm, MNRJ 17515; SNB, CRT and NM coll. Jul/2000, 1♀ (ovigerous), cl: 17.1mm, cw: 15.0mm; 1♂ , cl: 18.3mm, cw: 15.8mm, MNRJ 17512.

Description – Two long and setose rostral spines, divergent at base, extremities curving inward (Fig.3a). Carapace sub triangular, longer than wide, with some setae and small truncate spines; with a spine at the lateral angle, and a small one behind that spine; cervical and cardiac grooves well defined; hepatic region depressed; cardiac region elevated, with 4-5 truncate spines; one truncate spine on each side of cardiac groove; intestinal region with four truncate spines, distributed as an arc. Orbits composed of basal article of antennae 2, with one ventral spine, one dorsal spine, and one spine between ventral and dorsal ones. Basal article of antennae 2 with a spine and a small one on the base of that spine (Fig.3b). Third maxilliped, ischium with some small spines and with inner margin setose; anterior margin of merus with a truncate setose spine (Fig.3c). Chelipeds with dark and irregular spots; fingers either without hiatus, with the

cutting edge serrate, or with a hiatus, with anterior extremity of cutting edges serrate and with a proximal truncate spine on fixed finger (Fig.3d,e); carpus either smooth or with a truncate spine on outer surface; merus smooth or with a row of three spines on anterior surface. Pereopods 2-5 setose; propodus and carpus unarmed, merus with a row of until four spines on anterior surface.

Remarks – *Microphrys bicornutus* was described as having a row of three or four spines on the merus of chelipeds (RATHBUN, 1925), but the examined specimens have a row varying from 0 to 3 spines, except for one male (MNRJ 16650) that has four spines. MELO (1996), RATHBUN (1925), and WILLIAMS (1984) also observed specimens of *M. bicornutus* with a hiatus between the fingers, which was variable in Rocas specimens.

Habitat – Most samples of *Microphrys bicornutus* were found between seaweeds and calcareous algae, all from shallow waters, and most specimens were covered by algae and sponges.

Distribution – East of USA, Gulf of Mexico, Antilles, Central America, north of South America, Brazil - from Maranhão to Rio Grande do Sul, Fernando de Noronha and Rocas Atoll (COELHO, 1969, 1971; COELHO & RAMOS, 1972; MELO, 1996).

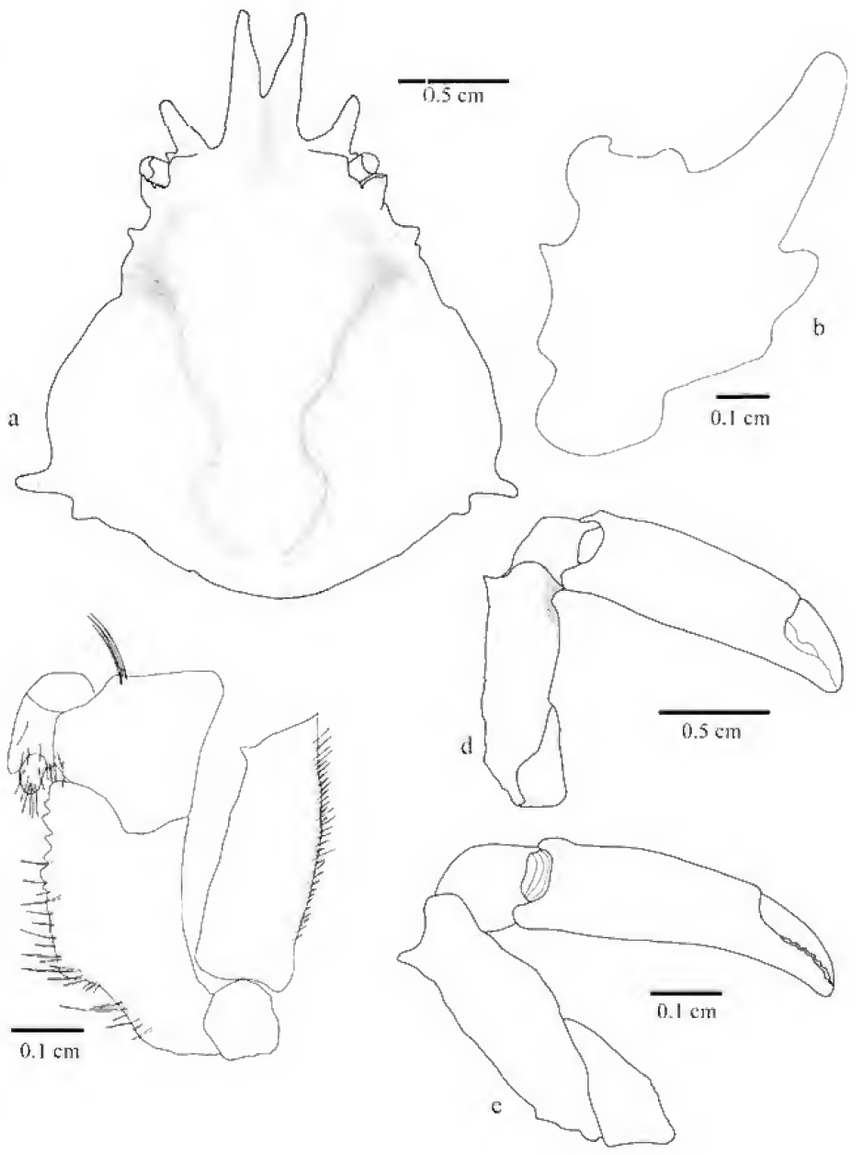

Fig.3- *Microphrys bicornutus* (Latreille, 1825). MNRJ 16655, ♂, cl: 19.2mm, cw: 16.4mm. a) Carapace, dorsal view; b) Left antenna 2, basal article; c) Left maxilliped 3, ventral view; d) Left cheliped, dorsal view. MNRJ 17153, ♀, cl: 7.5mm, cw: 5.8mm. e) Left cheliped, dorsal view.

Genus *Mithraculus* White, 1847
Mithraculus forceps (A.Milne-Edwards, 1875)
(Fig.4)

Mithrax (*Mithraculus*) *forceps* A.MILNE-EDWARDS, 1875:109, pl.23, fig.1; RATHBUN, 1925:431, pl.156.

Mithraculus forceps – COELHO & RAMOS, 1972:216; WILLIAMS, 1984, figs.272, 275f; ABELE & KIM, 1986:47, 529, figs.c-d; MELO, 1996:229.

Material examined – Rocas Atoll, Pools, PSY, PCP and AAA coll. 13/Oct/2000, 2♂, cl: 13.0-16.8mm, cw: 14.5-18.8mm, MNRJ 15620; PSY, PCP and AAA coll. 20/Oct/2000, 1♀ (juvenile), cl: 12.7mm, cw: 8.4mm, MNRJ 17492; PSY, PCP and AAA coll. 25/Oct/2000, 1♂, cl: 6.8mm, cw: 7.3mm, MNRJ 15617; PSY, PCP and AAA coll. 26/Oct/2000, 22♂, cl: 5.8-16.8 mm, cw: 6.3-20.2mm; 9♀ (ovigerous), cl: 8.9-12.7mm, cw: 9.5-14.9mm; 3♀, cl: 9.2-11.0mm, cw: 10.7-13.1mm, MNRJ 15613;

PSY, PCP and AAA coll. 27/Oct/2000, 5♂, cl: 4.9-8.6 mm, cw: 4.8-9.5mm, 1♀ (ovigerous), cl: 10.3mm, cw: 11.9mm, MNRJ 15612; PSY, PCP and AAA coll. 27/Oct/2000, 1♀ (juvenile), cl: 4.4mm, cw: 4.4mm; 3♂, cl: 2.8-4.3mm, cw: 2.7-4.4mm, MNRJ 17494; PSY, PCP and AAA coll. 28/Oct/2000, 2♂, cl: 8.2-13.5mm, cw: 8.5-15.3mm, MNRJ 15616; FBP and RB coll. 22/Dec/2000, 2m, cl: 3.2-3.7mm, cw: 3.0-3.5mm, MNRJ 17488; FBP and RB coll. 28/Dec/2000, 1♂, cl: 18.4mm, cw: 21.8mm, MNRJ 15611; FBP and RB coll. 30/Dec/2000, 1♂, cl: 7.8mm, cw: 8.1mm, MNRJ 16786; FBP and RB coll. 02/Jan/2001, 2♀, cl: 12.1-12.2mm, cw: 12.5-13.1mm; 2♀ (ovigerous), cl: 11.2-12.2mm, cw: 12.4-13.6mm; 6♂, cl: 3.6-14.2mm, cw: 3.4-15.5mm, MNRJ 16787; FBP and RB coll. Dec/2000, 6♂, cl: 1.6-3.2mm, cw: 1.3-2.9mm, MNRJ 17495; CSS and MCR coll. 22/Oct/2001, 1♂, cl: 9.1mm, cw: 10.1mm, MNRJ 16190; Inner Laguna, PSY, PCP and AAA coll. 14/Oct/2000, 1♀ (juvenile), cl: 12.0mm, cw: 12.9mm, MNRJ 15619; PSY, PCP and AAA coll. 15/Oct/2000, 5♂, cl: 3.2-10.6mm, cw: 3.0-12.3mm; 2♀ (ovigerous), cl: 7.9-8.2mm, cw: 8.8-9.3mm; 2♀, cl: 8.3-9.5mm, cw: 9.1-10.7mm, MNRJ 15615; FBP and RB coll. 18/Dec/2000, 4♀ (ovigerous), cl: 7.7-10.7mm, cw: 7.8-11.6mm; 3♂, cl: 7.2-12.3mm, cw: 7.9-13.6mm, MNRJ 15614; CSS and MCR coll. 07/Nov/2001, 1♂, cl: 5.1mm, cw: 5.3mm, MNRJ 17151; No detailed locality, PSY, PCP and AAA coll. 11/Oct/2000, 1♂, cl: 7.7mm, cw: 7.3mm, MNRJ 15618; PSY, PCP and AAA coll. 16/Oct/2000, 3♂, cl: 3.4-4.1mm, cw: 3.0-3.7mm, MNRJ 17493; PSY, PCP and AAA coll. Oct/2000, 5♂, cl: 1.5-3.2mm, cw: 1.7-2.9mm, MNRJ 17490; FBP and RB coll. Dec/2000, 5♂, cl: 5.0-18.1mm, cw: 4.9-9.0mm, MNRJ 17491.

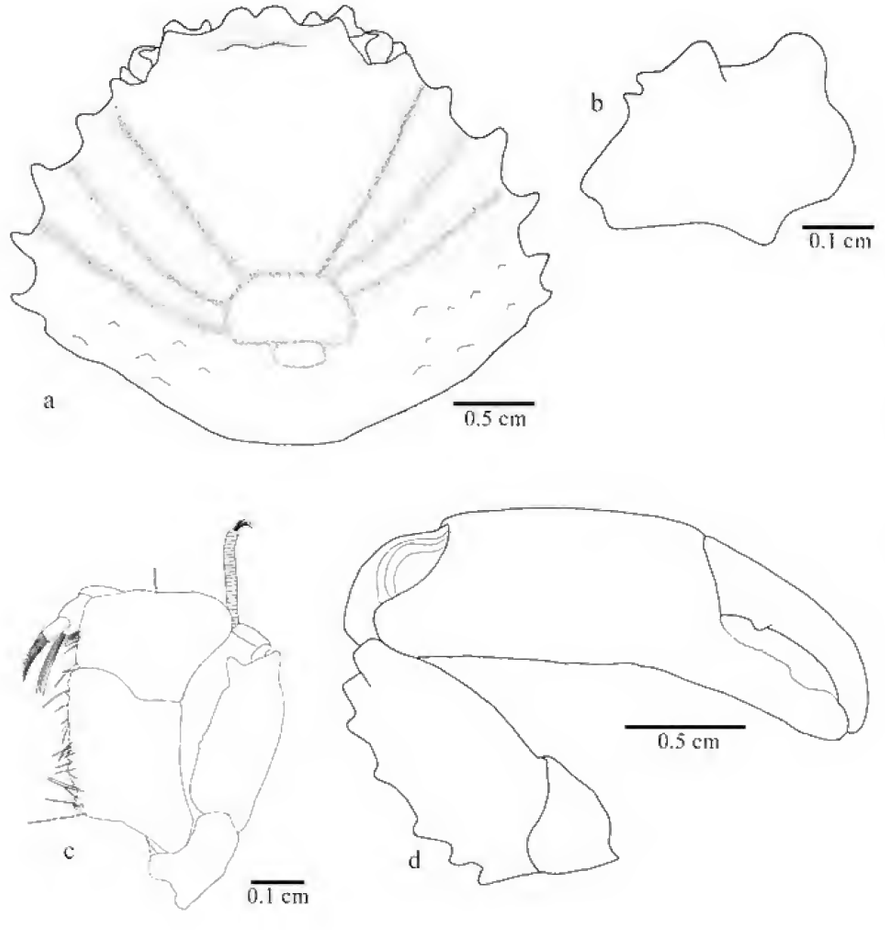

Fig.4- *Mithraculus forceps* (A.Milne-Edwards, 1875). MNRJ 15611, ♂, cl: 7.8mm, cw: 8.1mm. a) Carapace, dorsal view; b) Left antenna 2, basal article; c) Left maxilliped 3, ventral view; d) Left cheliped, dorsal view.

Description – Rostrum bifid, truncate, separated near the base (Fig.4a). One pair of small truncate spines posterior to rostrum, and another pair posterior to first pair, in line with inner dorsal orbital spine. Carapace, anterolateral margin with four spines directed forward; one groove between the first and the second anterolateral spine, another one between the second and the third antero lateral spine, and another one between the third and the fourth anterolateral spines; hepatic, gastric and cardiac regions with truncate spines. Orbits composed by the basal article of antennae 2, two ventral, and three dorsal spines. Basal article of antennae 2 with 2-3 spines, enlarged (Fig.4b). Third maxilliped, margin of ischium armed with some small spines (Fig.4c). Chelipeds of same size; a large hiatus between fingers; dactyl with a posterior spine or with a row of small spines; fixed finger with a row of small spines on posterior part; carpus with 1-2 inner lateral spine, sometimes with small spines on the superior part; merus with 1-2 spines on inner

surface, 5-6 spines on outer surface and 2-3 small truncate spines on upper surface (Fig.4d). Pereopods 2-5 setose, with some small spines.

Habitat – Sampled from calcareous bottoms, but one sample was collected between seaweeds, all of them from shallow waters.

Distribution – From North Carolina to south Florida (USA), Antilles, Venezuela, and Brazil - Maranhão to São Paulo, Rocas Atoll and Fernando de Noronha (Coelho, 1969, 1971; Coelho & Ramos, 1972; Melo, 1996).

Genus *Mithrax* Desmarest, 1823
Mithrax verrucosus H. Milne Edwards, 1832
(Figs.5-8)

Mithrax verrucosus H.Milne Edwards, 1832: no pagination, pl.4; Rathbun, 1925:400, pl.144; Coelho & Ramos, 1972:215; Williams, 1984:336, figs. 271, 275c; Abele & Kim, 1986:47, 525, figs.c-d; Melo, 1996:239.

Material examined – Rocas Atoll, Pools, PSY, PCP and AAA coll. 13/Oct/2000, 2♂, cl: 7.7-9.8mm, cw: 6.9-10.8mm, MNRJ 15600; PSY, PCP and AAA coll. 17/Oct/2000, 1♀, cl: 23.1mm, cw: 26.9mm, MNRJ 15605; PSY, PCP and AAA coll. 25/Oct/2000, 2♂, cl: 9.7-14.5mm, cw: 10.0-16.7mm, MNRJ 15608; PSY, PCP and AAA coll. 26/Oct/2000, 5♂, cl: 5.3-19.9mm, cw: 4.7-22.6mm, 3♀, cl: 16.0-21.4mm, cw: 18.7-26.3mm, MNRJ 15601; PSY, PCP and AAA coll. 27/Oct/2000, 2♂, cl: 6.5-6.6mm, cw: 5.9-6.2mm, 1♀, cl: 13.5mm, cw: 15.1mm, MNRJ 15607; PSY, PCP and AAA coll. 28/Oct/2000, 1♂, cl: 7.2mm, cw: 7.0mm, MNRJ 15602; PSY, PCP and AAA coll. 24-28/Oct/2000, 3♂, cl: 30.2-46.3mm, cw: 57.6-58.1mm, 1♀, cl: 30.2mm, cw: 38.0mm, MNRJ 16341; FBP and RB coll. 28/Dec/2000, 2♂, cl: 22.3-41.7mm, cw: 26.3-53.3mm, MNRJ 15609; SNB, CRT and NM coll. 03/Jul/2001, 1♀ (juvenile), cl: 16.6mm, cw: 18.5mm, MNRJ 15690; Inner Laguna, PSY, PCP and AAA coll. 14/Oct/2000, 3♂, cl: 11.6-14.3mm, cw: 12.4-15.0mm, MNRJ 15604; PSY, PCP and AAA coll. 15/Oct/2000, 1♂, cl: 17.7mm, cw: 20.6mm, MNRJ 15606.

Description – Rostrum small, bifid, truncate, setose, separated near base (Fig.5a). Carapace covered with some short truncate spines; lateral margin with four pairs of spines, the anterior ones smaller than the posterior; subhepatic region with few spines and some plumose setae. Orbits composed by the basal article of antennae 2, three dorsal and two lateral spines. Antennae 2 with basal article expanded, three lateral spines, middle one largest, truncate or not (Fig.5b, 6c). Outer lateral margin of ischium of third maxilliped with some spines (Fig.5c, 6d). Chelipeds of same size; fingers approximately ½ length of propodus; palm smooth; dactyl with a small truncate spine on inner surface; inner margin of carpus with 2-3 spines, denticulate or not; upper surface of merus

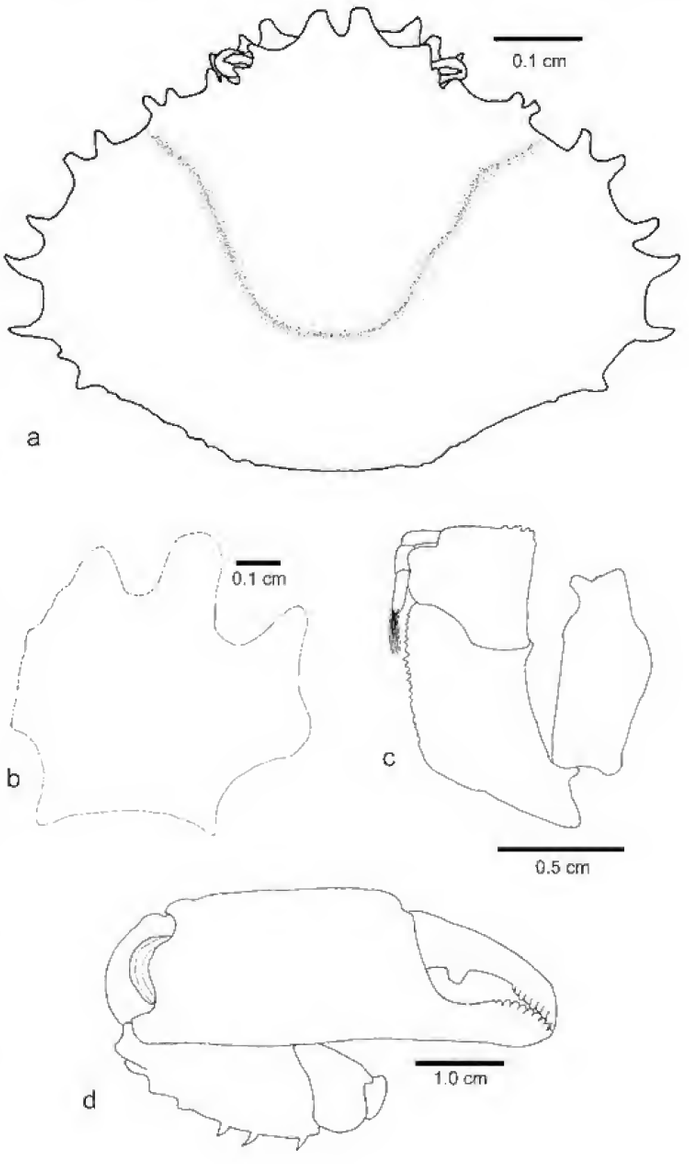

Fig.5- *Mithrax verrucosus* H.Milne Edwards, 1832. MNRJ 16341, ♂, cl: 44.9mm, cw: 58.1mm. a) Carapace, dorsal view; b) Left antenna 2, basal article; c) Left maxilliped 3, ventral view; d) Left cheliped, dorsal view.

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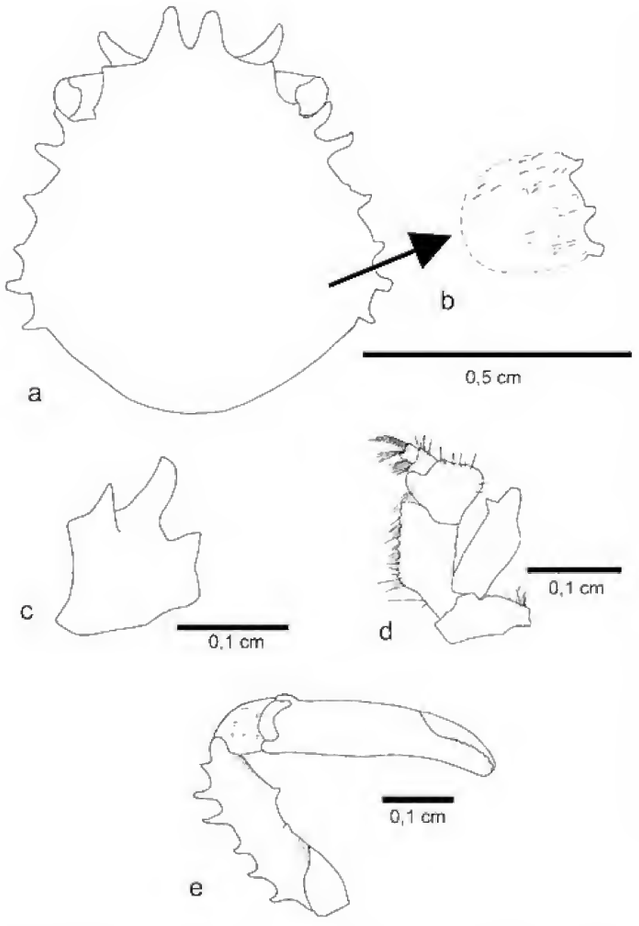

Fig.6- *Mithrax verrucosus* H.Milne Edwards, 1832. MNRJ 15602, juvenile ♂, cl: 7.2mm, cw: 7.0mm. a) Carapace, dorsal view; b) detail of the carapace; c) Left antenna 2, basal article; d) Left maxilliped 3, ventral view; e) Left cheliped, dorsal view.

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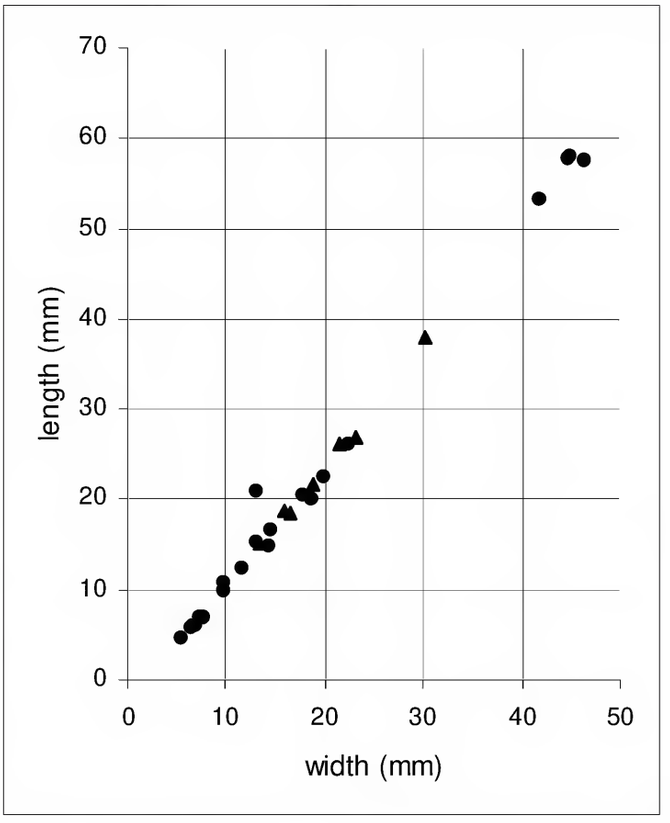

Fig.7- *Mithrax verrucosus* H.Milne Edwards, 1832. Length/ width rate; ♂ (●), ♀ (▲).

covered with 5-16 spines (Fig.5d). Pereopods 2-5 with plumose setae and spines.

Remarks – *Mithrax verrucosus* rostral spines are larger in adults than in juveniles. Only juveniles present a small spine on the superior proximal part of palm of chelipeds. The carpus has some small spines only in the smaller specimens (Fig.6e). The carapace is wider than long in adults, and in juveniles with carapace length larger than 10.0mm. Juveniles with carapace length less than 10.0mm have the carapace a little longer than wide, at least in males (Fig.6a, 7). The same pattern appears to occur in females but the specimens examined did not present any specimen less than 13.5mm (Fig.8). Adults present only short, truncate spines on the carapace in adults. Juveniles present the spines not truncate and also have short setae covering the carapace (Fig.6b).

Mithrax verrucosus is the largest majid found in Rocas atoll, reaching 46.3mm of carapace length.

Habitat – Only once *M. verrucosus* was found between seaweed, the others were found in calcareous bottoms, all of them in shallow waters.

Distribution: South Carolina, Florida, Gulf of Mexico, north of South America, Brazil - Fernando de Noronha and Rocas Atoll (Coelho, 1969, 1971; Coelho & Ramos, 1972; Melo, 1996).

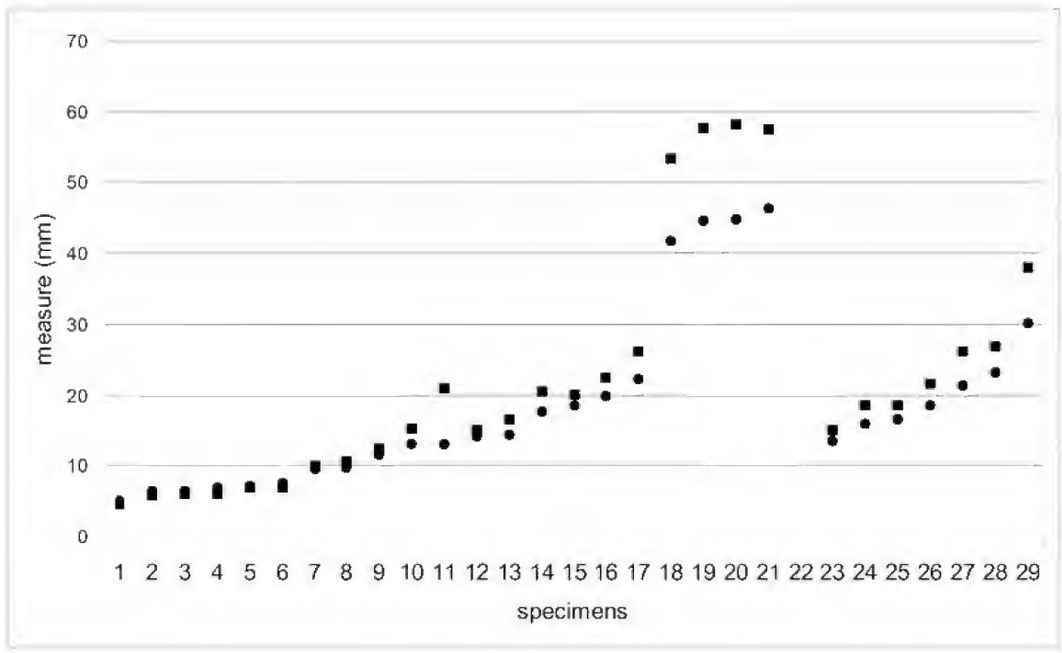

Fig.8- *Mithrax verrucosus* H.Milne Edwards, 1832. Length (●) and width (■) of the specimens; ♂ (1-21), ♀ (23-29).

Genus *Nemausa* Stimpson, 1870
Nemausa acuticornis (Stimpson, 1870)
(Fig.9)

Mithrax acuticornis Stimpson, 1870:116.

Mithrax (*Mithrax*) *acuticornis* – Rathbun, 1925:388, pl.136, figs.1-2, pl.257, fig.1.

Nemausa acuticornis – Melo, 1996:241.

Material examined – Rocas Atoll, Pool, PSY, PCP and AAA coll. 28/Oct/2000, 1♂♂, cl: 8.4mm, cw: 7.2mm, MNRJ 17152.

Description – Two acute rostral spines, distally slightly curved upward, outer margin with 2-3 denticles (Fig.9a). Carapace, lateral margin with one hepatic spine, followed by three smaller ones at same line; subhepatic region with four small spines; gastric and branchial regions covered with some truncate spines; cardiac and intestinal region with four short truncate spines; cervical groove well defined. Orbits composed of one wide and serrate preorbital spine, one postorbital spine with external margin serrate directed forward, one spine between the preorbital spine and the postorbital spine measuring ½ length of postorbital spine. One spine between postorbital spine and basal article of antennae 2. Basal article of antennae 2 with three spines, outer and middle spines denticulated on external margin; inner spine smooth, located at base of first movable segment of antennae 2 (Fig.9b). Outer lateral margin of ischium and anterior margin of merus of third maxilliped with some short truncate spines (Fig.9c). Chelipeds, cutting edge of fingers serrate and with a small posterior hiatus; palm with two small truncate spines on proximal region; propodus about twice length of fingers carpus granulate; merus with one row with six dorsal spines, one row with 3-4 ventral external spines and one inner dorsal row with 4-5 spines (Fig.9d). Pereopods 2-5 setose and with some spines.

Remarks – Rathbun (1925) observed *Nemausa acuticornis* with a double hepatic spine, with a small anterior spine on the carapace. Melo (1996) observed that all anterolateral spines have a small anterior spine. The only specimen examined has the spine posterior to the hepatic spine with a small anterior spine; all others are simple.

Habitat – Sampled between seaweed, from a depth of 10m.

Distribution – North Carolina to Florida, Gulf of Mexico, Antilles and Brazil - from Amapá to Rio de Janeiro and Rocas Atoll (Coelho, 1969; Coelho, 1971; Coelho & Ramos, 1972; Melo, 1996).

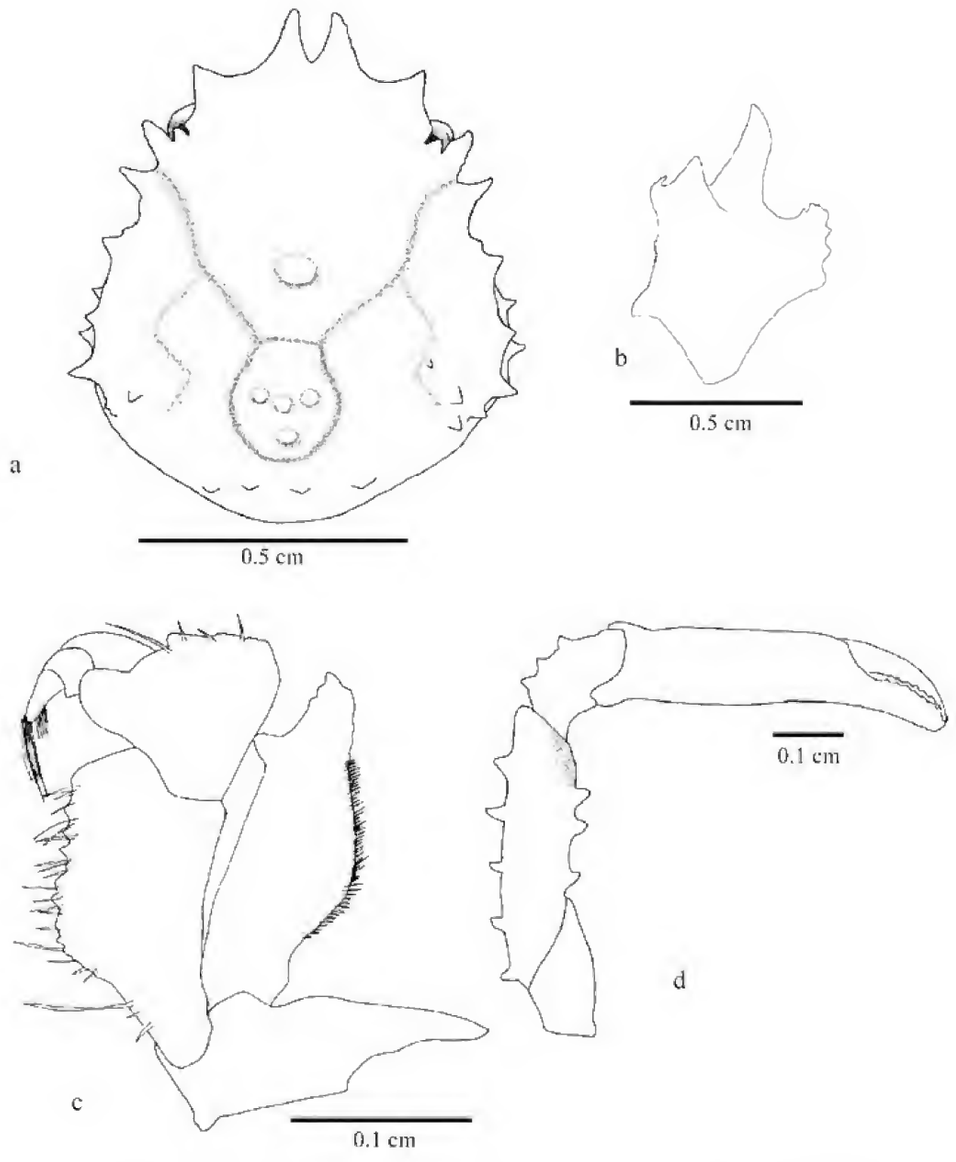

Fig.9- *Nemausa acuticornis* (Stimpson, 1871). MNRJ 17152, ♂, cl: 8.4mm, cw: 7.2mm. a) Carapace, dorsal view; b) Left antenna 2, basal article; c) Left maxilliped 3, ventral view; d) Left cheliped, dorsal view.

Genus *Pitho* Bell, 1835
Pitho lherminieri (Schramm, 1867)
(Fig.10)

Othonia lherminieri Schramm *in* Desbonne & Schramm 1867:20.

Pitho lherminieri – Rathbun, 1925:362, pl.128, figs.1-2, pl.129, figs.1-2, pl.252, fig.2; Coelho & Ramos, 1972:210; Williams, 1984:311, figs. 246, 259a; Abele & Kim, 1986:48, 531, figs.d-e; Melo, 1996:271.

Material examined – Rocas Atoll, no detailed locality, FBP and RB coll. 28/Dec/2000, 1♀ (juvenile), cl: 9.9mm, cw: 8.7mm, MNRJ 17487; SNB, CRT and NM coll. 03/Jul/2001, 1♀ (juvenile), cl: 7.2mm, cw: 5.8mm, MNRJ 17486.

Description – Two rostral spines wide, divergent at base with extremities curving inward and upward; margins setose (Fig.10a). Carapace covered with some curved setae and truncate spines (Fig.10b); anterolateral margin with five spines, two posteriormost strongly reduced in females and

young males (Fig.10a); cervical groove and cardiac region not well defined. Tubular orbits formed by basal article of antennae 2 and with a preorbital and a postorbital spine. Basal article of antennae 2 with one spine between preorbital and postorbital spines (Fig.10c). First movable article of antennae 2 flattened, wider than long. Third maxilliped, inner margin of ischium, proximal outer and inner margins of merus of with spines (Fig.10d). Chelipeds covered with small truncate spines and some simple setae; propodus with two proximal tubercles; fingers without hiatus, cutting edges serrate. Pereopods 2-5 covered with small truncate spines and simple setae; inner margin of dactyl serrate.

Habitat – Found in calcareous bottoms, from intertidal zone up to 10m.

Distribution – North Carolina to west Florida (USA), Gulf of Mexico, Antilles, Brazil - from Pará to São Paulo, Fernando de Noronha (MELO, 1996); Rocas Atoll (new occurrence).

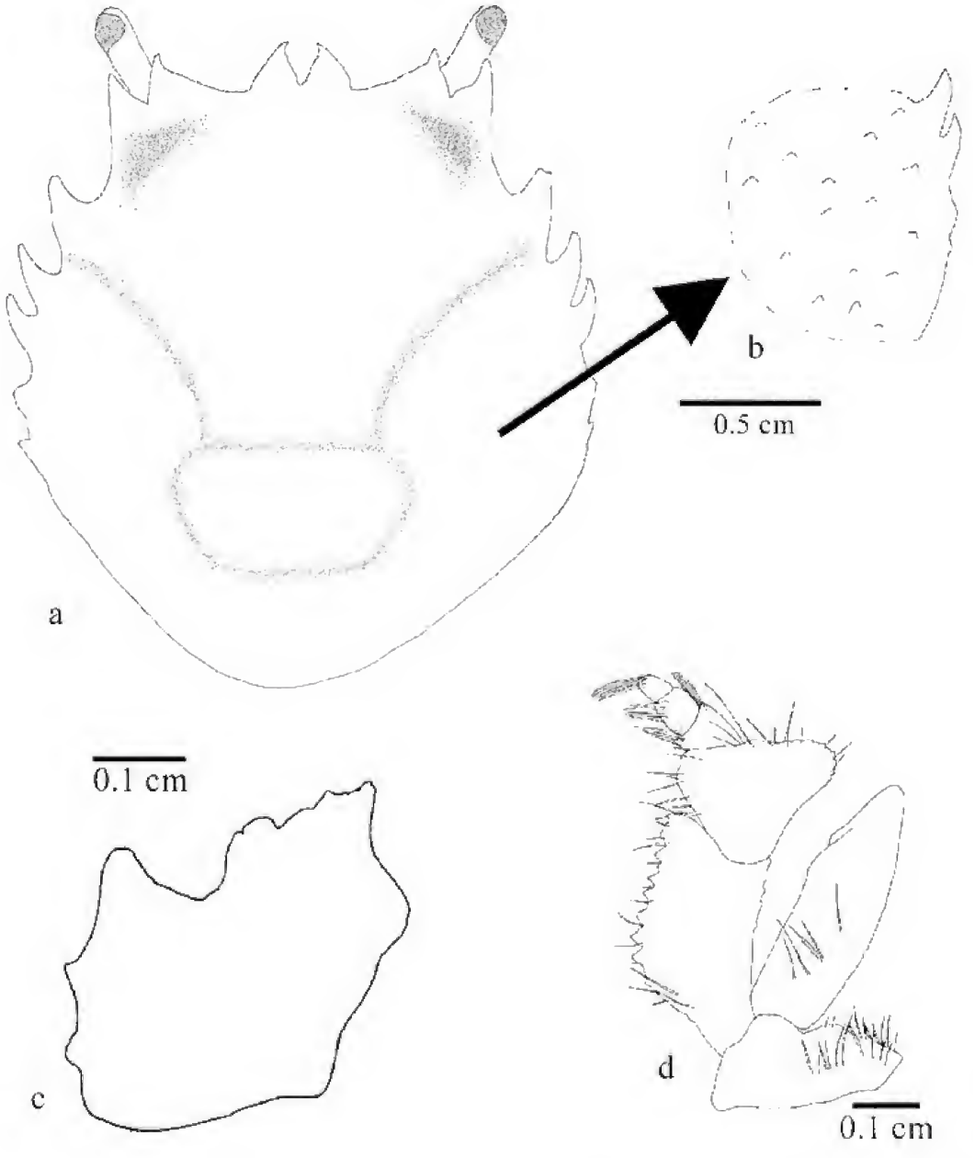

Fig.10- *Pitho lherminieri* (Schramm, 1867). MNRJ 17487, juvenile ♀ , cl: 9.9mm, cw: 8.7mm. a) Carapace, dorsal view; b) Carapace detail; c) Left antenna 2, basal article; d) Left maxilliped 3, ventral view.

Genus *Podochela* Stimpson, 1860
Podochela brasiliensis Coelho, 1972
(Fig.11)

Podochela brasiliensis Coelho, 1972:122, fig.1; Melo, 1996:186.

Material examined – Rocas Atoll, 3°51,680'S, 33°49,604'W, PSY, PCP and AAA coll. 16/Oct/2000, 2♀ (ovigerous), cl: 6.3-6.4mm, cw: 4.1-4.2mm, MNRJ 17485.

Description – Rostrum triangular, not ending in a spine, setose (Fig.11a). Carapace, lateral margin with one spine near gastric region; gastric region elevated, with a small truncate spine and some setae; posterior region, except for cardiac region, depressed. Postorbital short truncate spine inconspicuous. Basal article of antennae 2 slender and long (Fig.11b). Third maxilliped slender with inner lateral margins of ischium and merus and lateral margins of palp setose (Fig.11c). Chelipeds covered with short truncate spines and simple and curved setae; fingers long, about same size as propodus, cutting edges serrate, with a small proximal hiatus; propodus with a row of small truncate spines on upper edge, carpus with a small proximal truncate spine (Fig.11d).

Habitat – Sampled between seaweed and sponges, at 19m depth.

Distribution – Brazil - from Ceará to Sergipe (Melo, 1996); Rocas Atoll (new occurrence).

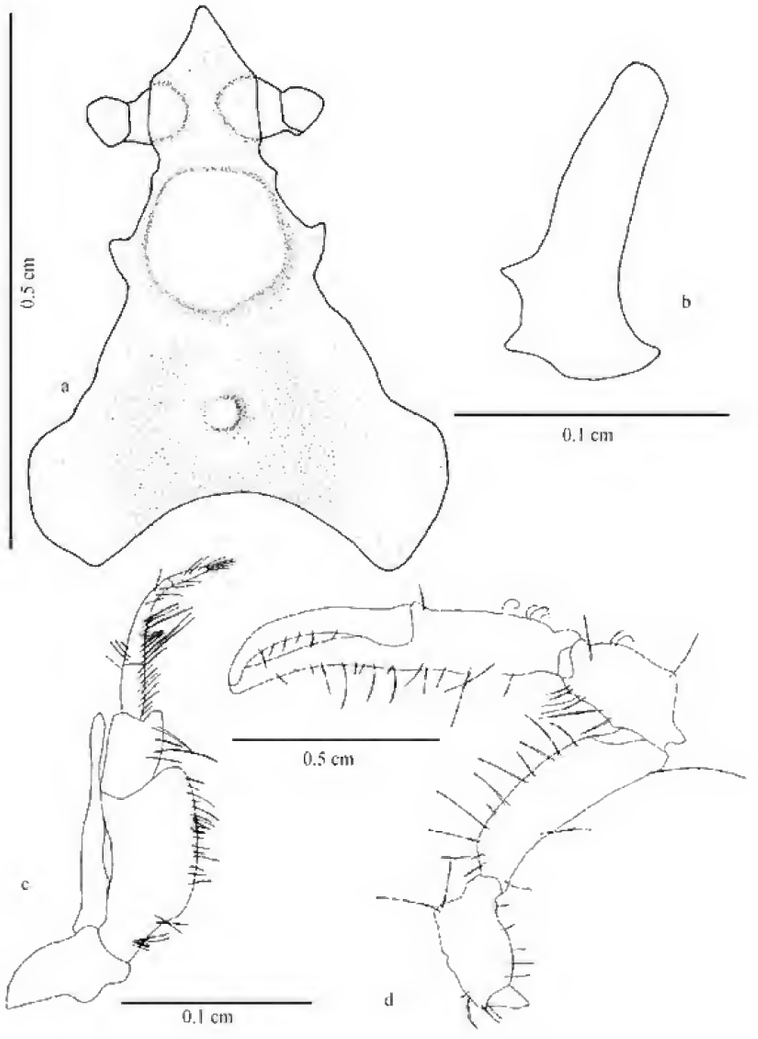

Fig.11- *Podochela brasiliensis* Coelho, 1972. MNRJ 17485, ovigerous ♀ , cl: 6.3mm, cw: 4.1mm. a) Carapace, dorsal view; b) Left antenna 2, basal article; c) Right maxilliped 3, ventral view; d) Right cheliped, dorsal view.

DISCUSSION

Aepinus septemspinosus (A.Milne-Edwards, 1879), *Microphrys bicornutus, Mithraculus forceps, Mithrax hemphilli* Rathbun, 1892, *Mithrax verrucosus,* and *Nemausa acuticornis* were previously recorded to Rocas Atoll (Coelho, 1969, 1971; Coelho & Ramos, 1972). The new collections contain four species that represent first records for this area: *Chorinus heros, Macrocoeloma concavum, Pitho lherminieri,* and *Podochela brasiliensis*. *Aepinus septemspinosus* is usually recorded deeper than 10m on hard substrates, a depth range that was poorly sampled during our surveys. *Mithrax hemphilli* is known from the intertidal zone deep to 60m and its record needs confirmation.

Of the eight species collected from Rocas Atoll, *Mithrax verrucosus* occurs only in the Brazilian oceanic islands of Rocas Atoll and Fernando de Noronha. Continental records of this species are found from South Carolina (USA) to Antilles. *Podochela brasiliensis* is the only endemic species from Brazil collected during our surveys. All the other species found in Rocas Atoll occur in the Western Atlantic, including the Brazilian Province (10°-35°S). These species also have their distribution extended to the Guiana Province (5°S-10°N) (Longhurst, 1998).

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CARIDEA (CRUSTACEA, DECAPODA: DISCIADIDAE, PALAEMONIDAE, PROCESSIDAE, RHYNCHOCINETIDAE) FROM ROCAS ATOLL INCLUDING TWO NEW SPECIES OF *PERICLIMENAEUS* BORRADAILE, 1951 [1]

(With 46 figures)

IRENE AZEVEDO CARDOSO [2]
PAULO S. YOUNG [3]

ABSTRACT: *Periclimenaeus caraibicus*, a species never recorded in Brazilian waters, is described, two new species of the genus *Periclimenaeus* are described: *P. brucei* sp.nov. and *P. crosnieri* sp.nov. Furthermore, six species previously recorded in Brazilian waters are redescribed: *Discias serratirostris*, *Brachycarpus biunguiculatus*, *Leander tenuicornis*, *Processa fimbriata*, *Processa brasiliensis*, and *Cinetorhynchus rigens*. Of these six species, only the two *Processa* were previously recorded in Rocas Atoll.

Key words: Caridea. Pontoniinae. *Periclimenaeus brucei* sp.nov. *Periclimenaeus crosnieri* sp.nov. Rocas Atoll.

RESUMO: Caridea (Crustacea, Decapoda: Disciadidae, Palaemonidae, Processidae, Rhynchocinetidae) de Atol das Rocas incluindo duas novas espécies de *Periclimenaeus* Borradaile, 1951.

Redescreve-se *Periclimenaeus caraibicus*, uma espécie nunca registrada no litoral brasileiro, e descrevem-se duas novas espécies do gênero *Periclimenaeus*: *Periclimenaeus brucei* sp.nov. e *Periclimenaeus crosnieri* sp.nov. Além disso, redescrevem-se seis espécies previamente registradas na costa brasileira: *Discias serratirostris, Brachycarpus biunguiculatus*, *Leander tenuicornis*, *Processa fimbriata*, *Processa brasiliensis* e *Cynertorhynchus rigens*. Destas seis, apenas as duas espécies de *Processa* já haviam sido registradas no Atol das Rocas.

Palavras-have: Caridea. Pontoniinae. *Periclimenaeus brucei* sp.nov. *Periclimenaeus crosnieri* sp.nov. Atol das Rocas.

INTRODUCTION

The Infraorder Caridea Dana, 1852 includes 36 families. The family Disciadidae Rathbun, 1902 includes three genera, only one of which occurs in Brazilian waters. The family Palaemonidae Rafinesque, 1815 is subdivided in two subfamilies: Palaemoninae Rafinesque, 1815 with 18 genera, nine of which occur in Brazilian waters, and Pontoniinae Kingsley, 1878 with 90 genera, five of which occur in Brazilian waters. The family Processidae Ortmann, 1890 presents three genera, two of which occur in Brazilian waters. The family Rhynchocinetidae Ortmann, 1890 presents two genera, and only one occurs in Brazilian waters (Holthuis, 1993; Ramos-Porto & Coelho, 1998).

This study intends to describe the caridean shrimps (except Alpheidae) collected in the Rocas Atoll (03°52'S,33°48'W). A total of nine species are treated herein; seven of them are redescribed and two new species are described.

The carapace length was measured from rostrum base to the carapace end. The nomenclature of the mouth parts that cited by Mclaughlin (1980) (Fig.1) and the nomenclature of the setae is that proposed by Watling (1989) and Garm (2004) (Fig.2).

SYSTEMATICS

Family Disciadidae Rathbun, 1902

Discias Rathbun, 1902

Discias Rathbun, 1902:289; Lebour, 1949:1107; Kensley, 1983:2.

Diagnosis – Carapace with rostrum short, dorsoventrally flattened; with or without antennal

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[3] *In memoriam*.

and branchiostegal spine. Mandible with or without palp; incisor and molar process widely separated. Pereopods 1 and 2 with ischium and merus fused. Pereopod 1 with highly specialized chela with circular dactyl. Dactyl of pereopod 3 simple (modified from KENSLEY, 1983).

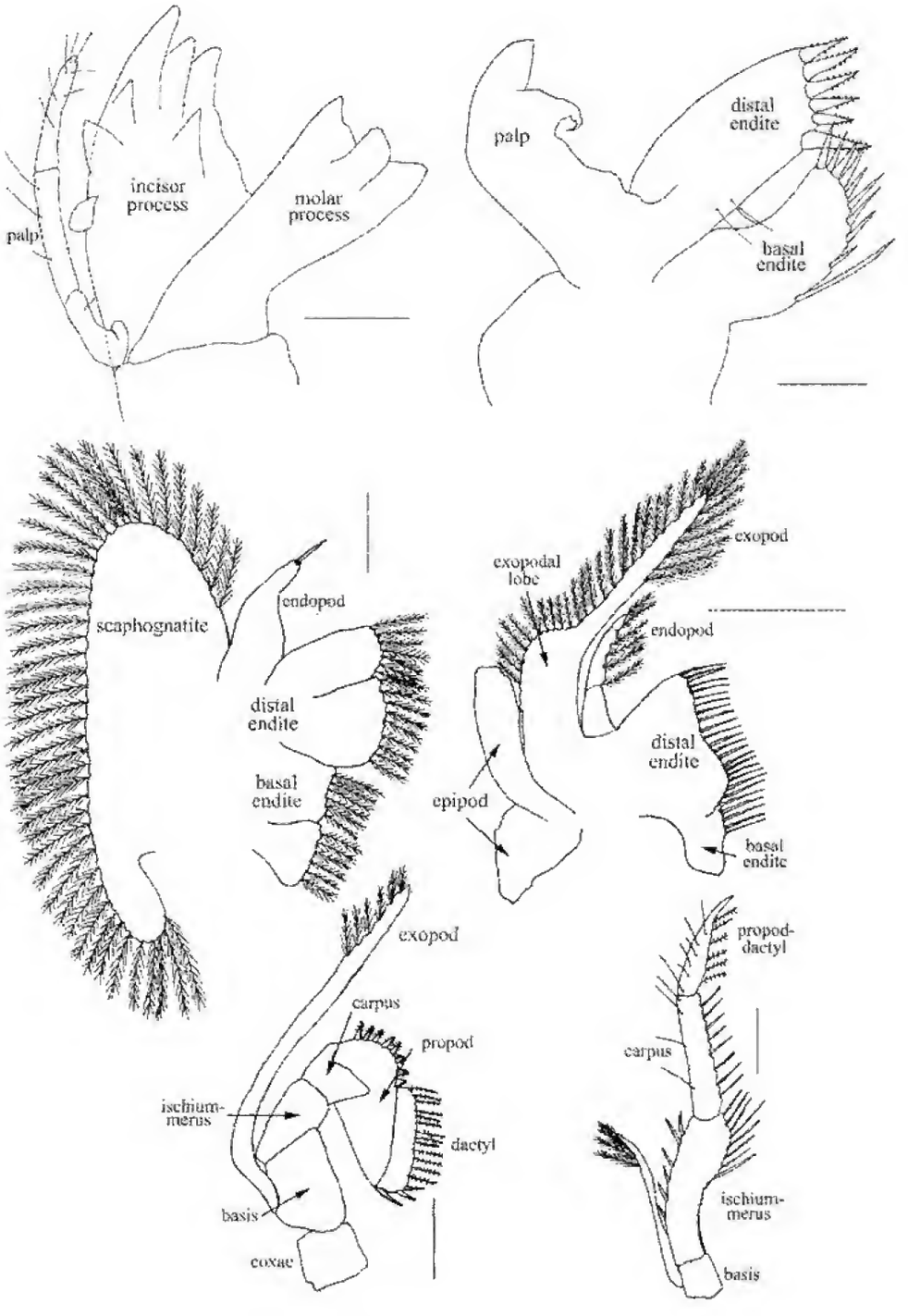

Fig.1- Mouth parts nomenclature. Hypothetical caridean. (A) left mandible; (B) left maxilla 1; (C) left maxilla 2; (D) left maxilliped 1; (E) left maxilliped 2 (bas-basis; c-carpus; cx-coxa; d-dactyl; i-m-ischio-merus; pr-propod); (F) left maxilliped 3 (bas=basis; c=carpus; i-m=ischio-merus; p-d=propod-dactyl).

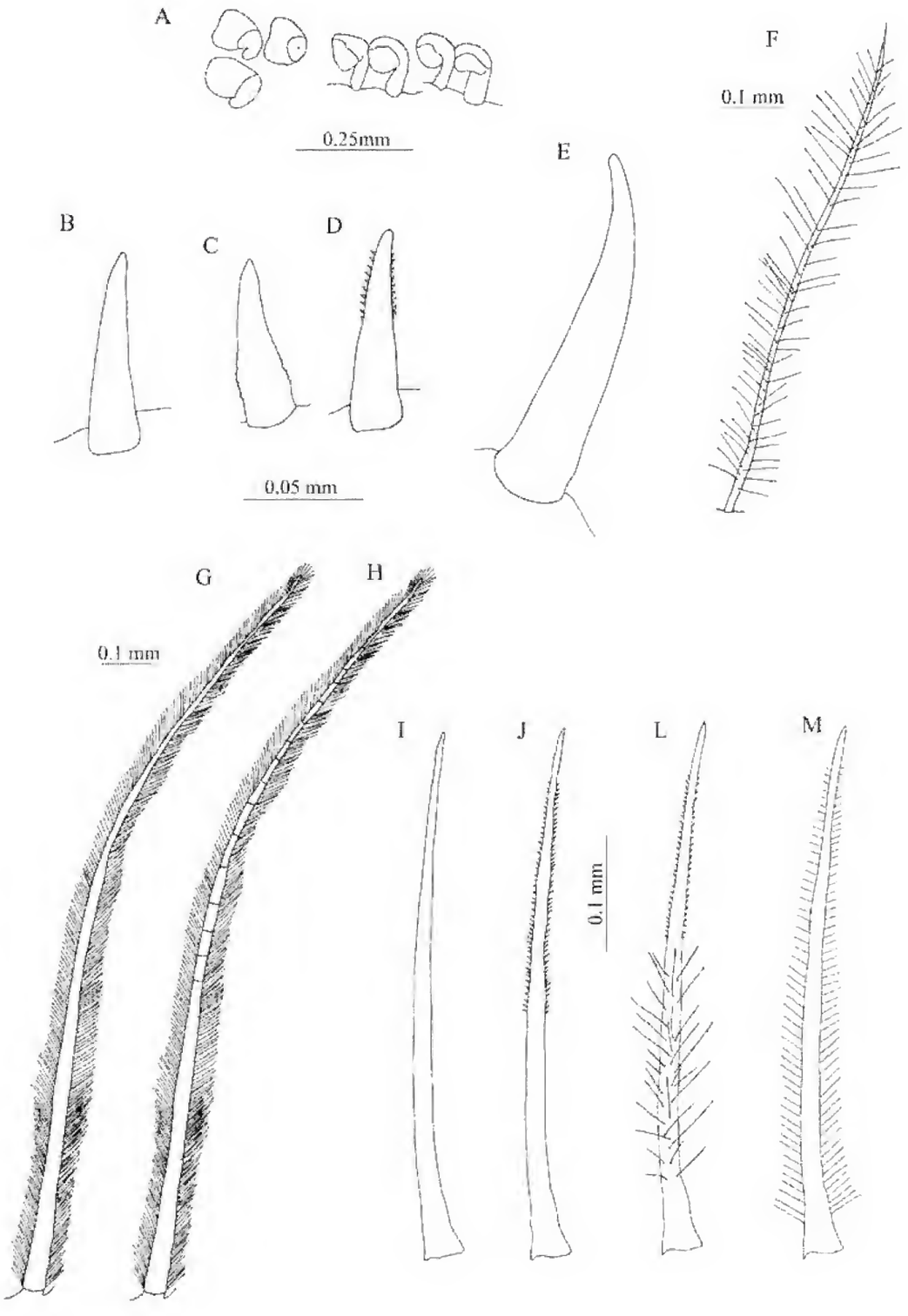

Fig.2- Types of setae found in material examined. (A) hook; (B) cuspidate; (C) cuspidate serrate; (D) cuspidate denticulate; (E) long cuspidate; (F) pappose; (G) densely plumose; (H) densely plumose articulated; (I) simple; (J) serrulate; (L) papposerrate; (M) scattered plumose.

Discias serratirostris Lebour, 1949
(Figs.3-6)

Discias serratirostris LEBOUR, 1949:1107, figs.1, 2; BRUCE, 1970:315; 1975:34; 1976:129; CHACE, 1972:16; HOLTHUIS, 1981:791; KENSLEY, 1983:15, figs.13-14.

Material examined – Rocas Atoll, central lagoon, near Guarapirá pool, 1♂ (1.2mm), MNRJ 19038.

Diagnosis – Carapace with rostrum short, lanceolate; point acute; lateral margins serrate; with antennal spine on carapace margin, branchiostegal spine small; branchiostegal groove absent. Stylocerirte reaches ½ of basal antennular article; anterolateral tooth of basal article reaches ½ of second antennular article. Scaphocerite without distal teeth. Telson with 3 pairs of distal setae. Uropod exopod without serrate outer margin.

Description – Carapace with rostrum short, lanceolate, point acute, lateral margins serrate; with antennal spine on carapace margin, and small branchiostegal spine; branchiostegal groove absent (Fig.3A, B). Broad stylocerite ending in sharp point, half of basal antennular article length; anterolateral tooth reaching half of second antennular article; second antennular article without lobe on inner margin (Fig.3C). Scaphocerite without distolateral tooth; blade elongate, with anterior margin truncate (Fig.3D). Maxilla 2 with broad scaphognathite with densely plumose setae on all margins; endopod short, less than half of scaphognathite length; two bilobed endites, distal larger than basal, both with densely plumose setae on inner margin (Fig.4A). Maxilliped 1 with large epipod; broad, short exopodal lobe with densely plumose setae on outer margin; exopod short; endopod three-fourths exopod length, with several densely plumose setae on inner margin; endite with densely plumose setae on straight inner margin (Fig.4B). Maxilliped 2 with merus and ischium fused; carpus short; propodus elongate, with serrulate setae on inner margin; dactyl rounded, with serrulate setae on inner margin (Fig.4C). Maxilliped 3 with tufts of slender setae on all articles; propod-dactyl broad, with cuspidate setae on outer margin, and serrulate setae on inner margin (Fig.4D). Pereopod 1 robust, ischio-merus with distal cuspidate setae on outer margin; carpus reduced; dactyl circular, one-third propodus length; propodus with one cuspidate seta at distal inner angle (Fig.5A). Pereopods 3-5 with simple dactyl. Pereopod 3, ischium with one cuspidate seta on inner margin; merus with four cuspidate setae on inner margin; propodus with five small cuspidate setae on inner margin, last one at inner distal angle (Fig.5B). Pereopod 4, ischium with two cuspidate setae on inner margin; merus with four cuspidate setae on inner margin; propodus with five cuspidate setae on inner margin (Fig.5C). Pereopod 5, ischium with two cuspidate setae on inner margin; merus with two cuspidate setae on inner margin; propodus with six small cuspidate setae on inner margin (Fig. 5D). Abdomen with dorsal spine on somite 2 (Fig.6C). Male endopod of pleopod 1 leaf shaped, with simple setae on distal margin (Fig. 6A). Endopod of pleopod 2 with slender appendix interna, with many hook setae distally; appendix masculina slender, with several acute, simple setae distally (Fig.6B). Abdomen with dorsal spine on somite 2 (Fig.6C). Telson with three pairs of dorsolateral cuspidate setae; three pairs of distal setae, outer pair cuspidate and inner pair simple; distal end slightly rounded (Fig.6D). Exopod of uropod without diaresis, lateral margin not ending in sharp triangular projection, with strong posterolateral stout seta that not overreaches exopod tip (Fig. 6D).

Distribution – Western Atlantic Ocean: Bermuda, Florida, Belize, Gulf of Mexico, Brazil (Espírito Santo and Rocas Atoll).

Remarks – Only *Discias atlanticus* Gurney, 1939 and *D. serratirostris* (CHACE, 1972) are recorded in the Atlantic Ocean. These two species occur in Brazilian waters, the former from Maranhão to Ceará and the latter in the Espírito Santo (RAMOS-PORTO & COELHO, 1998). Others previous records of *D. serratirostris* were from Bermuda, Florida, Belize, and Gulf of Mexico (LEBOUR, 1949; KENSLEY, 1983).

Discias atlanticus has a narrow rostrum, with subparalell margins and the sixth abdominal somite is twice as long as the fifth, while *D. serratirostris* has the rostrum broadly triangular, with serrate lateral margins and the sixth abdominal somite is a little longer than the fifth.

The specimen examined agrees with the description of LEBOUR (1949) in the triangular rostrum and serrate lateral margins, by the mouth parts shape, and by the pereopod 1 propodus and dactyl shape (the pereopod 2 was lost in the specimen). However, the small distolateral tooth on scaphocerite cited by LEBOUR (1949) was not observed, and the cuspidate setae on ischium, merus and propodus of pereopods 3-5 presents some variation in number and position. The diagnostic characters cited by KENSLEY (1983) are: rostrum lanceolate, apically acute with lateral margins serrate; dorsal spine on abdominal somite 2; scaphocerite without distolateral tooth and telson with three pairs of cuspidate setae on distal margin

and uropod exopod without diaresis. All these characters agree with material examined except the telson that has two pairs of distal cuspidate setae and four pairs of dorsolateral cuspidate setae. The number and position of cuspidate setae on ischium, merus and propodus of pereopods 4 and 5 is similar to that figured by KENSLEY (1983), who did not figured the pereopod 3.

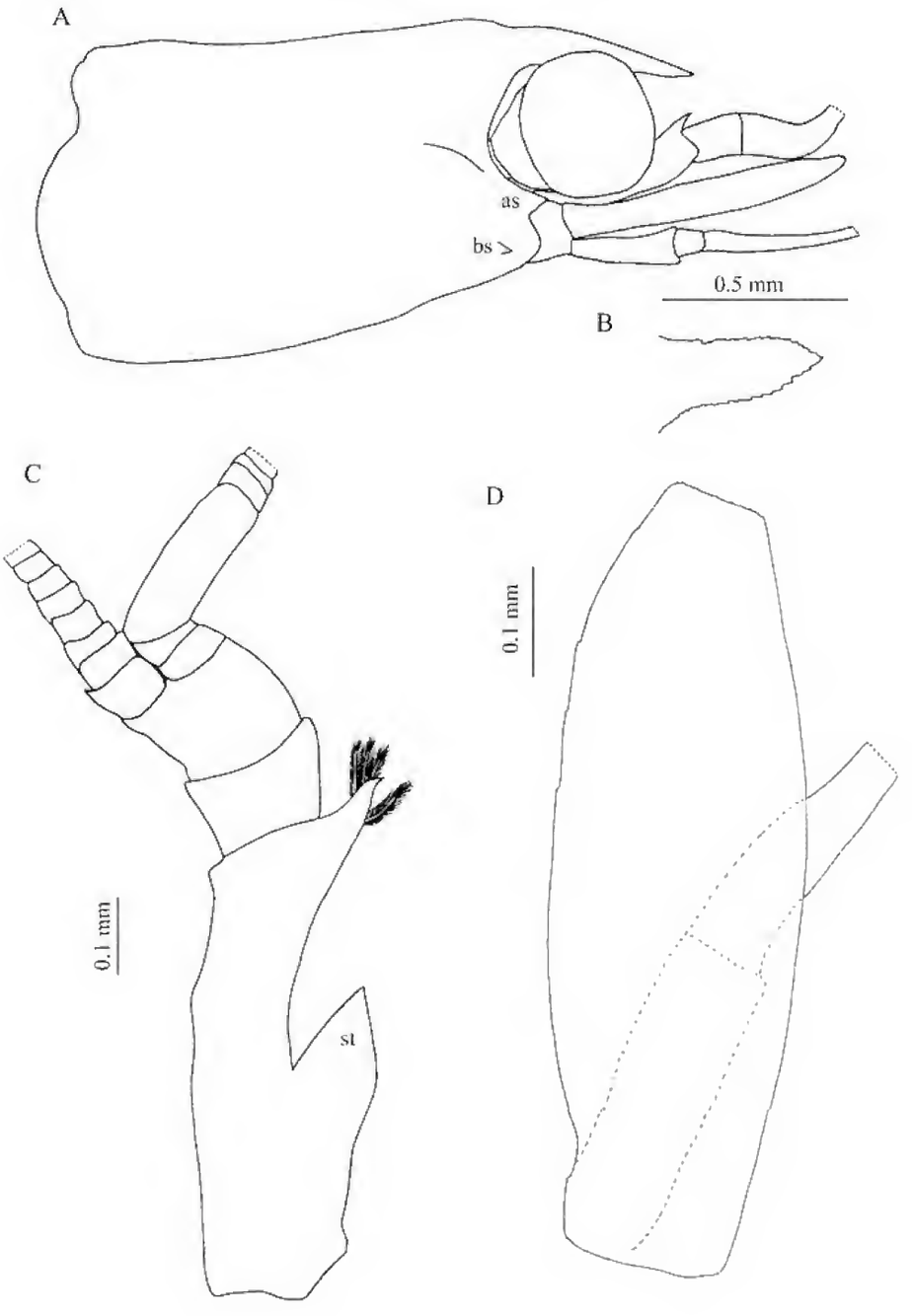

Fig.3- *Discias serratirostris* Lebour, 1949, ♂, MNRJ 19038 (carapace length 1.2mm). (A) carapace and cephalic appendages, lateral (as=antennal spine; bs=branchiostegal spine); (B) rostrum, dorsal; (C) right antennula, dorsal (st=stylocerite); (D) right scaphocerite, dorsal.

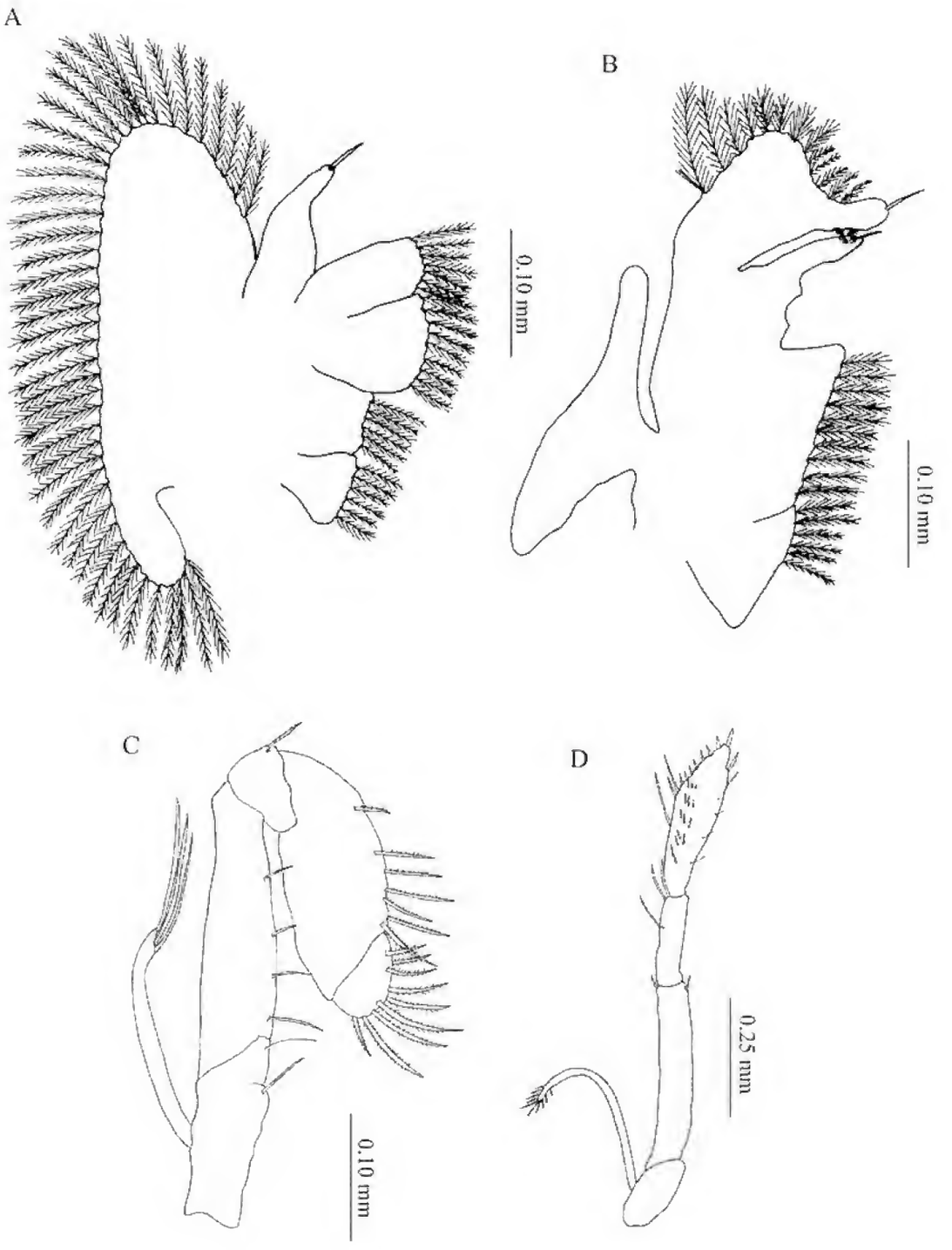

Fig.4- *Discias serratirostris* Lebour, 1949, ♂, MNRJ 19038 (carapace length 1.2mm). (A) left maxilla 2, dorsal (end=endite; enp=endopod;sc=scaphognathite); (B) left maxilliped 1, dorsal (el=exopodal lobe; end=endite; enp=endopod; ep=epipod; exp=exopod); (C) left maxilliped 2, dorsal (exp=exopod); (D) left maxilliped 3, dorsal (exp=exopod).

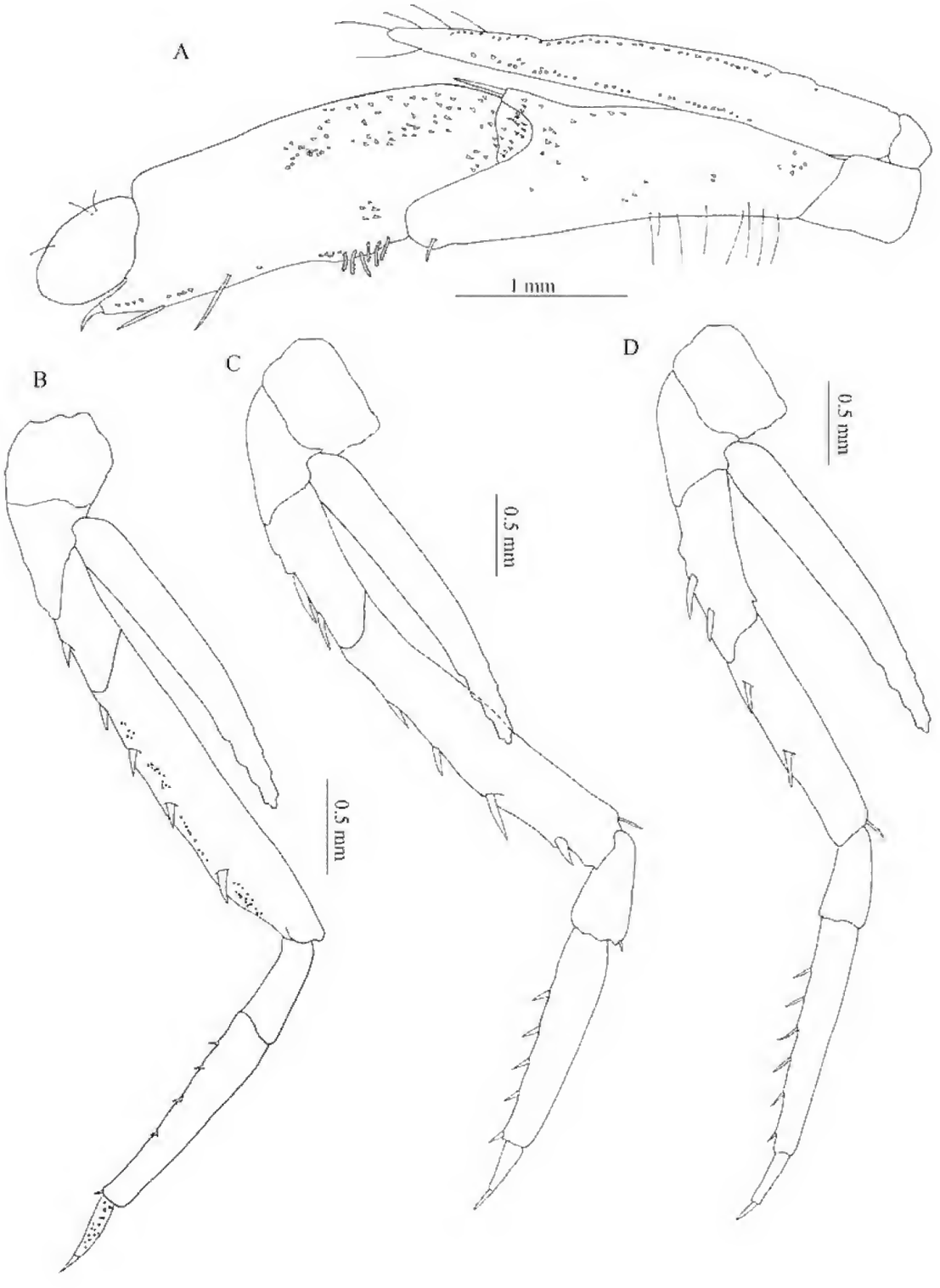

Fig.5- *Discias serratirostris* Lebour, 1949, ♂, MNRJ 19038 (carapace length 1.2mm). (A) right pereopod 1, lateral; (B) left pereopod 3, lateral; (C) left pereopod 4, lateral; (D) left pereopod 5, lateral.

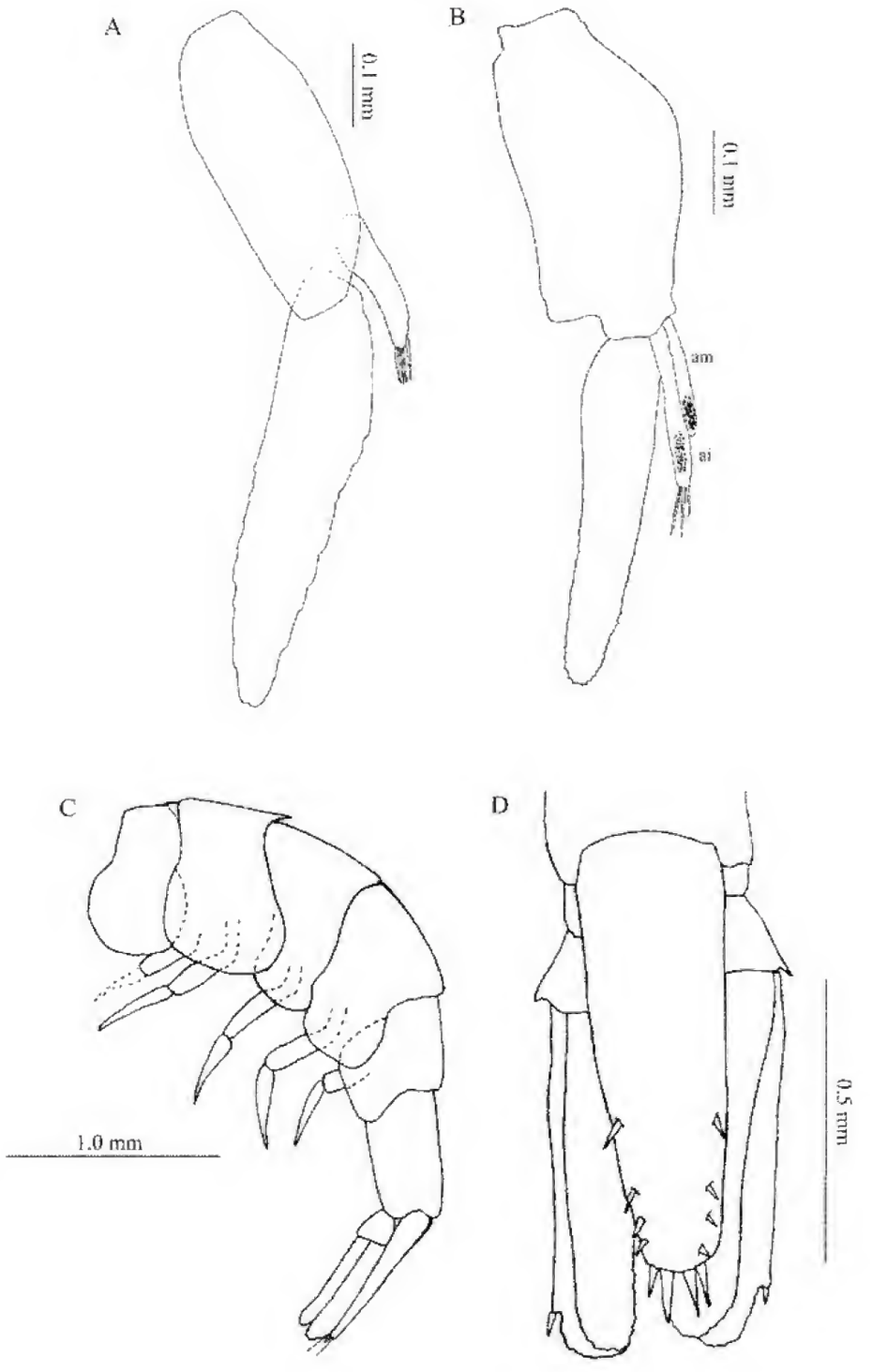

Fig.6- *Discias serratirostris* Lebour, 1949, ♂, MNRJ 19038 (carapace length 1.2mm). (A) left pleopod 1, lateral; (B) left pleopod 2, lateral (ai=appendix interna; am=appendix masculina); (C) abdomen, lateral; (D) telson and uropods, dorsal.

Family Palaemonidae Rafinesque, 1815

Subfamily Palaemoninae Rafinesque, 1815

Brachycarpus Bate, 1888

Brachycarpus BATE, 1888:795; HOLTHUIS, 1952a:2.

Diagnosis – Carapace with rostrum long; with antennal and hepatic spines. Mandibular palp with three articles. Dactyl of pereopods 1-3 bifid. Telson with two pairs of dorsal cuspidate setae (modified from HOLTHUIS, 1952a).

Brachycarpus biunguiculatus (Lucas, 1846) (Figs.7-10)

Palaemon biunguiculatus LUCAS, 1846:45, pl.4, fig.4.

Brachycarpus savignyi BATE, 1888:795, pl.129, fig.4.

Brachycarpus biunguiculatus – HOLTHUIS, 1952:3, pl.1, figs.a-q (with synonym); CHACE, 1972:18.

Material examined – Rocas Atoll, pool, 1♂ (14.0mm), MNRJ 19030; pool, 1 ovigerous ♀ (11.0mm), 1♀ (11.5mm) MNRJ 19031; pool, 2♀ (11.0, 6.0mm), MNRJ 19032; pool, 1♀ (10.5mm), MNRJ 19033; no detailed locality, 1 juvenile (3.0mm), MNRJ 19037.

Diagnosis – Carapace, rostrum upper margin with seven or eight teeth, lower margin with three teeth; antennal and hepatic spines present. Stylocerite half of basal antennular article length, anterolateral tooth reaches end of second antennular article. Scaphocerite with strong terminal tooth overreaching end of scale. Dactyl of pereopods 3 to 5 bifid (modified from HOLTHUIS, 1952a).

Description – Carapace with rostrum long, reaching end of scaphocerite, upper margin bearing eight teeth, lower margin with three teeth and distal part unarmed; with antennal spine slender; hepatic spine present; without branchiostegal spine (Fig.7A). Stylocerite half basal antennular article length, anterolateral tooth reaching distal margin of second article (Fig.7B). Scaphocerite with distal tooth strong, distinctly overreaching end of scale (Fig.7C). Mandible, incisor process with three acute distal teeth, three acute median teeth, and a lateral tubercle; molar process with three strong triangular teeth distally; palp three-articulated, reaching almost the end of incisor process (Fig.8A). Maxilla 1 with one endite, with long cuspidate setae on inner margin; palp bilobed, lower lobe with curved acute point (Fig.8B). Maxilla 2 with broad scaphognathite with densely plumose setae on all margins; endopod one-third of scaphognathite length; endite bilobed with simple setae on inner margin (Fig.8C). Maxilliped 1 with short rounded exopodal lobe, densely plumose setae on outer margin; slender and elongate exopod with densely plumose setae on inner margin; endopod almost one-fifth of exopod length, with several papposerrate seta on inner and anterior margins; endite bilobed, basal lobe rounded, distal lobe straight, both with serrulate setae (Fig. 8D). Maxilliped 2 with ischio-merus elongate; carpus short; curved propodus, with long cuspidate serrulate seta on distal and inner margins; dactyl with serrulate setae on inner margin, long stout simple setae on posterior margin; exopod elongate with plumose setae on outer and distal margins (Fig.8E). Maxilliped 3 ischio-merus with simple setae on inner margin, six long cuspidate setae on outer margin; carpus with simple setae on inner margin; propod-dactyl with serrulate setae on inner margin; exopod with densely plumose setae on outer margin (Fig.8F). First pereopod with carpus as long as propodus; dactyl slightly overreaching propodus length; propodus and dactyl with tufts of setae, more dense distally; chela with slender lamina in inner margin (Fig.9A). Pereopod 2 longer and much stronger than first, dactyl half propodus length; propodus and dactyl with tufts of setae; chela with slender lamina in inner margin (Fig.9B). Pereopod 3 to 5 slender, dactyls bifid. Pereopods 3 and 4, propodus with six cuspidate setae on inner margin (Fig.9C, D). Pereopod 5 longer than pereopod 3-4 propodus with four cuspidate setae on inner margin (Fig.9E). Male endopod of pleopod 1 rounded, with anterior distal lobe with hook setae short plumose setae on anterior margin (Fig.10A). Male endopod of pleopod 2 with appendix interna slender, with numerous hook setae distally; appendix masculina subequal in length to appendix interna, with serrulate setae distally (Fig.10B). Female endopod of pleopod 1 leaf like with plumose setae on all margins (Fig.10C). Female endopod of pleopod 2 with appendix interna slender, elongate, with hook setae at point (Fig.10D). Telson with two pairs of dorsolateral cuspidate setae; two pairs of distal setae, outer cuspidate setae and inner simple setae (Fig.10E). Exopod of uropod with incomplete diaresis; lateral margin ending in sharp triangular projection; with a posterolateral cuspidate seta that not overreaches exopod tip (Fig.10E).

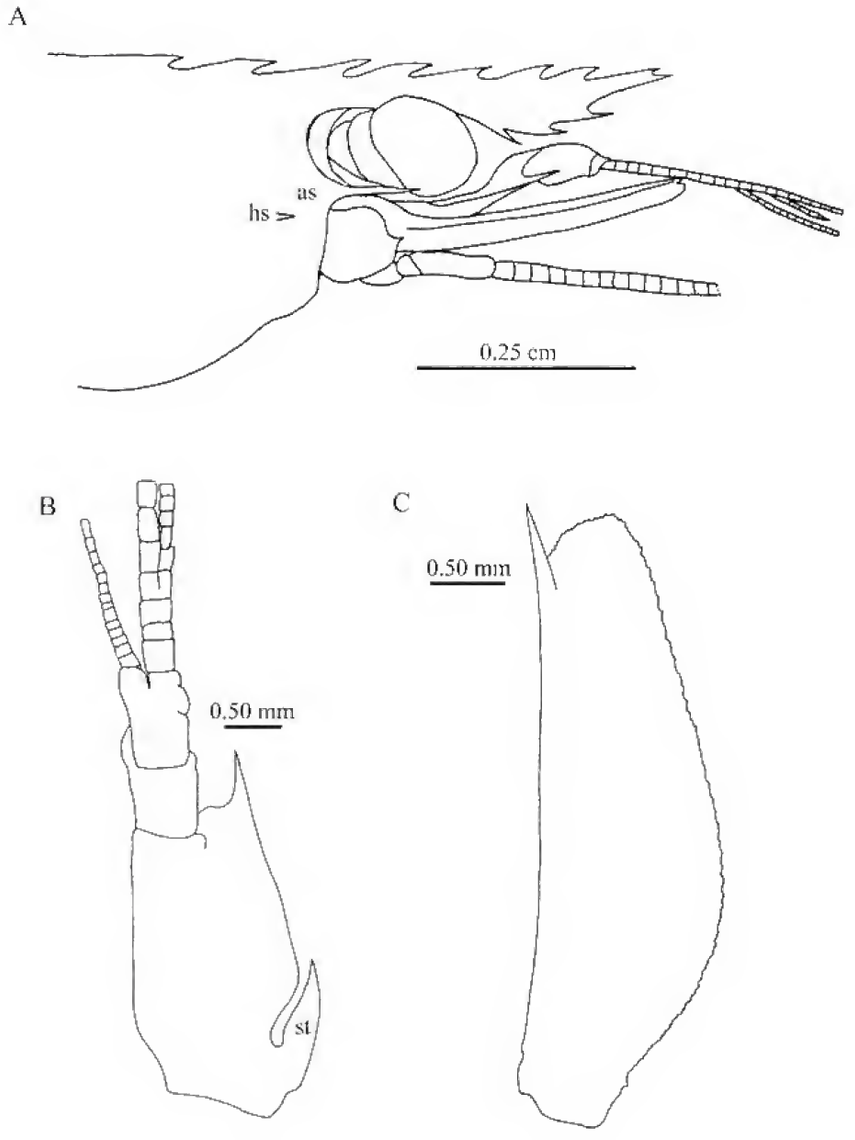

Fig.7- *Brachycarpus biunguiculatus* (Lucas, 1846), ♀ , MNRJ 19033 (carapace length 10.5mm). (A) carapace and cephalic appendages, lateral (as=antennal spine; hs=hepatic spine); (B) right antennula, dorsal (st=stylocerite); (C) right scaphocerite, dorsal.

Distribution – Pacific and Indian Oceans: American western coast (Clipperton Island); Red Sea, Tanganyika, Ceylon, Japan, Hawaii. Mediterranean Sea. Atlantic Ocean: West Africa (Liberia), American eastern coast, Caribbean Sea, Brazil: from Amapá to Espírito Santo, Fernando de Noronha and Rocas Atoll.

Remarks – The genus *Brachycarpus* is represented in the Western Atlantic by two species that occur in Brazilian waters: *Brachycarpus biunguiculatus* and *B. holthuisi* Fausto Filho, 1966. *Brachycarpus holthuisi* has the rostrum convex dorsally; dorsal cuspidate setae on telson submarginal and directed laterally; anterolateral tooth of basal article of antennular peduncle not reaching the tip of second article; mandibular palp reduced, not reaching half of incisor process length, first pereopod carpus half as long as propodus, in contrast to *B. biunguiculatus* which has rostrum straight dorsally, dorsal cuspidate setae on telson not submarginal and directed posteriorly; antero lateral tooth of basal antennular article reaching the tip of second article; mandibular palp not reduced, reaching at least, to distal third of incisor process, and first pereopod carpus slightly longer than chela.

The specimens agree mostly with the description of Holthuis (1952a) and with the diagnostic characters cited by Chace (1972) in the key of western Atlantic species of *Brachycarpus*. The only distinction observed was that the first pereopod carpus is slightly shorter than the propodus, and not slightly longer as cited by these authors.

Leander Desmarest, 1849

Leander Desmarest, 1849:92; Holthuis, 1952a:154.

Diagnosis – Carapace with rostrum long; with antennal and branchiostegal spines; without branchiostegal groove. Mandibular palp with 2 articles. All maxillipeds with exopods. Dactyl of pereopods 1-3 simple (modified from Holthuis, 1952a).

Leander tenuicornis (Say, 1818)
(Figs.11-14)

Palaemon tenuicornis SAY, 1818:249.

Leander tenuicornis – KINGSLEY, 1878:66; HOLTHUIS, 1952a:155, pl.41, figs.a-g; pl.42, figs.a-f (with synonym).

Material examined – Rocas Atoll, 03°51.68'S, 33°49.64'W, 19m, 1♀ (9.5mm), MNRJ 19034.

Diagnosis – Carapace with rostrum long, larger in female than in male, upper margin with eight to 14 teeth, lower margin with five to seven teeth; antennal and branchiostegal spines present; branchiostegal groove absent; cornea with dark colored horizontal bands. Stylocerite reaches two-thirds of basal antennular article; anterolateral tooth of basal article reaches distal margin of second antennular article. Scaphocerite with distal tooth strong, overreaching end of scale (modified from HOLTHUIS, 1952a).

Description – Carapace with rostrum long, larger in female than in male, reaching end of scaphocerite, upper margin with 11 teeth and lower with six teeth, with minute simple setae between this teeth; antennal and branchiostegal spines present; branchiostegal groove absent; cornea with dark colored horizontal bands (Fig.11A). Stylocerite reaches two thirds of basal antennular article; anterolateral tooth of basal article reaches distal margin of second antennular article (Fig.11B). Scaphocerite with distal tooth, overreaching end of scale (Fig.11C). Mandible with incisor process with three acute teeth; molar process with strong rounded teeth at distal end; palp biarticulated (Fig.12A). Maxilla 1 with two endites, basal endite with cuspidate setae on inner margin, distal endite with stout and serrulate setae on inner margin; palp bilobed distally, basal lobe with curved acute point (Fig.12B). Maxilla 2 with broad scaphognathite with densely plumose setae on all margins; endopod is one-fourth of scaphognathite length; endite bilobed, slender, elongate, with simple setae on inner margin (Fig.12C). Maxilliped 1 with epipod bilobed, basal endite sub-quadrate, distal endite rounded, both with serrulate setae on inner margin; short sub-quadrate exopodal lobe, with densely plumose setae on outer margin; slender and elongate exopod, with densely plumose setae on outer margin and distally; endopod almost one-fifth of exopod length, with slender long cuspidate setae; endite bilobed, with serrulate setae on inner margin, basal lobe rounded, twice length of distal lobe (Fig.12D). Maxilliped 2 with merus elongate, carpus short triangular, propodus with short simple setae on inner margin; dactyl rounded, with short serrulate setae on inner margin; exopod elongate with plumose setae distally (Fig.12E). Maxilliped 3, ischio-merus with simple setae on distal inner and outer margins; carpus with simple setae on inner margin and serrulate setae on outer margin; propod-dactyl with serrulate setae on all margins and tufts of serrulate setae on dorsal surface; exopod with densely plumose setae on outer margin (Fig.12F). Pereopod 1 slender, reaching tip of scaphocerite; dactyl more than half propodus length (Fig. 13A). Pereopod 3-5 slender with simple dactyl. Pereopod 3 with propodus less than three times longer than dactyl, with four cuspidate setae on inner margin, and two pairs of distal cuspidate setae, one at inner and one at outer angle (Fig.13B). Pereopod 4, propodus three times longer than dactyl, with four cuspidate setae on inner margin, two pairs of distal cuspidate setae, one at inner and one at outer angle (Fig.13C). Pereopod 5 with propodus more than three times longer than dactyl, with ten cuspidate setae on inner margin, one pair of cuspidate setae on distal angle (Fig.13D). Female endopod of pleopod 1 rounded, with densely plumose setae on all margins (Fig.14A). Endopod of pleopod 2 with appendix interna slender elongate, with numerous hook setae distally (Fig.14B). Telson with two pairs of dorsolateral cuspidate setae; three distal cuspidate setae, and pair of simple setae (Fig.14C). Exopod of uropod without complete diaresis; lateral margin ending in sharp triangular projection (Fig.14C).

Distribution – Tropical and Subtropical seas all over the world, except for the American western coast. It occurs in shallow waters near the seashore between seaweeds (HOLTHUIS, 1952a). Brazil: from Maranhão to São Paulo and Rocas Atoll.

Remarks – The genus *Leander* includes four species, two occurring in the Western Atlantic and in Brazilian waters: *Leander paulensis* Ortmann, 1897 and *L. tenuicornis* (Say, 1818). MANNING (1961a) redescribed *L. paulensis* and presented a table distinguishing both Atlantic species. *Leander paulensis* does not show sexual dimorphism in the shape of the rostrum; the outer margin of basal antennular article is convex; the stylocerite is short, reaching the middle of the basal antennular article and the scaphocerite is slender in both sexes. On the other hand, *L. tenuicornis* has sexual dimorphism in the shape of the rostrum; the female has a broadened ventral margin; the outer margin of basal antennular article is straight and the stylocerite is long, reaching the distal third of the basal antennular article. The only female examined agrees in all characters observed by HOLTHUIS (1952a) and MANNING (1961a).

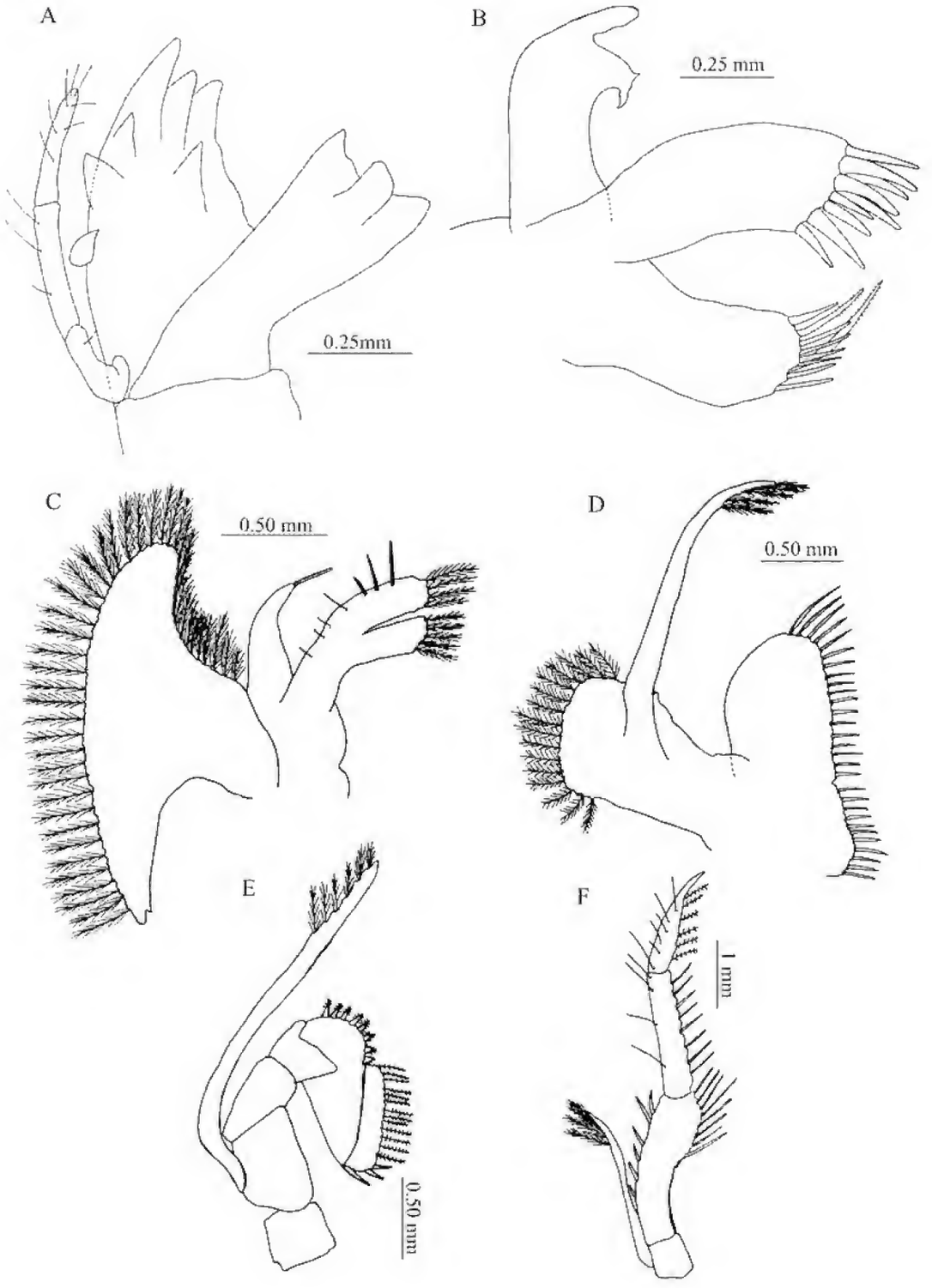

Fig.8- *Brachycarpus biunguiculatus* (Lucas, 1846), ♀ , MNRJ 19033 (carapace length 10.5mm). (A) left mandible, dorsal (ip=incisor process; mp=molar process; p=palp); (B) left maxilla 1, dorsal (end=endite; p=palp); (C) left maxilla 2, dorsal (end=endite; enp=endopod; sc=scaphognathite); (D) left maxilliped 1, dorsal (el=exopodal lobe; end=endite; enp=endopod; exp=exopod); (E) left maxilliped 2, dorsal (exp=exopod); (F) left maxilliped 3, dorsal (exp=exopod).

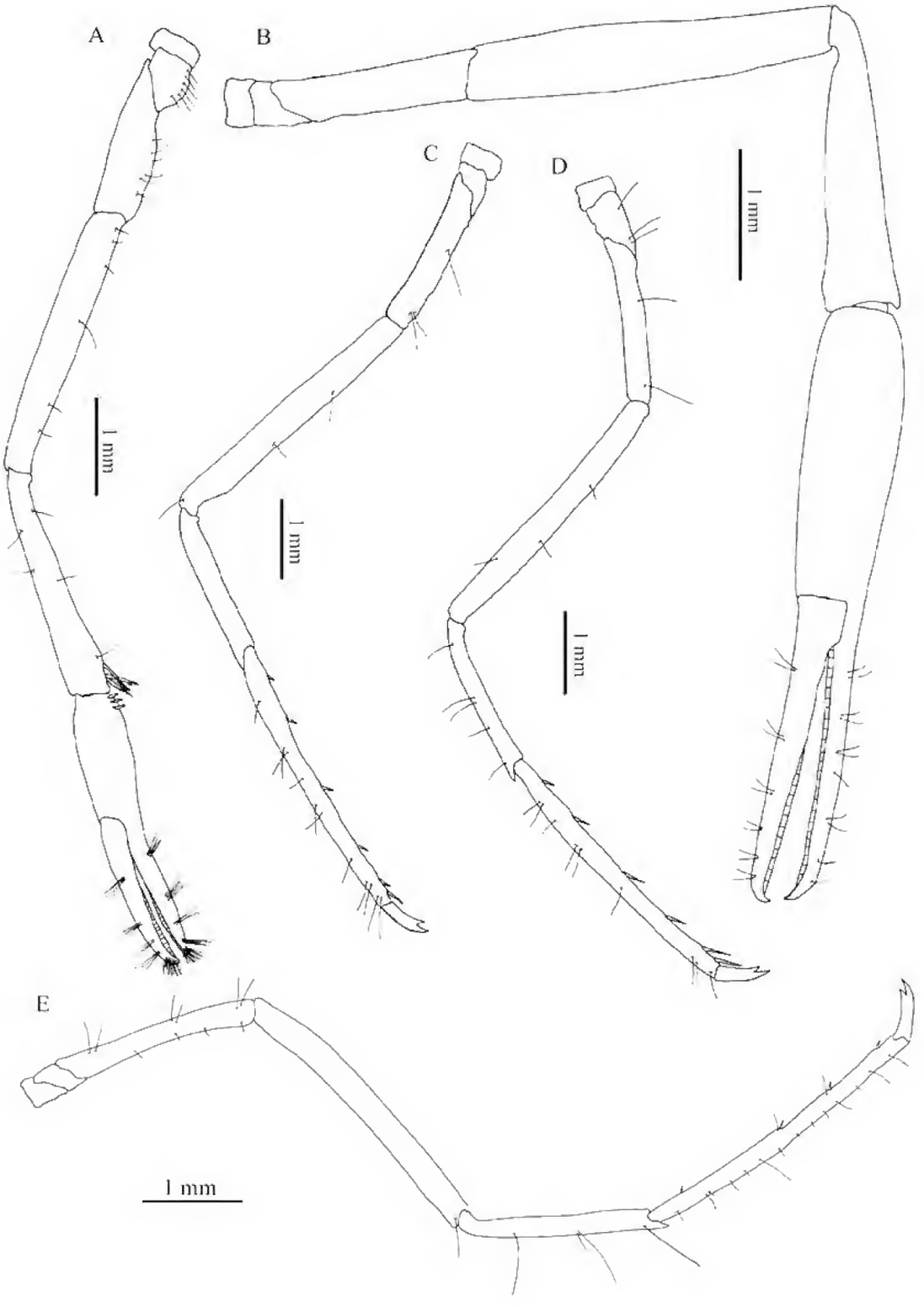

Fig.9- *Brachycarpus biunguiculatus* (Lucas, 1846), 1895, ♀ , MNRJ 19033 (carapace length 10.5mm). (A) right pereopod 1, lateral; (B) right pereopod 2, lateral; (C) right pereopod 3, lateral; (D) right pereopod 4, lateral; (E) right pereopod 5, lateral.

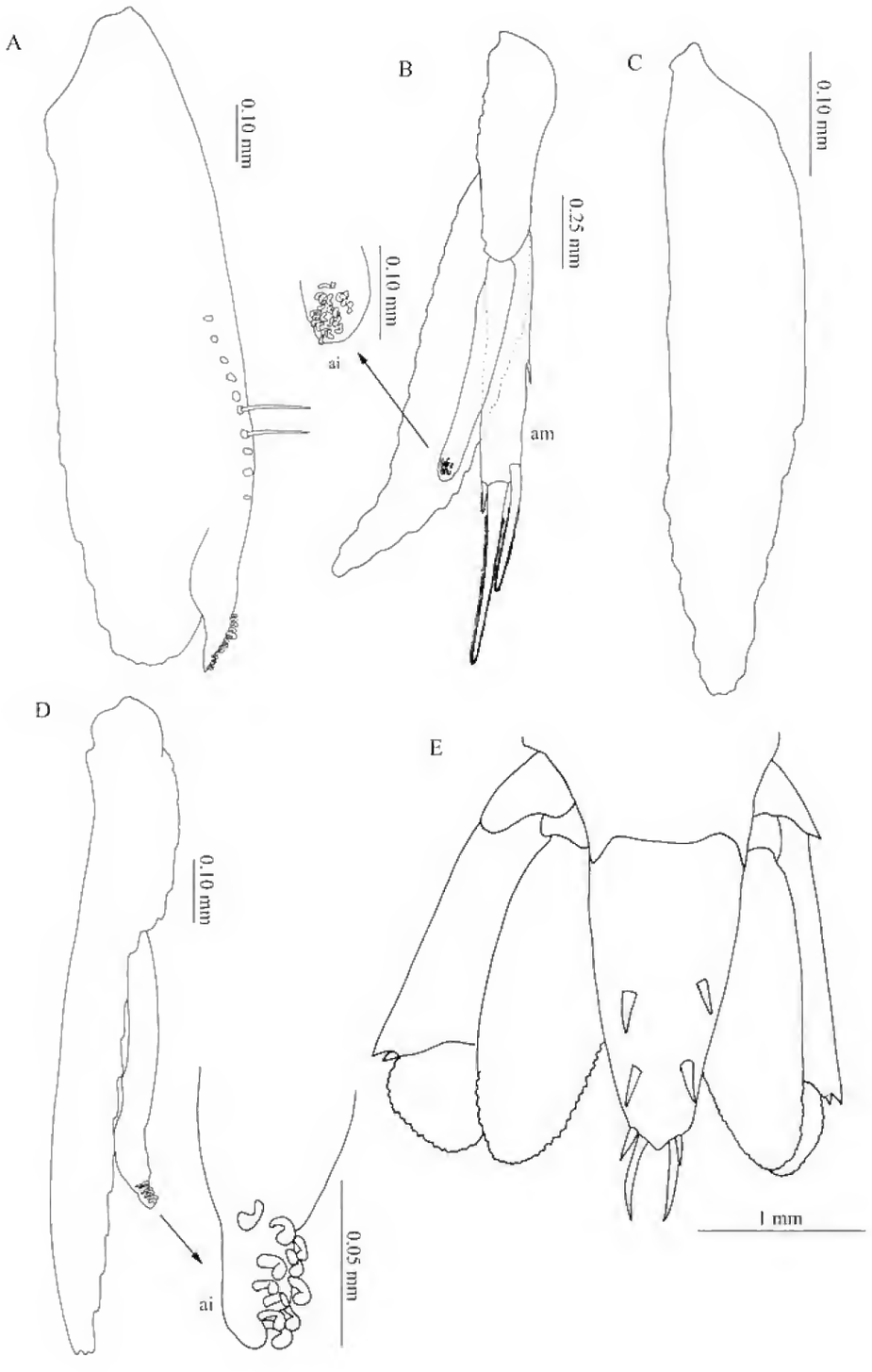

Fig.10- *Brachycarpus biunguiculatus* (Lucas, 1846), ♂ , MNRJ 19030 (carapace length 14mm). (A) left endopod of pleopod 1, lateral; (B) left pleopod 2, lateral (ai=appendix interna; am=appendix masculina). *Brachycarpus biunguiculatus* (Lucas, 1846), ♀ , MNRJ 19033 (carapace length 10.5mm); (C). left endopod pleopod 1, lateral; (D) exopod and appendix interna of pleopod 2 (ai=appendix interna); (E) telson and uropods.

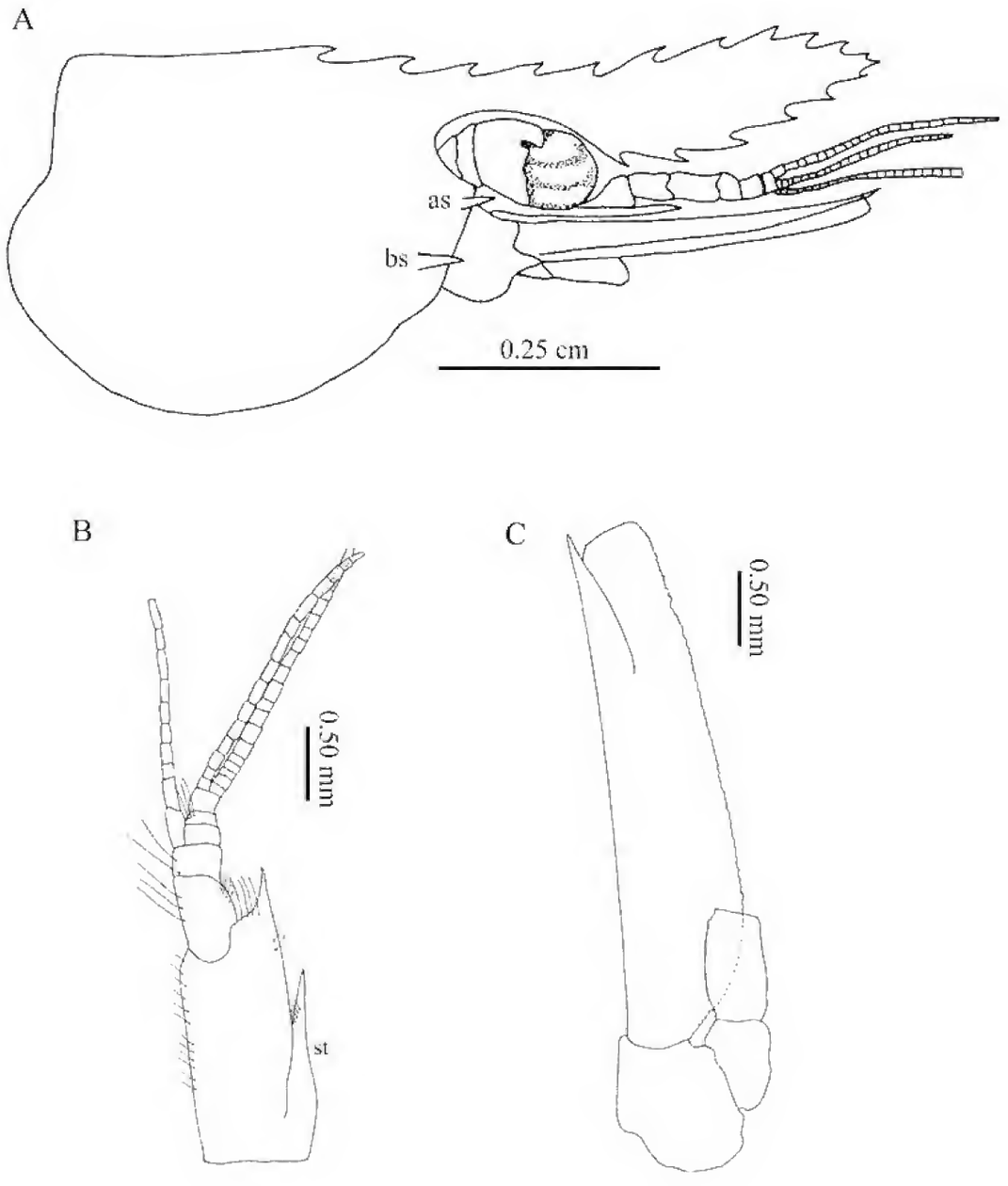

Fig.11- *Leander tenuicornis* (Say, 1818), ♀ , MNRJ 19034 (carapace length 9.5mm). (A) carapace and cephalic appendages, lateral (as=antennal spine; bs=branchiostegal spine); (B) right antennula, dorsal (st=stylocerite); (C) right scaphocerite, dorsal.

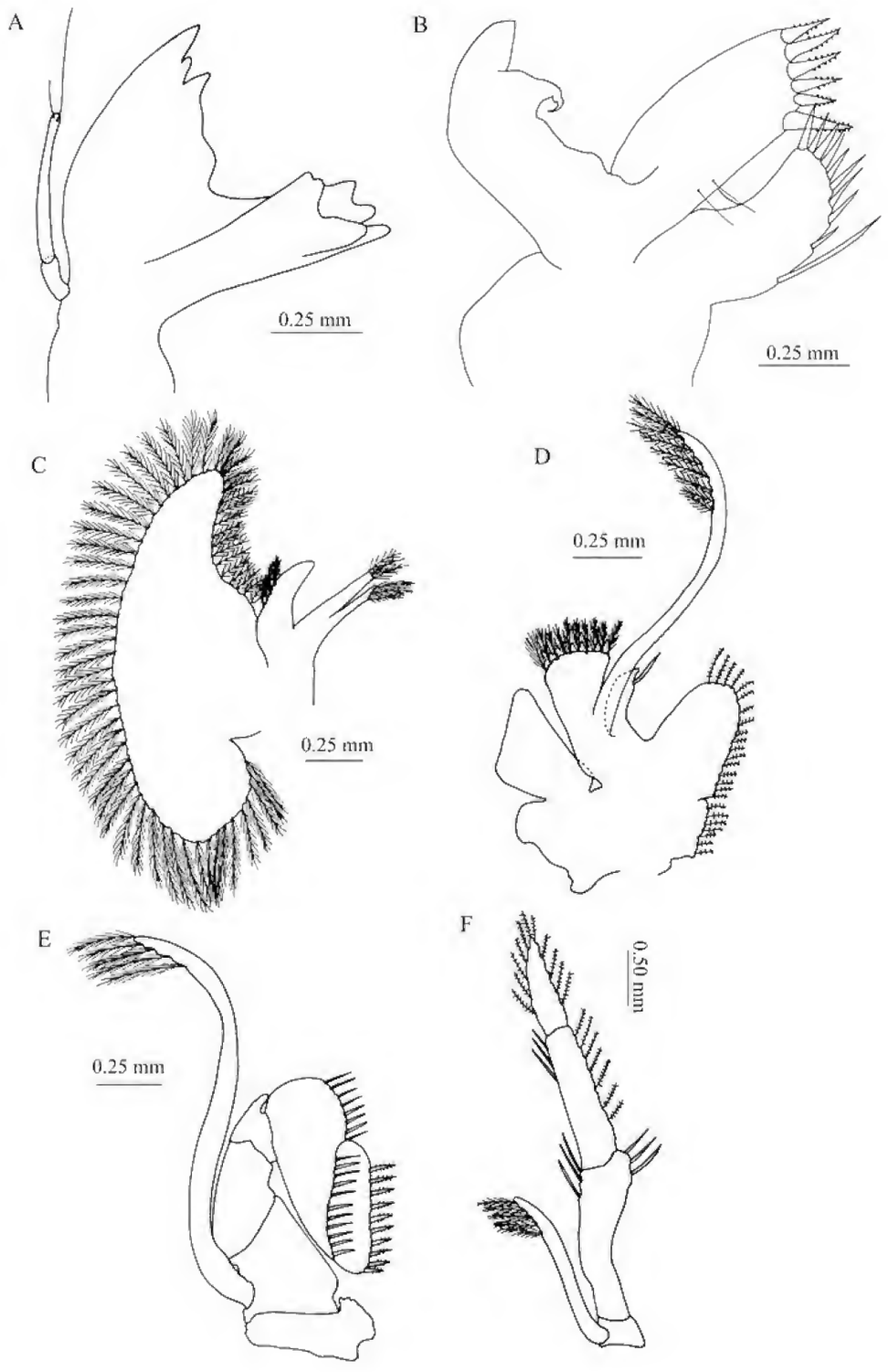

Fig.12- *Leander tenuicornis* (Say, 1818), ♀ , MNRJ 19034 (carapace length 9.5mm). (A) left mandible, dorsal (ip=incisor process; mp=molar process); (B) left maxilla 1, dorsal (end=endite; p=palp); (C) left maxilla 2, dorsal (end=endite; enp=endopod; sc=scaphognathite); (D) left maxilliped 1, dorsal (el=exopodal lobe; end=endite; enp=endopod; ep=epipod; exp=exopod); (E) left maxilliped 2, dorsal (exp=exopod); (F) left maxilliped 3, dorsal (exp=exopod).

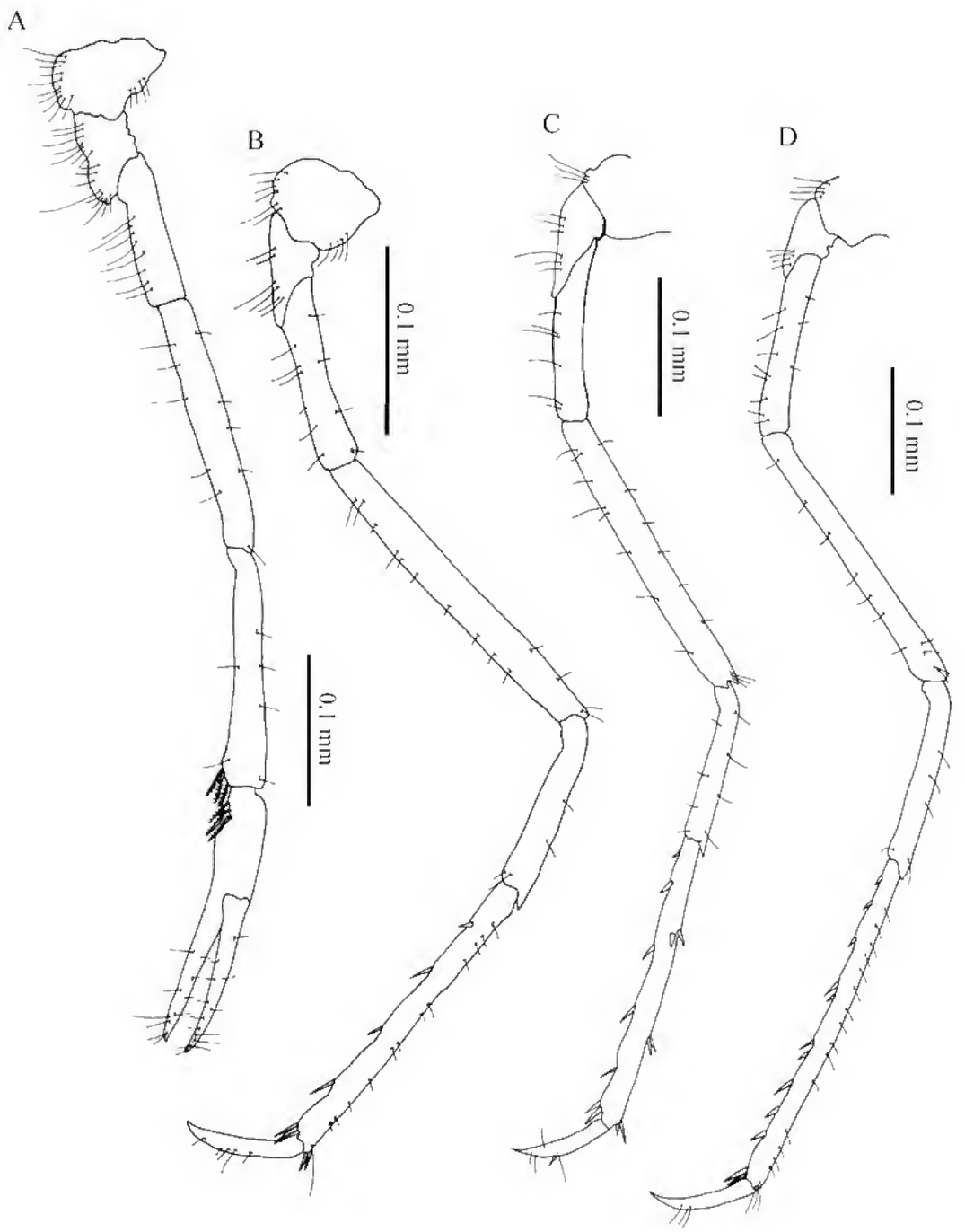

Fig.13- *Leander tenuicornis* (Say, 1818), ♀ , MNRJ 19034 (carapace length 9.5mm). (A) left pereopod 1, lateral; (B) left pereopod 3, lateral; (C) left pereopod 4, lateral; (D) left pereopod 5, lateral.

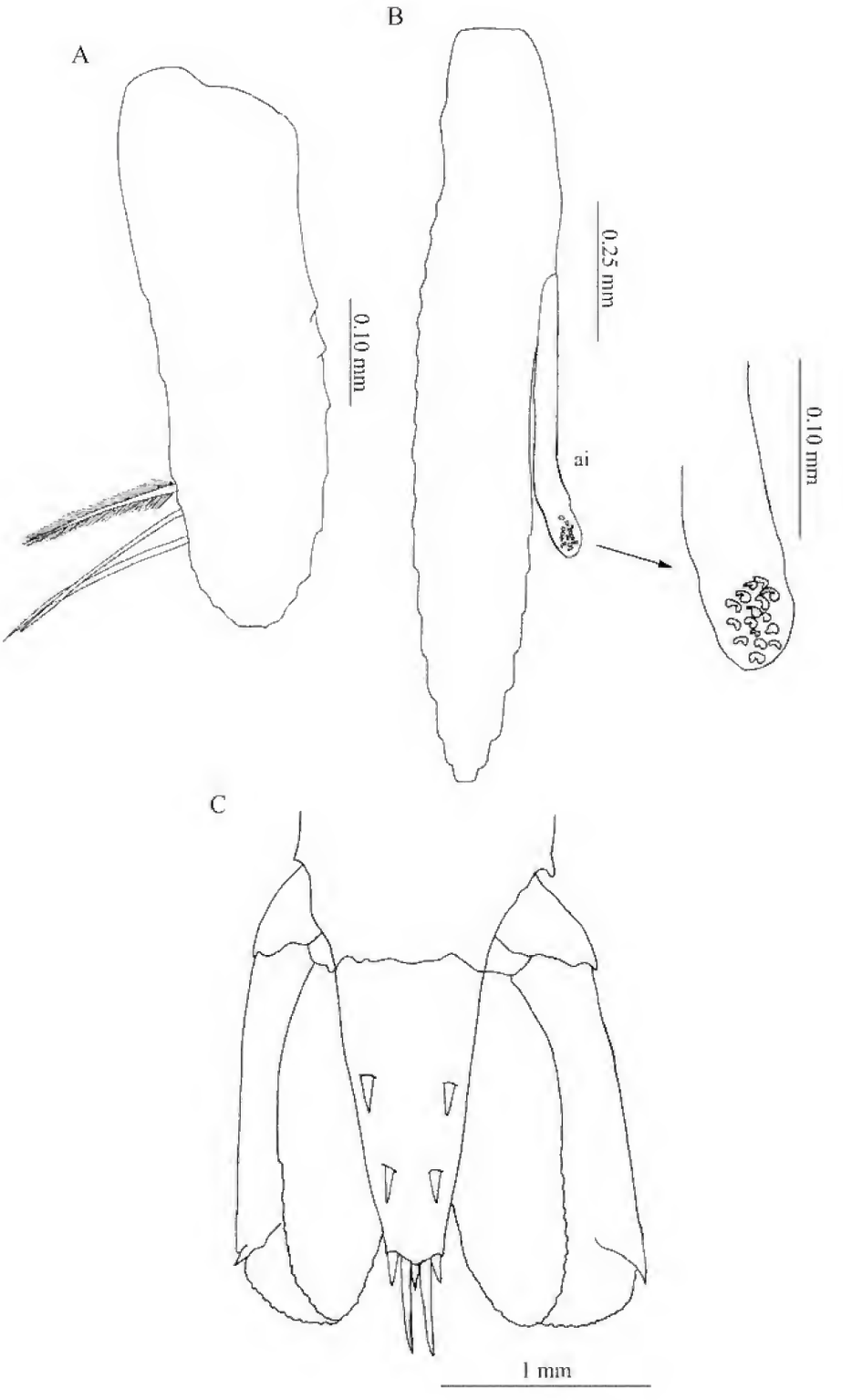

Fig.14- *Leander tenuicornis* (Say, 1818), ♀ , MNRJ 19034 (carapace length 9.5mm). (A) left endopod of pleopod 1, lateral; (B) left exopod and appendix interna of pleopod 2, lateral (ai=appendix interna); (C) telson and uropods, dorsal.

Subfamily Pontoniinae Kingsley, 1878

Periclimenaeus Borradaile, 1915

Periclimenaeus BORRADAILE, 1915; HOLTHUIS, 1951:76.

Diagnosis – Carapace with rostrum short; supra orbital spine present or absent; with antennal spine; without hepatic spine. Mandible with incisor and molar process widely separated; without palp. Pereopod 2 strong, generally markedlly unequal, fingers hammer-shaped. Pereopods 1-3 slender with dactyl simple or bifid (modified from HOLTHUIS, 1951).

KEY TO ATLANTIC SPECIES OF *PERICLIMENAEUS* (MODIFIED FROM CHACE, 1972)

1a. Telson with anterior pair of cuspidate setae arising from its anterior fourth (Fig.19D) 2
1b. Telson with anterior pair of cuspidate setae arising at end of its anterior third or posterior to it 10
2a. Telson with three pairs of distal cuspidate setae inserted in continuous line 3
2b. Telson with outer pair of distal cuspidate setae inserted distinctly anterior to the other two pairs 5
3a. Rostrum with one ventral tooth; carapace with denticle or tubercle posterior to orbit (Fig.15A) ..... *P. caraibicus*
3b. Rostrum without ventral tooth; carapace without denticle or tubercle posterior to orbit 4
4a. Maxilliped 3 with two distal articles broad; pereopod 1 with movable finger tapering to tip, not strongly convex; minor pereopod 2 with fingers longer than palm ..... *P. ascidiarum*
4b. Maxilliped 3 with two distal articles slender; pereopod 1 with movable finger strongly convex; minor pereopod 2 with fingers much shorter than palm ..... *P. pearsei*
5a. Rostrum with four dorsal teeth ..... *P. chacei*
5b. Rostrum with seven to 12 dorsal teeth 6
6a. Pereopod 1 distinctly long and slender, carpus nearly twice as long as chela ..... *P. perlatus*
6b. Pereopod 1 not distinctly long and slender, carpus less than once and a half as long as chela 7
7a Rostrum with seven to eigth dorsal teeth; telson with posterior pair of dorsolateral cuspidate setae arising from anterior half of its segment 8
7b. Rostrum with ten to 12 dorsal teeth; telson with posterior pair of dorsolateral cuspidate setae arising from its posterior half of segment ..... *P. wilsoni*
8a. Carapace inflated; major pereopod 2 with dactyl elongate, strongly overreaching propod (Figs.26A, 28A) ..... *P. crosnieri* sp. nov.
8b. Carapace not inflated; major pereopod 2 with dactyl not overreaching or slightly overreaching propod 9
9a. Rostrum with eigth teeth; major and minor pereopod 2 o with rows of strong tubercles (Figs.20A, 22A) ..... *P. brucei* sp. nov.
9b. Rostrum with seven to eigth teeth; major and minor pereopod 2 sub-rectangular, with scattered tubercles ..... *P. bredini*
10a. Scaphocerite blade without distal tooth; pereopod 3 with dactyl bifid ..... *P. schmitti*
10b. Scaphocerite blade with distal tooth; pereopod 3 without distinct accessory tooth on flexor margin of dactyl 11
11a. Rostrum with four dorsal teeth; scaphocerite with large distal tooth reaching distal margin of blade ..... *P. atlanticus*
11b. Rostrum with one or two dorsal teeth; scaphocerite with small distal tooth not reaching distal margin of blade ..... *P. maxillulidens*

Periclimenaeus caraibicus Holthuis, 1951
(Figs.15-19)

Periclimenaeus caraibicus HOLTHUIS, 1951:110, pl.32, figs.h-j, pl.34.

Material examined – Rocas Atoll, pool, 1 ovigerous ♀ (3,0mm), 2♀ (2.5, 3.0mm), MNRJ 19035; pool, 1 ovigerous ♀ (1.3mm), 4♀ (1.2 to 2.8mm), 1 juvenile (1.2mm), MNRJ 17892; Barretão, 1 ovigerous ♀ (2.0mm), MNRJ 19036; pool, 1 ovigerous ♀ (2.0mm), 1♀ (1.3mm), MNRJ 17918.

Diagnosis – Carapace with rostrum short, upper margin with six teeth, lower margin slightly convex, with one tooth; with small supraorbital spine and strong antennal spine. Broad stylocerite ending in a sharp point. Scaphocerite with strong distal tooth that overreaches the scale. Female endopod of pleopod 1 leaf shaped, with papposerrate seta on distal part of anterior and posterior margins, and on inner surface. Endopod of pleopod 2 with appendix interna slender, short, with hook setae distally. Telson with anterior pair of dorsolateral cuspidate setae arising from its anterior fourth; three pair of distal setae inserted in continuous line (modified from HOLTHUIS, 1951 and CHACE, 1972).

Description – Carapace with rostrum directed slightly downwards, upper margin with six teeth, lower margin slightly convex, with one tooth; with small supraorbital spine and strong antennal spine (Fig.15A). Stylocerite broad end acute, less than half of basal antennular article length; strong anterolateral tooth reaching two-thirds of the second antennular article; second antennular article with small rounded lobe on inner margin with a slender setae (Fig.15B). Scaphocerite with strong distal tooth overreaching scale, distal tooth is one-fourth of the scale length; inner margin of scale broad and rounded (Fig.15C). Mandible with incisor process with 13 small acute distal teeth; molar process distally straight with row of slender setae on inner margin and acute anterior tooth (Fig.16A). Maxilla 1 with two endites, both with cuspidate serrulate seta and papposerrate seta on inner margin; palp short, with curved acute point (Fig.16B). Maxilla 2 with elongate epipod; broad scaphognathite with densely plumose setae on all margins; endopod unarmed, less than half of scaphognathite length; endite short, bilobed, with papposerrate seta on inner margin (Fig.16C). Maxilliped 1 with short exopodal lobe, anterior margin truncate, with densely plumose setae; slender and elongate exopod, with densely plumose articulated setae on anterior margin; endopod short, one-fourth of exopod length; endite broad, inner margin straight, with papposerrate seta (Fig.16D). Maxilliped 2 with ischio-merus short; carpus short, triangular; propodus and dactyl rounded, with setae on inner margin (Fig.16E). Maxilliped 3 with carpus and propod-dactyl with densely plumose setae on inner margin (Fig.16F). Pereopod 1 slender, dactyl one-third propodus length; propodus and dactyl with tufts of setae, more dense distally (Fig.17A). Pereopods 2 very unequal in size and shape, right stronger than left; in both carpus short triangular; propodus densely tuberculate and with small cuspidate setae; dactyl with strong, rounded tooth that fits in a concavity on the propodus cutting edge (Figs.17B, C). Major pereopod 2 with broad dactyl forming strong claw (Fig.17B). Minor pereopod 2 with dactyl elongate, forming strong claw (Fig.17C). Pereopod 3, propodus with eight cuspidate setae on inner margin, and a pair of cuspidate setae on distal inner angle (Fig.17D). Pereopod 4, propodus with five cuspidate setae on inner margin, and pair of cuspidate setae on distal inner angle (Fig.17E). Pereopod 5, propodus with five cuspidate setae on inner margin (Fig.17F). Pereopod 3, dactyl with five teeth distributed on median inner margin and one tooth on outer margin, sharp tip (Fig.18A). Pereopod 4, dactyl with seven teeth distributed on entire inner margin, without tooth on outer margin, sharp tip (Fig.18B). Pereopod 5, dactyl with six teeth distributed on distal inner margin, basal inner margin serrate, blunt tip (Fig.18C). Female endopod of pleopod 1 leaf shaped, with papposerrate seta on distal part of anterior and posterior margins, and on inner surface (Fig.19A). Endopod of pleopod 2 with appendix interna slender, short, with hook setae distally (Fig.19B, C). Telson with two pairs of dorsolateral cuspidate setae; three pairs of posterior marginal setae, outer cuspidate setae and two inner simple setae; distal end slightly rounded (Fig.19D). Exopod of uropod without diaresis; lateral margin ending in triangular projection, with a strong posterolateral stout seta that sligthly overreaches exopod (Fig.19D).

Distribution – Western Atlantic: Caribbean Sea (Tobago, Barbuda, Dominica, Santa Lucia), Brazil: Rocas Atoll.

Remarks – This species has never been recorded in Brazilian waters and was collected associated with sponges in Rocas Atoll (Brazil). According to CHACE (1972), *P. caraibicus* can be found in a variety of habitats as turtle-grass flats, near mangrove swamps or associated with coral incrusted rocks. From Maranhão to Paraíba, four species of *Periclimenaeus* are known: *P. ascidiarum* Holthuis, 1951, *P. atlanticus* Rathbun, 1902, *P. pearsei* (Schmitt, 1936), and *P. perlatus* (Boone, 1930) (YOUNG, 1986; RAMOS-PORTO & COELHO, 1998).

According to HOLTHUIS (1951, 1952b), BRUCE (1969, 1970, 1976, 1978, 1991, 1993, 1996) and others (BARNARD, 1958; FUJINO & MYIAKE, 1968; DURIS, 1990), the genus *Periclimenaeus* comprises a total of 70 species, 46 of which occur in the Indo-West Pacific and three in Eastern Pacific. The Atlantic species are: *P. atlanticus*, *P. wilsoni* Hay, 1917, *P. perlatus*, *P. pearsei*, *P. maxillulidens* Schmitt, 1936, *P.*

ascidiarum, *P. caraibicus*, *P. schmitti* Holthuis, 1951, *P. chacei* Abele, 1971 and *P. bredini* Chace, 1972.

Of the 10 species that occur in the West Atlantic, three species have the telson with the anterior pair of dorsolateral cuspidate setae arising from its anterior third, the remaining species, including *P. caraibicus* have the telson with the anterior pair of dorsolateral cuspidate setae arising from its anterior fourth. Of the remaining seven species only *P. caraibicus*, *P. ascidiarum* and, *P. pearsei* have the telson with three pairs of distal setae inserted in a continuous line. Of these three species, only *P. caraibicus* presents a rostrum with a ventral tooth, a carapace with supraorbital spine or tubercle and a scaphocerite with distolateral tooth distinctly overreaching scale.

The specimens examined agree with HOLTHUIS' (1951) description in most characters observed, such as rostrum shape, presence of supraorbital and antennal spines, and stylocerite, scaphocerite and mouth parts shape. The outer pair of distal setae on telson is inserted slightly anteriorly to the mesial and inner pairs.

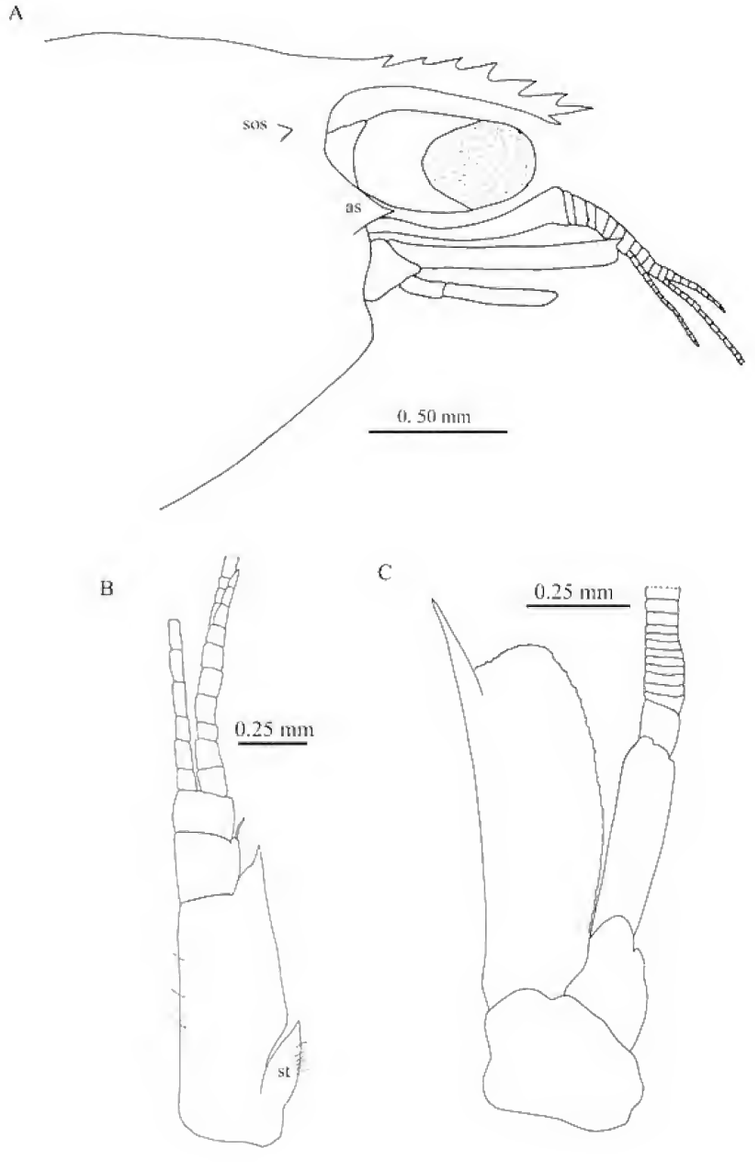

Fig.15- *Periclimenaeus caraibicus* Holthuis, 1951, ovigerous ♀ , MNRJ 19035 (carapace length 3.0mm). (A) carapace and cephalic appendages, lateral (as=antennal spine; sos=supraorbital spine); (B) right antennula, dorsal (st=stylocerite); (C) right scaphocerite, dorsal.

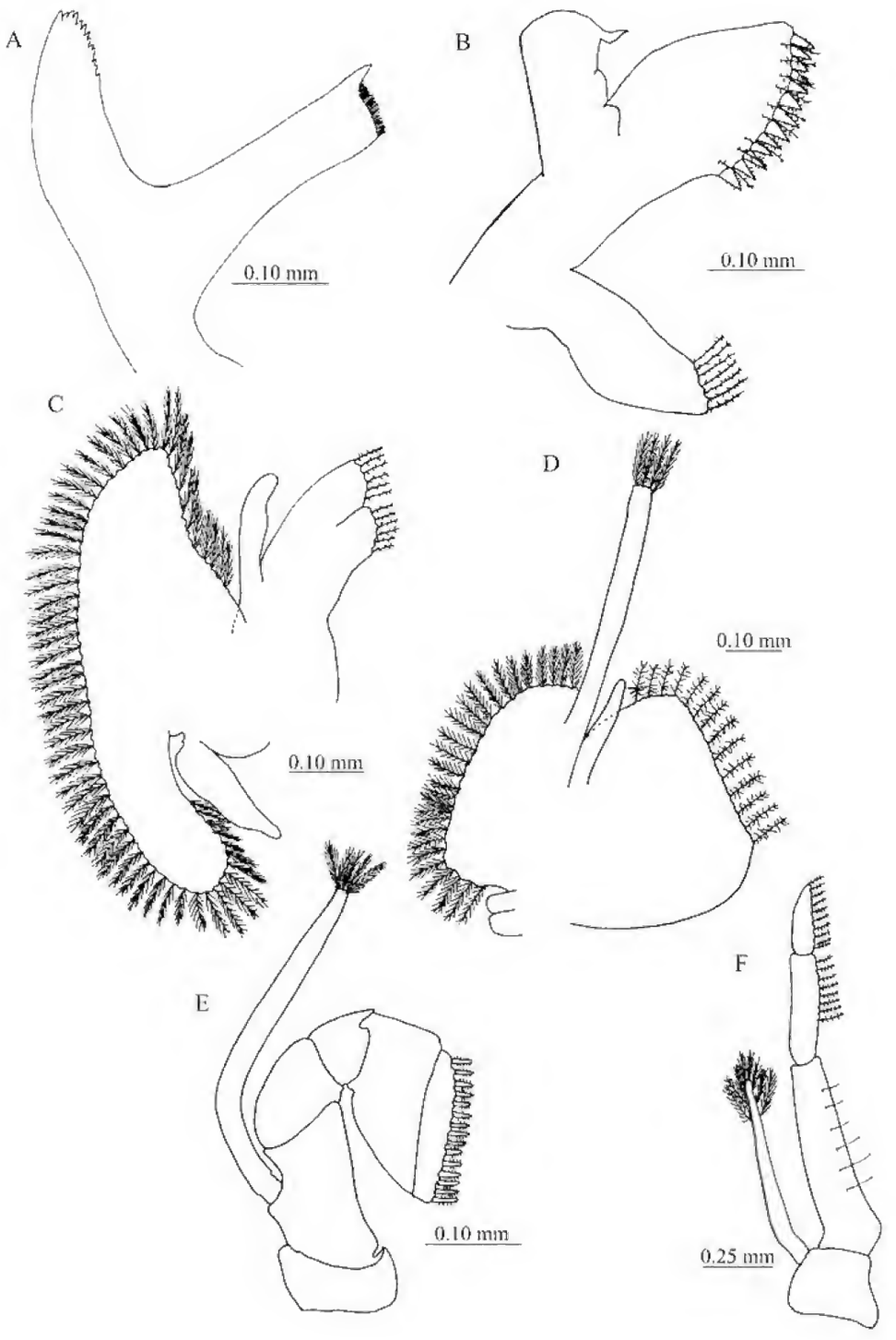

Fig.16- *Periclimenaeus caraibicus* Holthuis, 1951, ovigerous ♀ , MNRJ 19035 (carapace length 3.0mm). (A) left mandible, dorsal (ip=incisor process; mp=molar process); (B) left maxilla 1, dorsal (end=endite; p=palp); (C) left maxilla 2, dorsal (end=endite; enp=endopod; ep=epipod; sc=scaphognathite); (D) left maxilliped 1, dorsal (el=exopodal lobe; end=endite; enp=endopod; ep=epipod; exp=exopod); left maxilliped 2, dorsal (exp=exopod); left maxilliped 3, dorsal (exp=exopod).

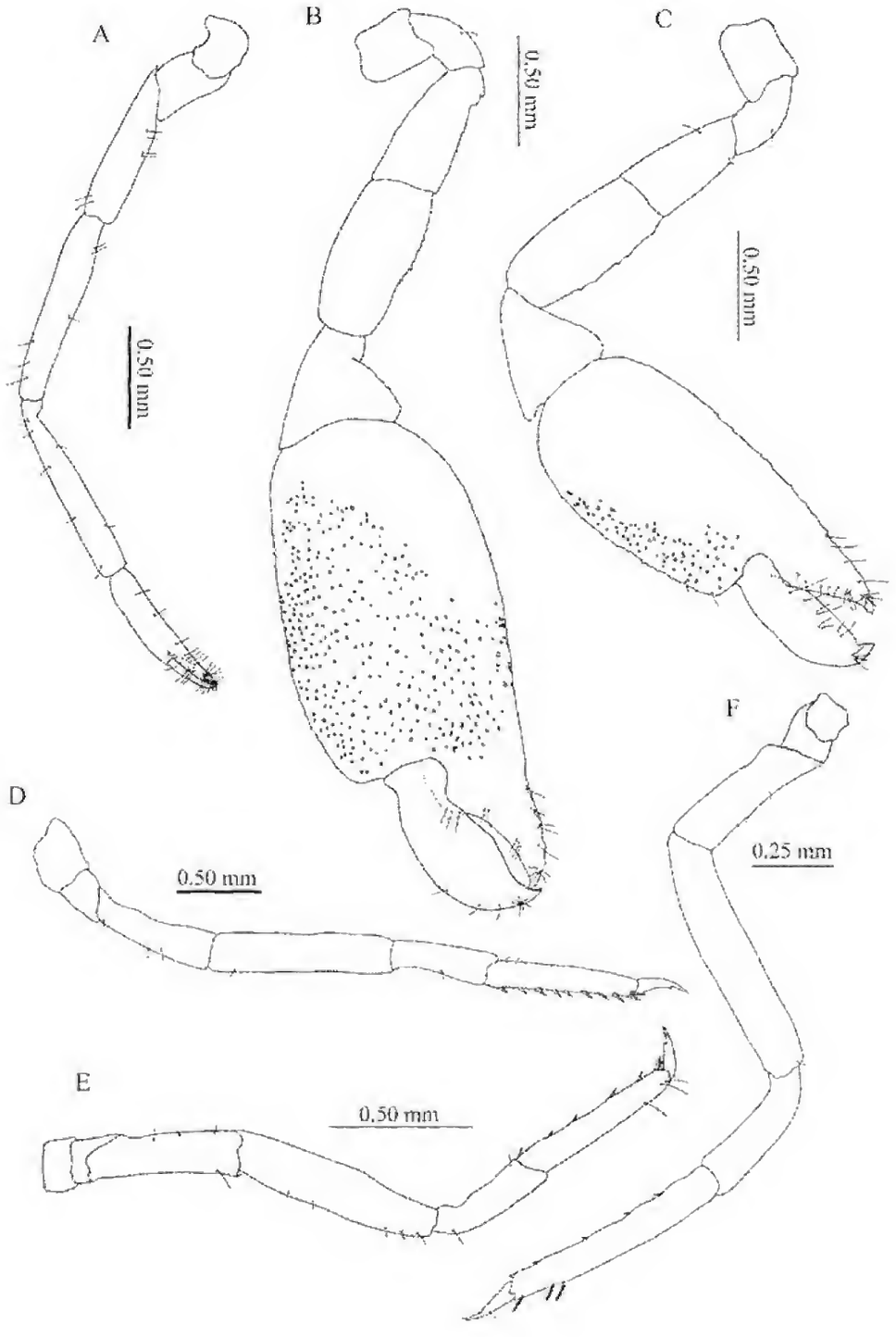

Fig.17- *Periclimenaeus caraibicus* Holthuis, 1951, ovigerous ♀ , MNRJ 19035 (carapace length 3.0mm). (A) right pereopod 1, lateral; (B) right pereopod 2 , lateral; (C) left pereopod 2, lateral; (D) right pereopod 3, lateral; (E) right pereopod 4, lateral; (F) right pereopod 5, lateral.

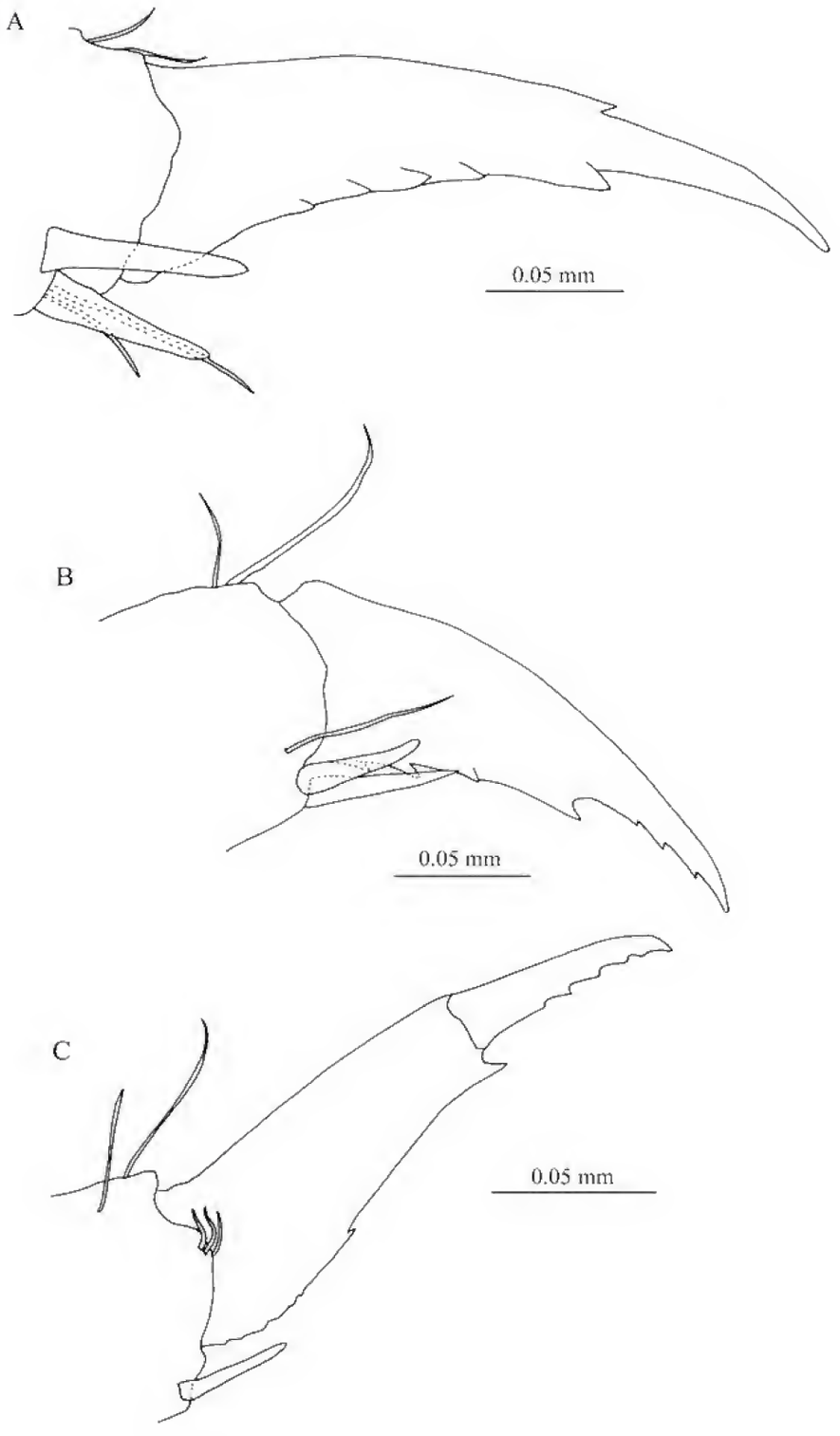

Fig.18- *Periclimenaeus caraibicus* Holthuis, 1951, ovigerous ♀ , MNRJ 19035 (carapace length 3.0mm). (A) Pereopod 3 dactyl lateral; (B) pereopod 4 dactyl lateral; pereopod 5 dactyl lateral.

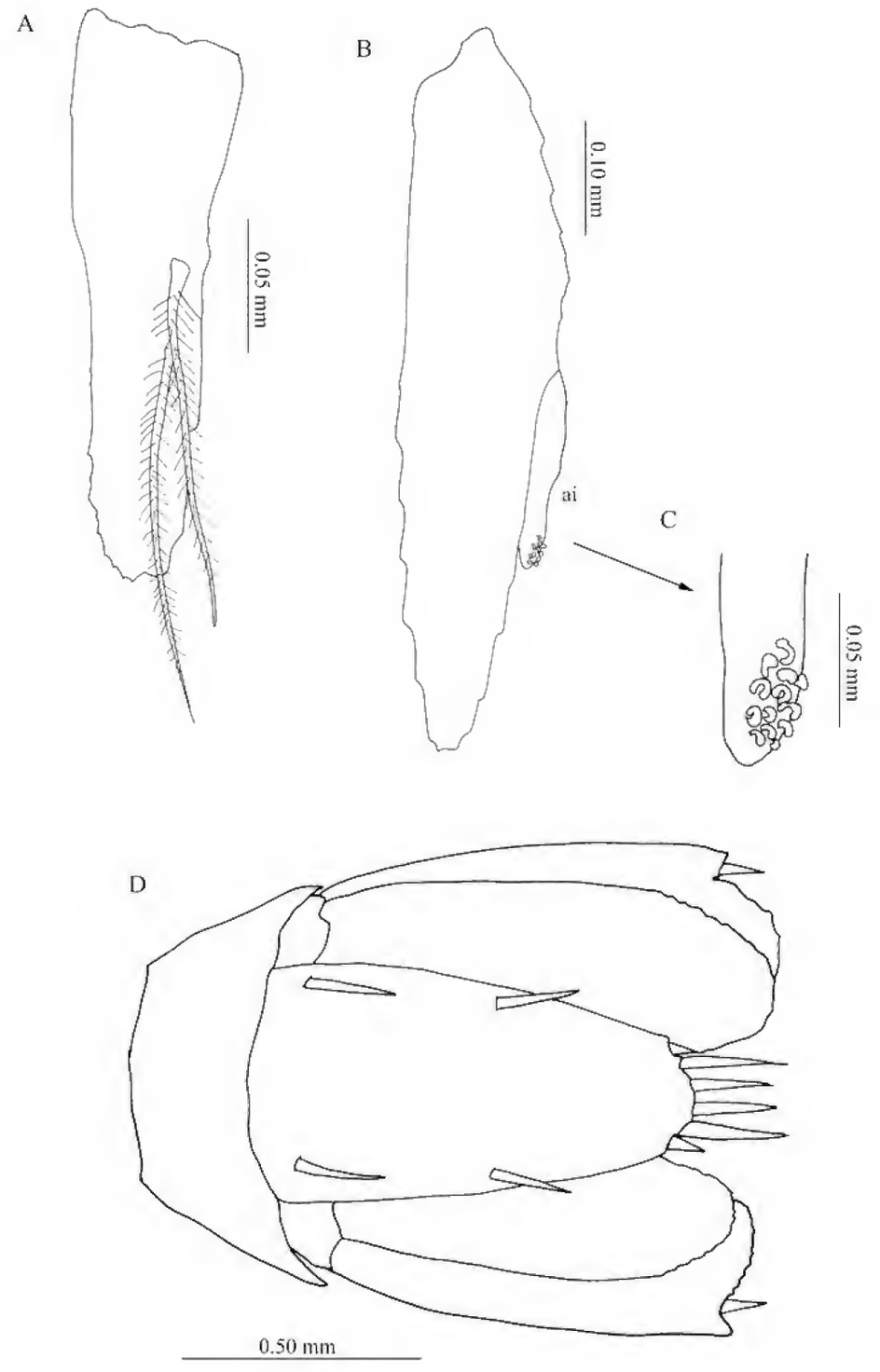

Fig.19- *Periclimenaeus caraibicus* Holthuis, 1951, ovigerous ♀ , MNRJ 19035 (carapace length 3.0mm). (A) left endopod of pleopod 1; (B) exopod and appendix interna of left pleopod 2 (ai=appendix interna); (C) appendix interna of left pleopod; (D) telson and uropods, dorsal.

Periclimenaeus brucei sp.nov.
(Figs.20-25)

Material examined – Rocas Atoll, outer reef, 20m, holotype: 1 ovigerous ♀ (3.0mm); paratypes: 1♀ (2.5mm), 1♂ (2.1mm), MNRJ 19040, in *Ircina* sp. (Porifera).

Diagnosis – Carapace with rostrum short, upper margin with eight teeth, lower margin unarmed, convex; without supraorbital spine; with sharp antennal spine. Stylocerite broad ending in a sharp point. Scaphocerite with small distal tooth that do not overreach scale. Major pereopod 2 with tooth on dactyl margin, fitting in a cavity on propod. Telson with anterior pair of dorsolateral cuspidate setae arising from its anterior fourth; lateral pair of distal setae inserted distinctly anterior to intermediate and mesial pairs.

Description – Carapace, rostrum directed downwards, upper margin with eight teeth, lower margin unarmed, convex; without supraorbital spine; with sharp antennal spine present (Fig.20A). Stylocerite broad ending in sharp point, less than half of basal antennular article length; strong anterolateral tooth reaching two-thirds of second antennular article; second antennular article without small rounded lobe on inner margin (Fig.20B). Scaphocerite with small distal tooth, not overreaching scale; inner margin of scale broad and rounded (Fig.20C). Mandible with incisor process slender, blade shaped, ending in a sharp point; molar process with acute distal teeth and a distal strong tooth (Fig.21A). Maxilla 1 with two endites, basal endite with eight long cuspidate setae on inner margin; distal endite short and rounded, with simple setae on inner margin; palp short and broad (Fig.21B). Maxilla 2 with broad scaphognathite, densely plumose setae on all margins; endopod one-third of scaphognathite length; endite short, with densely plumose setae on inner margin (Fig.21C). Maxilliped 1 with epipod rounded, bilobed; elongate exopodal lobe with densely plumose setae on all margins, anterior margin rounded; slender and elongate exopod with densely plumose setae on distal margin; endopod short, one-third of exopod length; endite broad with densely plumose setae on inner margin (Fig.21D). Maxilliped 2 with ischio-merus short; carpus short, triangular; propodus and dactyl curved, with serrulate setae on inner margin (Fig.21E). Maxilliped 3 with simple setae on inner margin of all articles (Fig.21F). Pereopod 1 slender, dactyl one-third of propodus length; propodus and dactyl with tufts of setae (Fig. 23A). Pereopods 2 very unequal in size and shape, right stronger than left; both with carpus short, triangular; propodus covered with many rows of sub-quadrate tubercles and with rounded concavity where a strong hammer shaped tooth of dactyl fits; broad dactyl forming strong claw; dactyl less than one-third of propodus length (Figs.22A, B). Pereopod 3, propodus with five cuspidate setae on inner margin (Fig.23B). Pereopod 4, propodus with four cuspidate setae on inner margin (Fig.23C). Pereopod 5, propodus with two small cuspidate setae on inner margin (Fig.23D). Pereopods 3-5 with dactyls bifid. Pereopods 3 and 4 with dactyl outer margin very concave (Fig.24A, B). Pereopod 5 with dactyl outer margin slightly concave (Fig.24C). Male endopod of pleopod 1 leaf like, with densely plumose setae on all margins (Fig.25A). Endopod of pleopod 2 with appendix interna slender, short, with numerous hook setae distally; appendix masculina short, with one simple acute setae distally (Fig.25B, C). Telson with three pairs of dorsolateral cuspidate setae; two pairs of distal slender setae; distal end truncate (Fig.25D). Exopod of uropod without complete diaresis; lateral margin not ending in sharp triangular projection; with a strong posterolateral stout seta that overreaches exopod and endopod (Fig.25D).

Distribution – Known only from the type-locality, Barretão, Rocas Atoll, Brazil, 20m, in *Ircina* sp.

Etymology – In honor of Dr. Alexander Bruce (Queensland Museum, Australia), who has contributed so much to knowledge of Caridea, especially the Pontoniinae.

Remarks – *Periclimenaeus brucei* sp.nov. has the anterior pair of dorsolateral cuspidate setae arising posteriorly to its anterior fourth. *Periclimenaeus pearsei*, *P. ascidiarum*, and *P. caraibicus* have the three distal setae of telson inserted in a continuous line, distinct from *P. brucei* sp.nov. which has the outer pair of distal setae situated anteriorly to the others. *Periclimenaeus perlatus* has the pereopod 1 with carpus nearly twice as long as propod, while *P. brucei* sp.nov. has the carpus less than three-fourths as long as propod. *Periclimenaeus wilsoni* has ten to twelve teeth on rostrum and major pereopod 2 subretangular, with tubercles arranged in a honeycomb pattern; *P. bredini* has seven teeth on rostrum and major pereopod 2 subretangular, with scattered tubercles; and *P. brucei* sp.nov. has eight teeth on rostrum and major pereopod 2 broad at base, tapering distally, with scattered strong tubercles (Tab.1).

The three specimens of *P. brucei* sp.nov. were collected in sponges, *Ircina* sp., at 20m depth, therefore probably this species is an obligate symbiont. Most of the species of this genus live in sponge and cnidarians.

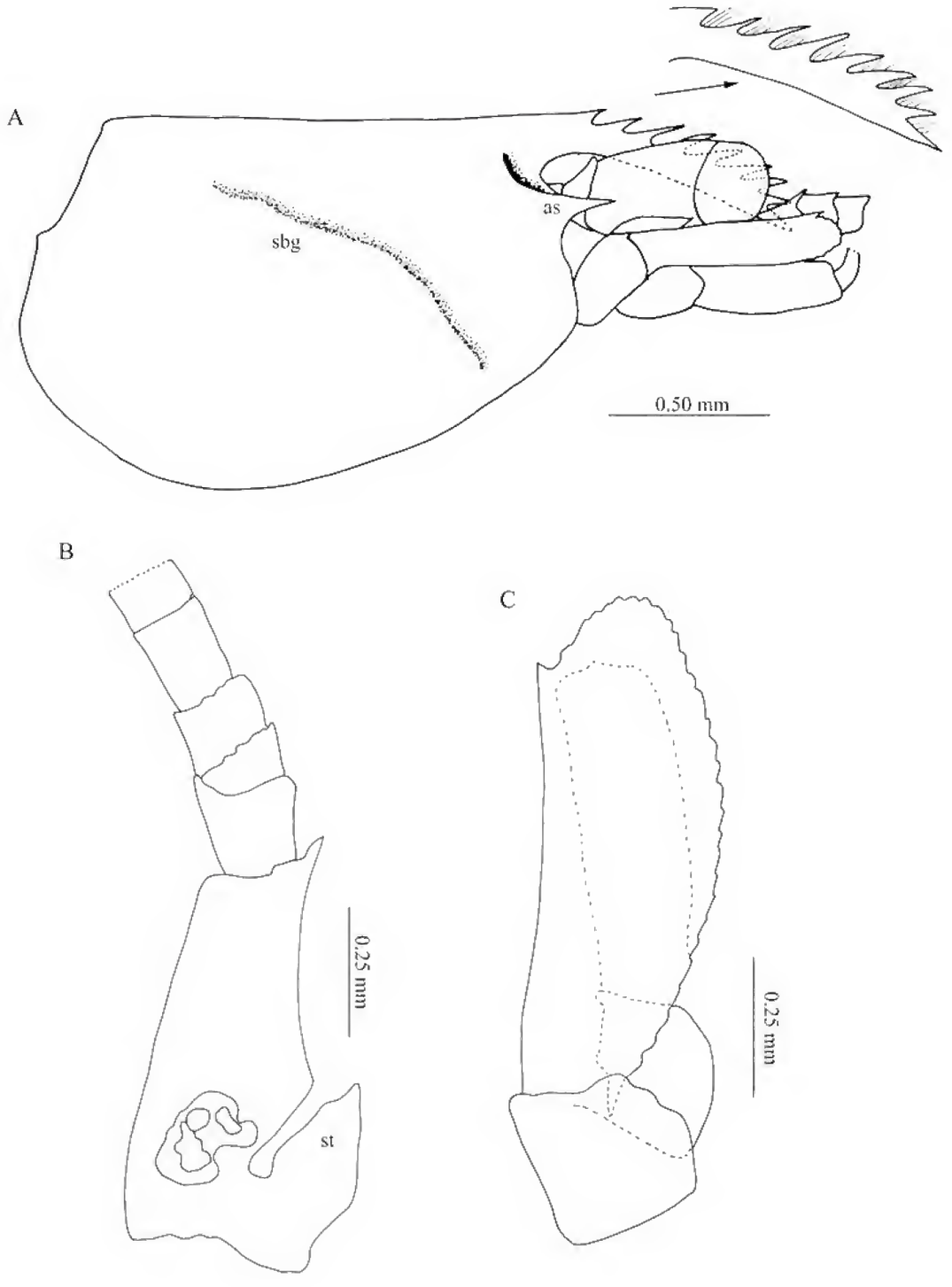

Fig.20- *Periclimenaeus brucei* sp.nov., ovigerous ♀ , holotype, MNRJ 19040 (carapace length 3.0mm). (A) carapace and cephalic appendages, lateral (as=antennal spine; sbrg=suprabranchial groove); (B) right antennula, dorsal (st=stylocerite); (C) right scaphocerite, dorsal.

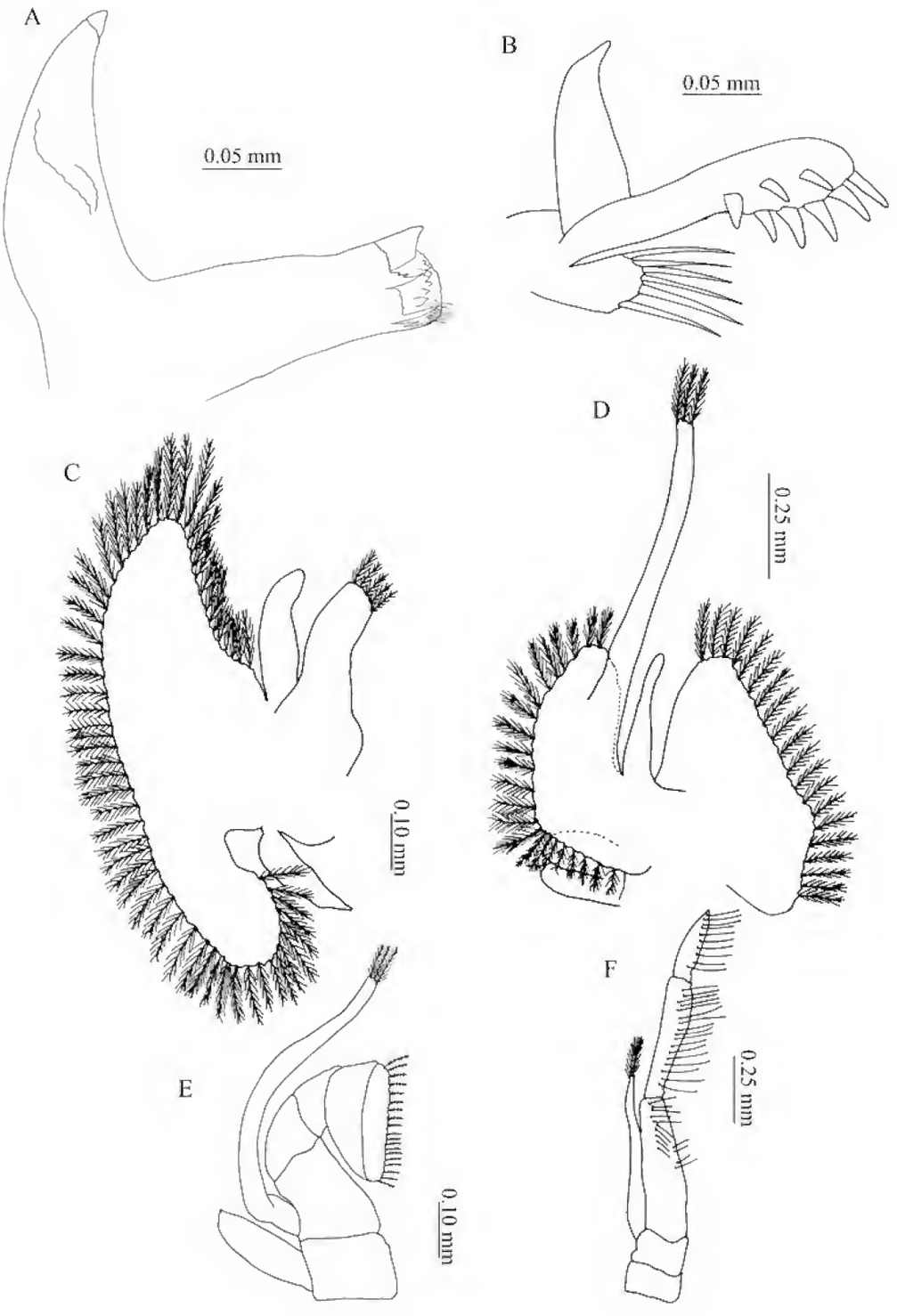

Fig.21- *Periclimenaeus brucei* sp.nov., ovigerous ♀ , holotype, MNRJ 19040 (carapace length 3.0mm). (A) left mandible, dorsal (ip=incisor process; mp=molar process); (B) let maxilla 1, dorsal (end=endite; p=palp); (C)left maxilla 2, dorsal (end=endite; enp=endopod; ep=epipod; sc=scaphognathite); (D) left maxilliped 1, dorsal (el=exopodal lobe; end=endite; enp=endopod; ep=epipod; exp=exopod); (E) left maxilliped 2, dorsal (exp=exopod); (F) left maxilliped 3, dorsal (exp=exopod).

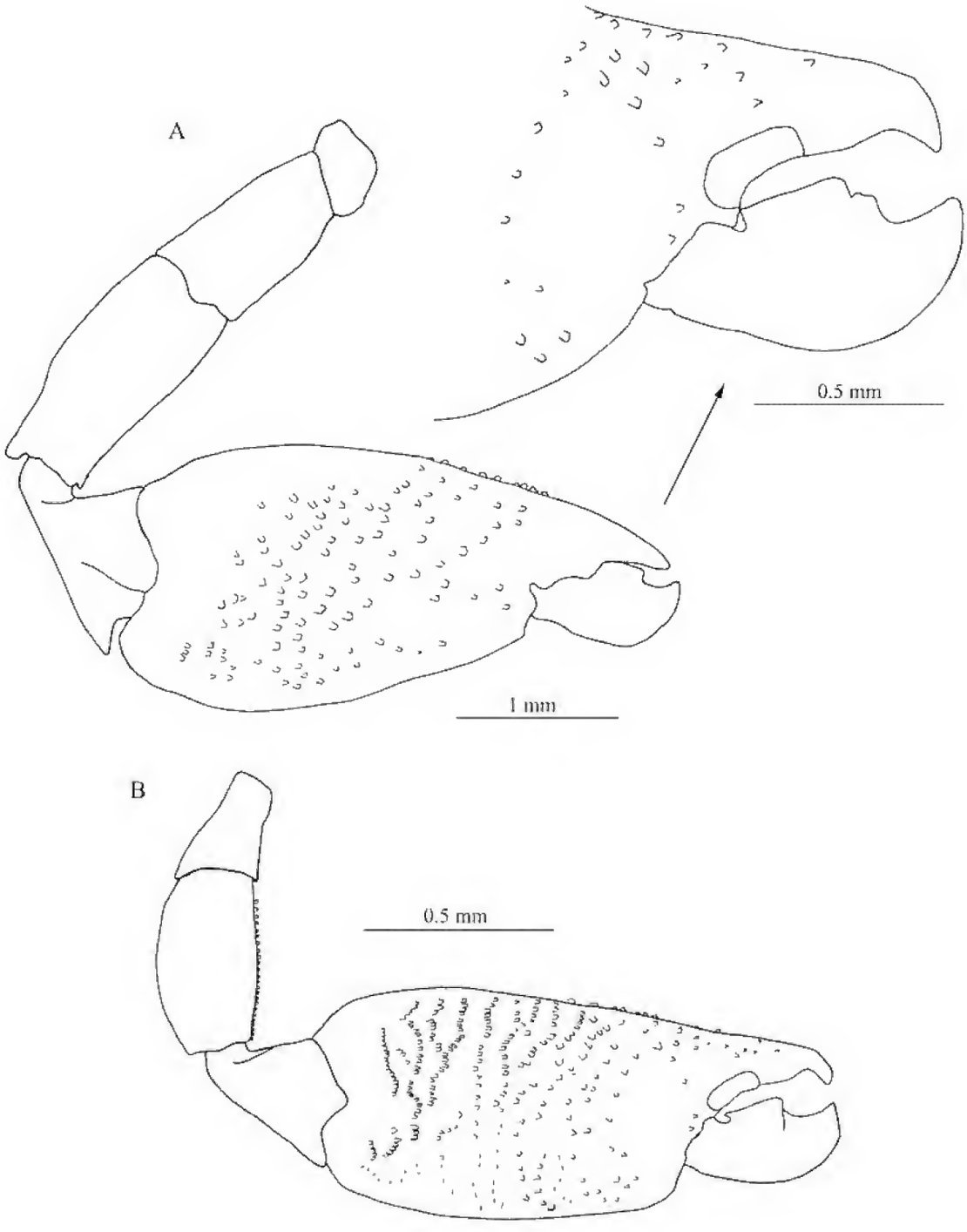

Fig.22- *Periclimenaeus brucei* sp.nov., ovigerous ♀ , holotype, MNRJ 19040 (carapace length 3.0mm). (A) left pereopod 2, lateral; (B) right pereopod 2, lateral.

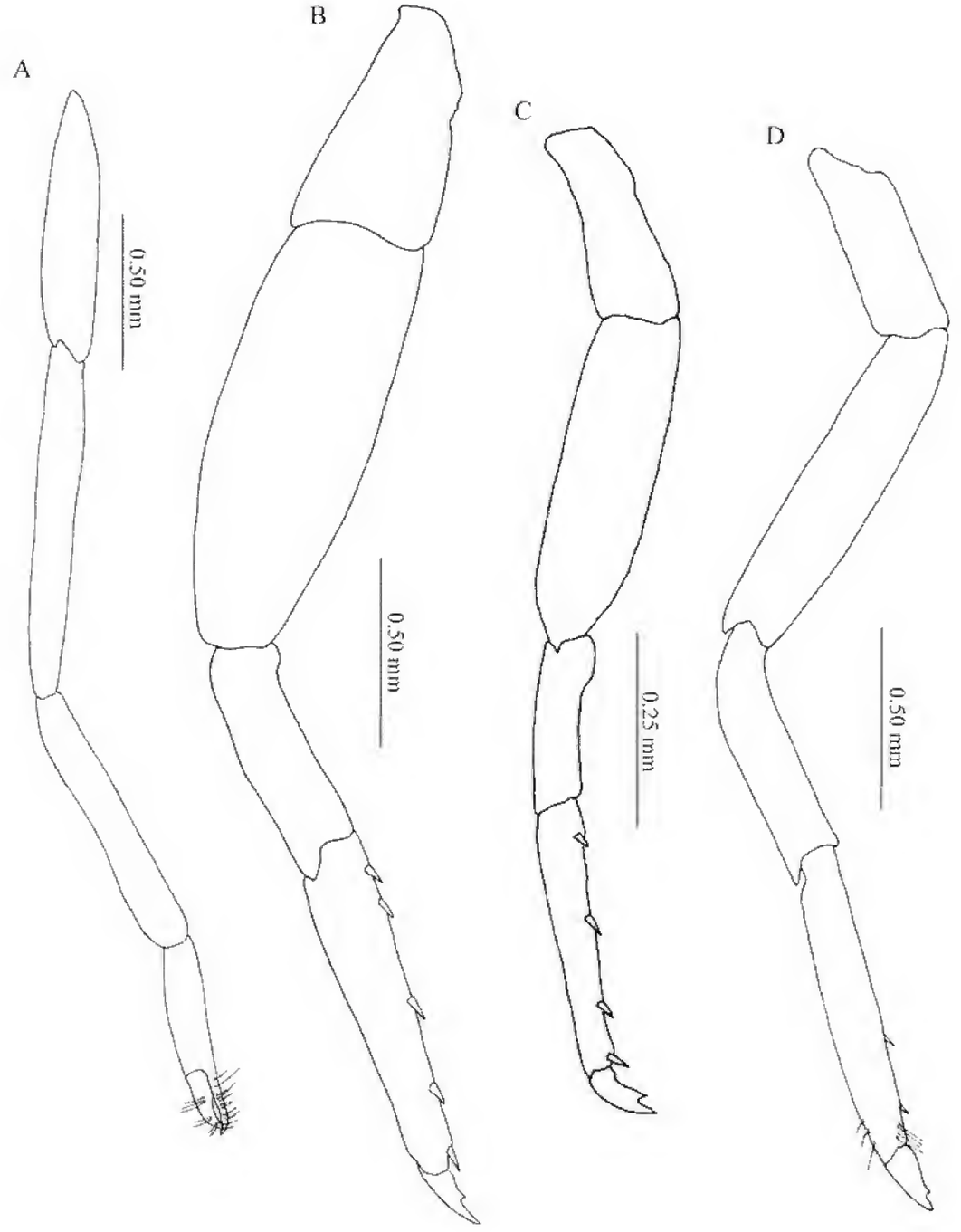

Fig.23- *Periclimenaeus brucei* sp.nov., ovigerous ♀ , holotype, MNRJ 19040 (carapace length 3.0mm). (A) right pereopod 1, lateral; (B) right pereopod 3, lateral; (C) right pereopod 4, lateral; (D) right pereopod 5, lateral.

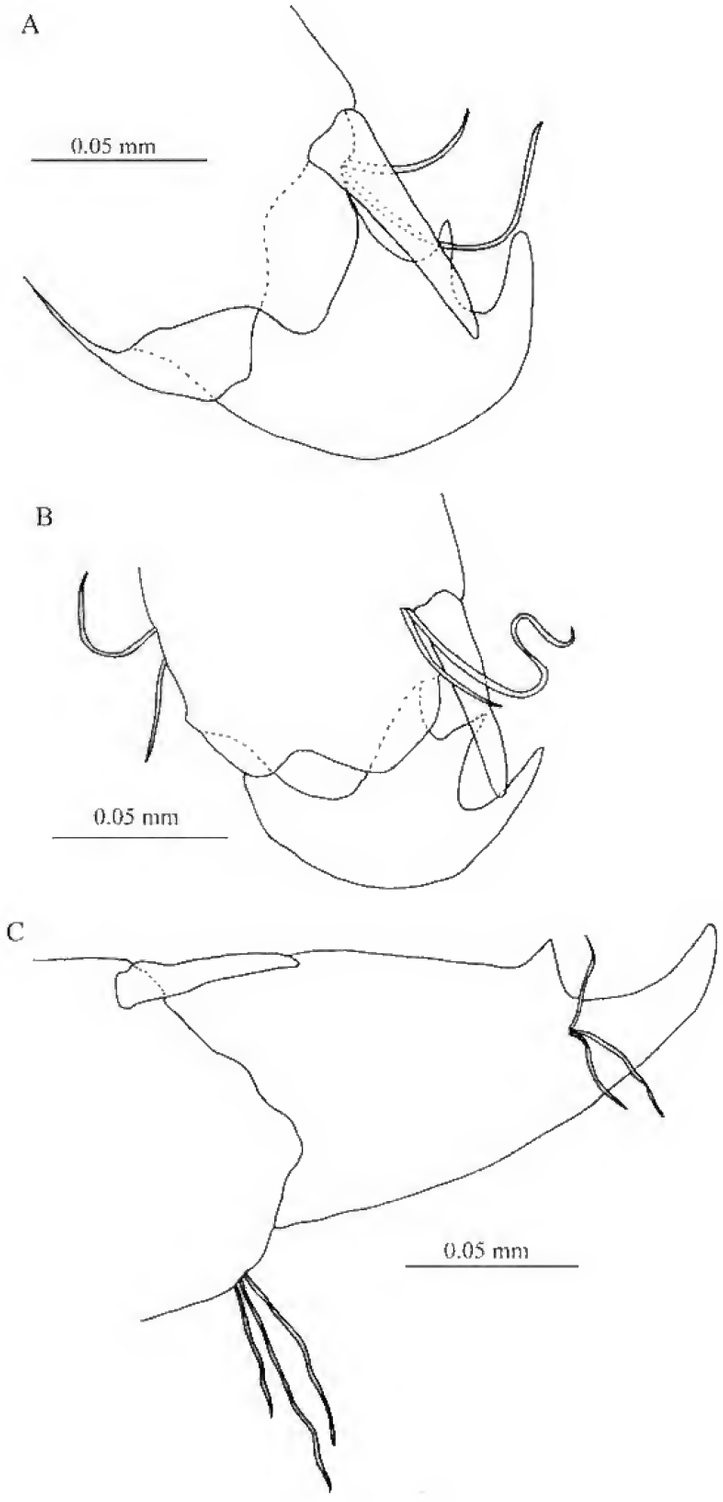

Fig.24- *Periclimenaeus brucei* sp.nov., ovigerous ♀ , holotype, MNRJ 19040 (carapace length 3.0mm). (A) Pereopod 3 dactyl lateral; (B) pereopod 4 dactyl lateral; pereopod 5 dactyl lateral.

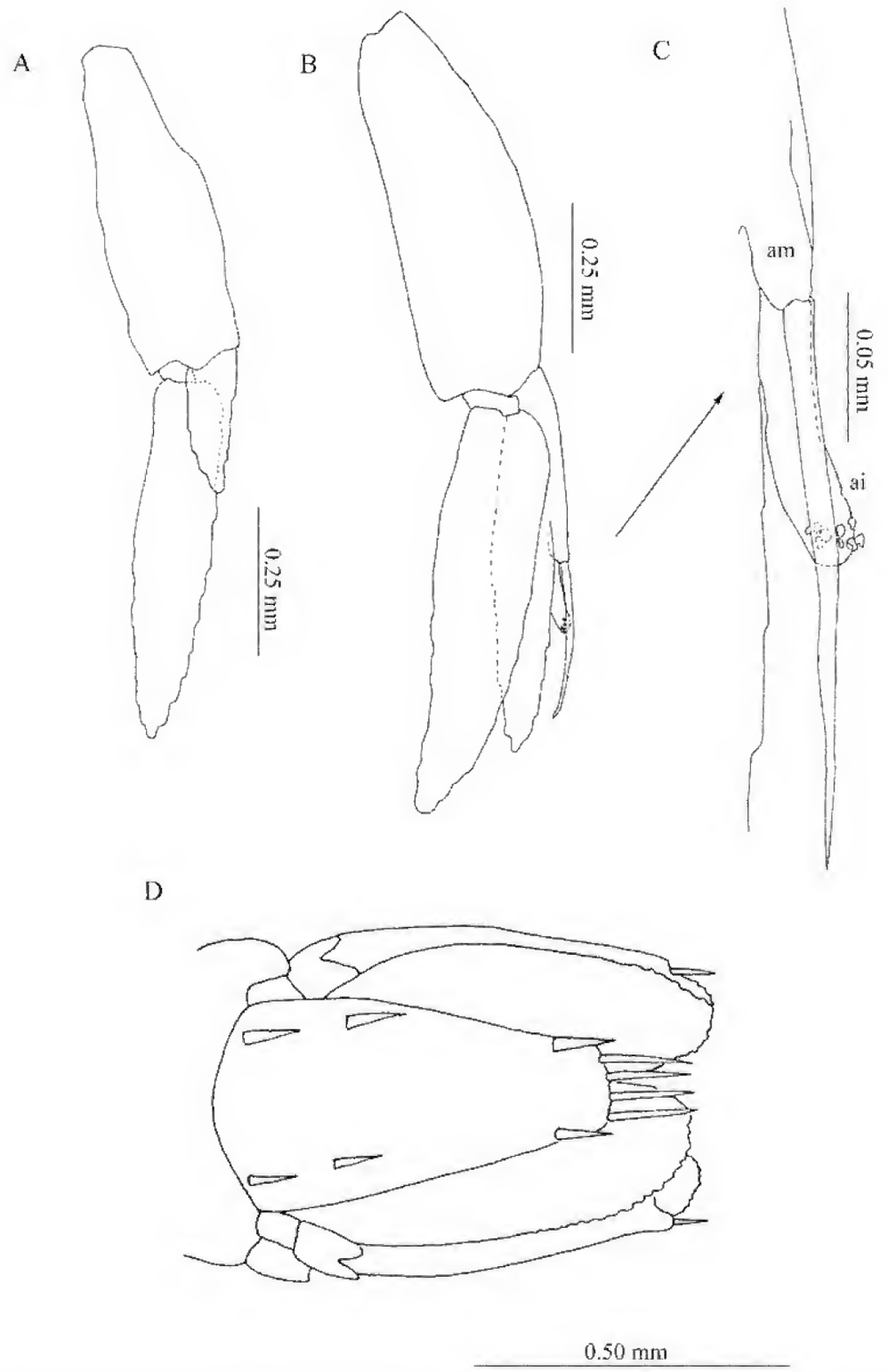

Fig.25- *Periclimenaeus brucei* sp.nov., ♂ , paratype, MNRJ 19039 (carapace length 2.1mm). (A) right pleopod 1, lateral; (B) right pleopod 2, lateral; (C) appendix interna and masculina of pleopod 2, lateral (ai=appendix interna; am=appendix masculina). *Periclimenaeus brucei* sp.nov., ovigerous ♀ , holotype, MNRJ 19040 (carapace length 3.0mm); (D) telson and uropods, dorsal.

TABLE 1. Comparison between *Periclimenaeus brucei* sp.nov., *Periclimenaeus crosnieri* sp.nov. and closely related species.

	P. pearsei	*P. wilsoni*	*P. chacei*	*P. bredini*	*P. brucei* sp.nov.	*P. crosnieri* sp.nov.
Teeth on rostrum	4 (serrate)	10-12	4	7	8	7
Carapace	inflated	not inflated	not inflated	not inflated	not inflated	inflated
Dactyl of major P 2	sightly overreach propod	not overreach propod	strongly overreach propod	not overreach propod	sightly overreach propod	strongly overreach propod
Major P 2 dactyl shape	curved upward	normal, rounded	elongate	normal, rounded	normal, rounded	elongate
Major P 2 propodus shape	broaden	almost retangular	elongate	almost retangular	broaden	elongate
Major P 2 ornamentation	smooth	with tubercles	smooth	scattered tubercles	strong tubercles	smooth, but spotted
Minor P2 ornamentation	smooth	several tubercles	-	scattered tubercles	rows of strong tubercles	smooth
Minor P 2 shape	almost retangular	almost retangular	-	broaden	almost retangular	broad at base tapering distally
Posterior pair of dorsolateral setae on telson arising	from its posterior half	from its anterior half	from its posterior half	from its anterior half	from its anterior half	from its anterior half

(P) pereopod.

Periclimenaeus crosnieri sp.nov.
(Figs.26-31)

Material examined – Rocas Atoll, outer reef, 15 to 20m, holotype: 1♀ (5.3 mm), MNRJ 17914, in sponge.

Diagnosis – Carapace dorsoventrally expanded, rostrum short, upper margin with seven teeth, lower margin slightly convex; without supraorbital spine; with short antennal spine. Stylocerite broad, end acute. Scaphocerite with strong distal tooth that not overreaches the scale. Major pereopod 2 with tooth on dactyl margin, fitting in a cavity on propod. Telson with anterior pair of dorsolateral cuspidate setae arising from its anterior fourth; lateral pair of distal cuspidate setae inserted distinctly anterior to intermediate and mesial pairs.

Description – Carapace dorsoventrally expanded, with rostrum directed slightly downwards, upper margin with six teeth, lower margin unarmed, slightly convex; without supraorbital spine; with short antennal spine; branchiostegal angle rounded, anteriorly produced (Fig.26A). Stylocerite broad ending in sharp point, half of basal antennular article length; strong anterolateral tooth reaching one-third of second antennular article; second antennular article without small rounded lobe on inner margin (Fig.26B). Scaphocerite with strong distal tooth not overreaching scale; inner margin of scale broad and rounded (Fig.26C). Mandible with incisor process blade shaped, ending in cutting edge; molar process distally straight with subquadrate anterior tooth (Fig.27A). Maxilla 1 with two endites, distal endite with stout and papposerrate seta on inner margin; basal endite with serrulate setae on inner margin; palp short, with curved acute point (Fig.27B). Maxilla 2 with broad scaphognathite with densely plumose setae on all margins; endopod one-third of scaphognathite length; endite short, with

simple setae on inner margin (Fig.27C). Maxilliped 1 with broad exopodal lobe with densely plumose setae on outer margin; slender and elongate exopod, with articulated plumose setae on distal margin; endopod short, less than half exopod length, with a simple setae on inner margin; endite broad with papposerrate seta on inner margin (Fig.27D). Maxilliped 2 with ischio-merus and carpus short; propodus and dactyl curved, with denticulate and densely plumose setae on inner margin (Fig.27E). Maxilliped 3 with tufts of densely plumose setae on inner margin of all articles; exopod with densely plumose articulated setae on distal margin (Fig.27F). Pereopod 1 slender, dactyl less than one-third propodus length; propodus and dactyl with distal tufts of setae (Fig.29A). Pereopods 2 very unequal in size and shape, right stronger than left; in both, carpus short, triangular; propodus covered with lines forming a mosaic and with rounded concavity, where a strong hammer shaped tooth of dactyl fits; broad dactyl forming strong claw that distinctly overreaches propodus tip, dactyl less than one-third propodus length (Figs.28A, B). Pereopod 3, propodus with three cuspidate setae on inner margin, and one cuspidate seta near articulation with dactyl (Fig.29B). Pereopod 4, propodus with one cuspidate seta on inner margin, and one cuspidate seta near articulation with dactyl (Fig.29C). Pereopod 5, propodus without cuspidate setae (Fig.29D). Pereopods 3-5 with dactyls bifid (Fig.30A-C). Pereopod 5, dactyl with two basal tubercles on inner margin (Fig.30C). Female endopod of pleopod 1 leaf shaped, with densely plumose setae on all margins (Fig.31A). Endopod of pleopod 2 with appendix interna slender, with numerous hook setae distally (Fig.31B, C). Telson with three pairs of dorsolateral cuspidate setae; two pairs of distal slender setae; distal end truncate (Fig.31D). Exopod of uropod without complete diaresis; lateral margin ending in sharp triangular projection; with strong posterolateral stout seta not overreaching exopod and endopod (Fig.31D).

Distribution – Known only from the type-locality in the Rocas Atoll, Brazil, 15-20m.

Etymology – In honor of Dr. Alain Crosnier (Muséum National d´Histoire Naturelle, France) in recognition of his very important contributions to caridean knowledge.

Remarks – *Periclimenaeus crosnieri* sp.nov. is closely related to *P. brucei* sp.nov., *P. wilsoni*, and *P. bredini*. These species have the anterior pair of dorsolateral cuspidate setae on telson arising posteriorly to its anterior fourth; the outer pair of distal setae on telson anteriorly situated and the pereopod 1 has the carpus less than three-fourths as long as propodus. *Periclimenaeus wilsoni* has ten to 12 teeth on rostrum, carapace not inflated and dactyl of larger pereopod 2 not overreaching propodus tip, whereas *P. crosnieri* sp.nov. has seven teeth on the rostrum, carapace inflated and the dactyl of major pereopod 2 strongly overreaching propodus tip. *Periclimenaeus bredini* does not have inflated carapace, the dactyl of major pereopod 2 not overreaches propodus tip and the minor and major pereopods 2 has scattered tubercles, while *P. crosnieri* sp.nov. has inflated carapace, the dactyl of major pereopod 2 strongly overreacing propodus tip and both pereopods 2 smooth.

Furthermore, despite *P. chacei* Abele, 1971 presents a distinct position of the distal setae on telson, it has the dactyl very similar to *P. crosnieri* sp.nov. Both dactyl strongly overreach their propodus tip. In the same way, *P. pearsei* (Schmitt, 1936) has a distinct positioning of the distal setae on telson but it has a carapace shape very similar to *P. crosnieri* sp.nov.; their carapaces are very inflated, with their height more than three-fourths of its length.

Table 1 lists the differential characters of the species closely related to *P. brucei* sp.nov. and to *P. crosnieri* sp.nov.

The only female of *P. crosnieri* sp.nov. was collected in sponges at a depth of 15 to 20m, and probably this species is another obligate sponge associate.

Family Processidae Ortmann, 1890

Processa Leach, 1815

Processa Leach, 1815: plate 41; De Man, 1920:197; Holthuis, 1955:116; Nouvel & Holthuis, 1957:7.

Diagnosis – Mandible without incisor process and palp. Only one of first pereopods chelate, the other with simple dactyl; both first pereopods lacking exopods.

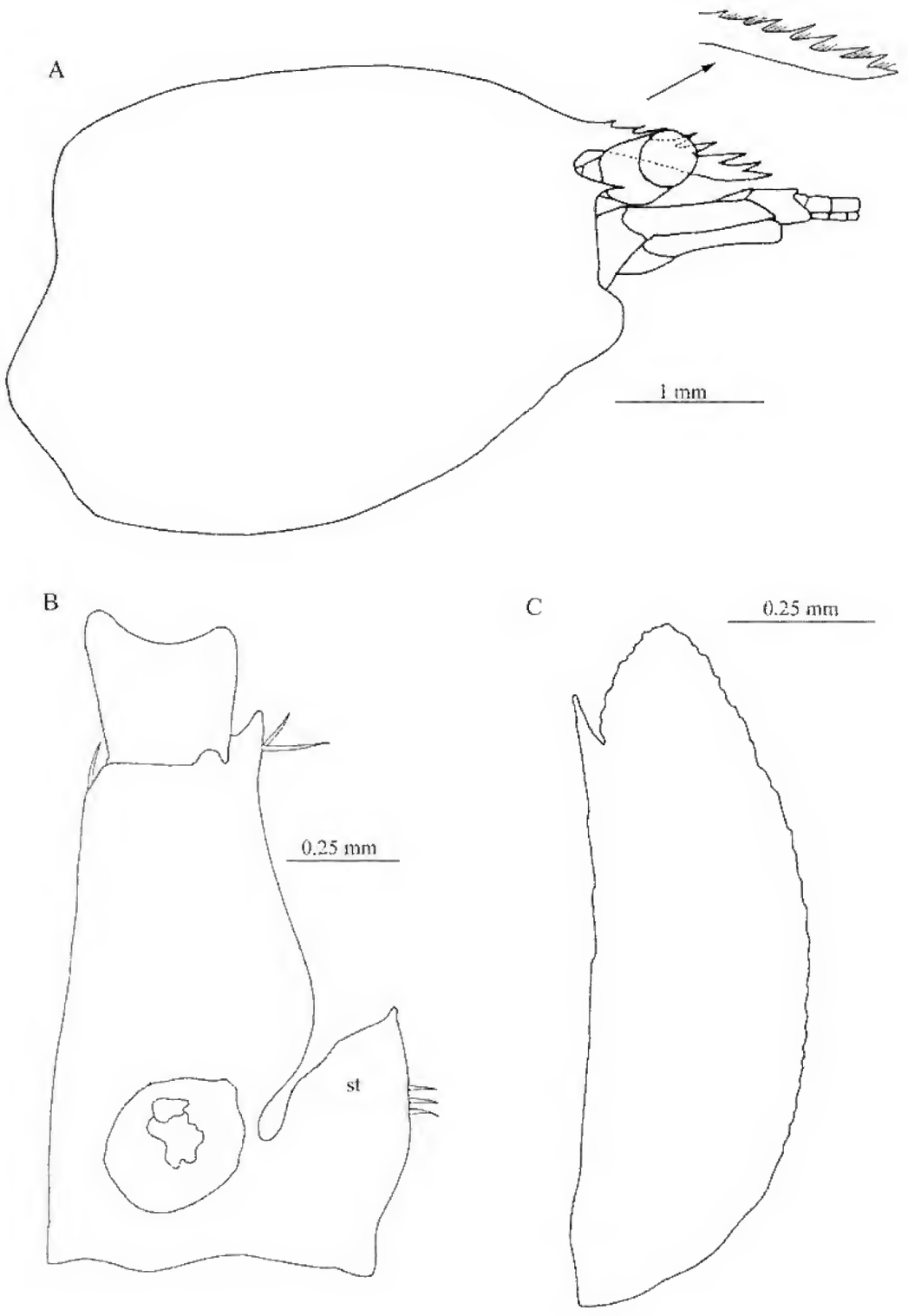

Fig.26- *Periclimenaeus crosnieri* sp.nov., ♀ , holotype, MNRJ 17914 (carapace length 5.3mm). (A) carapace and cephalic appendages, lateral (as=antennal spine); (B) right antennula, dorsal (st=stylocerite); (C) right scaphocerite, dorsal.

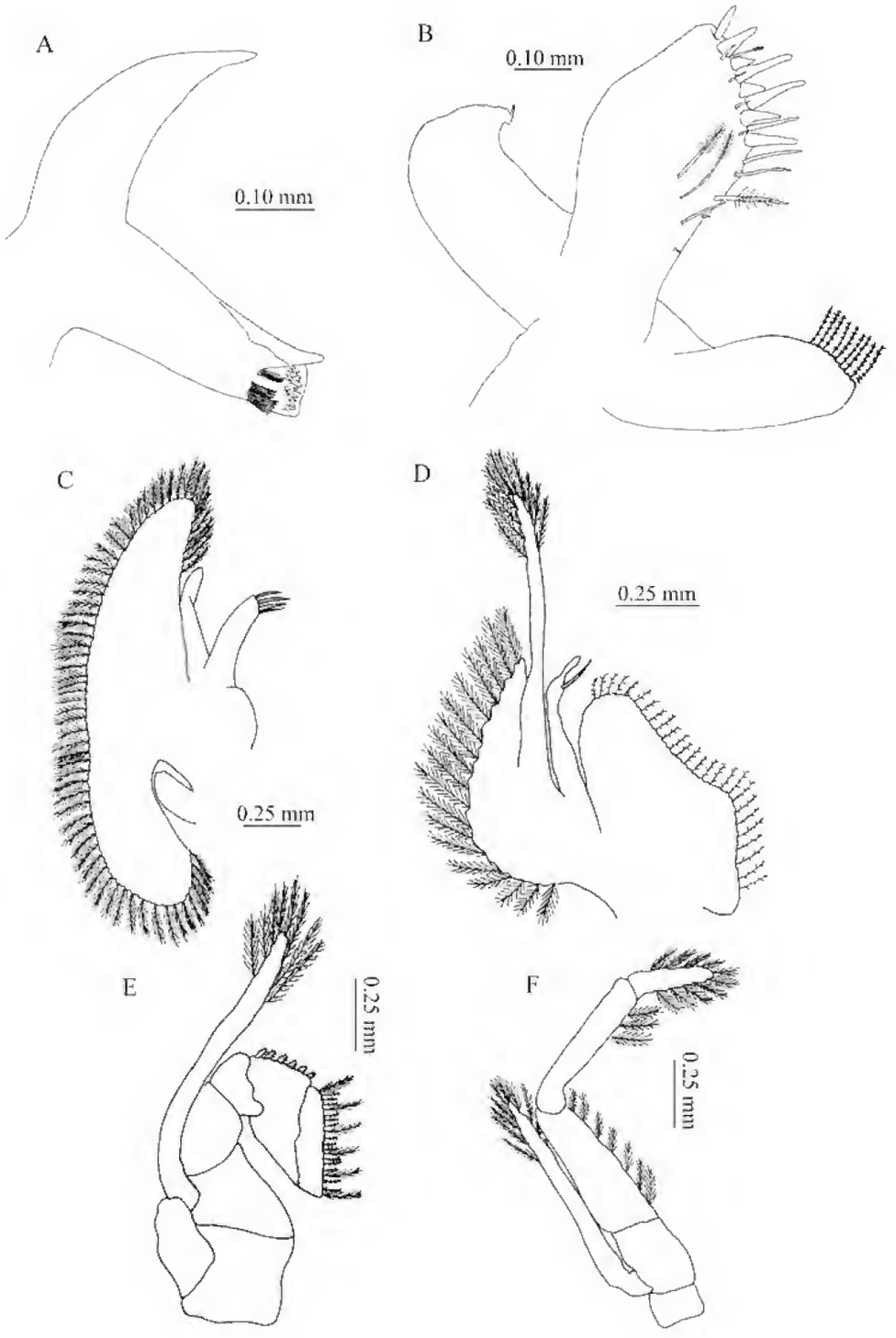

Fig.27- *Periclimenaeus crosnieri* sp.nov., ♀ , holotype, MNRJ 17914 (carapace length 5.3 mm). (A) left mandible, dorsal (ip=incisor process; mp=molar process); (B) left maxilla 1, dorsal (end=endite; p=palp); (C) left maxilla 2, dorsal (end=endite; enp=endopod; ep=epipod; sc=scaphognathite); (D) left maxilliped 1, dorsal (el=exopodal lobe; end=endite; enp=endopod; ep=epipod; exp=exopod); (E) left maxilliped 2, dorsal (exp=exopod); (F) left maxilliped 3, dorsal (exp=exopod).

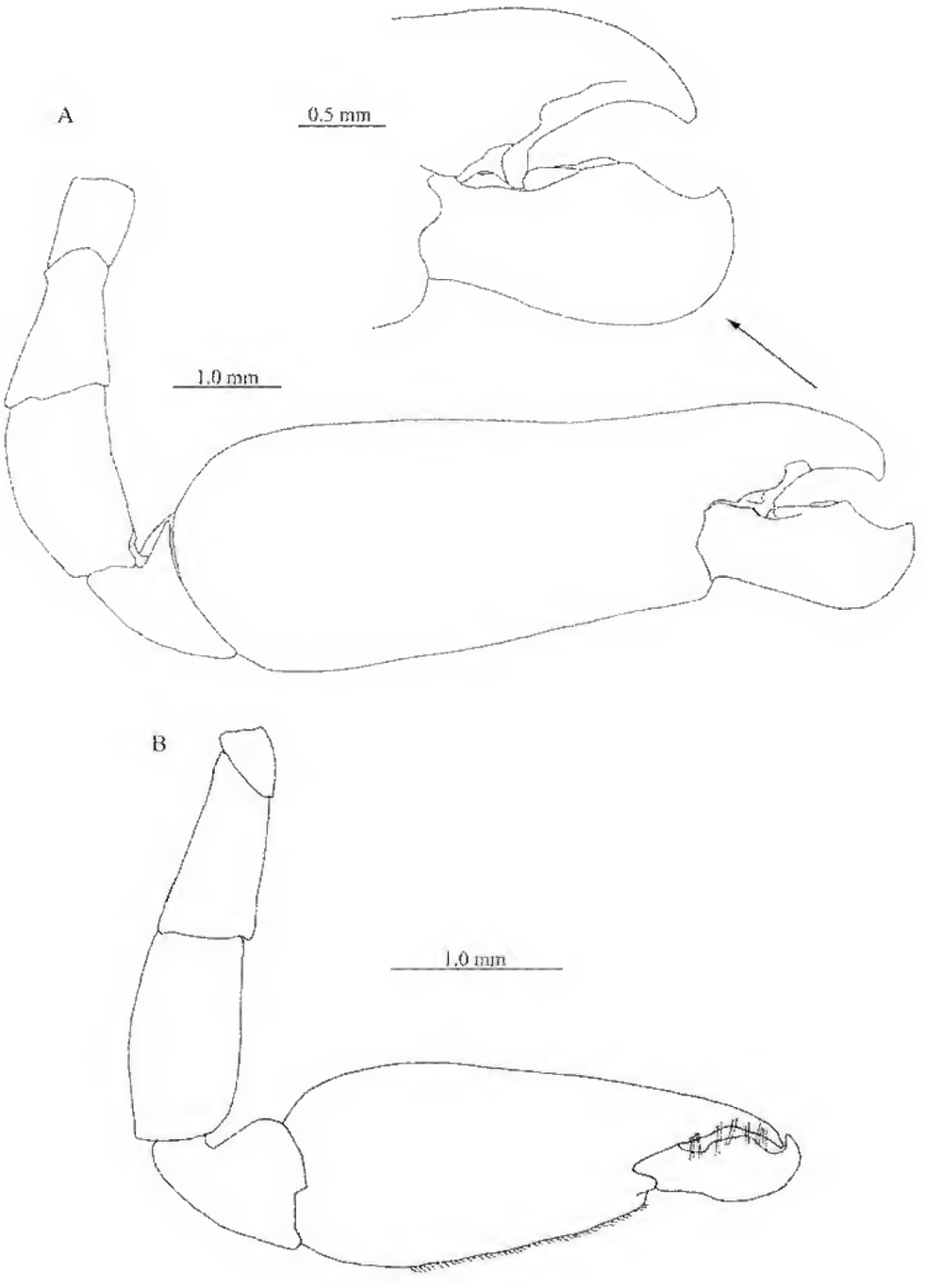

Fig.28- *Periclimenaeus crosnieri* sp.nov., ♀ , holotype, MNRJ 17914 (carapace length 5.3mm). (A) left pereopod 2, lateral; (B) right pereopod 2, lateral.

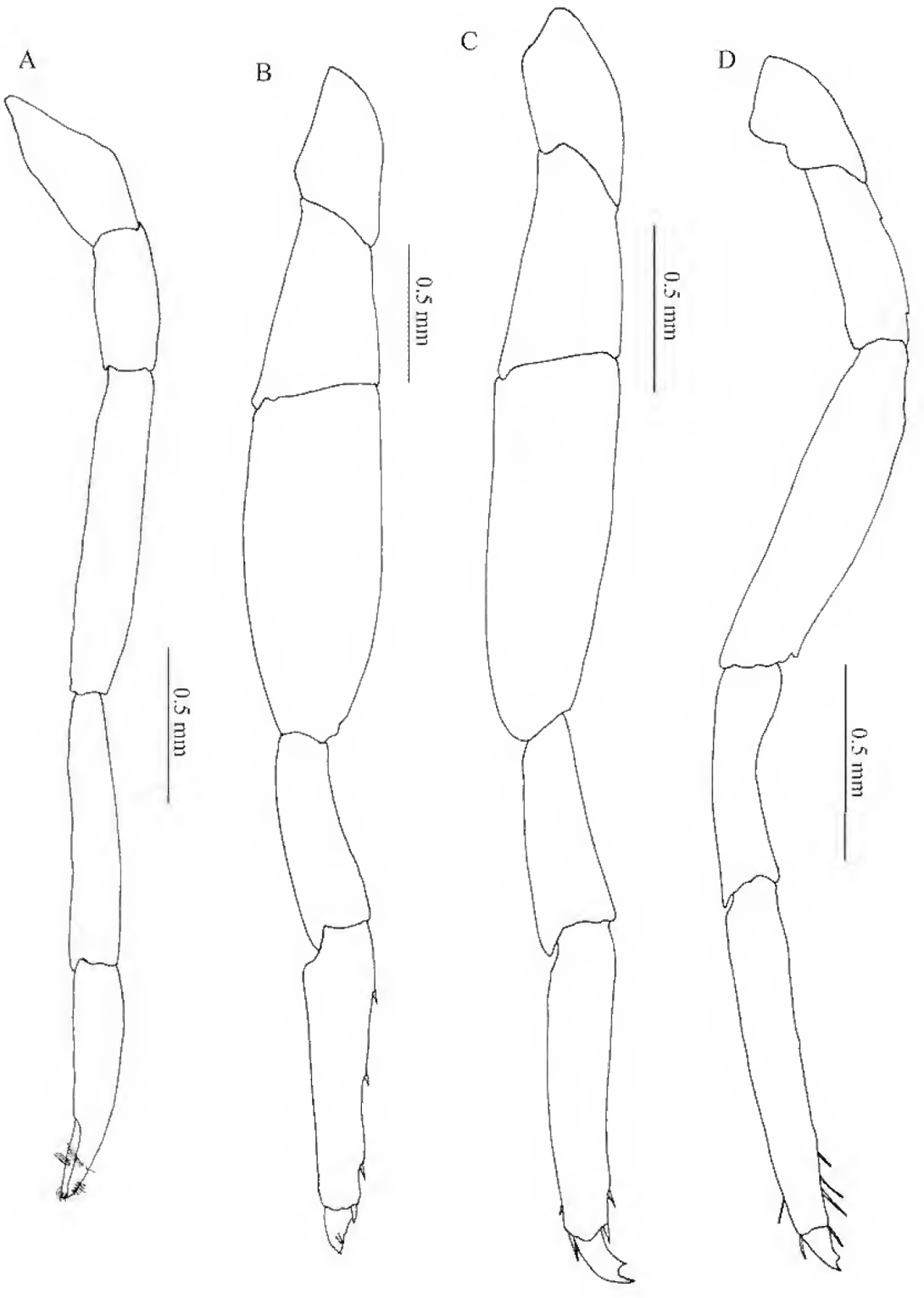

Fig.29- *Periclimenaeus crosnieri* sp.nov., ♀ , holotype, MNRJ 17914 (carapace length 5.3mm). (A) right pereopod 1, lateral; (B) right pereopod 3, lateral; (C) right pereopod 4, lateral; (D) right pereopod 5, lateral.

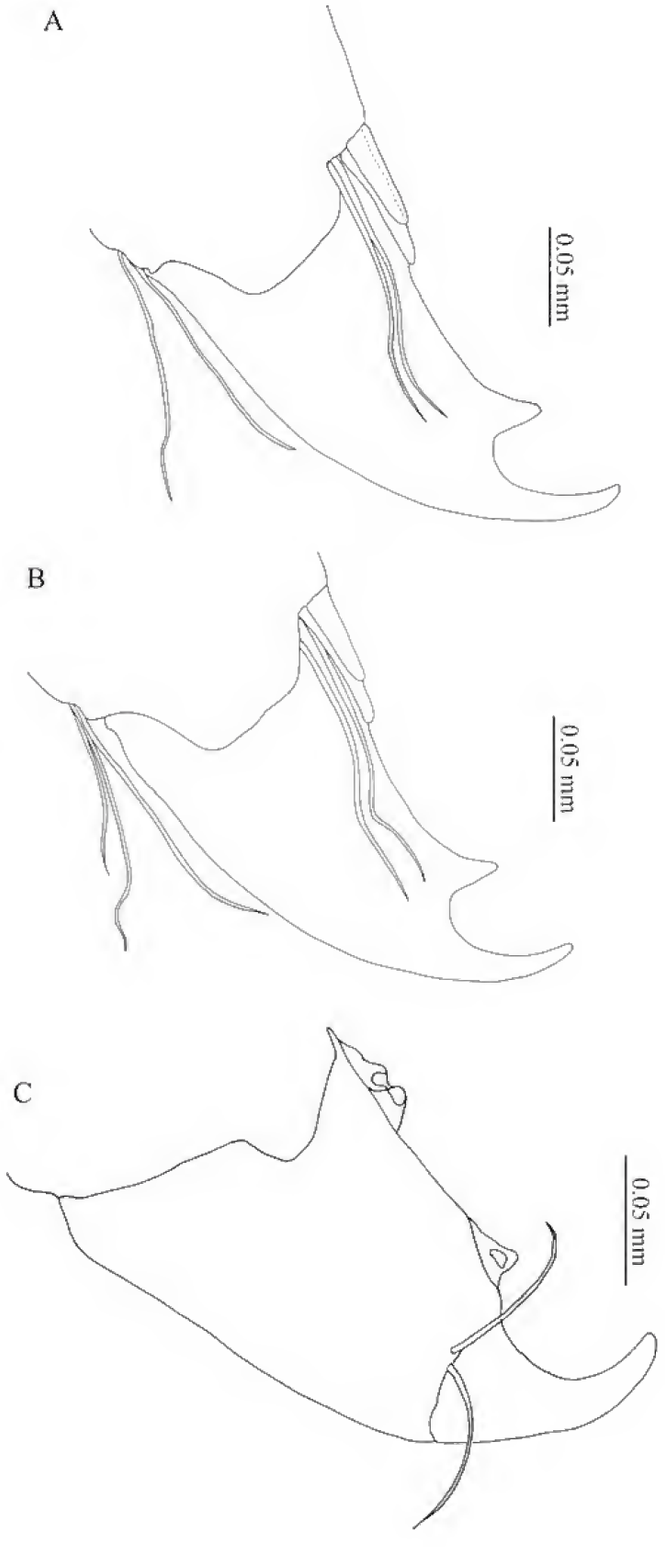

Fig.30- *Periclimenaeus crosnieri* sp.nov., ♀ , holotype, MNRJ 17914 (carapace length 5.3mm). (A) Pereopod 3 dactyl lateral; (B) pereopod 4 dactyl lateral; (C) pereopod 5 dactyl lateral.

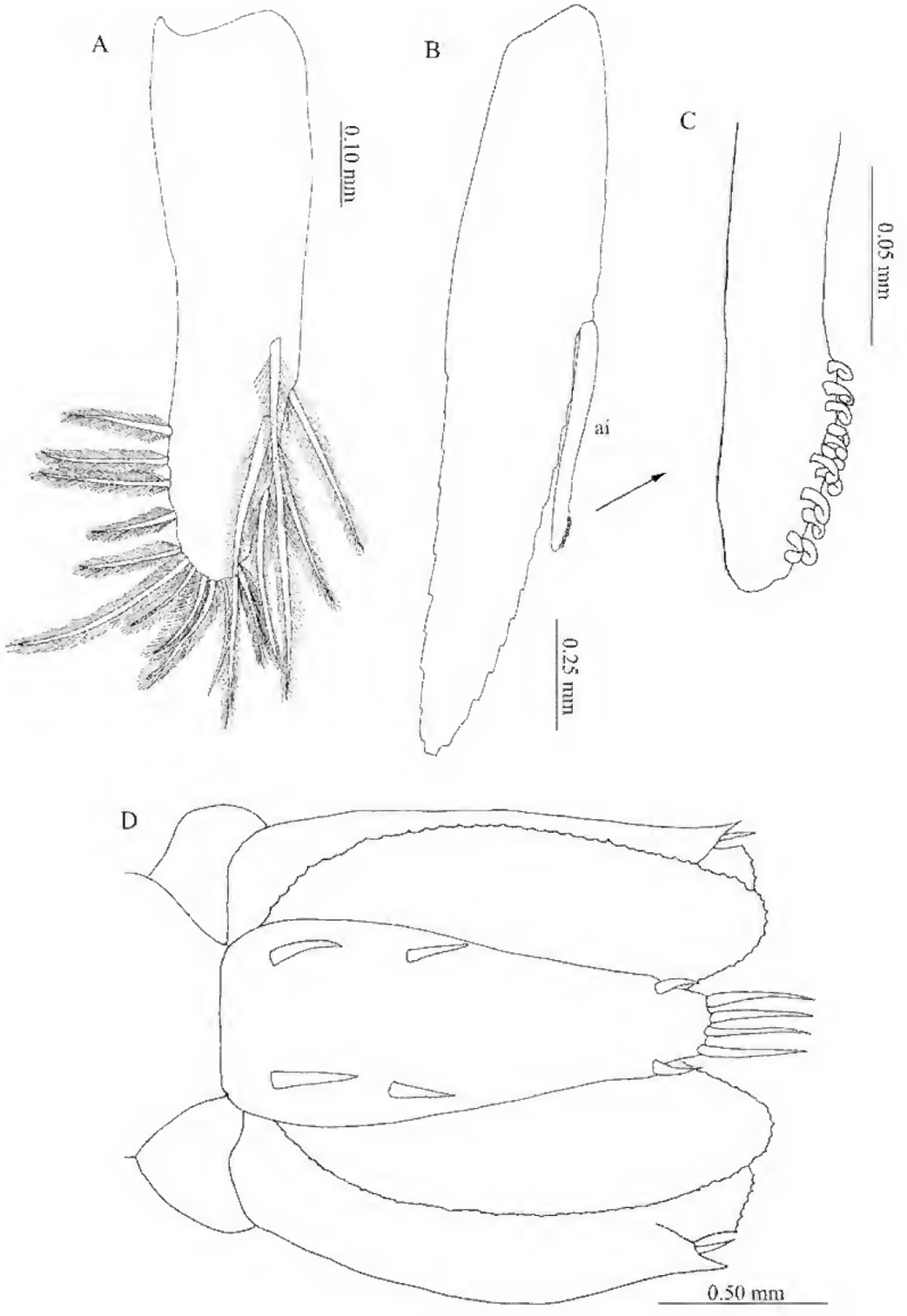

Fig.31- *Periclimenaeus crosnieri* sp.nov., ♀ , holotype, MNRJ 17914 (carapace length 5.3 mm). (A) endopod of left pleopod 1, lateral; (B) exopod and appendix interna of left pleopod 2 (ai=apendix interna); (C) appendix interna of left pleopod 2, lateral; (D) telson and uropods, dorsal.

Processa brasiliensis Christoffersen, 1979
(Figs.32-35)

Processa brasiliensis CHRISTOFFERSEN, 1979:364, figs.34, 35; NÖEL, 1986:261-301.

Material examined – Rocas Atoll, Cemitério Island margin, 5 ovigerous ♀ (4.0 to 6.5mm), 1♀ (4.0mm), 1♂ (4.0mm), MNRJ 19021; Cemitério Island margin, 1♀ (4.0mm), MNRJ 19027; pool, 1♀ (2.0mm), 1♂ (2.0mm), MNRJ 19042; pool, 1 ovigerous ♀ (5.0mm), MNRJ 19022; pool, 9 ovigerous ♀ (4.5 to 7.0mm), 4♀ (3.5 to 4.0mm), MNRJ 19025; central lagoon, close to Farol Island, 1♂ (3.0mm), 1♀ (3.0mm), MNRJ 19028; Barretinha channel, 2♂ (3.0, 3.5 mm), MNRJ 19024; northwestern Rocas atoll, 1♂ (3.0mm), MNRJ 19029.

Diagnosis – Carapace with rostrum short; antennal spine present. Stylocerite with teeth on anterior inner margin. Somites 1-5 without pair of spines on sternum. Right pereopod 2 merus with ten to 14 articles and carpus with 23-33 articles; left pereopod 2 merus with five articles, and carpus with 13-19 articles. Pleura of fifth abdominal somite lacking distinct posterolateral tooth. Lobe on abdominal somite 6, above articulation with uropod, unarmed (modified from CHRISTOFFERSEN, 1979).

Description – Eye large, reaching proximal third of scaphocerite. Carapace with rostrum not overreaching distal margin of cornea, tip bifid, with some setae, lower tooth longer than upper, lower margin convex and with numerous setae; with antennal spine (Fig.32A). Stylocerite rounded anteriorly, without acute tooth on inner margin, outer margin unarmed (Fig.32B). Scaphocerite extending beyond antennular peduncle, with distal spine on outer margin, overreaching scaphocerite, distal end truncate (Fig.32C). Mandible with molar process bearing strong teeth and numerous tubercles distally (Fig.32D). Maxilla 1 with one endite with pappose and six cuspidate serrulate seta on inner margin; palp hook like (Fig.32E). Maxilla 2, with broad scaphognathite, with densely plumose setae on all margins; endopod one-fifth of scaphognathite length; endite rounded, with several simple setae on inner margin (Fig.32F). Maxilliped 1 with elongate unarmed epipod; broad exopodal lobe, with densely plumose setae on outer margin; slender and elongate exopod, with several simple setae distally; endopod is almost half of exopod length, with simple setae on outer margin; endite bilobed, distal lobe straight, with scattered plumose setae on inner margin, basal lobe with triangular shape, unarmed (Fig.32G). Maxilliped 2 with ischio-merus short; carpus short, triangular; propodus elongate; dactyl short with denticulate and cuspidate serrulate seta on inner margin (Fig.32H). Maxilliped 3 with ischio-merus elongate; carpus short with densely plumose setae on inner and outer margins; propod-dactyl with two cuspidate setae on outer margin and densely plumose setae on inner and outer margins; exopod short, with dense plumose setae on distal margin (Fig.32I). Right pereopod 1 chelate; propodus little more than twice dactyl length; all articles with simple setae (Fig.33A). Left pereopod 1 with simple dactyl, almost one-third of propodus length; all articles with simple setae (Fig.33B). Right pereopod 2 longer than left, ischium with two articles, merus with 14 articles and carpus with 31 articles, dactyl half propodus length (Fig.34A). Left pereopod 2 with ischium entire; merus with five articles and carpus with 13 articles, dactyl almost half propodus length (Fig.34B). Pereopod 3, merus with four and ischium with two cuspidate setae on inner margins; carpus unarmed; propodus three times longer than dactyl, with tuft of setae distally; slender dactyl with setae distally (Fig.34C). Pereopod 4, merus with three, and ischium with two cuspidate setae on inner margins; carpus unarmed; propodus two times longer than dactyl, with tuft of setae distally; slender dactyl with setae on distal tip (Fig.34D). Pereopod 5 with merus, ischium and carpus unarmed; propodus with tuft of setae distally; slender dactyl with distal setae (Fig.34E). Abdomen, somites 1-4 with pleura rounded, somites 5-6 with pleura sub-quadrate, somite 5 without conspicuous posterolateral tooth (Fig.35E). Male pleopod 1, endopod with rounded point, with slender setae on posterior and distal margins (Fig.35A). Male pleopod 2, appendix masculina extending to extremity of endopod, with six cuspidate setae on inner surface and three distal acute simple setae (Fig.35B). Female pleopod 1, endopod leaf shaped, with slender setae on anterior and posterior margins (Fig.35C). Female pleopod 2, endopod with slender appendix interna, with simple setae distally (Fig.35D). Exopod of uropod without diaresis; lateral margin ending in sharp triangular projection, with strong spine (Fig.35F). Telson with three pairs of dorsolateral cuspidate setae, distal one smaller than other; three pairs of distal cuspidate setae, median pair stronger (Fig.35F).

Distribution – Brazil: Rocas Atoll and Pernambuco to south of Bahia.

Remarks – The genus *Processa* includes 45 species, of which 20 occur in the Indo-West Pacific and 25 occur in the Atlantic Ocean. On the Brazilian coast, six species have been previously recorded: *Processa bermudensis* (Rankin, 1900), *P. brasiliensis*, *P. fimbriata* Manning & Chace, 1971, *P. guyanae* Holthuis, 1959, *P. hemphilli* Manning & Chace, 1971, and *Processa profunda* Manning & Chace, 1971 (Christoffersen, 1998).

Of the 25 Atlantic species, ten have the pleura of abdominal somite 5 with posterolateral tooth, in contrast to *P. brasiliensis* which has the pleura of abdominal somite 5 rounded, lacking posterolateral tooth. Of the remaining 15 Atlantic species, *Processa bermudensis* (Rankin, 1900) and *P. vicina* Manning & Chace, 1971, do not have an antennal spine, while *P. brasiliensis* has a distinct antennal spine. *Processa parva* Holthuis, 1951, *P. hemphilli* Manning & Chace, 1971 and *P. pippinae* Wicksten & Méndez, 1985 have the pereopod 2 symmetrical, distinct from the other 11 species, including *P. brasiliensis*, which have the pereopod 2 asymmetrical. *Processa elegantula* Nouvel & Holthuis, 1957 and *P. wheeleri* Lebour, 1941 have the pereopod 2 sligthly asymmetrical, while *P. brasiliensis* has the peropod 2 very asymmetrical. *Processa profunda* Manning & Chace, 1971 and *P. mediterranea* (Parisi, 1915) have the lobe on abdominal somite 6 above the uropod articulation produced in a posterior spine, distinct from *P. brasiliensis* that has the lobe on abdominal somite 6 above the uropod articulation without posterior tooth. *Processa canaliculata* Leach, 1815 has the stylocerite with strong lateral tooth, while in *P. brasiliensis* this tooth is absent. *Processa famelica* Manning & Hart, 1991 has the rostrum extending beyond the eyes, while *P. brasilensis* has the rostrum shorter than eyes. *Processa vossi* Manning, 1991 has the right pereopod 2 with 18-19 articles on the merus, and 27-31 articles on carpus, and the telson with two pairs of dorsolateral cuspidate setae, while *P. brasiliensis* has the right pereopod 2 with ten to 14 articles on the merus, and 23-33 articles on the carpus, and the telson with three pairs of dorsolateral cuspidate setae. *Processa guyanae* Holthuis, 1959 has the carpus of the right second pereopod with more than 40 articles, while *P. brasiliensis* has the carpus with 26-33 articles.

The most closely related species to *P. brasiliensis* is *P. borboronica* Holthuis, 1952. *Processa borboronica* has the antennal spine short; the stylocerite with lateral angle of anterior margin produced in a minute tooth; and appendix masculina of second pleopod reaching only two-thirds to three-fourths of the endopod length, distinct from *P. brasiliensis* which has a long antennal spine, a stylocerite with lateral angle of anterior margin rounded; and appendix masculina reaching the tip of endopod. Other distinctions between these two species are listed by Christoffersen (1979).

The specimens examined agree with Christoffersen´s (1979) description, in all diagnostic characters examined. However, the number of articles in the merus and the carpus of second right and left pereopods presents variations. The articles of all specimens were counted and it was observed that four of the five examined males present a lower number of articles (right pereopod 2 merus 7-9, carpus 19-21; left pereopod 2 merus 5, carpus 9-12) than Christoffersen´s (1979) specimens. Non ovigerous females and ovigerous females present a high number of articles and are inside the range described by Christoffersen (1979). Four specimens present a number of articles larger than the observed by Christoffersen (1979) in right pereopod 2 merus (17-18).

Processa fimbriata Manning & Chace, 1971 (Figs.36-39)

Processa canaliculata – Rathbun, 1902:14 (not Leach, 1815).

Processa fimbriata Manning & Chace, 1971:19, figs.8-10; Chace, 1972:243.

Material examined – Rocas Atoll, Barretão channel, 1♀ (5mm), MNRJ 19023.

Diagnosis – Carapace with rostrum short; antennal spine present. Stylocerite with acute teeth on anterior outer margin. Somites 1-5 with pair of spines on sternites. Right pereopod 2 with 13-16 articles on merus, and 31-40 articles on carpus; left pereopod 2 with four to six articles on merus, and 15-18 articles on carpus. Pleura of fifth abdominal somite with distinct posterolateral tooth. Lobe on abdominal somite 6, above articulation with uropod with posterior tooth (modified from Manning & Chace, 1971).

Description – Eye large, reaching proximal half of scaphocerite. Carapace with rostrum not overreaching distal margin of cornea, bifid tip, lower

tooth longer than upper, lower margin slightly convex, with numerous setae; with antennal spine (Fig.36A). Stylocerite truncated anteriorly, with acute teeth on outer margin, inner margin unarmed (Fig.36B). Scaphocerite extending beyond antennular peduncle, with distal spine on outer margin, that does not overreach scaphocerite, distal end truncate (Fig.36C). Mandible with molar process bearing a tooth with margins covered by cuspidate setae and many strong teeth distally (Fig.36D). Maxilla 1 with one endite, with simple and long cuspidate serrulate seta on inner margin; palp hook like (Fig.36E). Maxilla 2, broad scaphognathite with densely plumose setae on all margins; endopod one-fourth of scaphognathite length; endite with papposerrate seta on inner margin (Fig.36F). Maxilliped 1 with elongate unarmed epipod; broad exopodal lobe with densely plumose setae on all margins; slender elongate exopod, with densely plumose setae on outer margin; endopod one-third of exopod length; endite rounded, with densely plumose setae on inner margin (Fig.36G). Maxilliped 2 with ischio-merus short; carpus short, triangular; propodus elongate; dactyl short with serrulate setae on inner margin (Fig.36H). Maxilliped 3, ischio-merus elongate with simple setae on inner margin; carpus with tufts of serrulate setae on outer surface; propodus and dactylus with tufts of densely plumose setae on inner margin, and 6 cuspidate setae on outer margin (Fig.36I). Right pereopod 1 chelate; propodus about slightly more than twice dactyl length; all articles with simple setae (Fig.37A). Left pereopod 1 with simple dactyl slightly less than one-third of propodus length, all articles with simple setae (Fig.37B). Right pereopod 2 longer than left, ischium with two articles; merus with 13 articles and carpus with 31 articles; dactyl half propodus length (Fig.37C). Left pereopod 2 with unsegmented ischium; merus with five articles and carpus with 13 articles; dactyl about one-third propodus length (Fig.37D). Pereopod 3, merus and ischium with two cuspidate setae on inner margin; carpus with pairs of setae along inner and outer margins; propodus three times longer than dactyl, with tuft of setae distally; slender dactyl with setae distally (Fig.38A). Pereopod 4 merus with three, and ischium with two cuspidate setae on inner margin; carpus slender, with simple setae on inner and outer margins; propodus four times longer than dactyl, with tufts of setae distally; dactyl with setae distally (Fig.38B). Pereopod 5 merus, ischium and carpus unarmed; propodus with simple setae on inner and outer margins; female with four cuspidate setae on inner margin; slender dactyl without distal setae (Fig.38C). Abdomen, somites 1-4 with pleura rounded, somites 5-6 with pleura sub-quadrate, somite 5 with conspicuous posterolateral tooth (Fig.39D). Female pleopod 1, endopod leaf shaped, with simple setae on posterior surface (Fig.39A). Pleopod 2, endopod with appendix interna slender, with numerous hook setae distally (Fig.39B, C). Exopod of uropod with complete diaresis; lateral margin ending in sharp triangular projection, with strong spine (Fig.39E). Telson with two pairs of dorsolateral cuspidate setae; two pairs of distal cuspidate setae, inner pair stronger (Fig.39E).

Distribution – Western Atlantic: North Carolina, southern Florida, Bahamas, Puerto Rico, Brazil: Espírito Santo, Rio de Janeiro, and Rocas Atoll.

Remarks – Of the 26 Atlantic species of *Processa*, 16 have the pleura of abdominal somite 5 rounded, lacking posterolateral tooth, distinct from *P. fimbriata* which has the pleura of abdominal somite 5 with distinct posterolateral tooth. Of the ten remainig species, three have the stylocerite unarmed, whereas *P. fimbriata* has the stylocerite armed with a tooth on anterior margin. *Processa macrodactyla* Holthuis, 1952 has the carpus of the left pereopod 2 unsegmented while *P. fimbriata* has the carpus of left pereopod 2 divided in at least five articles. *Processa macrophthalma* Nouvel & Holthuis, 1957 has the lobe on abdominal somite 6 above uropod articulation unarmed, while the remaining species, including *P. fimbriata*, have the lobe on abdominal somite 6 produced in a posterior tooth. *Processa pontica* (Sowinsky, 1882) has the stylocerite with row of spinules on the anterior margin and the pleura of abdominal somite 5 with a spinule above posterolateral tooth, distinct from *P. fimbriata* where these two structures are absent. *Processa intermedia* Holthuis, 1951 and *Processa packeri* Manning & Chace, 1990 have the abdomen without sternal spines, while *P. fimbriata* has spines on the sternum of the anterior five abdominal somites. *Processa riveroi* Manning & Chace, 1971 has the stylocerite with a spine on outer and inner angles, distinct from *P. fimbriata* that has the stylocerite armed only on the outer angle.

The female examined agrees with MANNING & CHACE (1971) description. However, the number of articles in carpus of left pereopod 2 presents a variation. In MANNING & CHACE´s (1971) description, the range of articles in carpus of left pereopod 2 was 15-18, and the female examined has 19 articles.

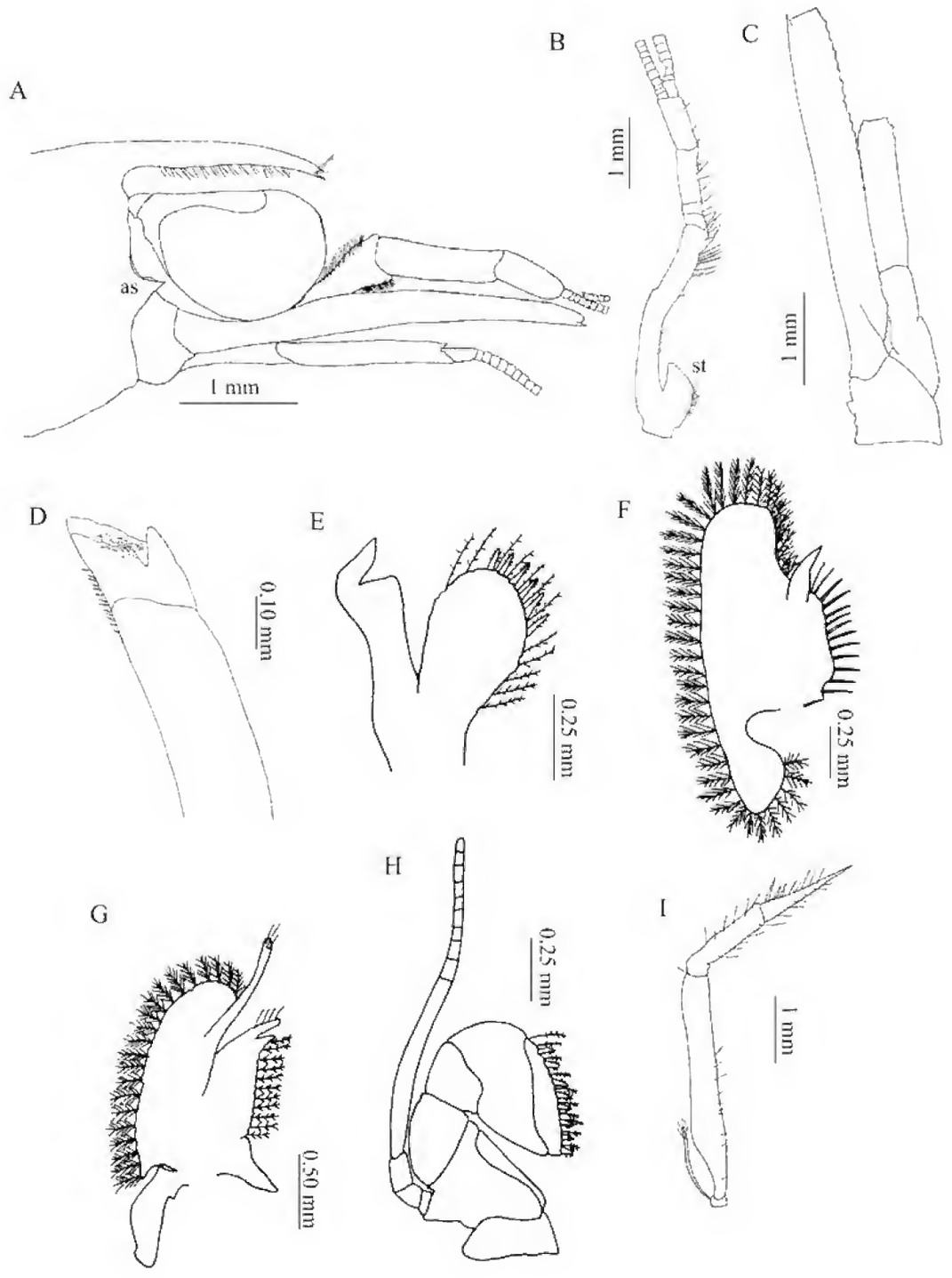

Fig.32- *Processa brasiliensis* Christoffersen, 1979, ♂, MNRJ 19024 (carapace length 3.0mm). (A) anterior part of carapace and cephalic appendages (as=antennal spine); (B) right antennula, dorsal (st=stylocerite); (C) right scaphocerite, dorsal; (D) left mandible, dorsal (mp=molar process); (E) left maxilla 1, dorsal (end=endite; p=palp); (F) left maxilla 2, dorsal (end=endite; enp=endopod; sc=scaphognathite); (G) left maxilliped 1, dorsal (el=exopodal lobe; end=endite; enp=endopod; ep=epipod; exp=exopod); (H) left maxilliped 2, dorsal (exp=exopod); (I) left maxilliped 3, dorsal (exp=exopod).

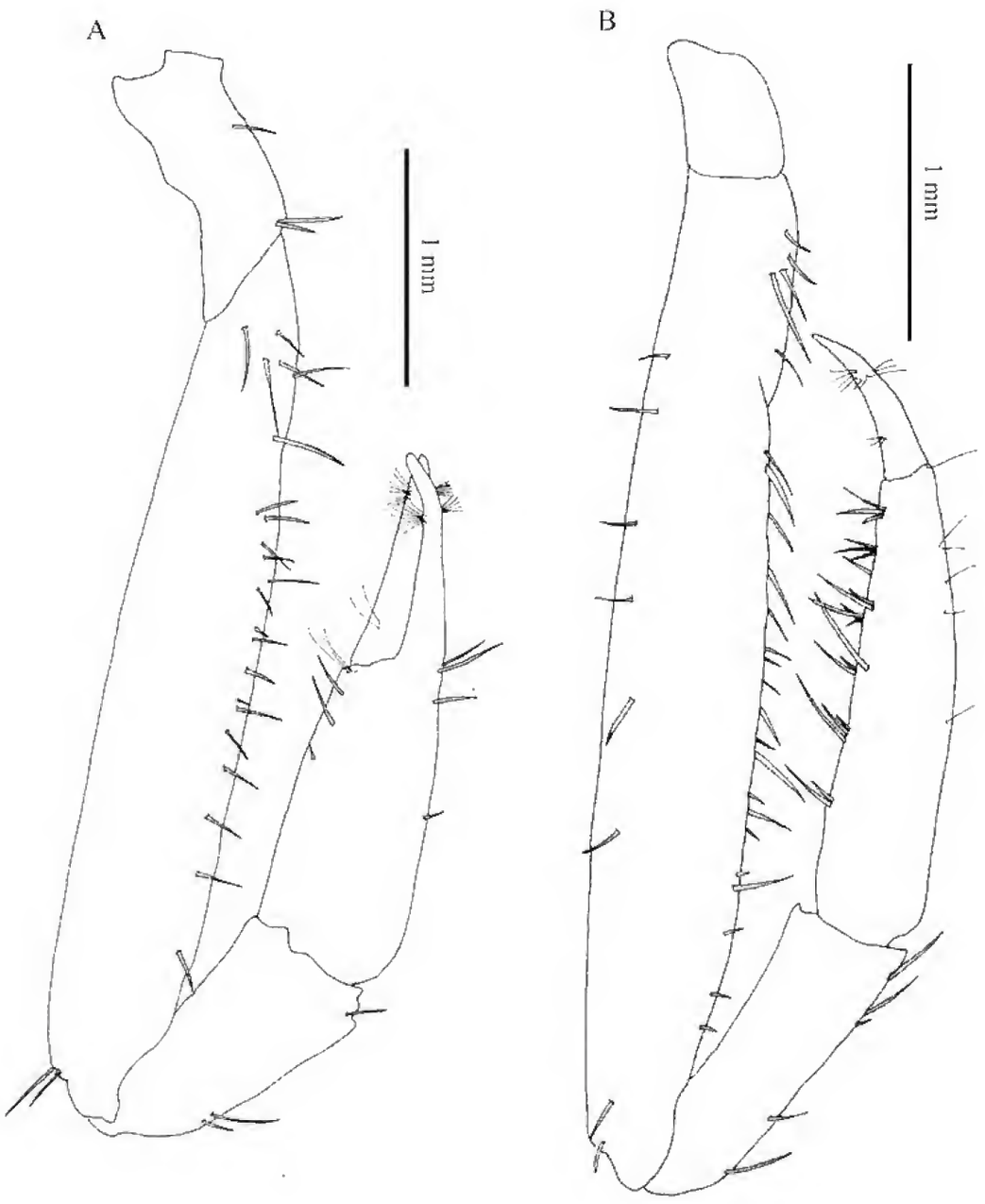

Fig.33- *Processa brasiliensis* Christoffersen, 1979, ♂, MNRJ 19024 (carapace length 3.0mm). (A) right pereopod 1, lateral; (B) left pereopod 1, lateral.

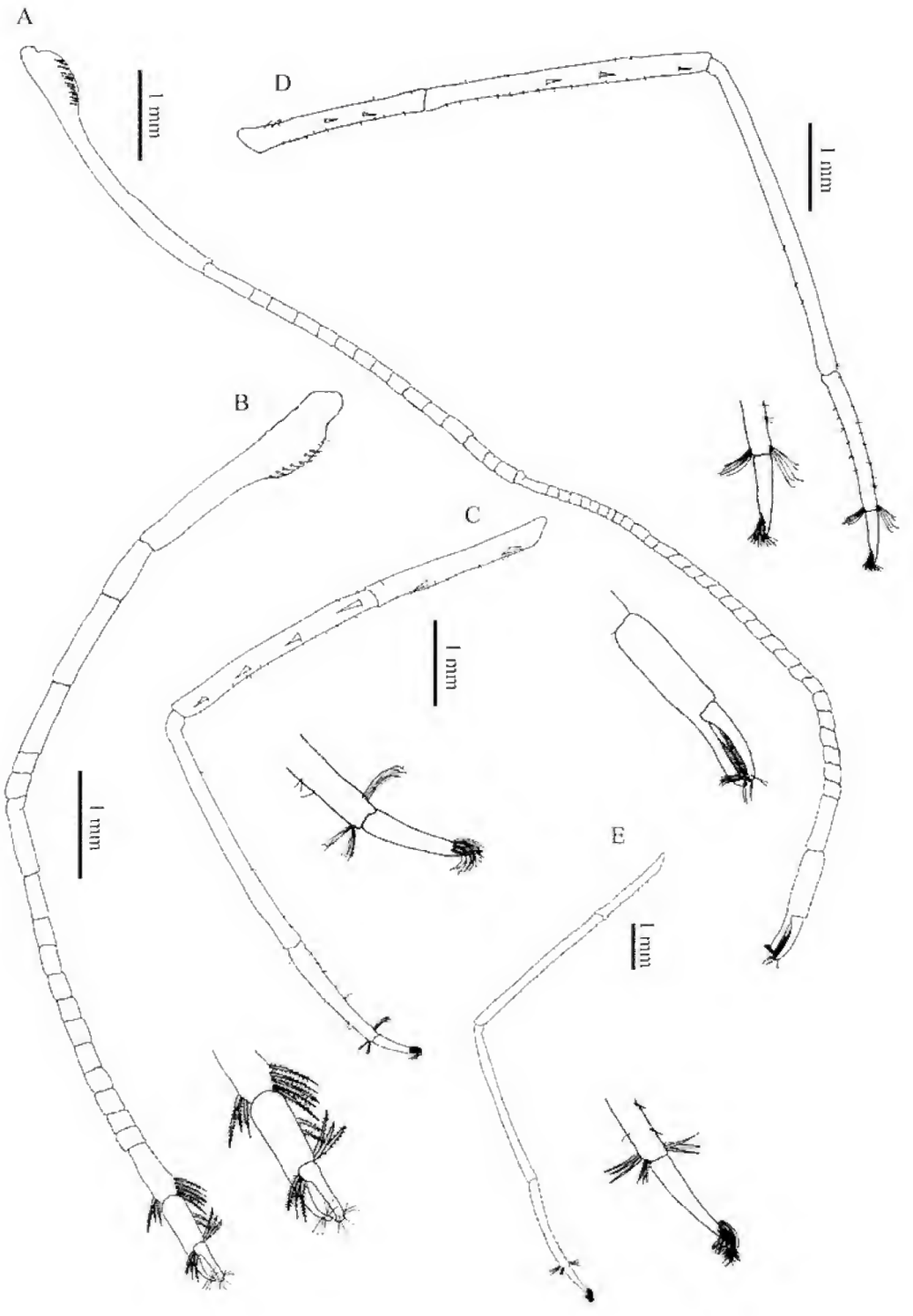

Fig.34- *Processa brasiliensis* Christoffersen, 1979, ♂, MNRJ 19024 (carapace length 3.0mm). (A) right pereopod 2, lateral; (B) left pereopod 2, lateral; (C) right pereopod 3, lateral; (D) right pereopod 4, lateral; (E) right pereopod 5, lateral.

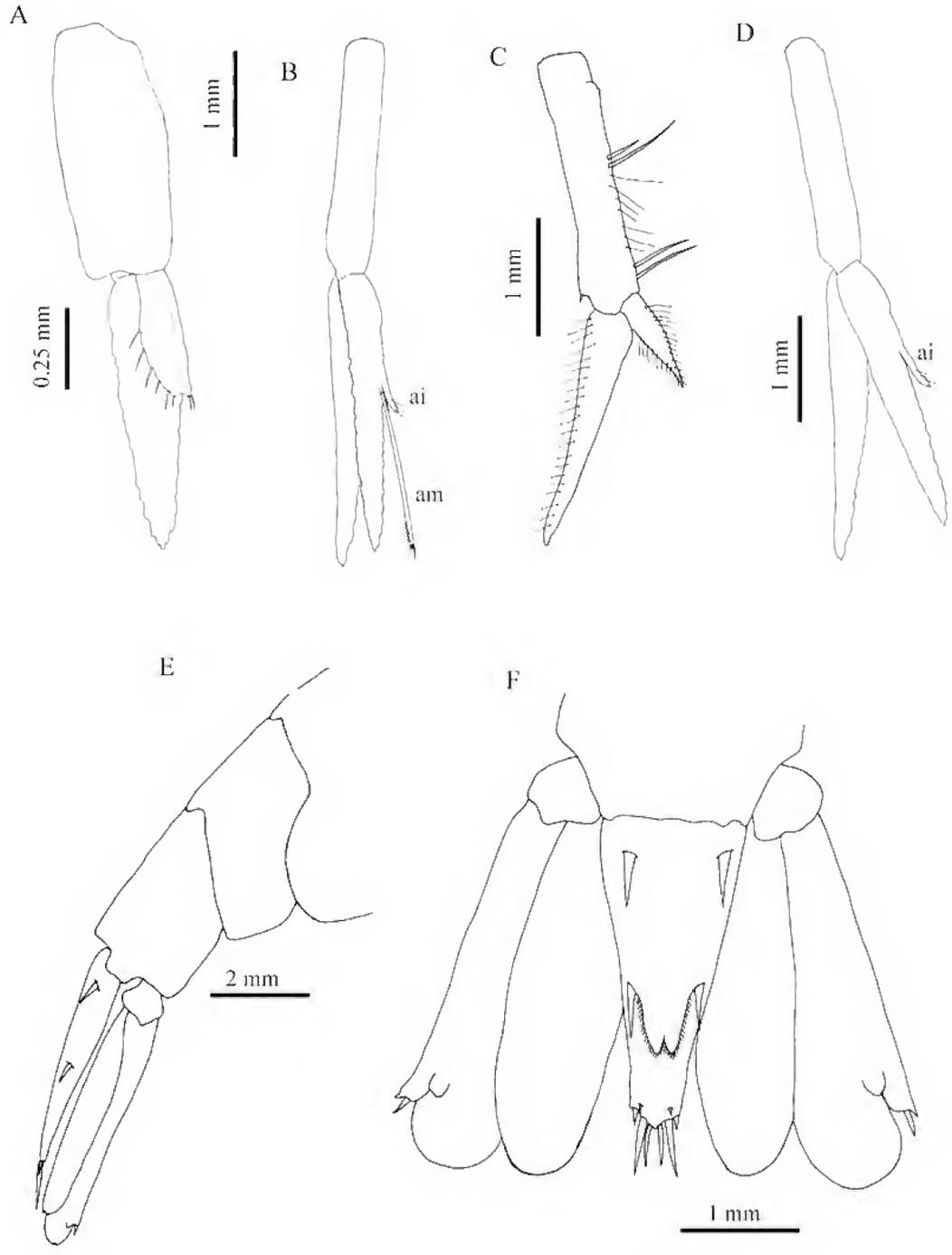

Fig.35- *Processa brasiliensis* Christoffersen, 1979, ♂, MNRJ 19024 (carapace length 3.0mm). (A) left pleopod 1, lateral; (B) left pleopod 2, lateral (ai=appendix interna; am=appendix masculina). *Processa brasiliensis*, ♀, MNRJ 19027 (carapace length 4.0mm). (C) left pleopod 1, lateral; (D) left pleopod 2, lateral (ai=appendix interna). *Processa brasiliensis*, ♂, MNRJ 19024 (carapace length 3.0mm). (E) posterior part of abdomen, telson and uropods, lateral; (F) telson and uropods, dorsal.

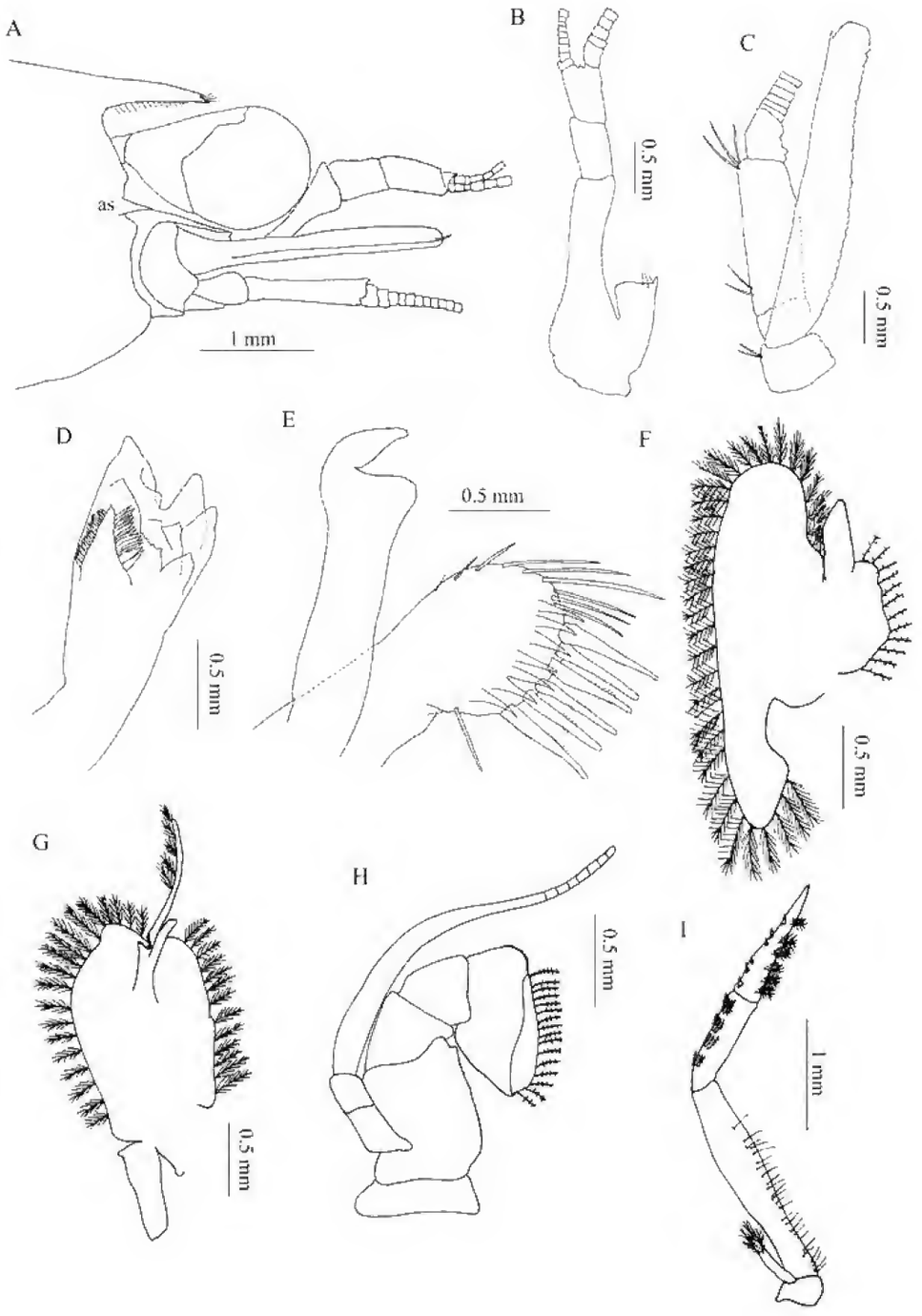

Fig.36- *Processa fimbriata* Manning & Chace, 1971, ♀ , MNRJ 19023 (carapace length 5mm). (A) anterior part of carapace and cephalic appendages (as=antennal spine); (B) right antennula, dorsal (st=stylocerite); (C) right scaphocerite, dorsal; (D) left mandible, dorsal (mp=molar process); (E) left maxilla 1, dorsal (end=endite; p=palp); (F) left maxilla 2, dorsal (end=endite; enp=endopod; sc=scaphognathite); (G) left maxilliped 1, dorsal (el=exopodal lobe; end=endite; enp=endopod; ep=epipod; exp=exopod); (H) left maxilliped 2, dorsal (exp=exopod); (I) left maxilliped 3, dorsal (exp=exopod).

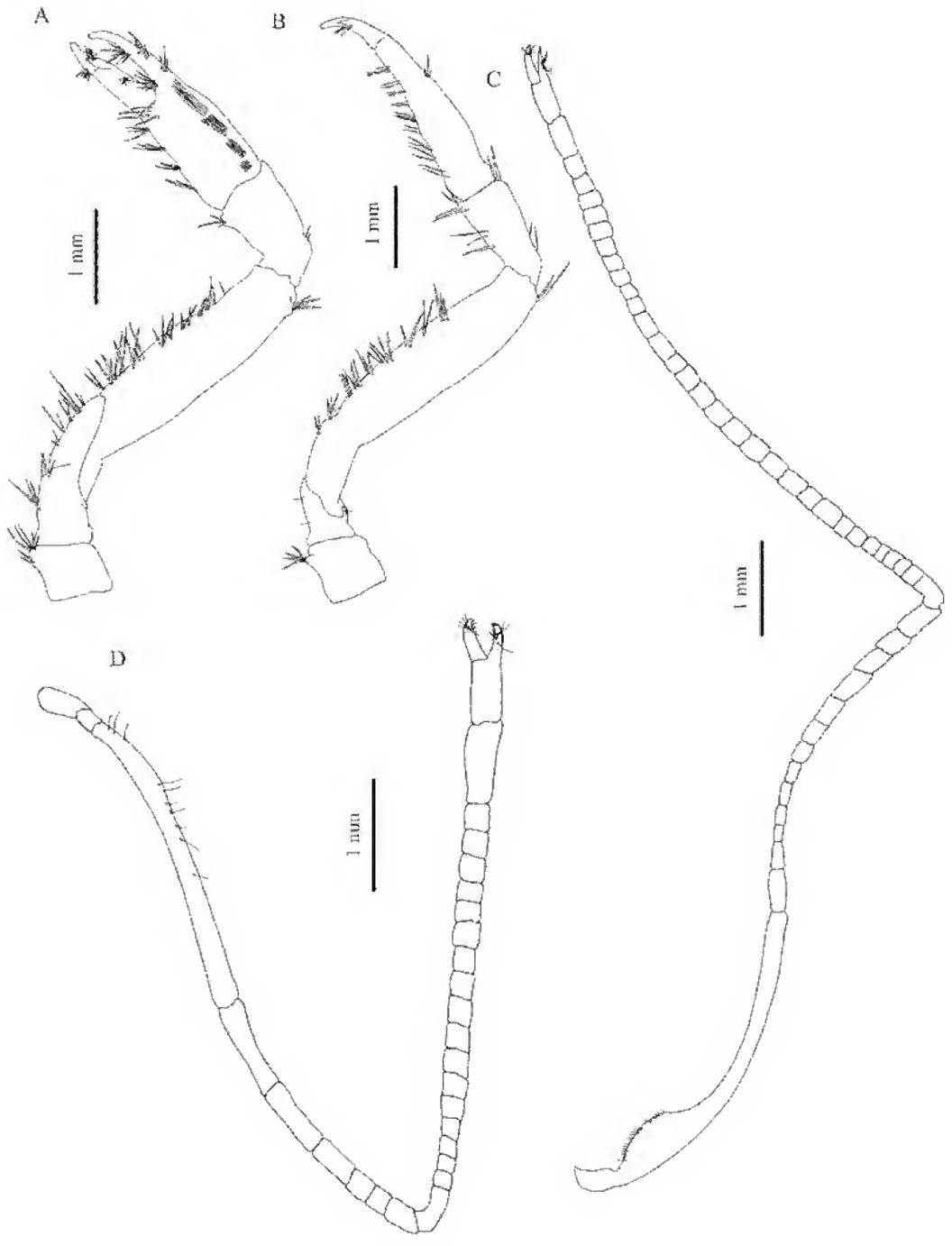

Fig.37- *Processa fimbriata* Manning & Chace, 1971, ♀ , MNRJ 19023 (carapace length 5mm). (A) right pereopod 1, lateral; (B) left pereopod 1,lateral; (C) right pereopod 2, lateral; (D) left pereopod 2, lateral.

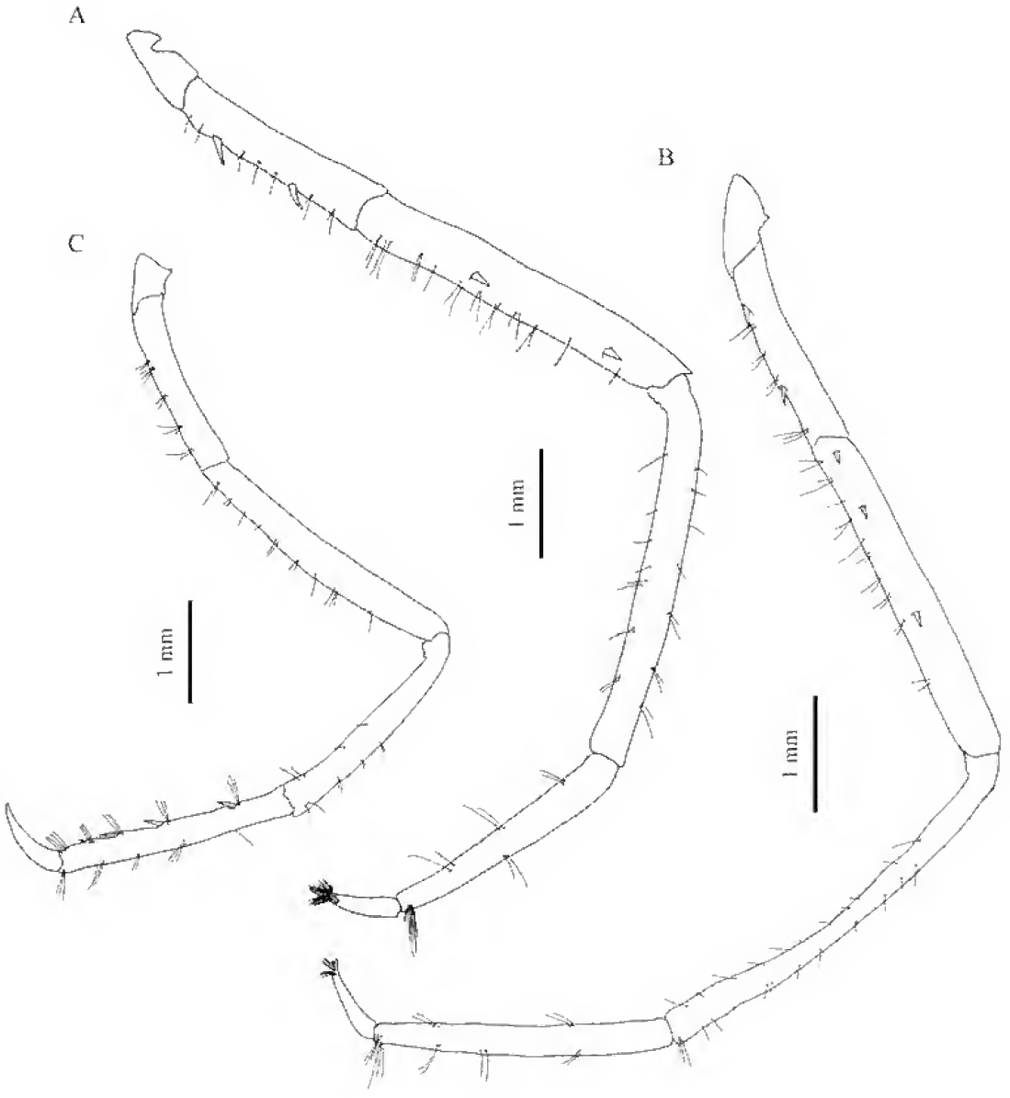

Fig.38- *Processa fimbriata* Manning & Chace, 1971, ♀ , MNRJ 19023 (carapace length 5mm). (A) right pereopod 3, lateral; (B) right pereopod 4, lateral; (C) right pereopod 5, lateral.

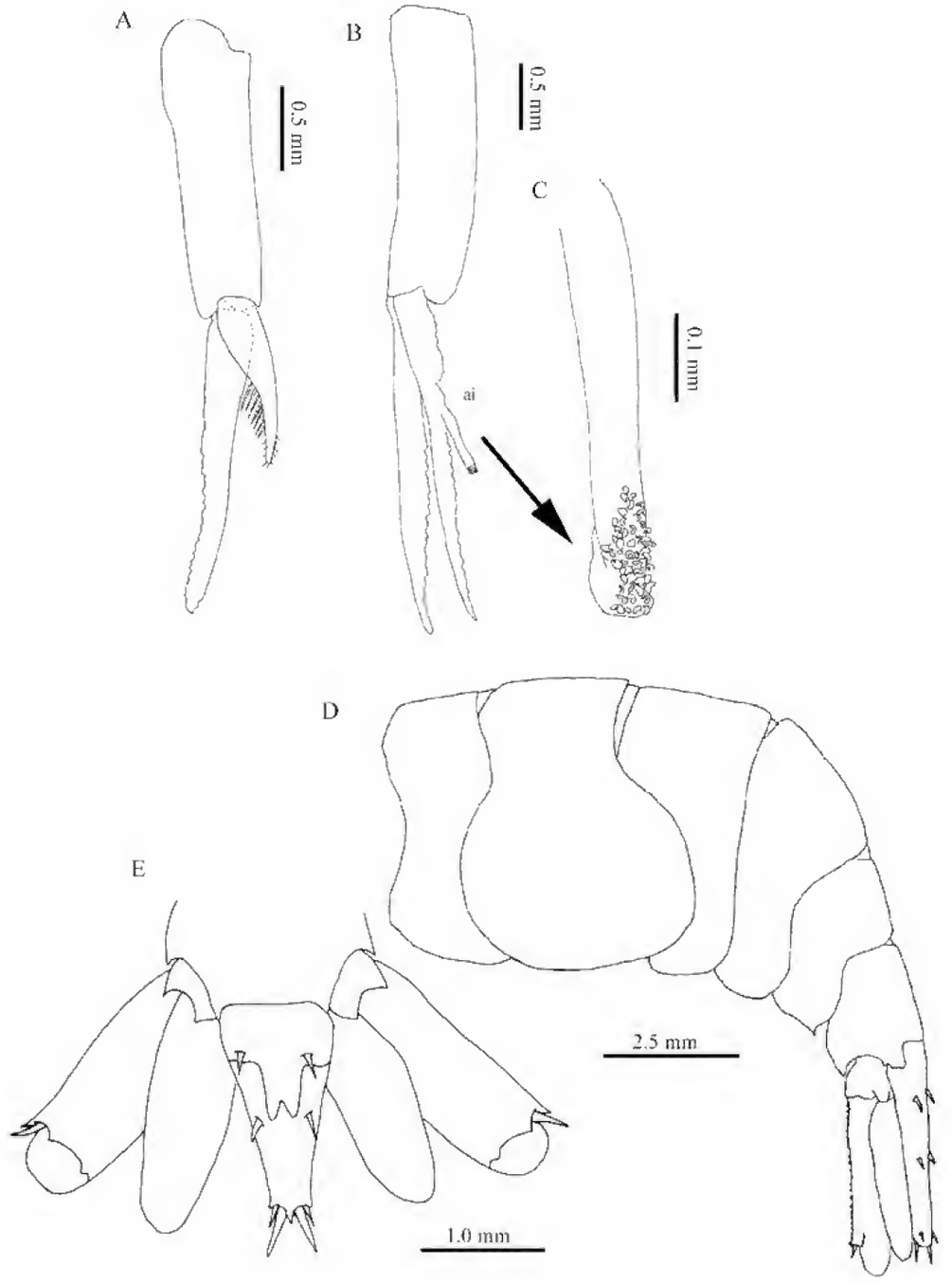

Fig.39- *Processa fimbriata* Manning & Chace, 1971, ♀ , MNRJ 19023 (carapace length 5mm). (A) left pleopod 1, lateral; (B) left pleopod 2, lateral (ai=appendix interna); (C) appendix interna of left pleopod 2, lateral; (D) abdomen, telson and uropods, lateral; (E) telson and uropods, dorsal.

Rhynchocinetidae Ortmann, 1890

Cinetorhynchus Holthuis, 1995

Cinetorrhynchus Holthuis, 1995:145; Okuno, 1997:31.

Diagnosis – Articulation between carapace and rostrum sometimes incomplete. Three dorsal teeth on carapace behind rostrum base. Postorbital spine absent. Lower orbital angle fused with antennal spine. Posterior margin of abdominal somite 5, sometimes also of somite 4 with distinct spine above the base of pleuron (from Holthuis, 1995).

Cinetorhynchus rigens (Gordon, 1936)
(Figs.40-46)

Rhynchocinetes rigens Gordon, 1936:76; Manning, 1961b:1.

Cinetorhynchus rigens – Holthuis, 1955:146; Okuno, 1997:31.

Material examined – Rocas Atoll, pool, 1♂ (4.5mm), MNRJ 19041; pool, 1♀ (3.0mm), MNRJ 19026.

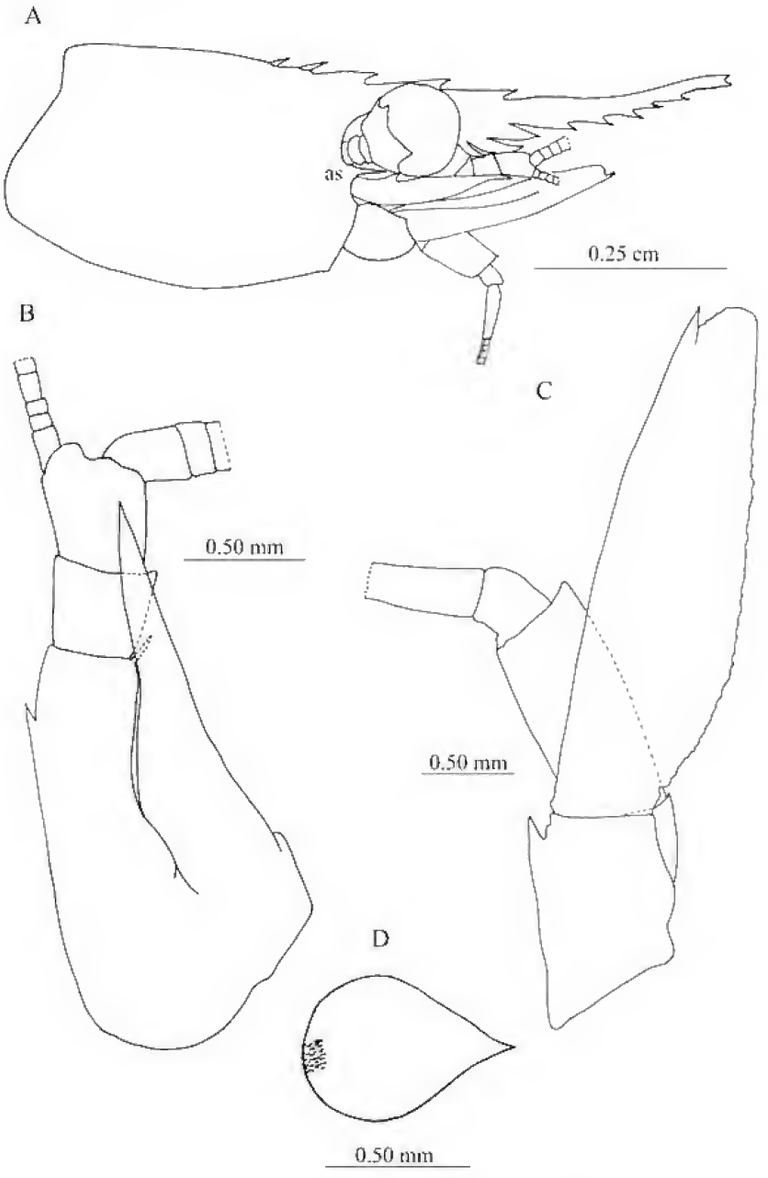

Fig.40- *Cinetorhynchus rigens* (Gordon, 1936), ♂, MNRJ 19041 (carapace length 4.5mm). (A) carapace and cephalic appendages, lateral (as-antennal spine); (B) right antennula, dorsal; (C) right antenna, dorsal; (D) epistome, ventral.

Diagnosis – Carapace with rostrum overreaching antennal scale, ventral margin with eight teeth, dorsal margin with five teeth, last two teeth articulated with carapace, apex bifid; antennal spine present; branchiostegal spine absent. Abdomen with pleura unarmed. Male pleopod 1 with rounded endopod, with simple setae on anterior margin and distal anterior lobe with hook setae on apex. Male pleopod 2 with appendix interna with three strong acute cuspidate setae on apex; appendix interna twice as long as appendix masculina, with numerous hook setae on apex.

Description – Carapace with rostrum 1.3 times carapace length, overreaching scaphocerite, ventral margin convex, with eight teeth, first three very strong; dorsal margin with five teeth, two postorbital teeth articulated with carapace, apex bifid; carapace dorsal margin not carinate; with acute antennal spine; without branchiostegal, supraorbital and pterygostomian spines; without cervical groove and suprabranchial carina. Eyes with large globular cornea, about one-third of carapace length, well pigmented, without ocellus, stalk short, about half of corneal diameter (Fig.40A). Stylocerite strongly developed, overreaching middle of third antennular article; distolateral tooth of basal article reduced, not reaching half of second antennular article, with small acute ventromedial tooth, without statocyst (Fig.40B). Scaphocerite tapering distally, with distal tooth reaching end of scale; basicerite with small acute lateral tooth (Fig.40C). Epistome rounded, with anterior acute point (Fig.40D). Mandible, incisor process with 5 acute, strong teeth and 12 denticles below; molar process complex, formed by alternating series of grooves and ridges and one strong multicuspidate tooth at upper angle (Fig.41A); palp 3-articulated, with scattered plumose setae on outer margin of second and third articles, anterior margin and inner surface of third article with short serrulate setae (Fig. 41B). Maxilla 1 with two endites, distal endite with denticulate cuspidate setae on inner margin, and series of long plumose setae behind; basal endite rounded, with simple setae on lateral margins, stout and serrulate setae on inner margin; palp rounded, with one slender pappose seta (Fig.42A, B). Maxilla 2 with two endites, distal endite bilobed, with serrulate setae on all margins, basal endite with long plumose setae on all margins; endopod, shorter than distal endite, unarmed; scaphognathite with long plumose setae on all margins (Fig.42C). Maxilliped 1 with two endites with simple setae on inner margin; endopod three segmented, twice longer than distal endite, with long plumose setae on inner margin; exopod twice longer than endopod, with long plumose setae on all margins; exopodal lobe with long plumose setae on outer margin; epipod large, deeply bilobed, distal lobe rounded, elongate; basal lobe short, triangular (Fig.42D). Maxilliped 2, 6-articulated, ischium and merus fused; endopod, basis with long plumose setae on inner margin; ischio-merus subquadrate, unarmed; carpus short triangular, unarmed; propodus rounded, unarmed; dactyl with cuspidate serrulate seta on inner margin; broad epipod without podobranch; exopod elongate, with long plumose setae on all margins (Fig.42E). Maxilliped 3 with elongate exopod, with long plumose setae on all margins; ischium and merus fused, with cuspidate setae and strong tooth on distal outer margin; carpus curved with denticulate cuspidate seta distally; propodus and dactyl fused, slender, elongate, inner margin one simple seta basally, nine long denticulate cuspidate setae medio-distally, and five dark horny cuspidate setae distally (Fig.42F). Maxilliped 3 and pereopods 1 to 5 coxa with posterior margin notched (Fig.45A). Maxilliped 3 and pereopods 1 to 4 with one epipod each; epipods rounded at base tapering posteriorly, with acute simple setae; point of attachment on coxa between rounded base and posterior elongate area (Fig.45A). Pereopods 1 to 5 without exopods and with only pleurobranchs. Pereopod 1 stronger and more robust than longer pereopod 2. Pereopods 1 and 2 chelate; dactyl and propodus tips with tufts of serrulate setae. Pereopod 1, propodus with denticulo-papposerrate seta on inner margin; fixed finger with two strong cuspidate setae, the posterior seta with concavity for receiving dactyl teeth; dactyl tip formed by four strong cuspidate setae (Fig.43A). Pereopod 2, propodus fixed finger with two strong cuspidate setae oppose to five strong dactyl cuspidate setae (Fig.43B). Pereopod 3 to 5 slender, elongate; ischium with one ventral and medial cuspidate seta; carpus with medial cuspidate seta and strong tooth on distal angle of inner margin; dactyl with four strong cuspidate setae on ventral margin, and tufts of long plumose setae on outer dorsal margin. Pereopod 3 longer than pereopod 4, merus with three ventral cuspidate setae, two distal cuspidate setae; propodus with 11 ventral cuspidate setae (Fig.44A). Pereopod 4 longer than pereopod 5; merus with one ventral cuspidate setae, three medial and two distal cuspidate setae; propodus with 12 ventral cuspidate setae, third to ninth cuspidate setae denticulate, articulated

(Fig.44B). Pereopod 5, merus with two medial cuspidate setae; propodus with nine ventral cuspidate setae (Fig.44C). Fifth thoracic sternite with pair of slender membranous submedian teeth; other thoracic sternites unarmed. Abdomen without dorsally carinate tergites; pleura unarmed (Fig.45B); pleopods 2 to 5 with appendix interna well developed. Pleopod 1 with modified endopod in male, rounded, with strong ten simple setae on medial margin, and medial lobe on anterior margin with hook setae distally (Fig.46A). Pleopod 2 with appendix masculina short and slender, with three stout acute setae on apex (Fig.46B); appendix interna, twice longer than appendix masculina (excluding spines length), distally rounded with several hook setae (Fig.46C). Exopod of uropod without diaresis, with strong distal spine on outer margin (Fig.46D). Telson not dorsally sulcate, with three pairs of dorsal cuspidate setae at about 0.45, 0.55 and 0.7 of telson length, posterior margin with acute median process, with three pairs of posterior marginal cuspidate setae, lateral cuspidate setae similar to dorsal cuspidate setae, intermediate cuspidate setae well developed, about 0.12 of telson length, submedian cuspidate setae shorter, about 0.6 of intermediate cuspidate setae length.

Distribution – Eastern Atlantic Ocean: Madeira and Azores Islands; Western Atlantic Ocean: Florida, Bahamas, Bermuda, and Brazil (Pernambuco, Fernando de Noronha and Rocas Atoll).

Remarks – This species is widely distributed in Atlantic Ocean and is the single species of the genus that occurs in the Brazilian region.

The sampled specimens are juveniles, with carapace length of 3.0 and 4.5mm; *Cinetorhynchus rigens* can reach 17mm in carapace length. The specimens examined present the stylocerite, scaphocerite, mandible and mandibular palp similar to the figured by GORDON (1936) for the adults. However, GORDON (1936) described an articulated rostrum, striae and ornamentations on carapace and abdomen and a strong lateral tooth on abdominal somites 4 and 5, distinct from the material examined which has rostrum not articulated, glabrous carapace and abdomen, and abdominal somites 4 and 5 without lateral tooth, all characters that are from the juvrnile stages.

MANNING (1961b) also noted some differences between juvenile and adult forms of *C. rigens*: the rostral articulation is not visible in specimens with less than 6mm of carapace length; the color pattern and ornamentation is noted only in specimens with more than 6mm of carapace length; and the lateral spines of abdominal somites 4 and 5 are not visible in the smallest specimens. Furthermore, in specimens with 3.4mm of carapace length, MANNING (1961b) observed two articulated teeth behind rostrum base, also observed in the material examined.

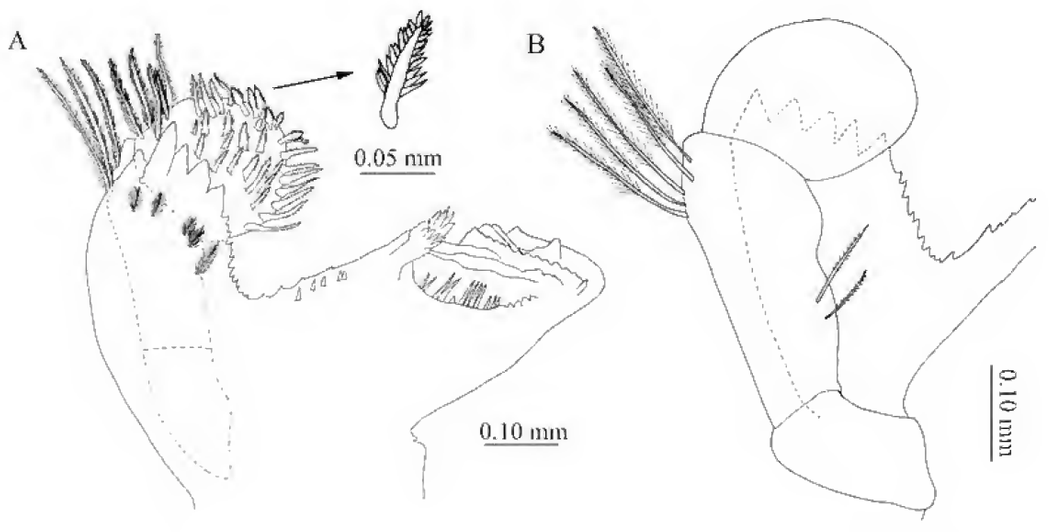

Fig.41- *Cinetorhynchus rigens* (Gordon, 1936), ♂, MNRJ 19041 (carapace length 4.5mm). (A) left mandible, dorsal (ip=incisor process; mp=molar process); (B) right mandular palp, ventral (p=palp).

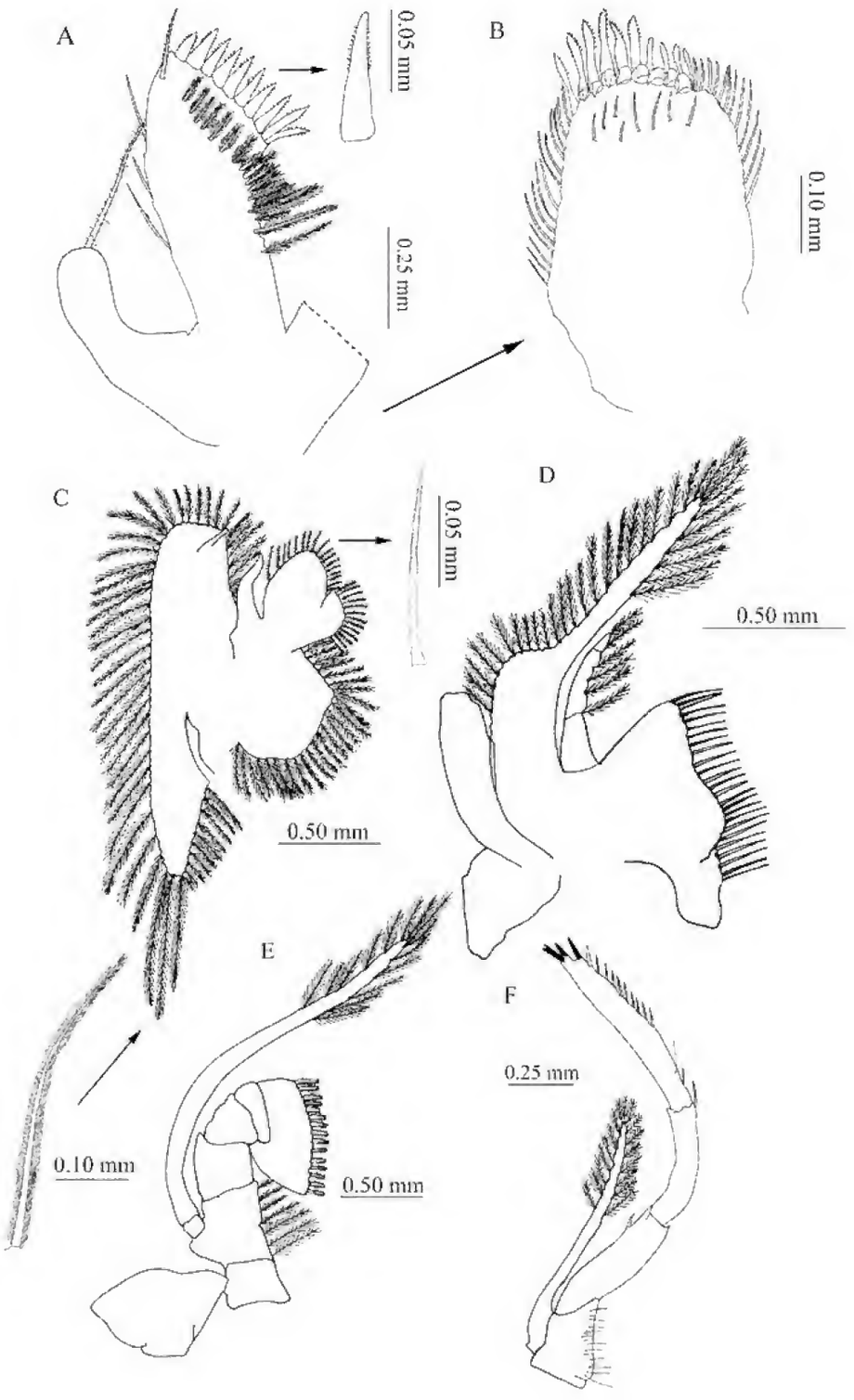

Fig.42- *Cinetorhynchus rigens* (Gordon, 1936), ♂, MNRJ 19041 (carapace length 4.5mm). (A) left maxilla 1, palp and distal endite, dorsal (end=endite; p=palp); (B) rigth maxilla 1, basal endite, dorsal (end=endite); (C) left maxilla 2, dorsal (end=endite; enp=endopod; sc=scaphognathite); (D) left maxilliped 1, dorsal (end=endite; el=exopodal lobe; enp=endopod; ep=epipod); (E) left maxilliped 2, dorsal (ep=epipod; exp=exopod); (F) left maxilliped 3, dorsal (exp=exopod).

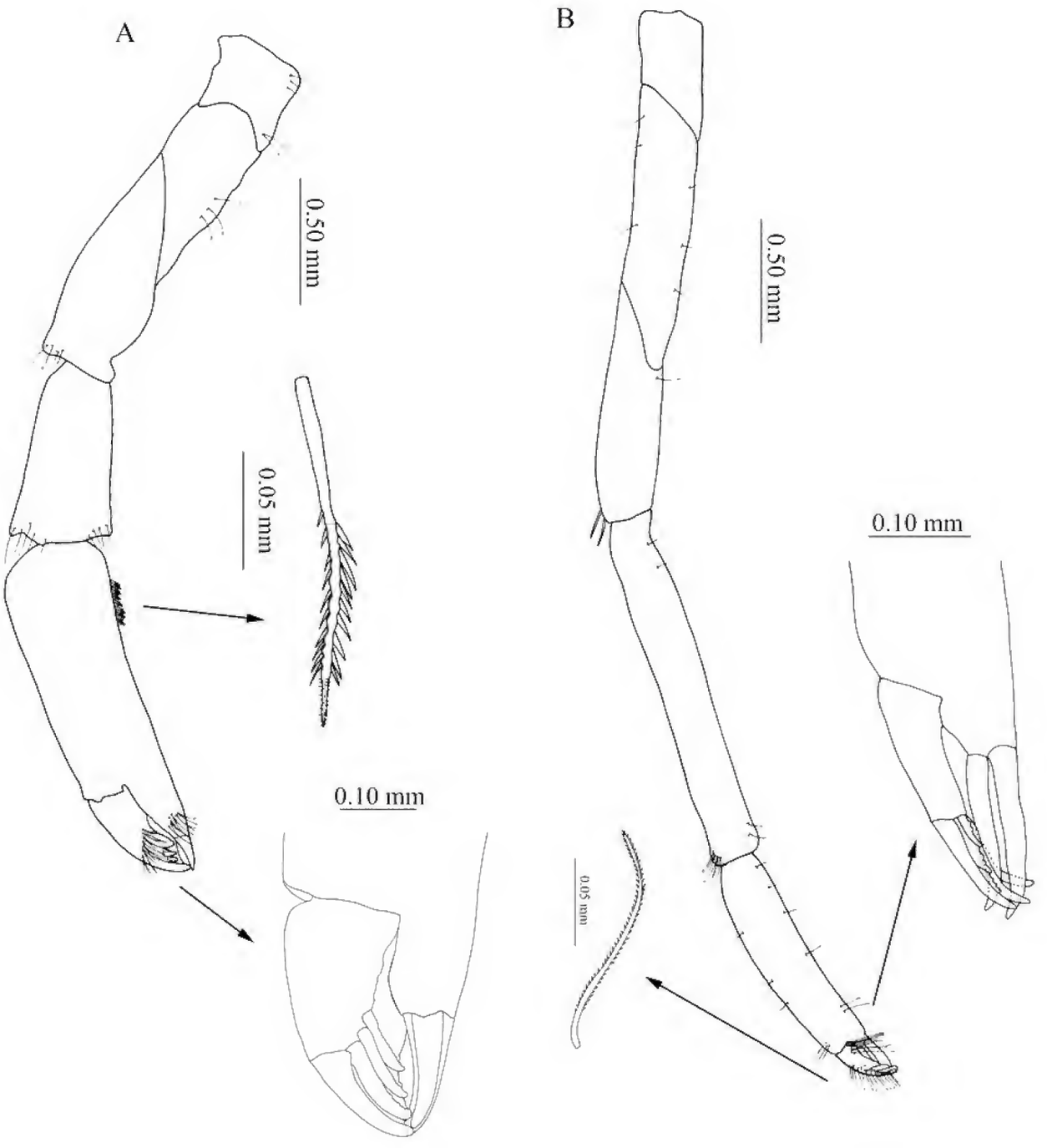

Fig.43- *Cinetorhynchus rigens* (Gordon, 1936), ♂, MNRJ 19041 (carapace length 4.5mm). (A) right pereopod 1, lateral; (B) right pereopod 2, lateral.

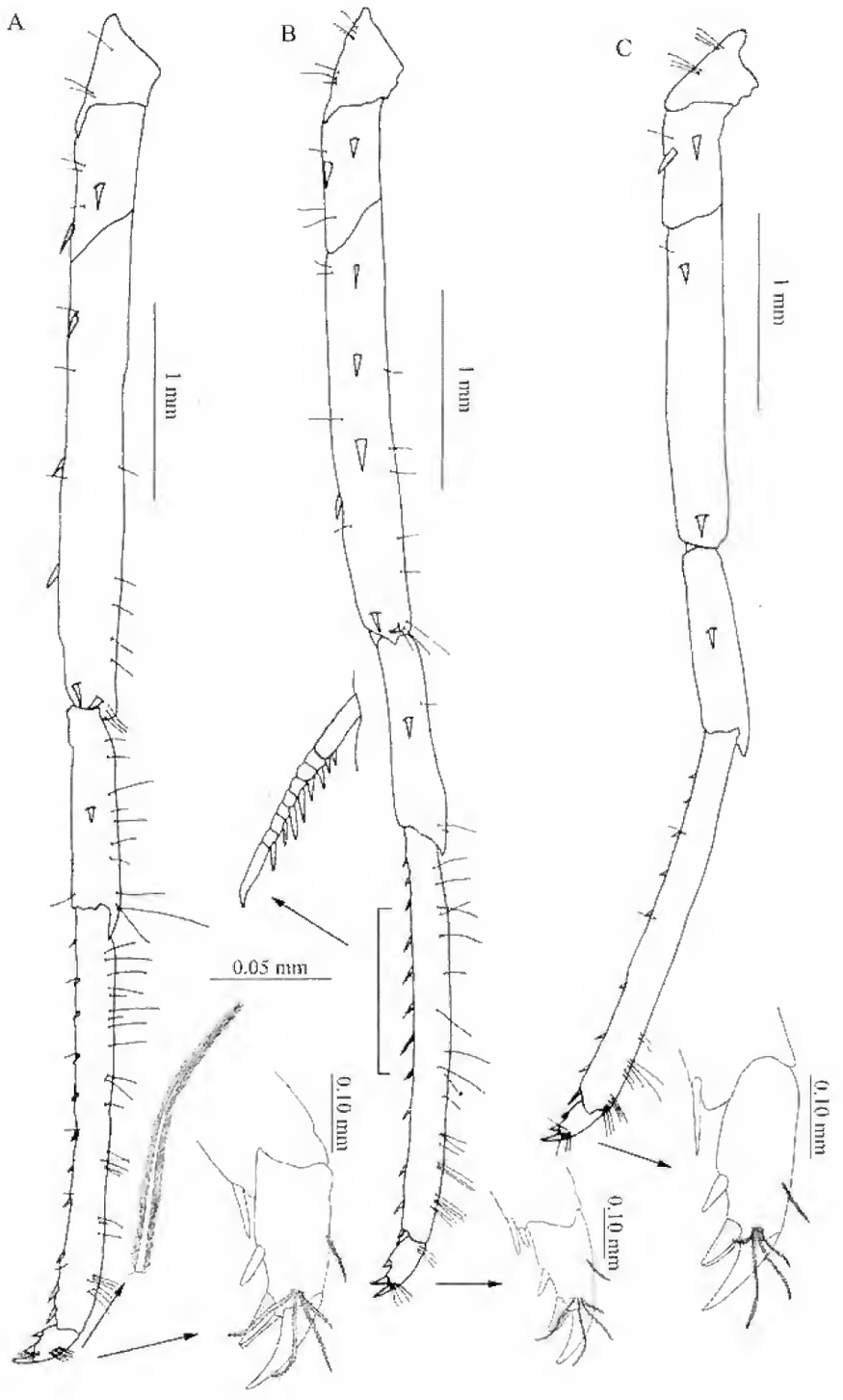

Fig.44- *Cinetorhynchus rigens* (Gordon, 1936), ♂, MNRJ 19041 (carapace length 4.5mm). (A) left pereopod 3, lateral; (B) left pereopod 4, lateral; (C) left pereopod 5, lateral.

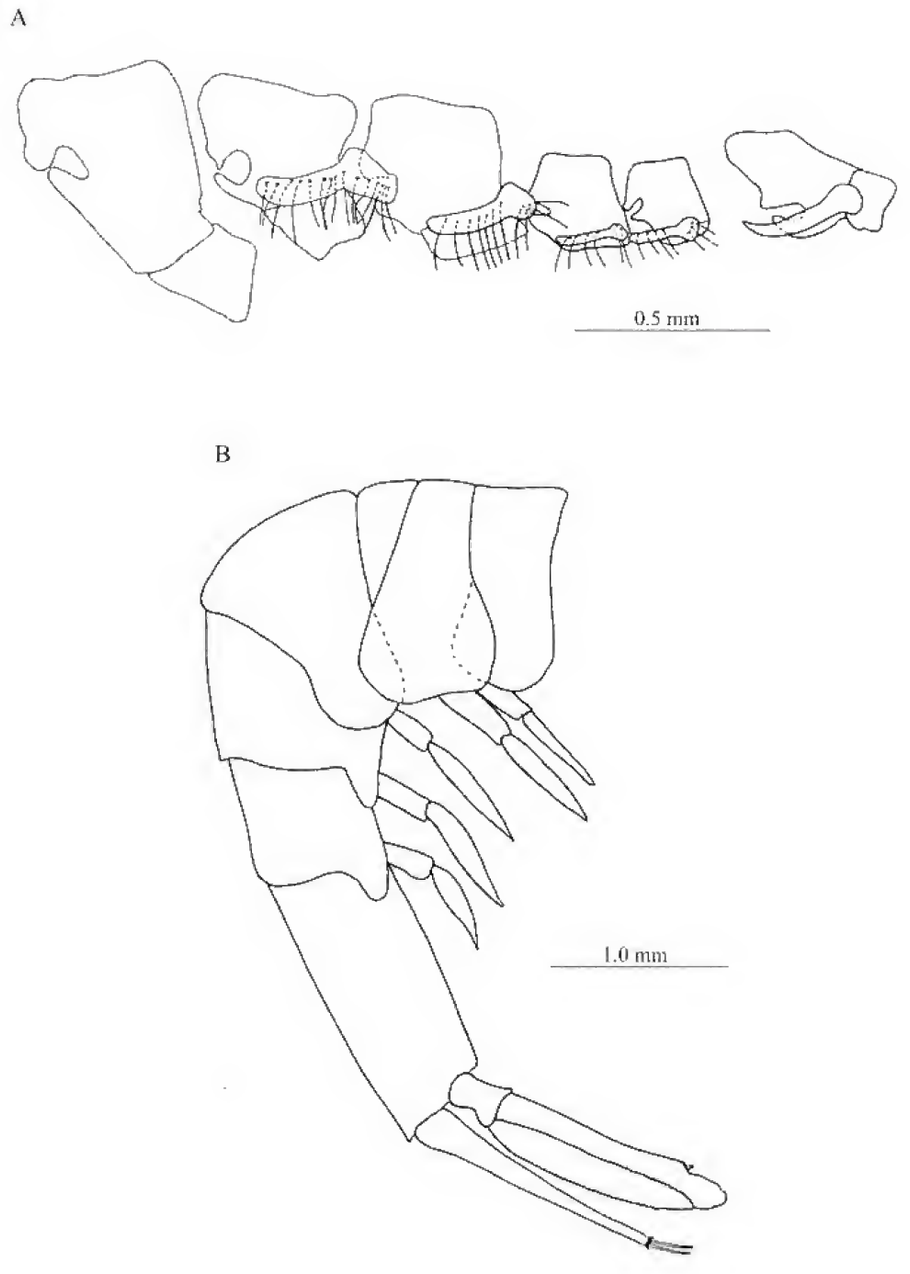

Fig.45- *Cinetorhynchus rigens* (Gordon, 1936), ♂, MNRJ 19041 (carapace length 4.5mm). (A) coxa (with epipods) and basis of maxilliped 3 to pereopod 5, lateral. *Cinetorhynchus rigens* (Gordon, 1936), ♀, MNRJ 19026 (carapace length 3.0mm). (B) abdomen, lateral.

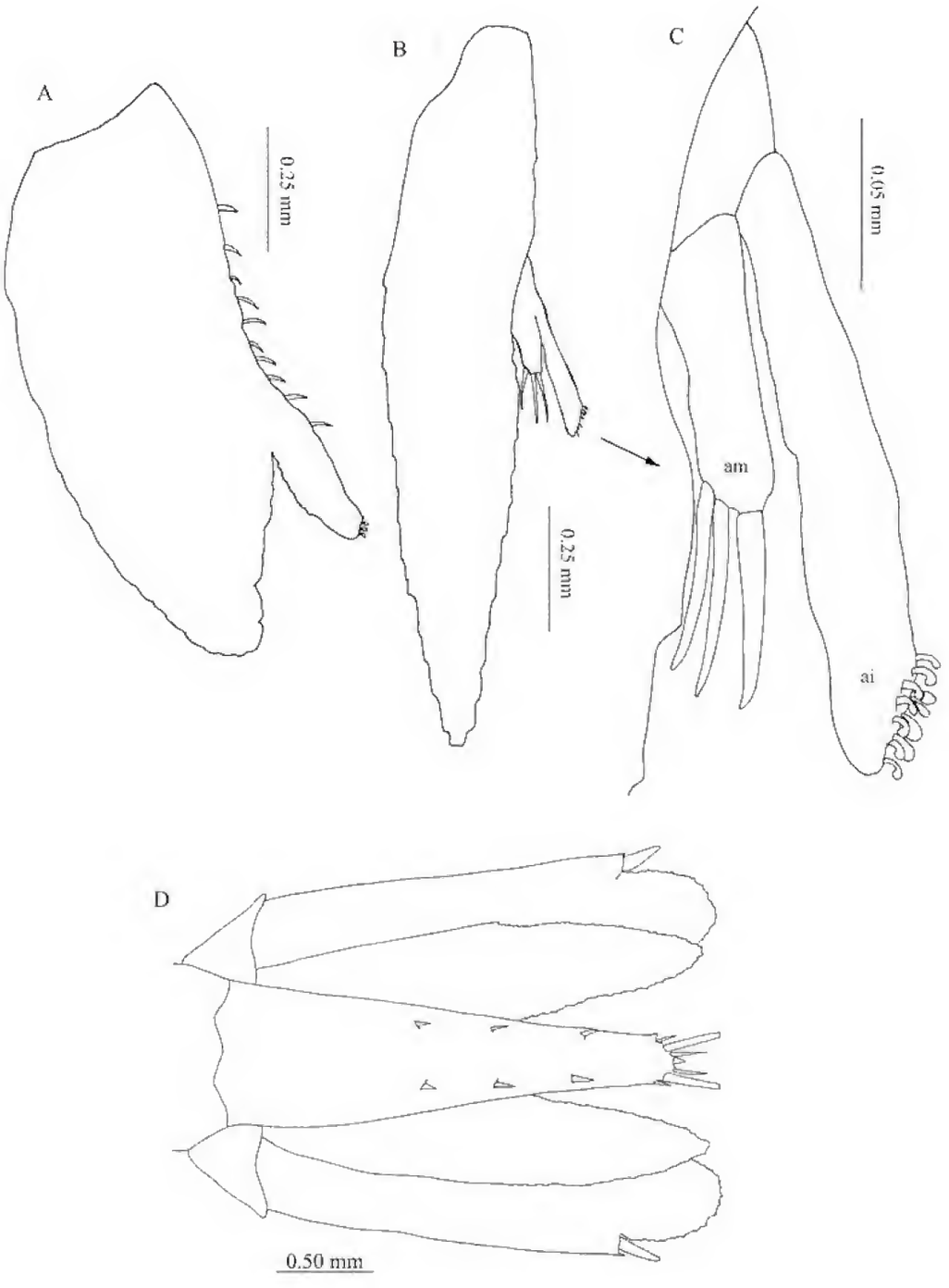

Fig.46- *Cinetorhynchus rigens* (Gordon, 1936), ♂, MNRJ 19041 (carapace length 4.5mm). (A) endopod of left pleopod 1, lateral; (B) endopod of left pleopod 2, lateral; (C) left appendix interna and masculina of pleopod 2, lateral (ai=appendix interna; am=appendix masculina); (D) telson and uropods, dorsal.

ACKNOWLEDGEMENTS

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HERMIT CRABS (CRUSTACEA, ANOMURA, DIOGENIDAE) FROM ROCAS ATOLL, BRAZIL [1]

(With 4 figures)

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ABSTRACT: Intertidal and shallow infra-littoral samples collected in Rocas Atoll, Rio Grande do Norte State, Brazil, during October 2000, provided material for this study. As a result of this survey, four species of hermit crabs were found and are herein redescribed: *Clibanarius antillensis*, *Calcinus tibicen, Dardanus venosus* and *Paguristes tortugae*. This is the first record of *C. tibicen* and *P. tortugae* for the Rocas Atoll.

Key words: Hermit crabs. Taxonomy. Paguroidea. Diogenidae. Rocas Atoll.

RESUMO: Caranguejos ermitões (Crustacea, Anomura, Diogenidae) de Atol das Rocas, Brasil.

Amostras do entre-marés e infralitoral raso coletadas no Atol das Rocas, Estado do Rio Grande do Norte, Brasil, em outubro de 2000, proporcionaram o material para este estudo. Como resultado dessas coletas, quatro espécies de ermitões foram encontradas e são aqui redescritas: *Clibanarius antillensis, Calcinus tibicen, Dardanus venosus* e *Paguristes tortugae* Schmitt, 1933. Este é o primeiro registro de *C. tibicen* e *P. tortugae* para o Atol das Rocas.

Palavras-chave: Ermitões. Taxonomia. Paguroidea. Diogenidae. Atol das Rocas.

INTRODUCTION

Hermit crabs are very common in the rocky intertidal zone of tropical and warm temperate areas throughout the world. This group of crustaceans is well known by the fact of being mostly gastropod shells inhabitants. They normally choose their shells by the size - and other morphological parameters - but the shell adequacy is conditioned by their availability in the area and habitat physical factors (Scully, 1979; Hazlett, 1981). In the Brazilian coast, 46 species belonging to the families Paguridae, Diogenidae and Parapaguridae have been registered (Melo, 1999). Rocas Atoll is localized in the northeastern coast of Brazil, 267 Km E-NE from Natal City in Rio Grande do Norte State. Rocas is the unique atoll in the South Atlantic. Its ecological importance is due to the high biological productivity and also because Rocas is an important reproduction, refuge and feeding site for many marine species. Because of these characteristics, Rocas Atoll is since 1979 the first marine biological reserve of Brazil. During high tide, only two islands keep emerged: Farol and Cemitério. During low tide, in the inner area of the atoll, can be found many tide pools, which are inhabited by juveniles of fish and many marine organisms as hermit crabs. Previous knowledge of the hermit crab fauna from Rocas Atoll is found in Rieger (1998), and Melo (1999), which consists of three species: *Clibanarius antillensis* Stimpson, 1859, *C. tricolor* (Gibbes, 1850) and *Dardanus venosus* (H. Milne Edwards, 1848). A contribution for a better understanding of the decapod fauna of Rocas Atoll, Brazil, is one of the main objectives of this paper.

SYSTEMATICS

Superfamily Coenobitoidea Dana, 1851
Family Diogenidae Ortmann, 1892
Genus *Clibanarius* Dana, 1852
Clibanarius antillensis Stimpson, 1859 (Fig.1)

Clibanarius antillensis Stimpson, 1859:85; Smith, 1869:18, 39; Rathbun, 1900:144; Benedict, 1901:142, pl.6, fig.1; Moreira, 1901:29, 87; Schmitt, 1935:199;

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1936:375; Provenzano, 1959:368, fig.5B; 1961:152; Forest & De Saint Laurent, 1967:99, fig.60; Coelho, 1971:232; Coelho & Ramos, 1972:169; Hebling, 1978:425; Coelho & Santos, 1980:143; Abele & Kim, 1986:29, 331, 339 (Fig.a); Coelho & Ramos-Porto, 1987:51; Rieger, 1998:421; Melo, 1999:48, fig.6.

Material examined – Rocas Atoll, pool, in *Nodilittorina vermeijii* Bandei & Kadolsky, 1982 shell, MNRJ, 19092, 1♂, C.Serejo and M.C.Rayol coll., 09/XI/2001; Rocas Atoll, pool, in *Olivella watermani* McGinty, 1940 shell, MNRJ, 19093, 1♂, C.Serejo and M.C.Rayol coll., 25/X/2001; Rocas Atoll, pool, in *Nassarius sp, Olivella watermani* McGinty, 1940, *Columbela mercatoria* (Linneus, 1758), *Natica sp* and Turridae shells, MNRJ, 19094, 20♂ e 45♀ (40 ovigerous), S.N.Brandão, N.Magalhães and C.R.Tavares coll. 03/VII/2001; Rocas Atoll, pool, in *Nassarius sp, Olivella* N. *watermani* e *Columbela mercatoria* shells, MNRJ, 19095, 21♂ e 48♀ ovigerous, S.N.Brandão, N.Magalhães and C.R.Tavares coll., 16/VII/2001; Rocas Atoll, pools, in *Olivella watermani* shell, MNRJ, 19096, 1♂, C.Serejo and M.C.Rayol coll., 22/X/2001; Rocas Atoll, in front of seamark, in *Engina turbinella* Kiener, 1836, *Olivella watermani* shells and Vermetidae tube, MNRJ, 19097, 3♂, P.S.Young, P.C.Paiva and A.A.Aguiar coll. 14/X/2000; Rocas Atoll, pool, MNRJ 19098, 5♂ and 4♀ ovigerous, P.S.Young, P.C.Paiva and A.A.Aguiar coll., 17/X/2000; Rocas Atoll, South channel, MNRJ, 19099, 1♂, P.S.Young, P.C.Paiva and A.A.Aguiar coll., 05/X/2000; Rocas Atoll, pool, MNRJ, 19100, 1♂, P.S.Young, P.C.Paiva and A.A.Aguiar coll., 13/X/2000; Rocas Atoll, pool, MNRJ, 19106, 1♂, C.Serejo and M.C.Rayol coll., 31/X/2001; Rocas Atoll, pool, MNRJ, 19107, 1♂, C.Serejo and M.C.Rayol coll., 29/X/2001.

Diagnosis – Walking legs, dactylus shorter than propodus; dactylus, propodus and carpus with a single broad longitudinal light stripe bordered by dark stripes in lateral surface; merus with two light stripes.

Description – Shield length varying from 1.5 to 4.5mm. Rostrum triangular, short, slightly beyond lateral projections (Fig.1A). Cephalic shield subrectangular, covered by minute concavities. Cervical suture almost straight (Fig.1A). Antennular peduncle longer or subequal to ocular peduncle. Antennal peduncle generally of the same length of eyestalk, or ending near cornea. Antennal acicle with strong spines.

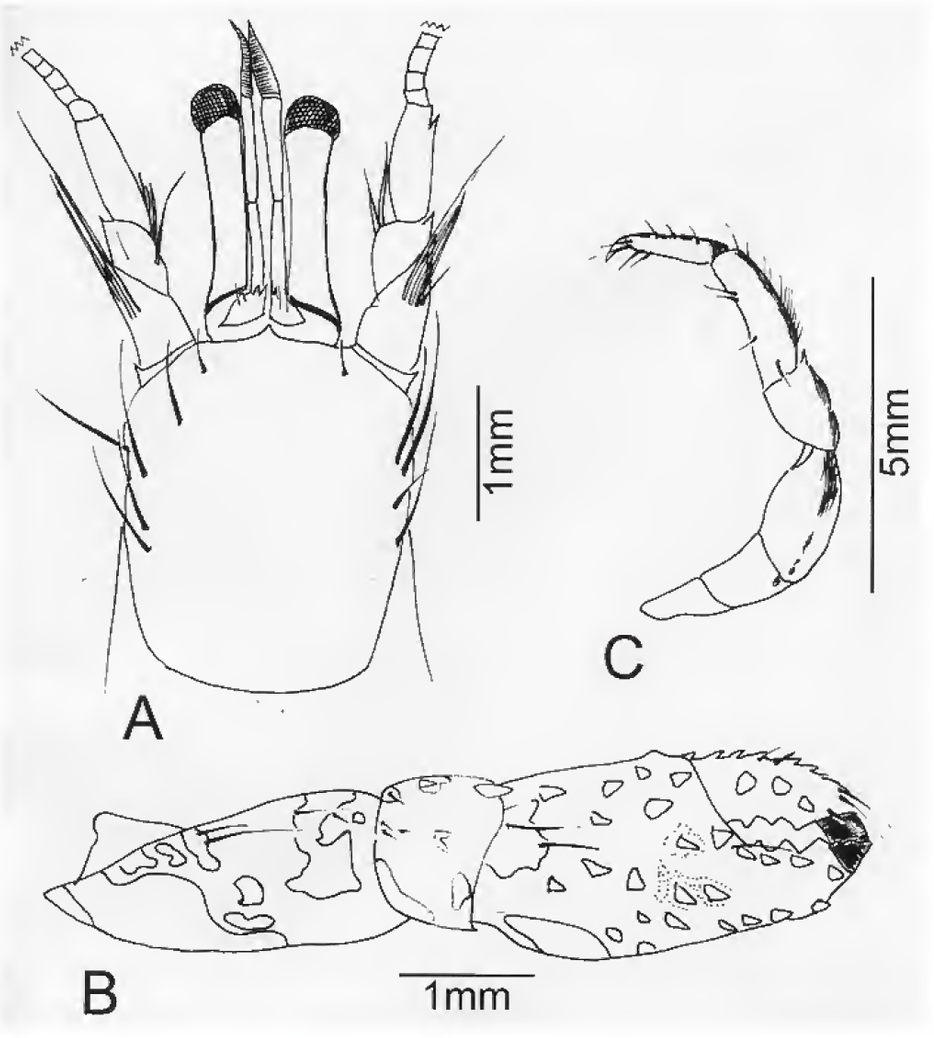

Fig.1- *Clibanarius antillensis* Stimpson, 1859, ♂, MNRJ 19092. (A) shield and cephalic appendages, dorsal view; (B) right cheliped, lateral view; (C) second left walking leg, lateral view.

Eyestalk thin and longer than front width, tapering in middle and broadening at cornea. Ocular acicles triangular, close to each other medially and with spines on superior branch, which decrease in length from middle to external margin. Chelipeds subequal; dorsal region of chela with coarse spines; left slightly larger. Chela and carpus with sparse setae, merus surface excavated, finger tip spooned (Fig.1B) and corneous. Walking leg with sparse setae, dactyl shorter than propodus (Fig.1C). Carpus of first pair of walking legs with one or two spines on antero-dorsal margin and with one spine in the same region of the second pair of legs. Dactyls and propodus of the second left walking leg slightly flattened and with a little conspicuous dorsolateral ridge.

Distribution – Western Atlantic: USA (Florida), Bermudas, Gulf of Mexico, Panama, West Indies, North of South America. Brazil: from Ceará to Santa Catarina, including Rocas Atoll (Melo, 1999).

Type-locality – Barbados (Provenzano, 1959; Abele, 1986).

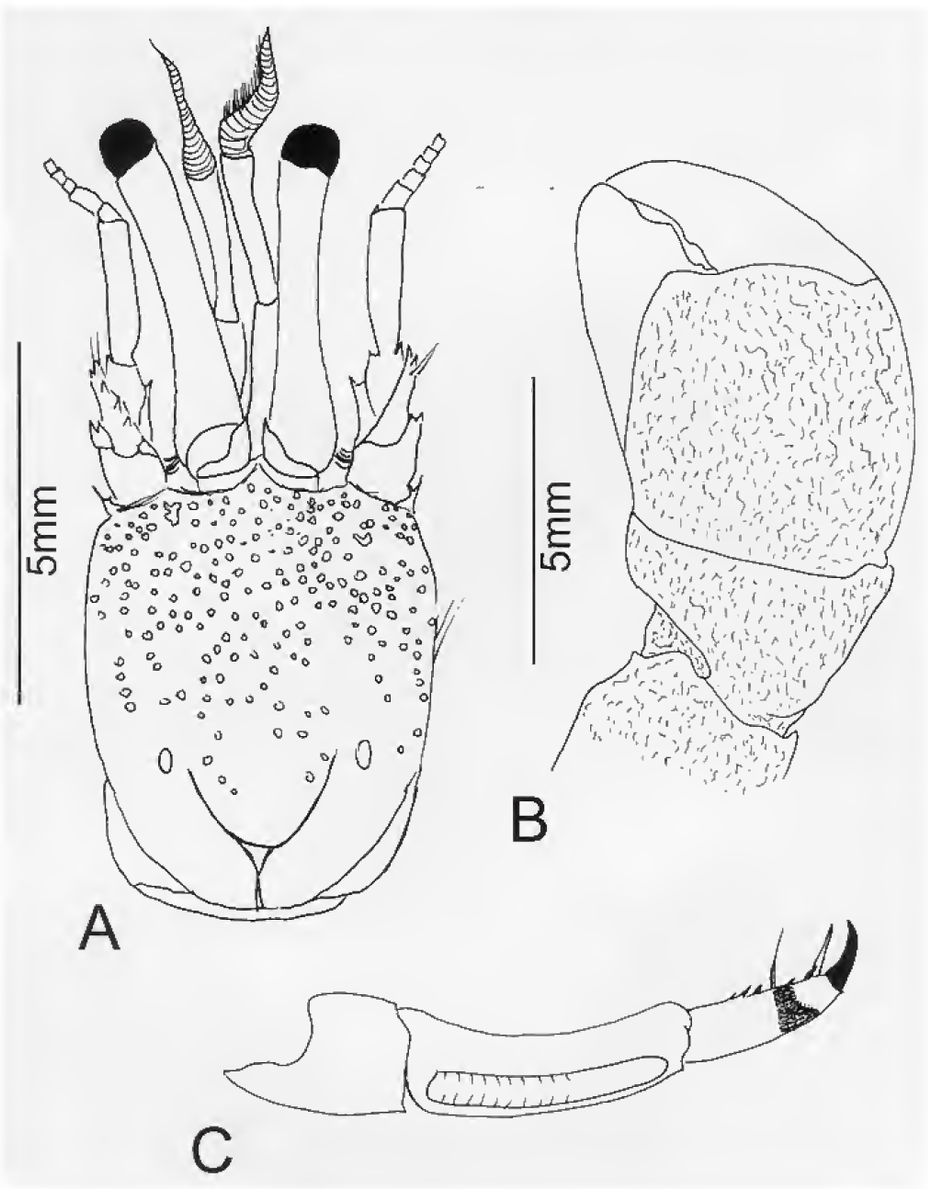

Fig.2- *Calcinus tibicen* (Herbst, 1791), ♂, MNRJ 19101. (A) cephalic region, dorsal view; (B) left cheliped, lateral view; (C) second left walking leg, lateral view.

Genus *Calcinus*
Dana, 1851
Calcinus tibicen
(Herbst, 1791) (Fig. 2)

Cancer tibicen Herbst, 1791:25, pl. 23, fig.7.
Pagurus sulcatus H. Milne Edwards, 1836:279; 1848: 64.
Calcinus sulcatus – Smith, 1869:17, 39; Rathbun, 1900: 144; Benedict, 1901: 141, pl.5, figs.3, 3a; Moreira, 1901:27, 86; Verril, 1908:439, figs.56, 57, pl.28, fig.7.
Calcinus tibicen – Rankin, 1900:533, pl.17, fig.1; Schmitt, 1924:94; 1935:198, figs.60a, b; 1936:376; Provenzano, 1959:363, fig.4; 1961:152; Forest & De Saint Laurent, 1967:106; Coelho, 1971:232; Coelho & Ramos, 1972:170; Hebling, 1978:425; Coelho & Santos, 1980:143; Abele & Kim, 1986:28, 353, fig.c; Coelho & Ramos-Porto, 1987:52; Rieger, 1998:422; Melo, 1999:42, fig.2.

Material examined – Rocas Atoll, pool, MNRJ, 19101, 1♂ and 2♀ ovigerous, P.S.Young, P.C.Paiva and A.A.Aguiar coll., 23/X/2000.

Diagnosis – Carapace surface smooth and bare. Eyestalks longer than front width. Propodus of second walking leg broader than its counterpart in right leg, and with a lateral longitudinal groove.

Description – Length of cephalic shield varying from 4.6 to 6.0mm. Rostrum triangular, acute, projecting toward beyond lateral projections (Fig.2A). Cephalic shield longer than broad, surface with minute fine concavities (Fig.2A). Antennular peduncle (Fig.2A) reaching non-pigmented portion of eyestalks. Antennal peduncle (Fig.2A) reaching at least the last third of eyestalk. Ocular acicle armed with 5-7 white-tipped spines.

Eyestalk slender (Fig.2A), curving gently outward. Ocular acicle acute, with one or two spines. Chelipeds unequal; left (Fig.2B) much larger than right. Fingers moving obliquely, with acute tips. Both chelipeds entirely smooth. Walking legs smooth, but with tufts of setae on ventral margins of dactyl. Propodus of the second walking leg larger than its counterpart on the right, with a broad longitudinal groove (Fig.2C) on the outer face.

Distribution – Western Atlantic: USA (Florida) and Bermudas. Brazil: from Ceará to São Paulo, including Fernando de Noronha Archipelago (Rieger, 1998; Melo, 1999), and Rocas Atoll.

Type-locality – unknown.

Remarks – This is a well known species for the Western Atlantic coast. However, this is the first record of *Calcinus tibicen* from Rocas Atoll.

Genus *Dardanus* Paulson, 1875

Dardanus venosus (H. Milne Edwards, 1848) (Fig.3)

Pagurus venosus H. Milne Edwards, 1848: 61; Stimpson, 1859:82.
Petrochirus insignis - Rathbun, 1900:144.
Pagurias insignis – Benedict, 1901:141.
Pagurus arrosor – Moreira, 1901:24.
Pagurus arrosor var. *divergens* - Moreira, 1906:133, pl. 4, fig.1.
Dardanus venosus – Verril, 1908:441, fig.58, 59, pl.26, figs.4a, 5a; Schmitt, 1924:95; 1935:201, fig. 2; 1936:376; Holthuis, 1959:153; Provenzano, 1959:374, fig.6; 1961:153; Forest & De Saint Laurent, 1967:94; Coelho, 1971:232; Biffar & Provenzano, 1972:778; Coelho & Ramos, 1972:168; Coelho & Santos, 1980:143; Abele & Kim, 1986:29, 341, figs.g-i; Coelho & Ramos-Porto, 1987:50; Rieger, 1998:420; Melo, 1999:64, fig.20.
Pagurus insignis – Bouvier, 1918:6.

Material examined – Rocas Atoll, Barretinha channel, MNRJ, 19102, 1♂, P.S.Young, P.C.Paiva and A.A.Aguiar coll., 05/X/2000.

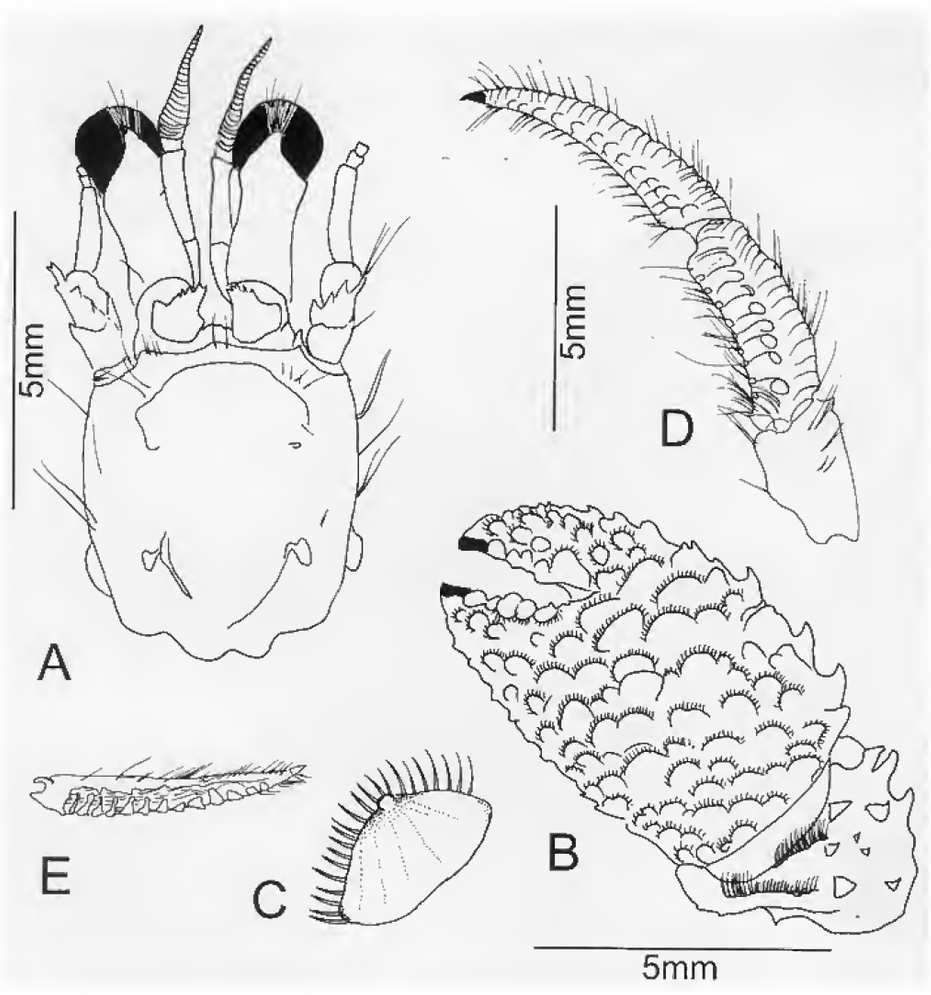

Fig.3- *Dardanus venosus* (H. Milne Edwards, 1848), ♂, MNRJ 19102. (A) cephalic region, dorsal view; (B) carpus and chela, lateral view; (C) cheliped tubercle in detail; (D) carpus, propodus and dactyl of second left walking leg; (E) dactyl, ventral view.

Diagnosis – Antennal peduncle not exceeding eyestalk length. Chela covered by scale-like tubercles and setae. Second left walking leg with longitudinal lateral ridge, crossed by transverse rugae. Dactyls of walking legs with setae.

Description – Cephalic shield length 5.0mm. Rostrum absent. Lateral projections forming acute angles at antero-lateral corners of carapace. Cephalic shield slightly longer than front width, smooth, with a few setae and some lines near lateral margins (Fig.3A). Antennular peduncle exceeding cornea tip by one third of the last antennular segment, when paralleled to each other. Antennal peduncle reaching cornea tips. Antennal acicle short, reaching at least half length of the eyestalk and bearing short acute spines.

Eyestalk robust and with a central constriction, extending to the tip of antennal peduncle and reaching slightly more than ¾ of front width in length. Tuft of setae behind the expanded cornea. Ocular acicles well separated, with straight internal margins and tips with spines (Fig.3A). Chelipeds unequal, the left much larger than right. Finger tips black, corneous, and spooned. Major chela (Fig.3B), external surface covered by scale-like tubercles (Fig.3C) bordered by fan-like fringe of apressed setae; inner surface smooth; dorsal margin of propodus with 7 acute horn-like spines projecting forward and continue as a row of shorter spines along the mobile dactyl and carpus; carpus with shorter and sharper spines scattered over surface. Right chela narrower, without scale-like tubercles on external surface and with long setae present. Walking legs with dactyls longer than propodus; the ones of the first pair larger than that of the second pair. Dactyl with several robust setae; other segments with fewer setae along dorsal and ventral margins. Second left walking leg (Fig.3D) markedly different from the others; propodus and dactyl broadened, fringed with setae and with a longitudinal lateral ridge paralleled by a slight groove. Ridge crossed by numerous rugae (Fig.3E).

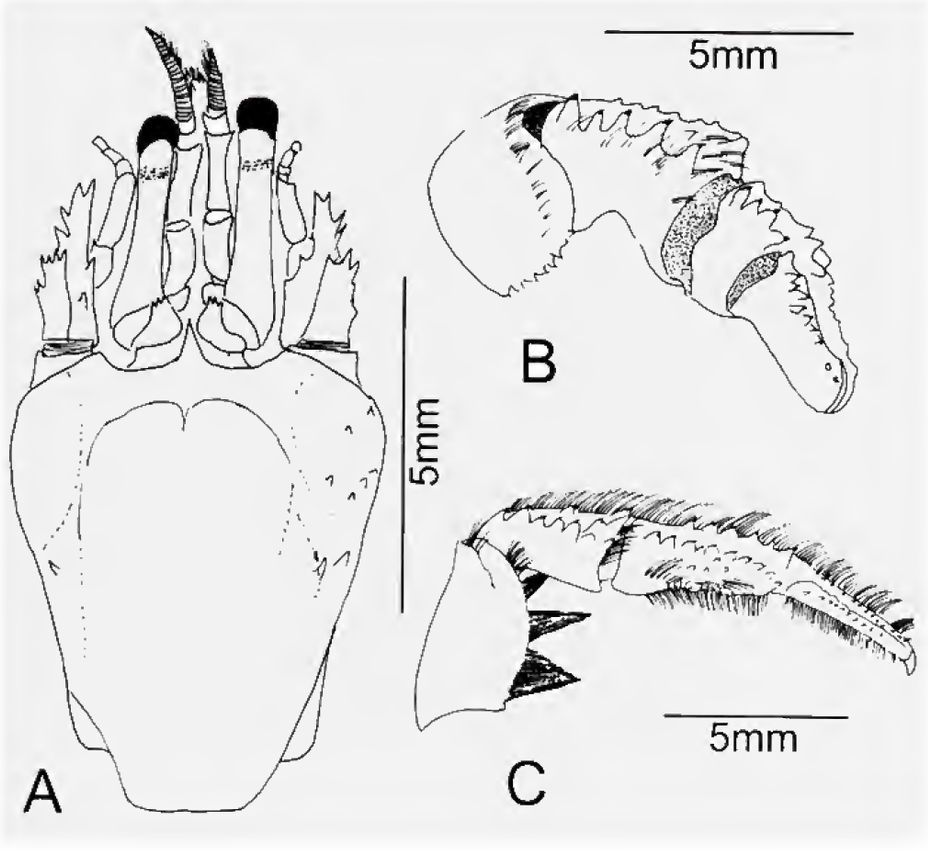

Fig.4- *Paguristes tortugae* Schmitt, 1933, ♂, MNRJ 19105. (A) cephalic region, dorsal view; (B) left cheliped, dorsal view; (C) second right walking leg, lateral view.

Distribution – Western Atlantic: Eastern USA, Bermudas, North of South America. Brazil: from Pará to Rio de Janeiro, including Fernando de Noronha Archipelago and Rocas Atoll (MELO, 1999).

Type-locality – Guadeloupe (PROVENZANO, 1959; ABELE AND KIM, 1986)

Genus *Paguristes*
Dana, 1851
Paguristes tortugae
Schmitt, 1933 (Fig.4)

Paguristes tortugae Schmitt, 1933:7, fig.4; 1935:204, fig.64; WASS, 1955:134; PROVENZANO, 1959:388, figs.11A, B; 12D; 1961:155;

HOLTHUIS, 1959:131, fig.21, 22a; WILLIAMS, 1965:119, fig.96; 1984:205, fig.44; FOREST & DE SAINT LAURENT, 1967:74, figs.7, 18, 27, 38 e 46; COELHO & RAMOS, 1972:167; HEBLING, 1978:425; ABELE AND KIM, 1986:31, 351 (Figs.g, h); COELHO & RAMOS-PORTO, 1987:48; RIEGER, 1998:419; MELO, 1999:88, fig.42.

Material examined – Rocas Atoll, Barretinha channel, MNRJ, 19103, 2♂, 1♀, P.S.Young, P.C.Paiva and A.A.Aguiar coll., 05/X/2000; Rocas Atoll, pool with calcareous algae nodule, MNRJ, 19104, 9♂, 7♀ (4 ovigerous), P.S.Young, P.C.Paiva and A.A.Aguiar coll., 25/X/2000; Rocas Atoll, pool, in *Leucozonia nassa* Gmelin, 1791 shell, MNRJ, 19105, 1♂, S.N.Brandão, N.Magalhães and C.R.Tavares coll., 10/VII/2001.

Diagnosis – Rostrum well developed, triangular. Eyestalk and antennule white, with black bands. Cheliped with corneous and spooned fingertips. Dactyl of walking legs slightly longer than propodus.

Description – Length of cephalic shield varying from 4.4 to 7.1mm. Rostrum large, triangular, toward beyond side branches of front. Cephalic shield longer than broad (Fig.4A). Antennular peduncle reaching base of cornea or slightly longer. Antennal peduncle reaching three-fourths of eyestalk length. Antenna short, not reaching finger tips of cheliped and sparsely setose, with very short setae. Acicle covered by setae and armed with two spines on inner margin and at least three on outer edge, termination prominent.

Eyestalk straight, slender, as long as width of cephalic shield. Ophthalmic acicle with 3-4 spines decreasing in size laterally. Acicles separated by rostrum (Fig.4A). Chelipeds equal, finger tips corneous and spooned. Inner margins of moving fingers of palm and of carpus straight. Chela and walking leg margins densely setose, hiding spines. External half of palm and external margin of fixed finger beset with sharp, forwardly directed hooked spines, likewise the medial area of the upper surface of palm. Internal margin of chela similarly with strong spines. Carpus of right cheliped with 5 large spines on inner margin (Fig.4B); 5 slightly smaller spines on the outer margin and 3 to 4 acute spines on anterior margin. Merus with acute corneous spine near the anterior end of superior margin and 3 similar spines on the anterior margin (Fig.4B). Inner inferior margin with 3-4 acute spines. Walking legs with dense fringes of setae along superior and inferior margins. First right walking leg (Fig.4C), merus denticulate on dorsal margin; carpus with a row of conical spines on dorsal margin and a second row of irregular spines on inner surface, aligned with a similar row of 7-9 spines on the inner face of propodus; dorsal margin of propodus with 7-8 conical, slightly corneous-tipped spines; dactyl with about 15 transverse tubercle-like ridges on superior margin, ending in a single, strong dark claw. The corresponding left walking leg is similar, but with less prominent spines. Second pair of left walking legs nearly smooth, except for two distal spines on the dorsal margin of carpus.

Distribution – Western Atlantic: EUA (North Carolina) to Brazil until Rio Grande do Sul (RIEGER, 1998; MELO, 1999), including now Rocas Atoll.

Type-locality – Dry Tortugas, Florida (SCHMITT, 1933).

Remarks – *P. tortugae* is widely distributed in the Western Atlantic coast, although, this is the first record for Rocas Atoll, Brazil.

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TERRESTRIAL ISOPODS (CRUSTACEA, ONISCIDEA) FROM ROCAS ATOLL, NORTHEASTERN, BRAZIL [1]

(With 15 figures)

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ABSTRACT: Four Oniscidea species are recorded from Rocas Atoll, State of Rio Grande do Norte: *Olibrinus antennatus* Budde-Lund, 1902, *Littorophiloscia culebrae* (Moore, 1901), *Niambia squamata* (Budde-Lund, 1885) and *Porcellionides pruinosus* (Brandt, 1833). These are the first records of terrestrial isopods from Rocas Atoll. *Littorophiloscia culebrae* is recorded for the first time from Brazil. *Niambia atracheata* (Schmalfuss & Ferrara, 1978) is considered to be a junior synonym of *N. squamata*.

Key words: Terrestrial isopods. Oniscidea. Rocas Atoll. Brazil. New synonymy.

RESUMO: Isópodos terrestres (Crustacea, Oniscidea) do Atol das Rocas, nordeste do Brasil.

Quatro espécies de Oniscidea são registradas para o Atol das Rocas, no Estado do Rio Grande do Norte: *Olibrinus antennatus* Budde-Lund, 1902, *Littorophiloscia culebrae* (Moore, 1901), *Niambia squamata* (Budde-Lund, 1885) e *Porcellionides pruinosus* (Brandt, 1833). Estes são os primeiros registros de isópodos terrestres para o Atol das Rocas. *Litorophiloscia culebrae* é registrada pela primeira vez para o Brasil. *Niambia atracheata* (Schmalfuss & Ferrara, 1978) é considerada sinônimo júnior de *N. squamata*.

Palavras-chave: Isópodos terrestres. Oniscidea. Atol das Rocas. Brasil. Nova sinonímia.

INTRODUCTION

Terrestrial isopods are widely distributed and vary greatly in their mode of life and habitat. They can be found from the littoral zone to desert areas, as well as forests, grasslands, ant and termite nests, bromeliads and caves. About 120 species of terrestrial isopods are recorded from Brazil (Souza-Kury, 1998; Leistikow & Wägele, 1999; Schmalfuss, 2003). Only one species has been recorded previously from the State of Rio Grande do Norte: *Atlantoscia floridana* (van Name, 1940), collected in the city of Maracaíba (Lemos de Castro, 1985). The present paper deals with terrestrial isopods collected from the coralline islands of Rocas Atoll off the coast of Rio Grande do Norte (between 3°45'S and 3°56'S and 33°37'W and 33°56'W), where no oniscidean species were previously known. Four species have been recognized, all certainly introduced by passive dispersal across the ocean or through human activities. Shell fragments, bones of birds and fishes, and vegetal debris are dispersed on the islands (IBAMA, 2006). The latter can represent the food source for the terrestrial isopods that inhabit the atoll.

Institution abbreviations are: Natural History Museum, London (BMNH), and Museu Nacional, Rio de Janeiro (MNRJ).

OLIBRINIDAE

Olibrinus antennatus (Budde-Lund, 1902) (Figs.1-2)

Trichoniscus antennatus Budde-Lund, 1902:379.
Olibrinus antennatus; Schmalfuss, 2003:182; Taiti & Ferrara, 2004:223, Pl.4 (for earlier references and synonymies).
Olibrinus mangroviarum; Schmalfuss, 2003:182.
Olibrinus nicobaricus; Schmalfuss, 2003:182.
Olibrinus olivaceus; Schmalfuss, 2003:182.
Olibrinus pigmentatus; Schmalfuss, 2003:182.
? *Olibrinus* sp.; Lemos de Castro, 1972:357.

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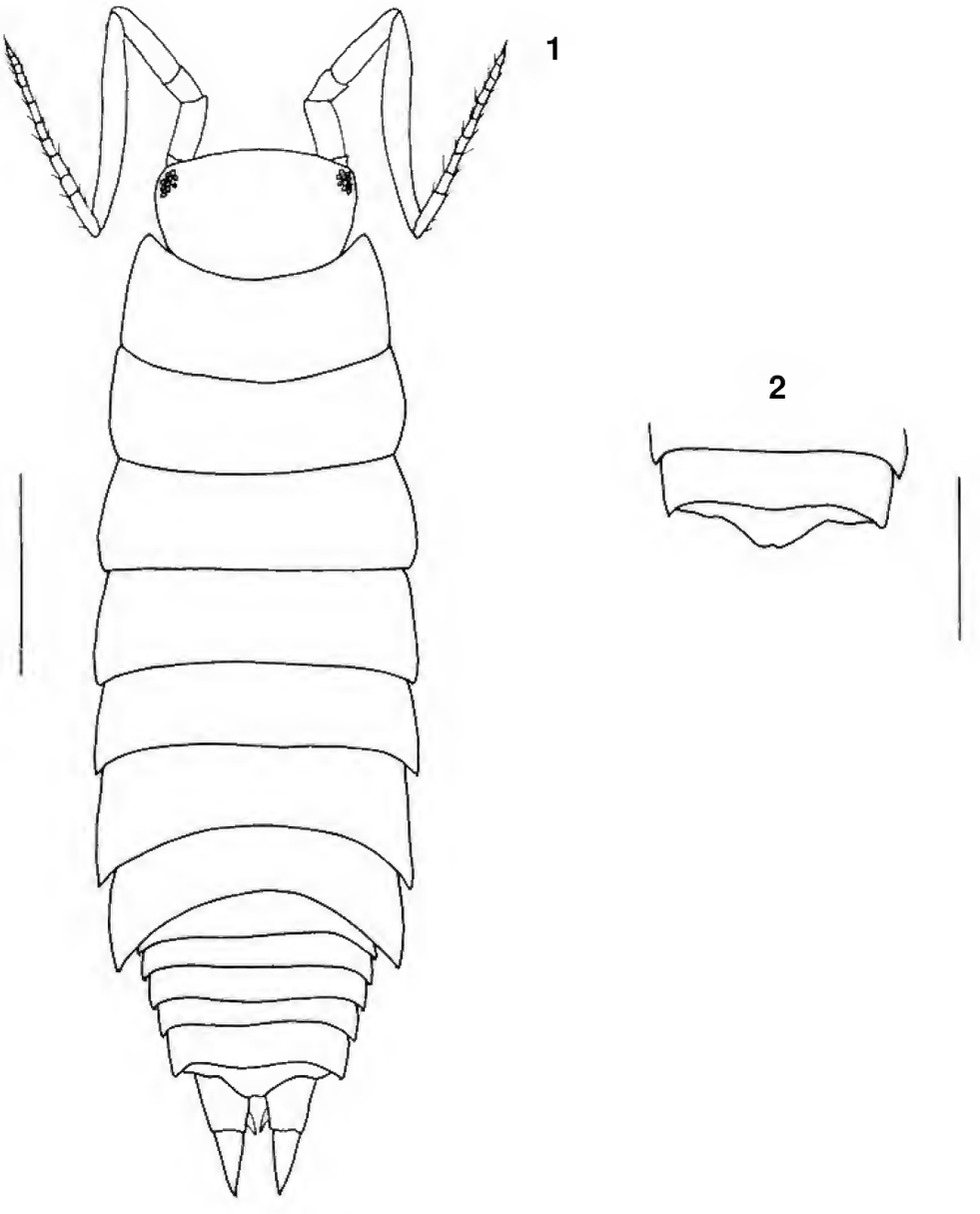
Material examined – BRAZIL, RIO GRANDE DO NORTE, Atol das Rocas, Ilha do Cemitério, in coarse sediment beneath stones in the intertidal zone, MNRJ 16921, 1♀ , C.Serejo and M.C.Rayol coll., 09/XI/2001

Diagnosis – Colour: reddish-brown in vivo, pale brown in alcohol. Body smooth (Fig.1). Eye of 10-11 ommatidia. Telson very short, with sinuous sides and a notch at the apex (Fig.2). Flagellum of antenna consisting of 10-18 articles. Endite of maxillule without penicils. Pereopods with a bifid dactylar seta. Exopods of pleopods 2-5 with plumose setae on margin. Male pleopod 1 endopod thickset, with distal part bearing numerous scales.

Maximum length: ♂ and ♀ = 10mm.

Distribution – This amphibious species is common in mangrove swamps and under coral rocks along the coasts of the tropics (Taiti & Ferrara, 2004).



Olibrinus antennatus: fig.1-♀ ; fig.2- telso. Scale bars: (1) = 1mm, (2) = 0.5mm.

Remarks – *Olibrinus antennatus* has several junior synonyms (see Taiti & Ferrara, 2004). For a description see Ferrara (1972), as *O. mangroviarum*. This is the first certain record of *O. antennatus* from Brazil and the entire Atlantic area. In Brazil, an unidentified species of *Olibrinus* was previously recorded by Lemos de Castro (1972) from the Abrolhos Archipelago. Most probably that record refers also to *O. antennatus*, but identification can be made with certainty only after re-examination of the material studied by Lemos de Castro.

PHILOSCIIDAE

Littorophiloscia culebrae (Moore, 1901) (Figs.3-6)

Philoscia culebrae Moore, 1901:176, pl.11, figs.13-17. *Littorophiloscia culebrae*; Taiti & Ferrara, 1986:1358, fig.8 (for earlier references and synonyms); Schotte & Heard 1991:247; Rodriguez & Barrientos 1993:190, figs.23-26; Taiti & Howarth, 1996:63; Leistikow & Wägele, 1999:18;

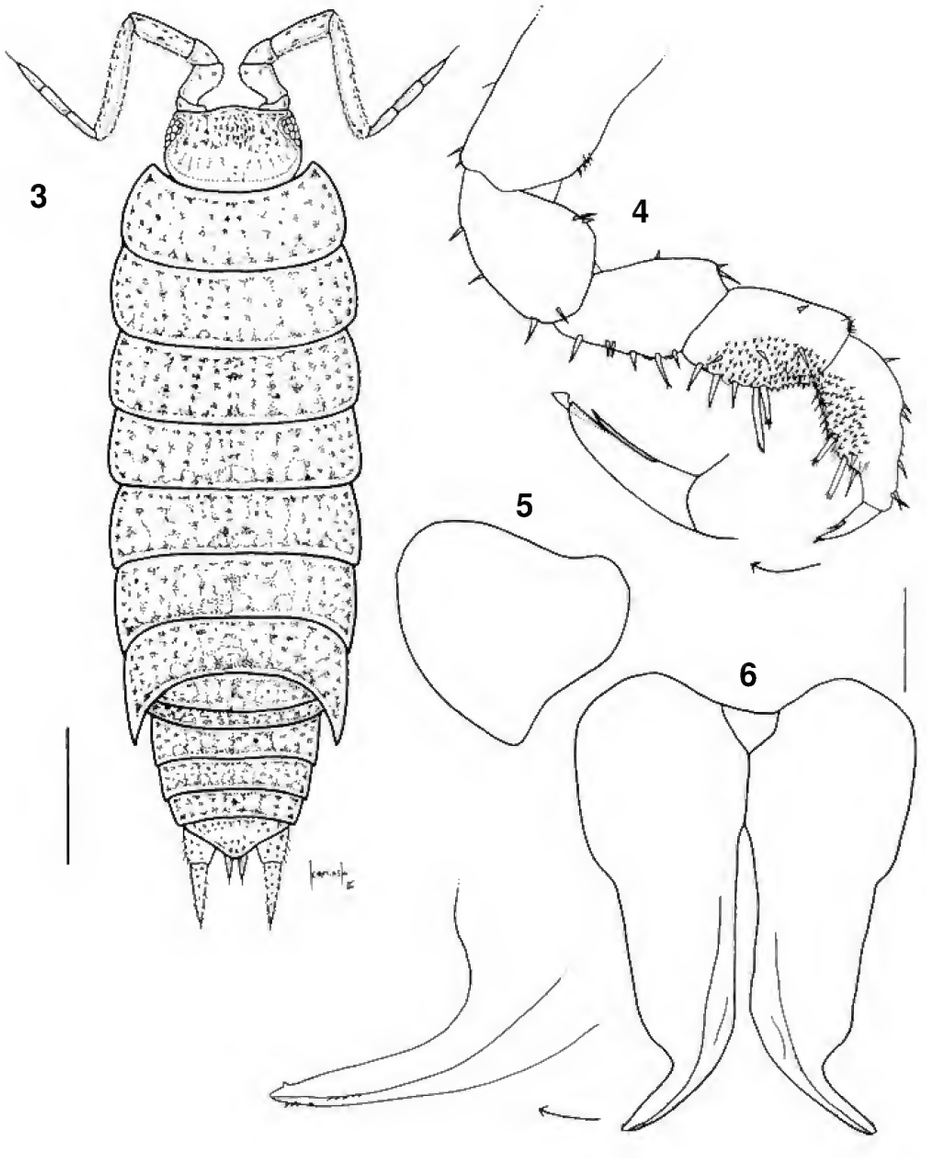
Taiti, 1999:37; Schmalfuss, 2003:151; Taiti & Ferrara, 2004:237, Pl.6.

Material examined – BRAZIL, RIO GRANDE DO NORTE, Atol das Rocas, east side of Ilha do Farol, supralittoral, MNRJ 16922, 1♂, 3♀, 1 ovigerous ♀, C.Serejo and M.C.Rayol coll., 30/X/2001.

Diagnosis – Colour: yellowish with brown spots (Fig.3). Dorsum covered with scale-spines. Antenna with fifth joint of peduncle as long as flagellum. Pereopods with ungual seta apically enlarged (Fig.4). Male pleopod 1 exopod triangular with sinuous outer margin (Fig.5); endopod with outer margin bearing a hump and a very small lobe at the apex (Fig.6).

Maximum length – ♂ = 2.5mm; ♀ with marsupium = 3.6mm.

Distribution – The species has been recorded from the USA (Florida, Puerto Rico and Hawaii), Cuba, Virgin Islands, Canary Islands, Angola, Madagascar and Yemen (Socotra Archipelago) (Schmalfuss, 2003; Taiti & Ferrara, 2004).



Littorophiloscia culebrae: fig.3- ♂; fig.4- pereiopod 1; fig.5- pleopod 1 exopod; fig.6- pleopod 1 endopod. Scale bars: (3) = 1mm; (4-6) = 0.1mm.

Remarks – This is the first record of *L. culebrae* from Brazil. Two other species of *Littorophiloscia* were previously recorded in this country: *L. tropicalis* Taiti & Ferrara, 1986 from Cabo Frio, State of Rio de Janeiro (Lemos de Castro, 1965), and *L. insularis* (Lemos de Castro & Souza, 1986) from Ilha de Fortaleza, State of Pará (Lemos de Castro & Souza, 1986). According to Leistikow (2001) these two species are morphologically very similar. One of the most important features distinguishing *L. culebrae* is the shape of the male pleopod 1 endopod.

PLATYARTHRIDAE

Niambia squamata (Budde-Lund, 1885) (Figs.7-13)

Leptotrichus squamatus Budde-Lund, 1885:196; ?Dollfus, 1898:125; ?Dollfus, 1899:256.
Niambia squamata; Budde-Lund, 1904:37; Budde-Lund, 1909:60, pl.VI figs.1-3; Stebbing, 1910:441; Van Name, 1920:45, 102, figs.122-126; Barnard, 1932:259, fig.23j; Paulian de Félice, 1940:109; Vandel, 1946:247; Arcangeli, 1950:56; Arcangeli, 1952:300; Brian, 1953:11, pl.2, fig.3; Lemos de Castro, 1967:315; Lemos de Castro, 1971:3, fig.5; Lemos de Castro, 1972:357; Schmalfuss & Ferrara, 1978:77; Ferrara & Taiti, 1979:123; Souza-Kury, 1998:664; Schmalfuss, 2003:179.
Leptotrichus atracheatus Schmalfuss & Ferrara, 1978:85, figs.169-170. New synonymy.
Niambia atracheata; Schmalfuss, 1982:132; Ferrara & Schmalfuss 1985:64; Schmalfuss, 2000:3; Schmalfuss, 2003:178.
Porcellio (Leptotrichus) squamatus; Jeppesen, 2000:260.
Niamba [sic!] *squamata*; Leistikow & Wägele, 1999:28.
? nec *Niambia squamata*; Panning, 1924:172.

Material examined – ANGOLA (CABINDA): LANDANA, 1♂ Syntype, Budde-Lund collection, BMNH 1921:10:18:1453. BRAZIL, PARÁ, Belém, MNRJ 10077, 2♀, O.Cunha coll., ?/?/1952; CEARÁ, Fortaleza, MNRJ 10073, 1♂, Fausto coll., 13/VII/1970; RIO GRANDE DO NORTE, Natal, MNRJ 10072, 1♀, A.Lemos de Castro coll., 01/III/1980; Atol das Rocas, Ilha do Farol, MNRJ 14842, 3♂, 7♀, 1 ovigerous ♀, P.S.Young, P.C.Paiva and A.A.Aguiar coll., 24/X/2000; MNRJ 16923, 1♀, pitfall trap, S.N.Brandão, N.Magalhães and C.R.Tavares coll., 10/VII/2001; MNRJ 18180, 2♂, 6♀, 4 ovigerous ♀, pitfall trap, S.N.Brandão, N.Magalhães and C.R.Tavares coll., 10/VII/2001; near the house, MNRJ 18179, 4♂, 7♀, 5 ovigerous ♀, S.N.Brandão, N.Magalhães and C.R.Tavares coll., 06/VII/2001, PERNAMBUCO, Fernando de Noronha, MNRJ 10071, 2♀, M.Alvarenga coll., ?/V/1954; BAHIA, Abrolhos, Santa Bárbara Island, MNRJ 10075, 2♂, 2♀, A.Lemos de Castro coll. 28/X/1969; MNRJ 10076, 2♂, J.Becker coll. 02/X/1969.

Distribution – Brazil, ?Senegal, Cape Verde Islands, ?Sao Thomé, Ivory Coast, Nigeria, Congo, Angola (Schmalfuss, 2003).

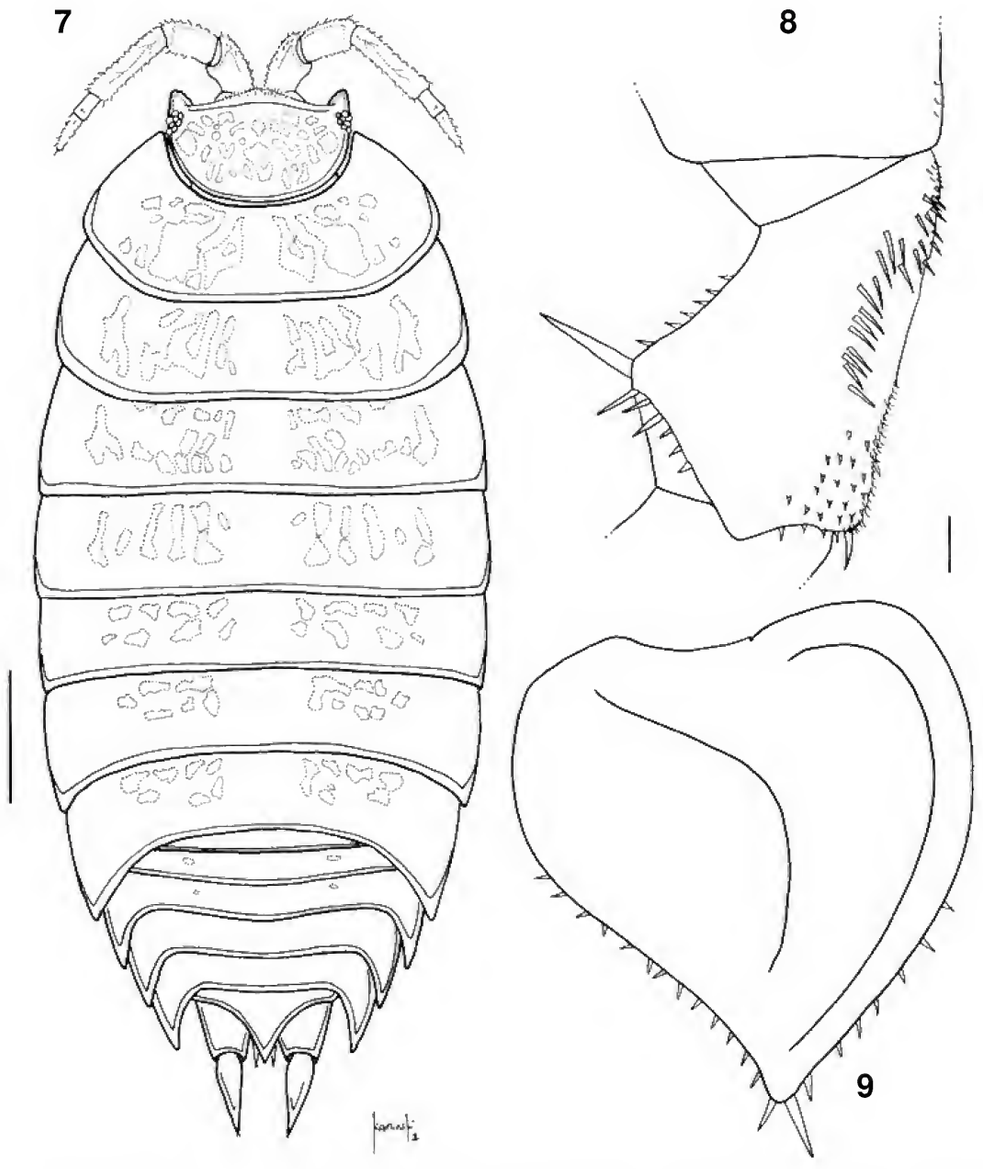
Diagnosis – Pereon epimera steep (Fig.7); dorsum densely covered with hair-like setae and scale-spines; cephalon with small rounded lateral lobes, slightly protruding in comparison with the bulbous profrons (Fig.10); telson with triangular distal part, acute apex (Fig.11); antennae very short, not reaching caudal margin of pereonite 1; male pereopod 7 ischium with a row of long spines (Figs.8, 13); pleopod exopods with respiratory areas; male pleopod 1 exopod with very short triangular medial lobe (Figs.9, 12).

Maximum length – ♂ = 7mm; ♀ with marsupium = 8mm.

Remarks – *Niambia squamata* was described by Budde-Lund (1885) in the genus *Leptotrichus* and later transferred to the genus *Niambia* (Budde-Lund, 1904). The original description was based on three syntype specimens from Cabinda, Angola (Jeppesen, 2000): a male specimen from Laudana [= Landana], deposited in the Natural History Museum, London (Ellis & Lincoln, 1975), and two female specimens from Chinchoxo, deposited in the Museum für Naturkunde, Berlin (H.Schmalfuss, pers.com.).

Schmalfuss & Ferrara (1978) described *Leptotrichus atracheatus* on 5 syntypes from an uncertain locality, either Zampalma, Sao Thomé or Luanda, Angola, since both localities were reported on the two labels inside the tube. Later Schmalfuss (1982) transferred the species to the genus *Niambia*. This species shows a peculiar character that is not mentioned for any other species of *Niambia*, i.e., a row of strong pointed setae near the sternal margin of the male pereopod 7 ischium (see figure 169 in Schmalfuss & Ferrara, 1978).

We have re-examined the male syntype of *N. squamata*, 7.5mm long (Figs.10-13), deposited in the Natural History Museum, London. Although it is damaged, the pereopod 7 ischium shows the row of strong setae near the sternal margin as described for *N. atracheata*: only one seta is still present in



Niambia squamata: fig.7- ♂ ; fig.8- pereopod 7 ischium; fig.9- pleopod 1 exopod. Scale bars: (7) = 1mm; (8-9) = 0.1mm.

this appendage of the syntype, but the bases where the rest of the setae were inserted are still clearly visible (Fig.13). Considering that also the shape of the male pleopod 1 exopod of *N. atracheata* is identical to that of *N. squamata* (compare figure 170 in SCHMALFUSS & FERRARA, 1978 and figure 12), we consider *N. atracheata* to be a junior synonym of *N. squamata*.

Re-examination of the specimens recorded as *N. squamata* by LEMOS DE CASTRO (1967; 1971; 1972) confirmed the identification of this species, which is considered introduced in Brazil.

PORCELLIONIDAE

Porcellionides pruinosus (Brandt, 1833)
(Figs.14-15)

Porcellio pruinosus Brandt, 1833:181.
Porcellionides pruinosus; Souza-Kury, 1998:666; Leistikow & Wägele, 1999:35; Schmalfuss, 2003:243 (for earlier references and synonyms).

Material examined – BRAZIL, RIO GRANDE DO NORTE, Atol das Rocas, Ilha do Farol, MNRJ 16349, 39 mancas, 46♂, 49♀, 4 ovigerous ♀, P.S.Young, P.C.Paiva and A.A.Aguiar coll. 24/

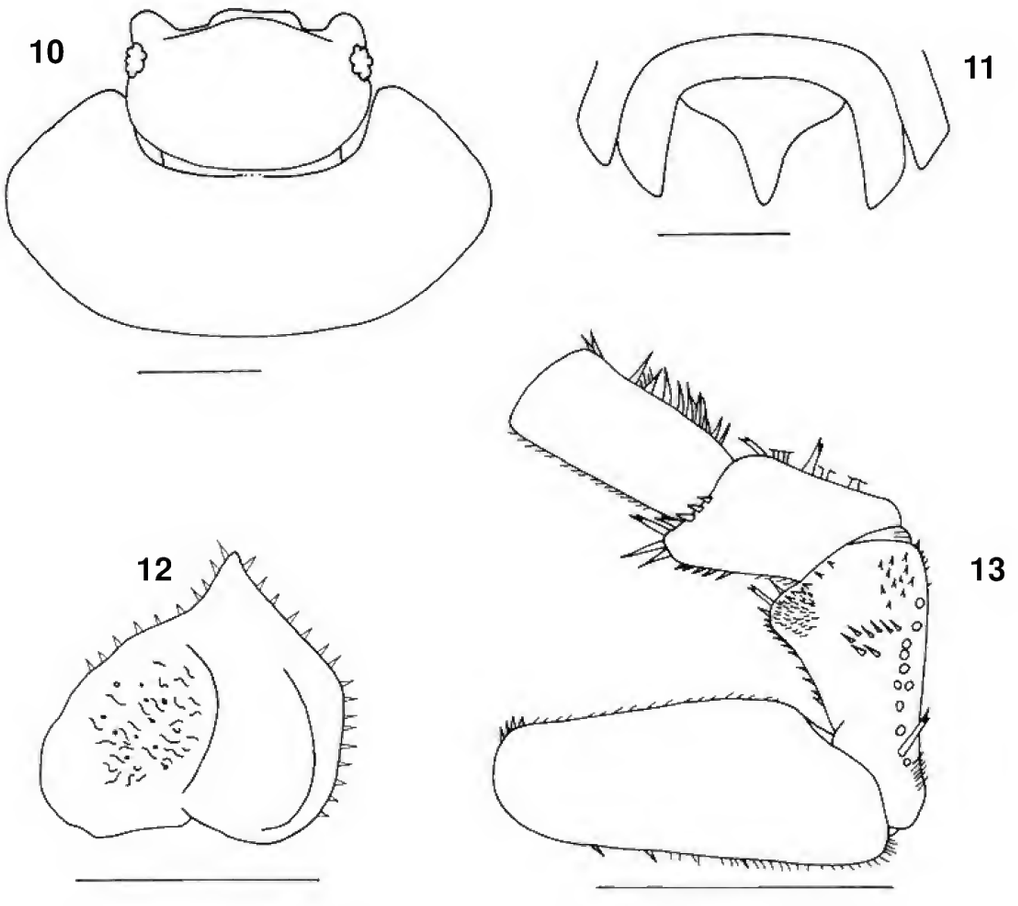
X/2000; MNRJ 16919, 11♂, 3♀, 3 ovigerous ♀, pitfall trap, S.N.Brandão, N.Magalhães and C.R.Tavares coll., 10/VII/2001; near the house, MNRJ 16920, 7♂, 6♀, 3 ovigerous ♀, pitfall trap, S.N.Brandão, N.Magalhães and C.R.Tavares coll. 10/VII/2001; near the house, MNRJ 16924, 1♂, 3♀, C.Serejo and M.C.Rayol coll. 18/X/2001.

Distribution – Species of Mediterranean origin with a cosmopolitan distribution. Records from Brazil: States of Pará, Bahia (Abrolhos), Santa Catarina and Rio Grande do Sul (Lemos de Castro, 1967; 1971; 1972; Araujo *et al.*, 1996).

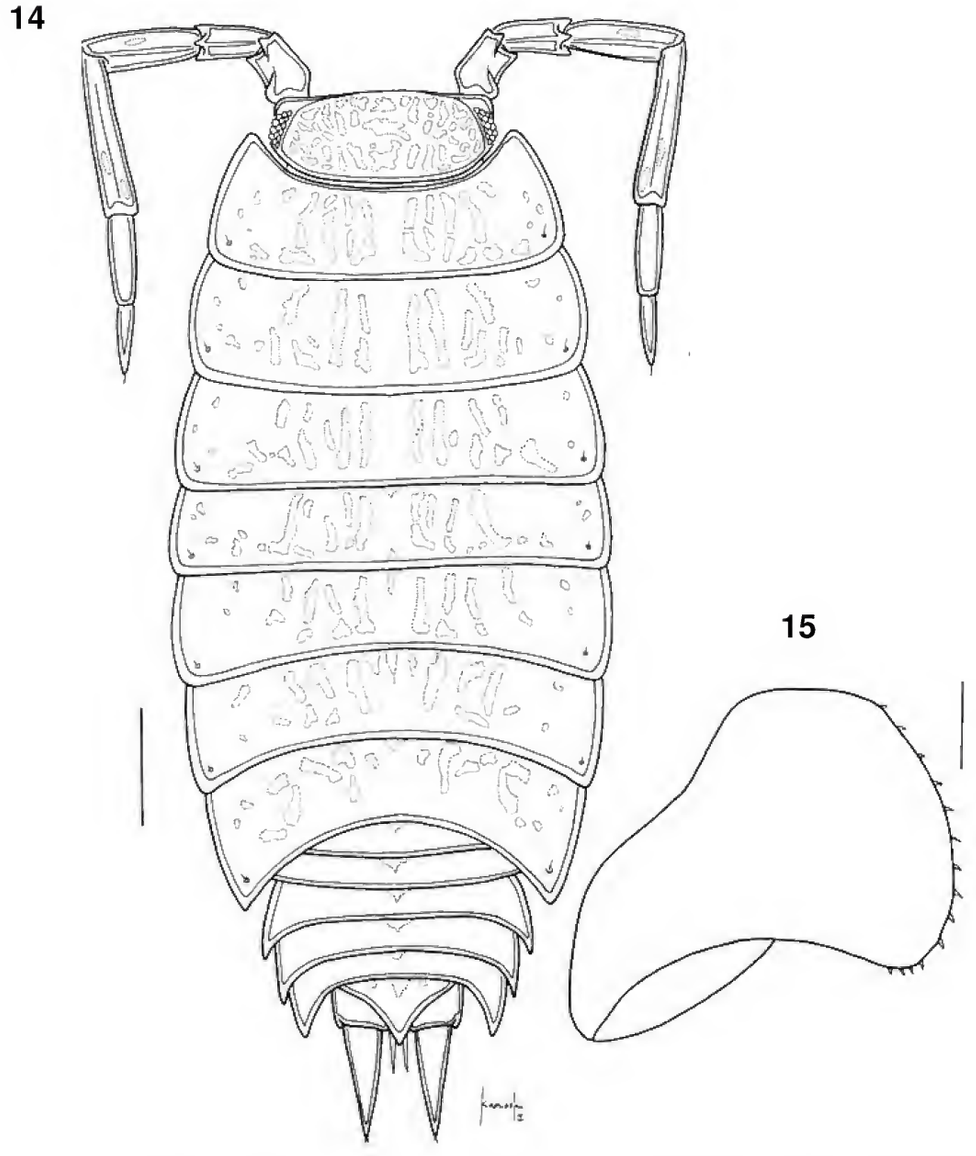
Diagnosis – Colour in vivo purple-grey with plum-like bloom on dorsal surface. Cephalothorax bearing small antero-lateral lobes, very prominent V-shaped supra-antennal line, eyes with 19-22 ommatidia (Fig.14). Flagellum of antenna composed of two articles, the first twice as long as the second. Pleon much narrower than pereion. Pleotelson triangular with acute apex. Two pairs of pleopodal lungs. Male pleopod 1 exopod pear-shaped with short rounded distal lobe (Fig.15).

Maximum length – ♂ = 11mm; ♀ = 13mm.

Remarks – The preference of *P. pruinosus* for synanthropic habitats suggests its introduction through human activities in many parts of the world. According to Dangerfield & Telford (1990) this species is capable of very rapid population growth, which probably explains its success in colonizing disturbed sites.



Niambia squamata, ♂ syntype: fig.10- cephalothorax and pereonite I; fig.11- telson; fig.12- pleopod exopod 1; fig.13- pereopod 7. Scale bars: 1mm



Porcellionides pruinosus: fig.14- ♂; fig.15- pelopod exopod 1. Scale bars: (14) = 1mm; (15) = 0.1mm.

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We wish to record our sincerest gratitude to the late Dr Paulo Young (Museu Nacional, Rio de Janeiro), who collected and entrusted us with the material examined in this study; and to Ms M. Lowe (The Natural History Museum, London) for the loan of specimens of *Niambia squamata*.

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AMPHINOMIDAE (ANNELIDA: POLYCHAETA) FROM ROCAS ATOLL, NORTHEASTERN BRAZIL [1]

(With 3 figures)

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ABSTRACT: Three amphinomid species from Rocas Atoll - Northeastern Brazil are reported. The re-description of *Eurythoe complanata*, *Hermodice carunculata* and the description of *Linopherus* cf. *canariensis* is provided.

Key words: Amphinomidae. *Eurythoe*. *Hermodice*. *Linopherus*. Rocas Atoll.

RESUMO: Amphinomidae (Annelida: Polychaeta) do Atol das Rocas, nordeste do Brasil.

Três espécies de anfinomídeos do Atol das Rocas, nordeste do Brasil foram identificados. São apresentadas redescrições das espécies: *Eurythoe complanata, Hermodice carunculata* e a descrição de *Linopherus* cf. *canariensis*.

Palavras-chave: Amphinomidae. *Eurythoe*. *Hermodice*. *Linopherus*. Atol das Rocas.

INTRODUCTION

The family Amphinomidae was proposed by Lamarck in 1818. Within this family, 19 genera and 130 species have been recognized (KUDENOV, 1995). The amphinomids are commonly found in shallow tropical and subtropical water; however specimens have also been reported in abyssal depths and polar regions (KUDENOV, 1993).

Members within this family normally have elongated body, more or less sub-rectangular in cross-section, less commonly depressed and sub-elliptic in outline. Colors are nearly always brilliant, often showing shades of green, red, scarlet, violet, or yellow. The prostomium is bilobated and the ventro-lateral palps are located in anterior lobe; it has three antennae, two laterals and a median antenna, present on the anterior and posterior lobes, respectively.

The nuchal organs are ciliary ridges along the caruncle margins, which extends dorsally from the prostomium. Although present in most, some amphinomids lack caruncle.

The parapodia are biramous, with one or two dorsal, and one ventral cirrus. One or two poorly developed pygidial appendages are also present. They possess an eversible pharynx, bearing neither jaws, teeth, nor papillae.

Branchiae may be present on some, or on all notopodia, although they are typically absent on the first setiger. Branchiae shape includes dendritic, bipinate or palmate forms.

All chaetae are calcified, and the notosetae include bifurcate and "harpoon" setae and neurosetae may include curved hooks, bifurcated setae, smooth or spurred spines and capillaries.

Amphinomids together with the other members of the Order Amphinomida are unusual, compared to other polychaetes, in having such features as calcified setae, two pairs of longitudinal nerve cords and a series of ventral epidermal pigment canals that are parallel to the nervous system (GUSTAFSON, 1930). All other known modern polychaetes lack these features, although a few interstitial forms may have two pairs of nerve cords (KUDENOV, 1995).

Diagnostic characters used to identify amphinomids species include the prostomial morphology and the development of prostomial appendages (i.e., eyes and the cacuncle), as well as the distribution of branchiae, setal types, and the distribution of notopodial and neuropodial aciculae (KUDENOV, 1995).

This paper describes the amphinomids species

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collected in Rocas Atoll – Northeastern Brazil, during four expeditions. A re-description of *Eurythoe complanata*, *Hermodice carunculata*, and *Linopherus canariensis* is provided.

MATERIAL AND METHODS:

Specimens were collected at the Rocas Atoll, Northeastern Brazil, 3°51'30"S and 33°49'29"W, on December 2000. This area is characterized by very coarse and calcareous sediment and reefs formation mainly by calcareous algae. Specimens were collected between 2-15m. *Eurythoe complanata* specimens were collected under stones, *Hermodice carunculata* specimens were collected walking on reefs, and *Linopherus canariensis* specimens were collected in coarse and calcareous sediment.

SYSTEMATICS

Family Amphinomidae Lamarck, 1818

Genus *Eurythoe* Kinberg, 1857

Body long, depressed, rectangular in cross section. Prostomium with four eyes. Caruncle elongated. One median and two lateral antennae. Two subulated palps. Parapodia biramous, with projecting rami. Notosetae of three kinds: simple capillary, sub-bifid and serrated. Ventral setae sub-bifid, stout. Each parapodia with a single dorsal and a ventral cirri. Branchiae in tufts of filaments from the second setiger.

Eurythoe complanata (Pallas, 1766)
(Fig.1A-H)

Material examined – 20 specimens. BRAZIL, RIO GRANDE DO NORTE, ROCAS ATOLL, IBUFRJ – 0460, F.Pitombo and R.Barroso coll., XII/2000.

Description – Body 3.7-9.4cm long, 0.5-1.3cm wide, 38-94 setigers. Colorless in alcohol. Prostomium with two pairs of eyes, being the second one more conspicuous. The median antennae aligned to the first pair of eyes, lateral antennae placed anteriorly; palps latero-posteriorly located (Fig.1A). Lips with a transversal groove. Caruncle long, smooth dorsal surface, 6-7 lobes vertically arranged and fixed in the dorsum, extending to the posterior margin of second setiger. Branchiae dendritically branched from setiger 2, with six filaments in setiger two. One dorsal and one ventral cirrus per parapodium. Neurosetae forked with smooth prongs of unequal length (Fig.1B). One specimen presented neurosetae forked with very fine serrations (Fig.1C) (see discussion). Notosetae of four types: forked setae with smooth prongs of unequal length from setiger 1 to 6 (Fig.1D and 1H); harpoon-setae with re-curved serrations on one side from setiger 3 onwards (Fig.1F); smooth pointed setae from setiger 3 onwards (Fig.1E); fine setae with a small spur and a long slender blade from setiger 6 onwards (Fig.1G).

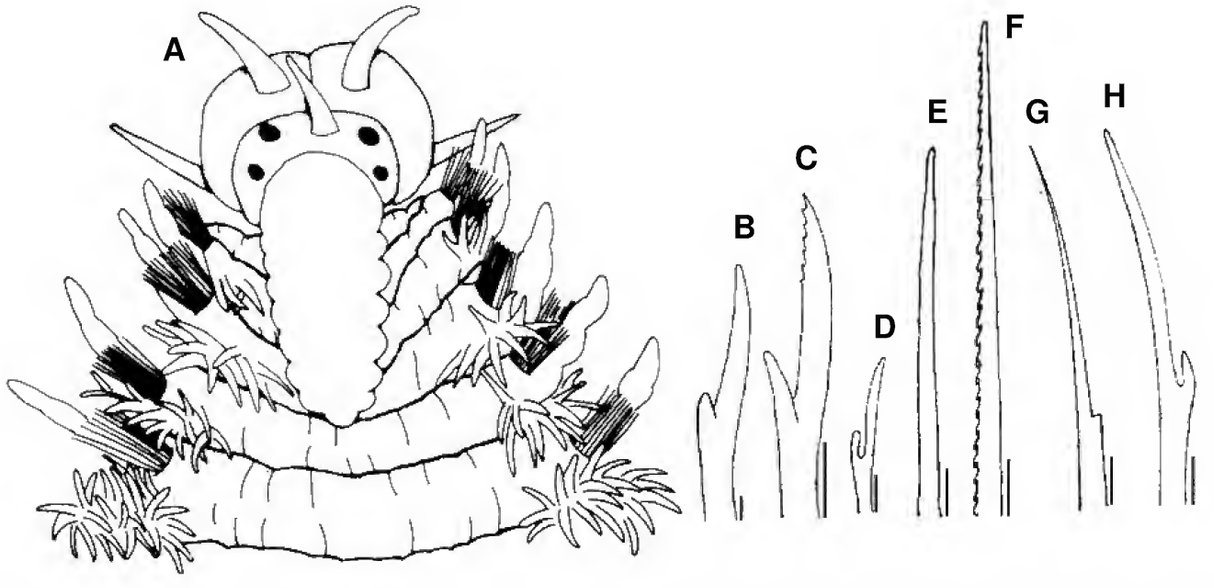

Fig.1- *Eurythoe complanata*: (A) anterior end in dorsal view; (B) furcate neurosetae; (C) furcate neuroetae with fine serrations; (D) and (H) furcate notoetae; (E) smooth pointed notosetae; (F) "harpoon" notosetae; (G) fine "spurred' notosetae. Scale bars = 25µm.

Distribution – From Caribbean Sea to Southern Brazil, including South Atlantic oceanic islands.

Discussion – In the last century, *E. complanata* has been considered synonymous of several others species from the Indian, Pacific and Atlantic Ocean, which increased the wide distribution of this species. HARTMAN (1948) redescribed and considered synonymous nine species described by KINBERG (1857, 1867) as *Eurythoe complanata*, but maintained *E. capensis* as valid, since the notosetae were serrated and coarser than the neurosetae. *E. capensis* was synonymized as *E. complanata* latter by DAY (1951). The circumtropical distribution of this species was suggested by some authors (NÚÑES, 1991; AMARAL & NONATO, 1994; SALAZAR-VALLEJO, 1997), although at least Atlantic and Eastern Pacific lineages are distinct species as demonstrated by BARROSO (2005) using allozymes. Some descriptions disagree about the specific details of the forked dorsal and ventral setae, showing diferences in neuropodial setae, as well as the forked setae of the dorsal ramus (TREADWELL, 1939:171; MCINTOSH, 1885, Pl.3A, Fig.9, NÚÑEZ, 1991, Fig.2E).

After an examination of specimens from Atlantic, Pacific and Indian Ocean, as well as Mediterranean and Red Sea, BARROSO (2005) did not find any difference in morphology among these samples, but a variation of setal morphology of individuals of the same population and among setae from different parapodia. These variations were mainly related to serrations in inner side and proportional length of the longer prong of notopodial sub-bifid setae. This result plus the molecular divergence between Atlantic and Pacific lineages suggests that *E. complanata* is a complex of cryptic species. The fact that this species presents few and simple morphological traits (such as simple setae, pharynx without jaws, teeth or papillae, branchiae in tufts) when compared with others polychaete species, may be responsible for this cosmopolitanism, that can be the result of over conservative systematics (KLAUTAU *et al.*, 1999). Detailed morphological analysis and molecular methods for assessing gene flow are necessary to determine the existence of intraspecific variation and speciation processes among populations and then determine the taxonomic status of this group, including distribution and also the importance of setae morphology, including shape and size in taxonomic studies.

Genus *Hermodice* Kinberg, 1857

Body long, depressed, rectangular in cross section. Prostomium rounded, with four dorsal eyes. Caruncle large, oval, laterally expanded in two foliaceous lobes. One median and two lateral antennae. Two lateral palps arising from buccal lips. Parapodia biramous, projecting. Dorsal setae of two types: smooth capillary and serrate. Ventral setae sub-bifid, denticulate toward rostral extremity. Each parapodia with a single dorsal and a ventral cirrus. Branchiae double, branched, in all parapodia, alternating in position.

Hermodice carunculata (Pallas, 1766)

Material examined – 15 specimens. BRAZIL, RIO GRANDE DO NORTE, ROCAS ATOLL, IBUFRJ – 0461, Collectors: F.Pitombo and R.Barroso coll., XII/2000.

Description – Body 15-24cm long, 1.5cm wide, 75-94 setigers. Prostomium posteriorly surrounded by the first setiger, with two pair of eyes, the second pair seems to be doubled. Median antennae aligned with the first pair of eyes. Buccal lips present a pair of anterior lateral antennae (half length of the median antennae) and a pair of palps latero-posteriorly. Caruncle presents two series of 6 to 9 foliaceous lobes, each series oblique extending backwards to setiger four (Fig.2A). Branchiae dendritically branched, from setiger 1 onwards. One dorsal and one ventral cirrus per parapodium, notopodial cirrus bi-articulated and larger than the neuropodial. Neuropodial setae spurred with serrations (Fig.2B). Notopodial setae smooth and pointed (Fig.2C-D).

Distribution – From Caribbean Sea to Southern Brazil, including Atlantic oceanic islands.

Discussion – *Hermodice carunculata* has a well-documented tropical Atlantic-Mediterranean distribution. In Brazil it has been referred to São Paulo, Rio de Janeiro, Bahia, Pernambuco, and Rio Grande do Norte States. This species is particularly associated with hard substrate, but also has been encountered at or near the surface in flotsam or swimming freely. MCINTOSH (1885) reported a one foot long specimen swimming.

The specimens from Rocas Atoll showed two color patterns in life, red and purple. No morphological differences were found among individuals of these two color patterns, but the possibility of two species

can not be discharged and a molecular study may be useful to investigate this question. All individuals presented dorsal intersegmental black stripes. Based on this characteristic, BAIRD (1870) described *H. nigrolineata*, rejected by EBBS (1966). HUMANN (1992) considered these stripes as a juvenile character. SALAZAR-VALLEJO (1997) observed small differences between individuals regarding the presence of such black stripes, including sexually mature specimens, pointing out the need for more studies. A comparative study with a high number of specimens of diverse localities is advisable in order to determine if *H. carunculata* is in fact a wide distributed species or a complex of sibling ones.

Genus *Linopherus* Quatrefages, 1865

The genus *Linopherus* was described by QUATREFAGES (1865) based on GRUBE (1860) redescription of *Amphinome incarunculata* Peters, 1854. The validity of this genus has been questioned due to the very superficial description of Quatrefages and an uncertainty on the presence or absence of a caruncle. Peters says: "Diese Art... zeigt keine Spur einer Carunkel" (meaning literally "This type... doesn't show any track of a caruncle"), while Grube mentioned: "caruncle ovalis, margine integro" (AMARAL & NONATO, 1994). The genus *Linopherus*, was not recognized by HARTMAN (1959), which considered *Pseudeurythoe* Fauvel, 1932 as valid. Nevertheless, FAUCHALD (1977), based on the priority principle, considered *Pseudeurythoe* as a junior synonymous of *Linopherus*.

Linopherus is characterized by a prostomium divided transversely with the anterior part bilobed, and bearing a pair of antennae and a pair of palps. The posterior part is almost square, with two pair of eyes and a median antenna. The caruncle is small or absent, sometimes sunk into the first setiger. The parapodia with the notopodia and neuropodia are well separated. A single dorsal cirrus per notopodium. Branchiae are present as single branching tufts, limited to the anterior part of the body. All setae are hollow and brittle, and the notosetae include harpoon-setae and capillaries, while the neurosetae are all spurred.

Linopherus cf. *canariensis* (Langerhans, 1881) (Fig.3A-E)

Material examined – 27 specimens. BRAZIL, RIO GRANDE DO NORTE, ROCAS ATOLL, IBUFRJ – 0459, F.Pitombo and R.Barroso coll., XII/2000.

Description – Body 3.0-9.0mm long ($\overline{X}$ =4.4, S=1.6, N=15), 0.3-0.8 mm wide ($\overline{X}$ =0.4, S=0.1, N=15), 23-48 setigers ($\overline{X}$ =34, S=8.1, N=15). The specimen was colorless in alcohol. Prostomium with anterior and posterior lobes; anterior lobe expanded, rounded and larger than the posterior lobe (Fig.3A-B). Anterior lobe with lateral antennae, slightly bi-articulate, located anteriorly, and a pair of palps slightly bi-articulated located latero-posteriorly. Two pairs of rounded eyes, anterior pair larger. Median antennae smaller than laterals, located between the second pair of eyes.

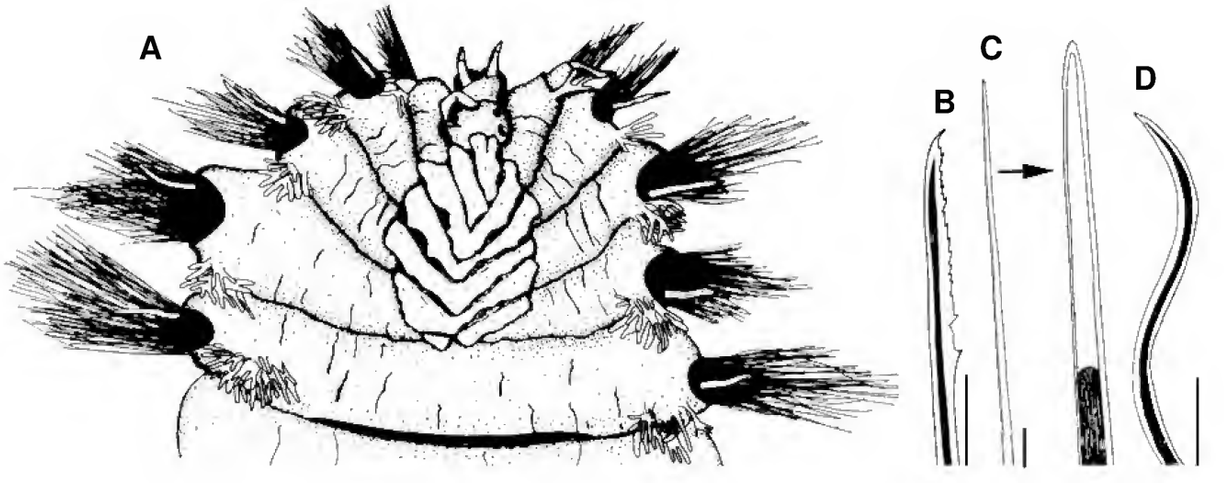

Fig.2- *Hermodice carunculata*: (A) anterior end in dorsal view; (B) "spurred" neurosetae with serrations; (C-D) smooth pointed notosetae. Scale bars = 100μm.

No caruncule. Parapodia biramous with notopodial and neuropodial cirri; notopodial cirri of the same length throughout the body. Branchiae present in setigers 3-7 (in some individuals ending in setigers 6 or 8). Each branchia with 3-6 filaments. Neurosetae spurred in two sizes, longer with a spur at the base of a serrated blade (Fig.3D), smaller with a well marked spur and coarser serrations on the longer prong (Fig.3C). Notosetae slender, smooth, ribbon-shape (Fig.3E). Some individuals with well-developed pygidial appendages.

Variation – The articulations of the lateral paired antennae and palps were not observed in all individuals, probably due to their small size or due to intraspecific variation. We think that this character (articulations of antennae and palps) does not help to sort out species.

Discussion – Specimens studied are quite similar to the description of *Linopherus canariensis* (Langerhans, 1881) presented by NÚÑES *et al.* (1991) based upon specimens from Canary Islands (type locality), but some differences were observed between specimens from Canary Island and Rocas Atoll. Differences were related to the number of branchial filaments on the first branchial setiger (one filament in Canary Islands individuals and 3-5 in Rocas Atoll individuals) and the occlusion of the second pair of eyes by the first setiger in Canary individuals, while in Rocas Atoll specimens the second pair of eyes is visible. These differences could be easily regarded as phenotypic plasticity or fixation artifacts. Furthermore, number of branchial filaments is a character likely to vary during ontogeny. *L. canariensis* was already reported from Canary Islands, Panama, Mexico, and Cuba. This species lives in interstices of organic sediments on tropical region of Atlantic Ocean.

Up to now, there are two species of *Linopherus* referred to Brazil: *L. canariensis* and *L. ambigua* (Monro, 1933) referred by AMARAL & NONATO (1994). Even though it is likely that a complex of species would be covered under this name since it had been considered as a cosmopolitan species, referred to Pacific, Indian, and Atlantic Oceans. These two species differs each other mainly by presence of branchiae restricted to setigers 3 to 7 and body length of 2-9mm in *L. canariensis*, while *L. ambigua* possess branchiae from setiger 3 to 43 and body length of 47mm.

A key including the species of *Linopherus* was presented by FAUCHALD (1972) and modified by SALAZAR-VALLEJO (1987), who considered as valid 17 species.

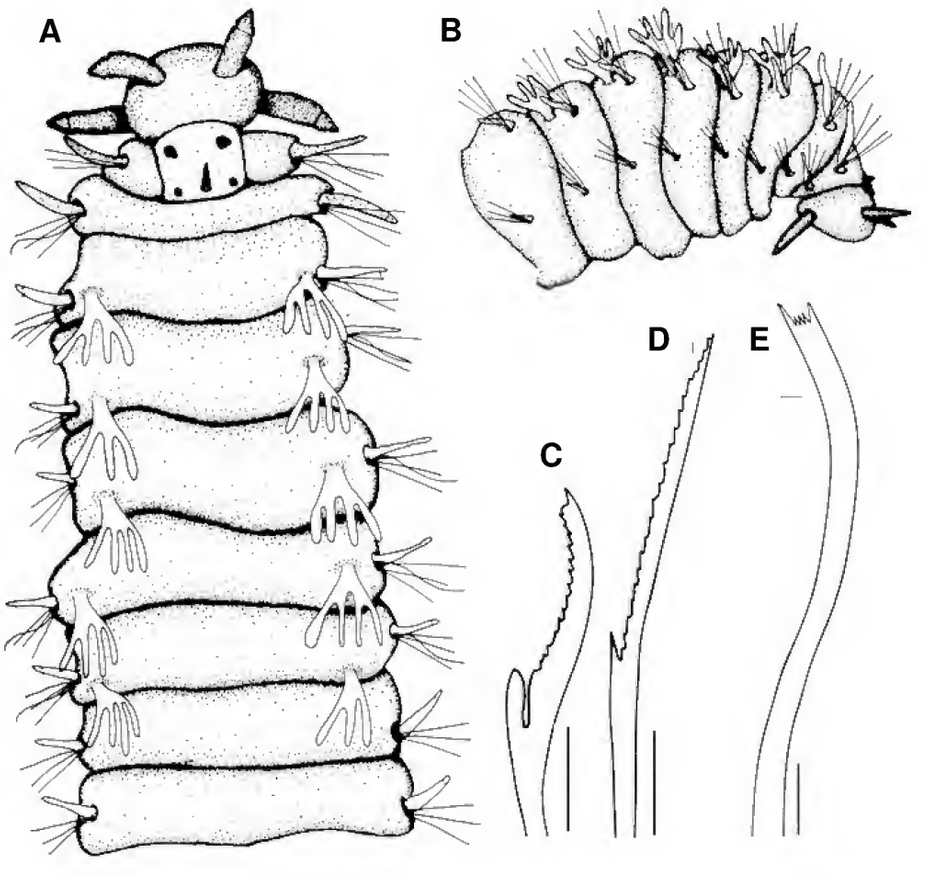

Fig.3- *Linopherus* cf. *canariensis*: (A) anterior end in dorsal view; (B) anterior end in lateral view; (C-D), forked denticulated neurosetae of two types; (E) slender and smooth notosetae. Scale bars = 50μm.

The species of *Linopherus* have been distinguished mainly by the number of branchial setigers, number of terminal branchial filaments, presence and number of eyes, relative length of notopodial and neuropodial cirri of first and second setiger, caruncle (present or absent), and few setal characters, that has been poorly described. Which one of these characters are in fact synapomorphies for this group it is still unknown.

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SABELLIDAE LATREILLE, 1825 (ANNELIDA, POLYCHAETA) FROM ROCAS ATOLL, BRAZIL, WITH THE DESCRIPTION OF A NEW SPECIES [1]

(With 4 figures)

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PAULO CESAR PAIVA [2]

ABSTRACT: Three species of sabellids belonging to the genera *Bispira* and *Notaulax* were found in Rocas Atoll, Rio Grande do Norte State (RN), Brazil (3°51'30"S and 33°49'29"W). Among them, *Bispira klautae* is a new species. The description of this new species and a redescription of *B. melanostigma* and *N. occidentalis* are provided.

Key words: Polychaeta. Sabellidae. Rocas Atoll. Brazil. New species.

RESUMO: Sabellidae Latreille, 1825 (Annelida, Polychaeta) do Atol das Rocas, Brasil, com a descrição de uma nova espécie.

Três espécies de sabelídeos pertencentes aos gêneros *Bispira* e *Notaulax* foram encontrados no Atol das Rocas, Rio Grande do Norte (RN), Brasil (3°51'30"S e 33°49'29"W). Dentre estas, uma nova espécie: *Bispira klautae*. Além da descrição desta nova espécie, é fornecida a redescrição de *B. melanostigma* e *N. occidentalis*.

Palavras-chave: Polychaeta. Sabellidae. Atol das Rocas. Brasil. Espécie nova.

INTRODUCTION

After the original description, the first significant subdivision of the Sabellidae was carried by RIOJA (1923) who divided the family in three subfamilies: Myxicolinae, Fabriciinae, and Sabellinae, based largely on setal characters. JOHANSSON (1927) subsequently modified RIOJA (1923) scheme assigning Myxicolinae to the Fabriciinae. Based in a detailed cladistic analysis of the sabellids and associated taxa, FITZHUGH (1989) recognized the monophyletic condition of Sabellidae supported by three setal synapomorphies: (1) thoracic neuropodial uncini with the main fang surmounted by a broad series of smaller teeth; (2) the proximal region of uncini with a handle or shaft, and; (3) spinelike abdominal neurosetae. FITZHUGH (1989) was able to confirm the monophyly for only two sabellid subfamilies, the Fabriciinae and Sabellinae, although several genera included to that point of time within Fabriciinae were transferred to Sabellinae. The emended diagnoses for subfamilies are currently used (*e.g.* SMITH, 1991; ROUSE, 2000; BICK, 2005).

Sabellids are distributed worldwide and are associated with hard surfaces and soft sediments for all latitudes from intertidal areas to shelf depths (FAUCHALD, 1977; ROUSE & PLEIJEL, 2001; GIANGRANDE & LICCIANO, 2004).

The major characteristics used in sabellids taxonomy include: (a) the presence or absence of companion setae to the neuropodial uncini in the thorax also called pennoned setae or pick-axe setae, (b) the structure of the thoracic uncini which may be acicular or avicular, and (c) the anatomy of the branchial crown and associated structures such as dorsal and ventral lips, pinnular, and radiolar appendages (PERKINS, 1984; FITZHUGH, 1989; ROUSE, 2000).

SYSTEMATICS

Family Sabellidae Latreille, 1825

Subfamily Sabellinae Johnston, 1846

Genus *Bispira* Krøyer, 1856

KRØYER (1856) defined *Bispira* without including any species. CLAPARÈDE (1868) was the first to refer a species to the genus, *Bispira volutacornis*, based on the

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description of *Amphitrite volutacornis* Montagu, 1804. This genus has a crown with unflanged base, usually in two semicircles with numerous pairs of radioles sometimes with composite eyes; crown with shallow palmate membrane about 1/10 of total crown length; collar margins usually separated dorsally by a distinct gap; inferior thoracic notosetal fascicles arranged in bundles with irregular longitudinal setal rows; inferior thoracic notosetae spinelike. Abdominal neurosetal tori as conical lobes; abdominal neurosetal fascicles arranged in a C-shaped configuration or partially spiraled; anterior abdominal neurosetae spinelike in anterior and posterior rows; thoracic uncini avicular; companion setae with distal ends as distinctly asymmetrical membranes; interramal eyespots present (FITZHUGH, 1989; KNIGHT-JONES & PERKINS, 1998).

Bispira melanostigma (Schmarda, 1861)
(Fig.1)

Sabella variegata Krøyer, 1856.
Sabella thoracica Krøyer, 1856.
Sabella melanostigma Schmarda, 1861.
Sabella bipunctata Baird, 1865.
Bispira melanostigma (Schmarda, 1861) comb.nov. – KNIGHT-JONES & PERKINS, 1998.

Material – 6 specimens under stones in tidal pools, Rocas Atoll, Brazil.

Diagnosis – Radioles in semicircular arrangement united by a palmate membrane, most radioles with five pairs of dark brown composite eyes. Ventral lappets prominent and involuted medially to form small pockets and collar dorsal margins separated by a wide gap. Discrete dark spots close to dorsal sides on all parapodia, and small brown strips at ventral end of each thoracic neuropodial torus and on ventral surface of each abdominal setiger.

Description – Body 58 to 77mm long without crown, in complete specimens; thorax 3 to 5mm wide, narrower in side view; 10 to 14 thoracic and 102 to 122 abdominal setigers (Fig.1a). Crown 17 to 27 mm long with 18 to 25 pairs of radioles usually in semicircular arrangement; most radioles with 5 pairs of dark brown composite eyes, radioles united by a palmate membrane in 1/8 of their total length, stylodes absent; dorsal lips tapered without radiolar appendages; dorsal margins of collar prominent and separated by a wide gap, lateral margins reaching junction between thorax and crown. Ventral lappets prominent and involuted medially to form small pockets; thoracic setigers becoming gradually narrower posteriorly; describe ventral sacs, since they are mentioned in the remarks first thoracic notosetae spinelike all with similar size (Fig.1b), notosetae on posterior thoracic setigers spinelike or elongate spinelike (Fig.1c), all thoracic notosetae slightly flattened laterally; thoracic neuropodial avicular uncini (Fig.1d) in a single row; companion setae with a thin, tapered extension on one side (Fig.1e). Abdominal neurosetae elongate spinelike all similar in size; abdominal notopodial avicular uncini in a single row, without companion setae. Pygidium well developed without eyespots.

Color (fixed material) pale with dark bands around the crown, diffuse liver-brown patches on dorsal thorax and ventral sacs, discrete dark spots close to dorsal sides on all parapodia, and small brown strips at ventral end of each thoracic neuropodial torus and on ventral surface of each abdominal setiger; collar with similar pigmentation on inner surface of ventral lappets and with elongate yellowish band parallel to dorsolateral margins.

Remarks – The smallest specimen observed in this study is larger than the largest specimen recorded by KNIGHT-JONES & PERKINS (1998) in their revision. Nevertheless, morphological differences are restricted to slight differences in number of abdominal setigers (102-122 in our material vs 60-100) and crown size (17-27mm vs 8-15mm).

Bispira melanostigma seems to be very close to *B. viola* (Grube, 1863) (KNIGHT-JONES & PERKINS, 1998). However, *B. melanostigma* differs in having a shorter first setiger and very protuberant ventral sacs.

Distribution – *Bispira melanostigma* is widespread in the Caribbean and Gulf of Mexico, extending northward as far as North Carolina and Bermuda (KNIGHT-JONES & PERKINS, 1998). The distribution is southerly expanded to Rocas Atoll, Brazil.

Bispira klautae sp.nov.
(Figs.2-3)

Material – 2 specimens associated with calcareous algae in tidal pools from Rocas Atoll, Brazil.

Diagnosis – Crown with reddish brown bands. Radioles in semicircular arrangement with dark brown composite eyes and united by a palmate membrane. Ventral lappets prominent and collar dorsal margins widely separated apparently pushed aside by spongy masses. Interramal spots present.

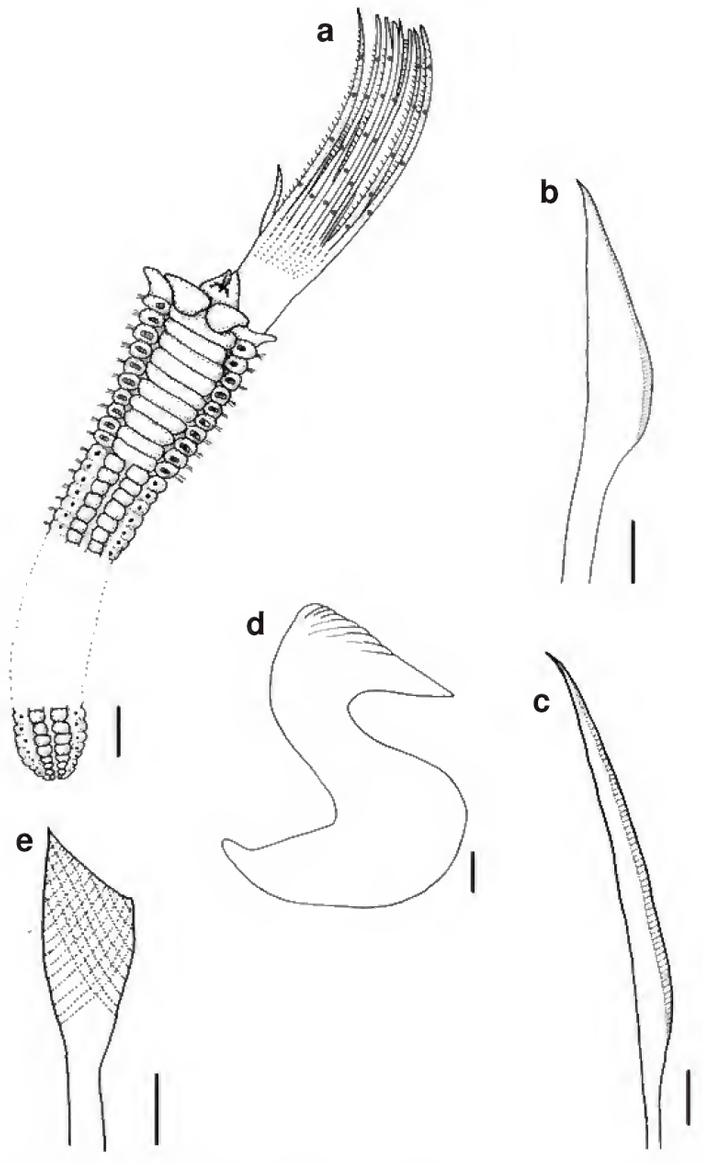

Fig.1- *Bispira melanostigma*: (a) ventral view, scale bar = 2mm; (b) thoracic spinelike notosetae, scale bar = 25µm; (c) thoracic elongate spinelike notosetae, scale bar = 25µm; (d) thoracic avicular uncini, scale bar = 10µm; (e) companion setae, scale bar = 10µm.

Description – Holotype (IBUFRJ-0454) complete; body 12mm long without crown, thorax 2mm wide (Fig.2a), with 9 thoracic and 36 abdominal setigers; crown 9mm long with 15 pairs of radioles in semicircular arrangement. Paratype (IBUFRJ-0455) complete; body 12mm long without crown, thorax 2mm wide, with 7 thoracic and 33 abdominal setigers; crown 9mm long with 15 pairs of radioles in semicircular arrangement. Radioles in the crown with dark brown composite eyes (Fig.2b); palmate membrane in 1/8 of total crown length, stylodes absent; tapering dorsal lips with dark brown tips, without radiolar appendages; dorsal margins of collar prominent and separated by a wide gap, lateral margins reaching junction between thorax and crown. Ventral lappets prominent and with dorsal margins widely separated, apparently pushed aside by spongy, cushion-like masses (Figs.2c, 3); thoracic setigers becoming gradually narrower posteriorly with two types of notosetae: spinelike (Fig.2d) and shorter broadly hooded (Fig.2e); thoracic neuropodial avicular uncini (Fig.2f) in a single row; companion setae with thin, wide, asymmetrical blades (Fig.2g). Abdominal neurosetae in a C-shaped arrangement, including longer needlelike (Fig.2h) and shorter spinelike setae; abdominal notopodial avicular uncini in a single row, without companion setae. Pygidium well developed without eye-spots.

Color after fixation: crown with reddish-brown bands, collar liver-brown in inner surface and whole body with conspicuous interramal spots.

Remarks - *Bispira klautae* sp. nov. belongs to a group of species that possesses thoracic spongy, cushion-like masses together with *B. porifera* (Grube, 1878) and *B. paraporifera* Tovar-Hernández & Salazar-Vallejo, 2006. Nevertheless it differs form *B. porifera* mainly by the presence of composite eyes in radioles and by thoracic notosetae including longer spinelike and shorter broadly hooded setae in *B. klautae* sp. nov. Besides, *B. klautae* sp. nov. has more thoracic setigers (9 in *B. klautae* sp. nov. vs 8 in *B. porifera*), a lower number of radioles (15 vs 45-80) and a shorter crown (9 mm vs 21-40 mm). It differs from *B. paraporifera* by the shape of the cushion-like masses (much wider in *B. klautae*) and by having 15 pairs of radioles and 3 pair of eyes (vs 14 and 4 in *B. paraporifera*). Furthermore, *B. klautae* has more thoracic setigers (9 in *B. klautae* sp. nov. vs 8 in *B. paraporifera*) and possess shorter broadly hooded setae besides spinelike ones.

Bispira klautae sp. nov. differs from all others species of the genus *Bispira* by the presence of the spongy masses in the thorax. It differs also from *B. tricyclia* (Schmarda, 1861) in the color of the bands in the branchial crown (reddish in *B. klautae* sp. nov. vs pale yellowish in *B. tricyclia*), the number of thoracic setigers (9 vs 12-21), the number of radioles (15 vs 29-132 on the left and 23-66 on the right) and the

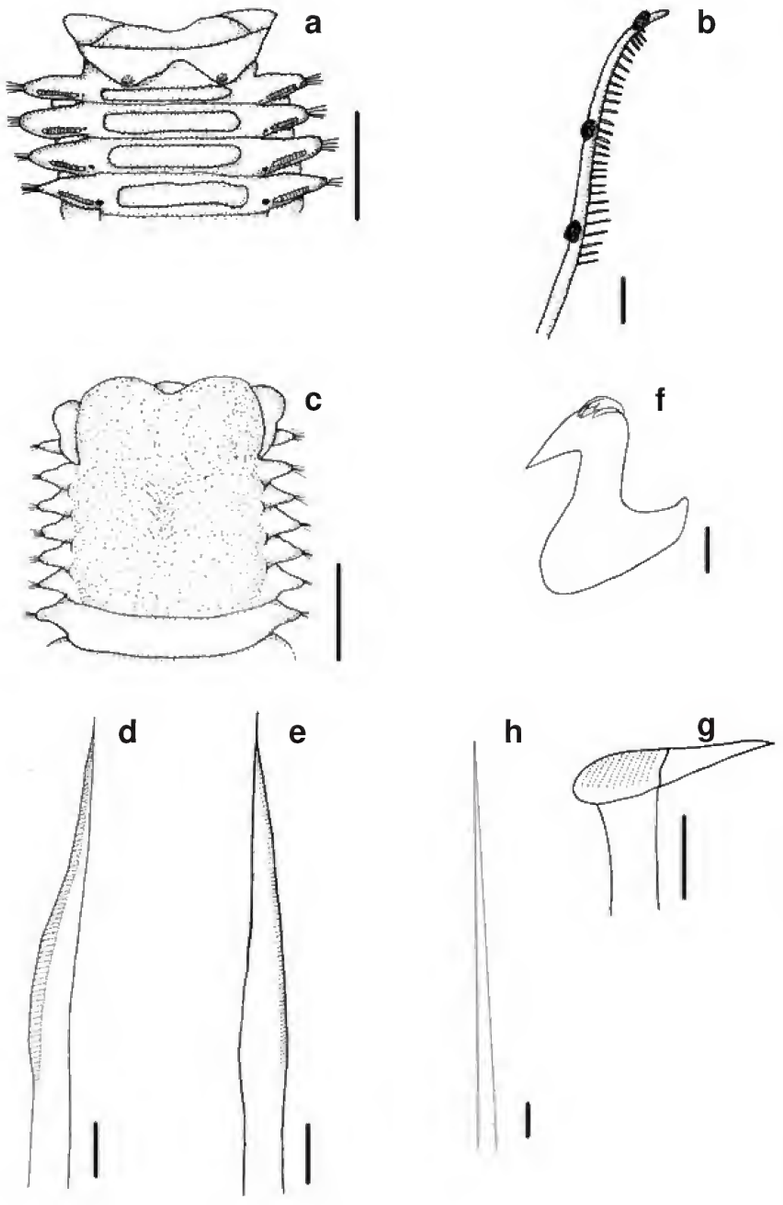

Fig.2- *Bispira klautae* sp.nov.: (a) anterior end, ventral view without branchial crown, scale bar = 1mm; (b) radiole with composite eyes, scale bar = 1mm; (c) anterior end, dorsal view, scale bar = 1mm; (d) thoracic spinelike notosetae, scale bar = 25μm; (e) thoracic broadly hooded notosetae, scale bar = 25μm; (f) thoracic avicular uncini, scale bar = 10μm; (g) companion setae, scale bar = 10μm; (h) abdominal needlelike neurosetae, scale bar = 10μm.

presence of interramal spots. The new species differs from *B. viola* (Grube, 1863) in the arrangement of composite eyes (always single in *B. klautae* sp. nov. vs single or paired in *B. viola*), the number of thoracic setigers (9 vs 11-17) and the number of radioles (15 vs 25) (Knight-Jones & Perkins, 1998).

Distribution – Rocas Atoll, Brazil.

Etymology – The spongy appearance of the thorax lead us to name the species for Dr. Michelle Klautau, whose work with sponges inspired our description.

Genus *Notaulax* Tauber, 1879

The genus *Notaulax* was described by Tauber (1879) and revised by Perkins (1984). This genus has a crown with numerous radioles; palmate membrane present; simple radiolar eyes organized in groups or on lateral margins distal to palmate membrane; branchial lobes very long with flanges in dorsal and ventral margins; collar setae spinelike arranged in longitudinal or oblique fascicles; thoracic superior notosetae spinelike and inferior ones paleate, both types arranged in two transverse rows; abdominal neurosetae in two transverse rows of capillary and paleate with long mucros; thoracic uncini avicular, companion setae present with teardrop-shaped membranes; abdominal uncini with main fang surmounted by teeth of equal size (Perkins, 1984; Fitzhugh, 1989; Nogueira, 2000).

Notaulax occidentalis (Baird, 1865) (Fig.4)

Sabella occidentalis Baird, 1865
Sabella alba Treadwell, 1917
Parasabella sulfurea Treadwell, 1917.
Hypsicomus purpureus Treadwell, 1924
Notaulax occidentalis (Baird, 1865) comb.nov. – Perkins, 1984

Material – 1 complete specimen and 1 anterior fragment, both associated with calcareous algae in tidal pools from Rocas Atoll, Brazil.

Diagnosis – Crown purple brown with white bands in the tip of radioles. Radioles in a semicircular arrangement united by a palmate membrane. Radiolar eyes present in scattered rows. Branchial lobes purple brown and long. Collar setae in an oblique fascicle. Abdomen pale with a dark yellowish band in the middle of ventral side and two eyespots in pygidium.

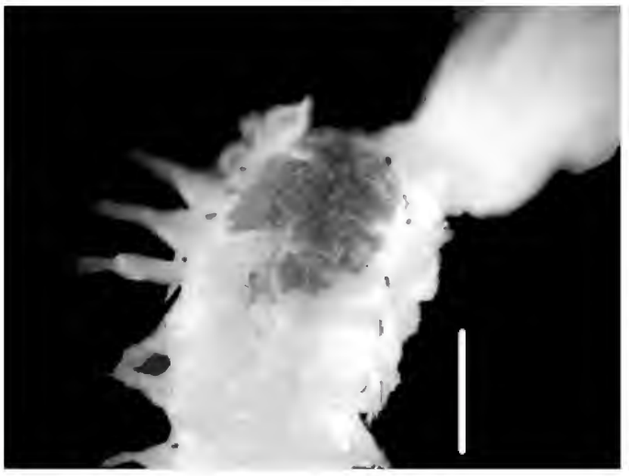

Fig.3- *Bispira klautae* sp.nov.: ventral side of thorax showing spongy, cushion-like mass, scale bar = 1mm.

Description – Body 54mm long without crown, thorax 4mm wide; with 8 thoracic and 138 abdominal setigers in the complete specimen (Fig.4a). Branchial crown, 16-23mm long, purple brown with white bands in the tip of radioles; 20 pairs of radioles in semicircular arrangement. Branchial lobes very long, exposed, stained with purple pigment. Radioles united by a palmate membrane about 1/4 of their total length; tips without pinnules and flattened; without stylodes; eyes arranged in scattered rows beginning above palmate membrane. Collar segment bilobed, dorsally purple brown; ventral side with two triangular lappets and rectangular shield; collar setae spinelike, in oblique rows. Thoracic notopodial fascicles bearing spinelike (Fig.4b, c) and two rows of paleate (Fig.4d) setae; thoracic neuropodia with avicular uncini (Fig.4e) and companion setae with a distally pointed, teardrop-shaped membrane (Fig.4f). Thoracic ventral shields trapezoidal. Neurosetae in anteriormost abdominal setigers including paleate and capillary; posteriormost setigers with paleate setae bearing longer mucros (Fig.4g) and capillary setae. Abdominal notopodial avicular uncini in a single row. Pygidium with two eyespots.

Color (after fixation) purple brown with white bands in the tip of radioles; thorax reddish-brown with a white band along dorsal surface; abdomen pale with a dark yellowish band along ventral side.

Remarks – These specimens of *N. occidentalis* seems to be very similar to those described by PERKINS (1984) concerning size, color pattern, habitat, and others taxonomic traits.

As regards the Brazilian shores, *Notaulax* specimens were previously referred to as *N. nudicollis* (Krøyer, 1856) (PERKINS, 1984), form of the southern coast, and as *Notaulax* sp. (NOGUEIRA, 2000), from the southeastern coast. However, *N. occidentalis* differs from these species by having ventrally incised collar margins in adults.

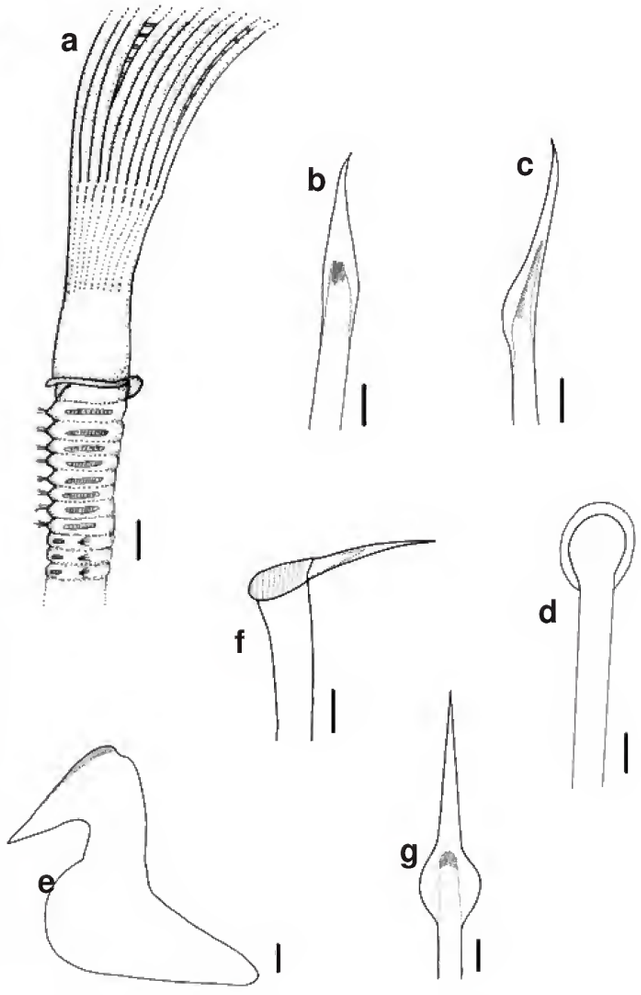

Fig.4- *Notaulax occidentalis*: (a) anterior end, lateral view, scale bar = 1mm; (b) thoracic spinelike notosetae, frontal view, scale bar = 25μm; (c) thoracic spinelike notosetae, lateral view, scale bar = 25μm; (d) thoracic paleate notosetae, scale bar = 25μm; (e) thoracic avicular uncini, scale bar = 10μm); (f) companion setae, scale bar = 10μm; (g) abdominal modified paleate neurosetae, scale bar = 10μm.

NONATO & LUNA (1970) and RULLIER & AMOUREUX (1979) reported *Hypsicomus elegans* (Webster, 1884) from the northeastern coast of Brazil, including Rocas Atoll. Nevertheless, *H. elegans* is actually a junior synonym of *N. occidentalis* (PERKINS, 1984). The occurrence of *N. occidentalis* herein reported is close to the localities sampled by NONATO & LUNA (1970) and RULLIER & AMOUREUX (1979), suggesting that their reports are likely to refer to *N. occidentalis*.

Distribution – *N. occidentalis* is widespread in the tropical eastern Atlantic, extending northward as far as North Carolina (PERKINS, 1984). The distribution is southerly expanded to Rocas Atoll, Brazil. Usually found in tidal pools or associated with coral reefs or calcareous algae.

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NEREIDIDAE FROM ROCAS ATOLL (NORTH-EAST, BRAZIL) [1]

(With 7 figures)

CINTHYA S. G. SANTOS [2]

ABSTRACT: Seven species of nereidids belonging to the genera *Nereis*, *Neanthes*, *Ceratocephale*, *Perinereis*, and *Ceratonereis* were identified in Rocas Atoll, Rio Grande do Norte State (RN), Brazil (03°51'30"S and 33°49'29"W). Among them, one is new, *Nereis lanai* sp.nov., and three *Nereis panamensis*, *Ceratonereis longicirrata* and *Perinereis floridana* are new records to Brazilian coast.

Key words: Nereididae. Rocas Atoll. Brazil. New species. New records.

RESUMO: Nereididae do Atol das Rocas (Nordeste, Brasil).

Sete espécies de nereidídeos pertencentes aos gêneros *Nereis*, *Neanthes*, *Ceratocephale Perinereis* e *Ceratonereis* foram identificados no Atol das Rocas, Rio Grande do Norte (RN), Brasil (03°51'30"S e 33°49'29"W). Dentre estas, uma espécie é nova, *Nereis lanai* sp.nov., e três constituem novos registros para a costa brasileira, *Nereis panamensis*, *Perinereis floridana* e *Ceratonereis longicirrata*.

Palavras-chave: Nereididae. Atol das Rocas. Brasil. Espécie nova. Novos registros.

INTRODUCTION

Nereididae Lamarck, 1818 is among the most familiar polychaetes, both as classical textbook examples and from their occurrence on seashores around the world. While often referred to as Nereidae, especially in the older literature, the emended spelling to Nereididae, attributable to Pettibone (1971), is followed herein. Nereididae are widely employed in laboratory experiments, as bait for fishing, and sometimes even for human consumption (Gambi, 1994; Olive, 1994). Presently, there are some 540 nominal species grouped into 47 genera, although there is little consensus among different authors (Bakken & Wilson, 2005; Khlebovitch, 1996; Pleijel, 2001; Santos *et al.*, 2005).

The prostomium has a shape approaching an inverted T, that usually bears a pair of antennae anteriorly, and a biarticulated pair of palps. Other important features are the number of tentacular cirri; development of parapodia lobes with one or two distinct rami, noto- and neuropodia; proboscis divided into two rings: smooth, ornate with paragnaths and/or papillae; jaws, serrated or smooth; compound noto- and neurochaetae, that can be homogomph, heterogomph, and sesquigomph spinigers and/or falcigers.

A previous study by Rullier & Amoureux (1979) recorded three species of Nereididae in Rocas Atoll namely, *Platynereis magalhensis* Kinberg, 1866, *Nereis trifasciata* Grube, 1878, and *Ceratonereis mirabilis* Kinberg, 1866. A total of 72 polychaetes species were identified in Rocas Atoll by Netto *et al.* (1999), being 45 meiobenthic, however they did not provide any specific information for Nereididae. Recently, Neves & Omena (2003) identified *Nereis trifasciata* Grube, 1878 as one of sixteen polychaetes taxa associated to sponges assemblages. Additionally, Santos & Lana (2001) described a new species to the area, *Ceratocephale rocaensis*, whereas Santos & Lana (2003) recorded *Nereis falcaria* (Willey, 1905) and *Ceratonereis mirabilis* Kinberg, 1866.

RESULTS AND DISCUSSION

Genus *Nereis* Linnaeus, 1758

Diagnosis – Four tentacular cirri; a pair of frontal antennae; proboscis with conical paragnaths on both rings, absent in one or two areas; parapodia with noto- and neuroaciculae supporting noto- and neuropodia, respectively; notopodial ligulae may be present; posterior notopodia with homogomph spinigers replaced by homogomph falcigers; neuropodia with homogomph spinigers, heterogomph spinigers and falcigers.

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Nereis lanai sp.n.
(Fig.1)

Examined material – Rio Grande do Norte, Rocas Atoll: HOLOTYPE: IBUFRJ 609 - "Cemitério" pool, 06/30/2001, C.Tavares, N.Magalhães and S.N.Brandão coll.; paratypes: IBUFRJ 610 - "Cemitério" pool, 06/30/2001, C.Tavares, N.Magalhães and S.N.Brandão coll., 20 specimens; IBUFRJ 611 - 03°51'751" S - 33°49'066 " W, calcareous algae, 10/05/2001, 1 specimen; IBUFRJ 612 - "Barretinha" Chanel, calcareous algae, 10/10/2000, 22 specimens.

Diagnosis – Specimens delicate and small. Proboscis with very delicate conical paragnaths. Notochaetae homogomph spinigers replaced by one homogomph falciger tridentate from chaetiger 8-9, the third tooth is small and can be absent or overlooked in some hooks; notopodial ligulae absent throughout.

Description – The holotype is a complete specimen of 35 chaetigers and 7mm long. Paratypes vary from 10 chaetigers, 1mm long to 37 chaetigers, 5mm long. Specimens whitish in ethanol, without any pigmentation pattern. Prostomium with 2 pairs of small eyes, in trapezoidal arrangement (Fig.1a), on the posterior half. One pair of frontal antennae, subigual in length to palps and palpostyles subconicals. Anterior cirri (=tentacular cirri) short, the postero-dorsal, usually the longest, reaches the second chaetiger (Fig.1a). Paragnaths small, few, poorly chitinized and hardly visualized, usually with the aid of optical microscopy, distributed in Area I.1-2?; Areas II.4-5; Area III.?; Areas IV. 3-4; Area V. 0; areas VI. 2-3?; Areas VII-VIII. 4-5. Peristomium maybe folded on the first pair of eyes (Fig.1a). Notopodia with dorsal cirri longer than notopodial lobe along the body and notopodial ligulae absent throughout (Figs.1b-1f). Neuropodial lobe acicular and neuropodial ligulae with almost half length of neuropodial lobe (Figs.1b-1f). Neuropodial cirri shorter than neuropodial ligulae along the body. Notochaetae homogomph spinigers (Fig.1g) in anterior chaetigers, replaced by homogomph falcigers from chaetigers 8-9 (Figs.1h-j). Neurochaetae supra-acicular homogomph and heterogomph spinigers and subacicular heterogomph spinigers and falcigers (Fig.1l). Pigidial cirri reaching 3-4 chaetigers when distended towards anterior region.

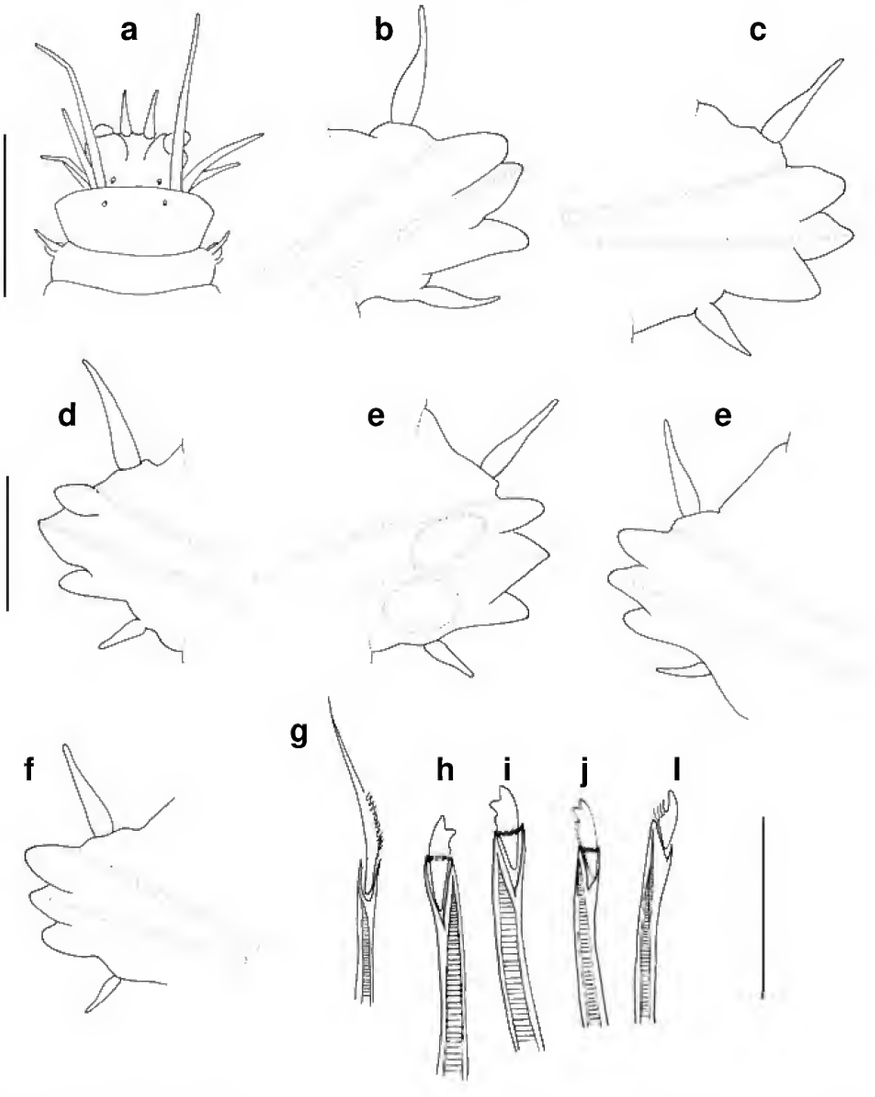

Fig.1- *Nereis lanai* sp.n.: (a) anterior end, dorsal view; (b) parapodium 5, posterior view; (c), parapodium 10, posterior view; (d) parapodium 15, anterior view; (e) parapodium 20, anterior view; (f) parapodium 30, posterior view; (g) notochaetae homogomph spiniger from parapodium 10; (h-j) notochaetae homogomph falciger; (l) neurochaeta heterogomph falciger from parapodium 30. Scale bars: a-f = 100μm; g-l=45μm.

Remarks – Similar species with notopodial homogomph falcigers dentate are *Nereis jacksoni* Kinberg, 1866, *Nereis falcaria* (Willey, 1905), *Nereis kauderni* Fauvel, 1921, and *N. panamensis* Fauchald, 1977, all these species present notopodial ligulae conspicuous in anterior parapodia. *Nereis trifasciata*, recorded by Neves & Omena (2003), has homogomph falcigers slightly serrated, never dentate, and notopodial ligulae present in anterior chaetigers, while in *Nereis lanai* chaetae are distinctly bi-tridentate and notopodial ligulae are absent.

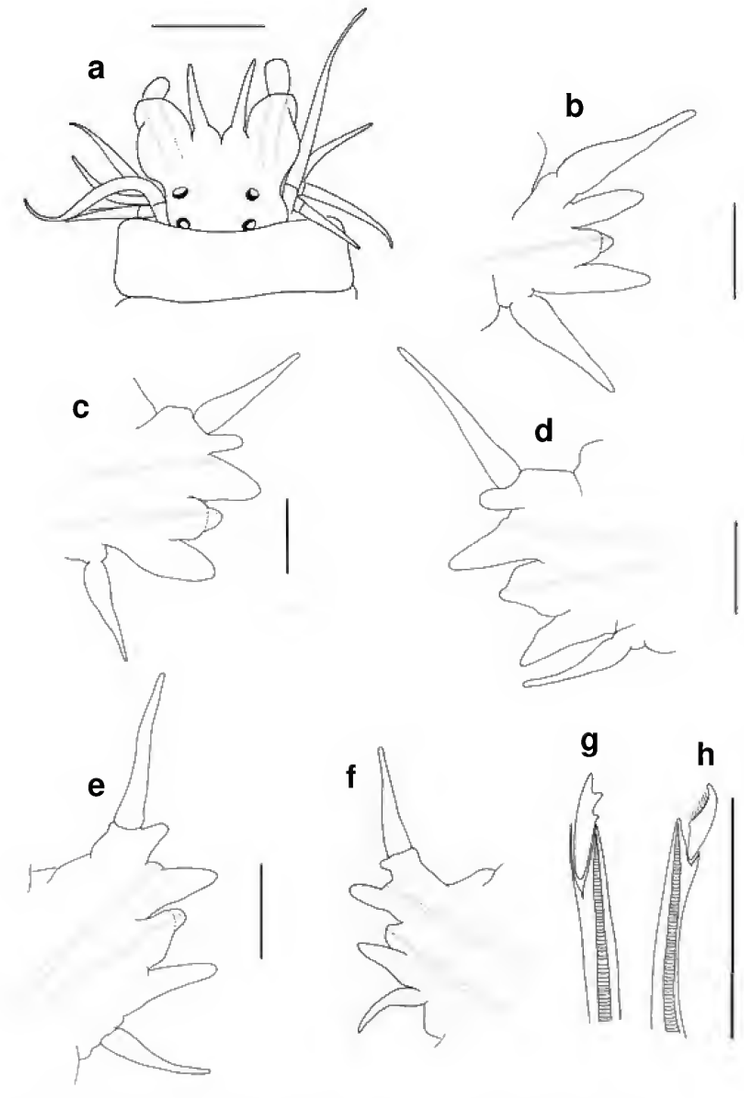

Fig.2- *Nereis panamensis*: (a) anterior end, dorsal, view; (b) parapodium 1, posterior view; (c) parapodium 5, posterior view; (d) parapodium 26, anterior view; (e) parapodium 40, posterior view; (f) parapodium 50, anterior view; (g) notochaeta homogomph falciger from parapodium 40; (h) neurochaeta subacicular from parapodium 40. Scale bars: a=450μm, b-f=100μm, g-h=45μm.

Specimens from Rocas Atoll examined by Santos & Lana (2003) were identified as *N. falcaria* having notopodial ligulae, not so well developed as described by Day (1967), and with dorsal cirri subterminal. Santos & Lana (2003) examined only 2 specimens that were not in good conservation conditions. Their material, figures and description are very similar to *N. lanai* and can be confounded; however the material identified as *N. falcaria* present notopodial ligulae, absent in *N. lanai* and not so well developed as seen in *N. panamensis*.

Habitat – Tide pools with fine sand.

Distribution – Only known up to this date to Rocas Atoll.

Etymology – The species is named after Paulo Lana, for his contribution to the knowledge of Brazilian polychaete fauna.

Nereis panamensis Fauchald, 1977
(Fig.2)

Nereis panamensis Fauchald, 1977:29-31, fig.6d-I; De León-González, 1997:148-152, figs.86a-g; 87a-b.

Examined material – Rio Grande do Norte, Rocas Atoll: IBUFRJ 613 - 03°51'751" S - 33°49'066"W, calcareous algae, 10/05/2001, 1 specimen.

Diagnosis – Prostomium with slightly bifid anterior margin (Fig.2a); Paragnaths absent on areas I and V, other areas II. 3-4 cones in a transverse row; III. 6 cones in transverse row; area IV. 6 cones in a single row; area VI. 5 cones in transverse row; areas VII-VIII. 10 cones in one row; jaws serrated with 8 teeth; notopodial ligulae present in anterior parapodia and reduced towards posterior region (Figs.2b-f); notochaetae homogomph spinigers replaced by one falciger tridentate from chaetiger 13 (Fig.2g). The only specimen collected is complete, with 55 chaetigers and 11mm long.

Remarks – According to Fauchald´s description, the anterior parapodia show a bluntly thick inferior lobe and a distinct superior lobe (=notopodial ligulae) is absent, however the author did not illustrated anterior parapodia, only one posterior without mention to the chaetiger number, that is similar to the posterior parapodia seen

here (Fig.2f). De León-González (1997) identified *N. panamensis* from Mexico, with specimens presenting a distinct notopodial ligulae (=Fauchald´s inferior lobe) in anterior parapodia, that decreases in length toward posterior region where they have a bluntly thick shape as illustrated by Fauchald for posterior parapodia.

Although I have not seen any material-type of *N. panamensis* I suspected that the Fauchald´s specimens have a notopodial ligulae in anterior parapodia as pointed out by De León-González (1997) for material from Mexico. It seems that what Fauchald (1977) named inferior lobe, described as bluntly and thick, and not illustrated for anterior parapodia, is in fact the notopodial ligulae shown by De León-González (1997).

The species has been also recorded in Cuba by San Martin (1993). Nevertheless, considering the parapodial morphology his material should have been referred to *N. panamensis* with doubt. According to San Martin´s drawings, the anterior parapodia present a very small projection in position corresponding to notopodial ligulae, median parapodia with notopodial ligulae conspicuous, and posterior parapodia without ligulae or any small projections (p.7, fig.2). *Nereis falcaria*, similar species recorded to Rocas Atoll, also have notopodial ligulae, however they are less developed, besides dorsal cirri are shorter and displaced subterminally from anterior region.

Distribution – Western Atlantic: Gulf of Mexico, from Panama to Cuba.

Genus *Neanthes* Kinberg, 1866

Diagnosis – Four tentacular cirri; a pair of frontal antennae; proboscis with conical paragnaths on both rings; parapodia with noto and neuroaciculae supporting noto- and neuropodia, respectively; notopodial ligulae present; notopodia with homogomph spinigers throughout; neuropodia with homogomph spinigers, heterogomph spinigers and falcigers.

Neanthes acuminata Ehlers, 1868 (Fig.3)

Neanthes acuminata, De León-González, 1997:81, figs.42a-b.
Nereis (*Neanthes*) *caudata* Delle Chiaje, 1841:96, pl.102, figs.10-15; Fauvel, 1923:347, figs.135a-e; Day, 1967:321; 1968:525, figs.1-5; Rullier & Amoureux, 1979:167.
Neanthes caudata; Imajima, 1972:105, figs.31a-l; Núñez, 1990:444, figs.143a-3; De León-González, 1997:84, figs.44a-d; 45a-b.

Examined material – Rio Grande do Norte, Rocas Atoll: IBUFRJ 614 - "Lama" Bay, 10/05/2000, P.S.Young, P.C.Paiva and A.C.Aguiar coll., 52 specimens; IBUFRJ 615 - same locality, same date, same collectors, 4 specimens. Specimens varied from 20mm long and 27 chaetigers, incomplete, to 4,2mm long and 27 chaetigers, complete.

Diagnosis – Prostomium wider than long with 2 pairs of black well developed eyes on posterior half of prostomium; longest tentacular cirri reaching chaetigers 3-4; proboscis with conical paragnaths: I. 17 oval group; II. 25 curved shape group; IIII. 32; IV. 30 ; V,VI,VII-VIII (Figs.3a-b). fused in a continuous band of conical paragnaths, 3-4 irregular rows; notopodial dorsal and median ligulae present; basal region of notopodial ligulae slightly enlarged on posterior region (Figs.3c-g); notopodial chaetae homogomph spinigers throughout; neuropodial chaetae homogomph spinigers and heterogomph falcigers in supra- and subacicular bundles (Fig.3h).

Remarks – *Neanthes caudata* differs from *Neanthes operta* Simpson, 1856, similar species, by the presence of two notopodial ligulae and more numerous paragnaths in areas I and II. Pettibone (1963) grouped *Neanthes caudata* and *Neanthes arenaceodentata* Moore, 1903 under *Neanthes arenaceodonta* Moore, 1903. Day (1967) and Imajima (1972) considered *N. arenaceodentata* and *N. arenaceodonta* identical to *N. caudata*, described about 60 years before. *N. arenaceodonta* was recorded for Brazilian coast, however the references do not include descriptions and/or illustrations and it is possible that this material could be in fact *Neanthes acuminata* Ehlers, 1868. *Neanthes caudata* and *Neanthes acuminata* are very similar species but according to Weinberg *et al.* (1990) are differente species based on genetic material and reproductive biology. *Neanthes caudata* has 11 pairs of cromosom and would be restricted to Atlantic and *Neanthes caudata* 9 pairs and would be restricted to Pacific. Meanwhile, the specimens from Brazilian coast will be identified as *N. acuminata* until more detailed studies provide more definitive information.

Habitat – Intertidal region.

Distribution – Circumtropical: North Atlantic, Santander and Massachusetts to Florida; Mediterraneo; California Southeast, Mexico; Tasmania and New Zealand.

Genus *Ceratocephale* Malmgren, 1868

Diagnosis – Pair of frontal antennae displaced nearby the basis of palps; proboscis with conical papillae on oral; parapodia with noto and neuroaciculae supporting noto- and neuropodia, respectively; notopodial ligulae absent; dorsal cirri with cirrophore, that might be expanded; double ventral cirri; notopodia with supra aciculars chaetae homogomph spinigers throughout and subacicular sesquigomph spinigers; neuropodia with homogomph and sesquigomph spinigers, sesquigomph falcigers may be present.

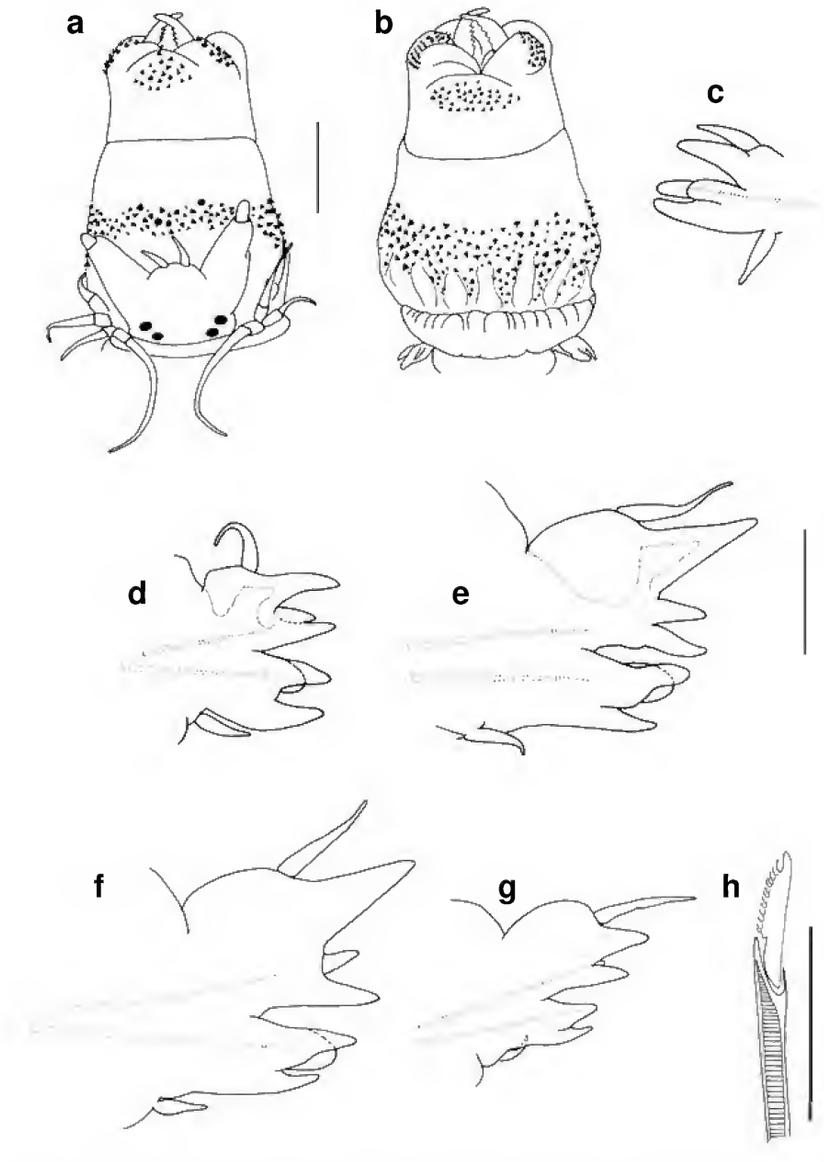

Fig.3- *Neanthes acuminata* ehlers, 1868: (a) anterior end, dorsal view, proboscis everted; (b) anterior end, ventral view, proboscis everted; (c) parapodium 1, anterior view; (d) parapodium 5, posterior view; (e) parapodium 18, posterior view; (f) parapodium 41, posterior view; (g) parapodium 57, posterior view; (h) neurochaeta heterogomph falcigers from parapodium 10. Scale bars: a-b=1.25mm, c-g=450μm, h=45μm.

Ceratocephale rocaensis Santos & Lana, 2001
(Fig.4)

Ceratocephale rocaensis Santos & Lana, 2001, figs.19-25.

Examined material – Rio Grande do Norte, Rocas Atoll: IBUFRJ 616 - 03°51'680" S - 33°49'604" W, 19m, 10/16/2000, P.S.Young, P.C.Paiva and A.C.Aguiar coll., 1 specimen; IBUFRJ 617 - 03°51'747" S - 33°49'497" W, 14m, same date, same collectors, 1 specimen; IBUFRJ 618 - 25 26 - 0 46, 1 specimen. Size varied from 6,8mm long and 31 chaetigers, incomplete to 2,8mm long, 24 chaetigers, incomplete.

Diagnosis – Four tentacular cirri, the longest reaching chaetiger 3; two pairs of black eyes disposed on the posterior half of prostomium (Fig.4a); proboscis with papillae on the oral ring and serrated amber jaws. Notopodial ligulae absent (Figs.4b-f). Double ventral cirri from chaetiger 1 (Fig.4b), where the ventral ramus have about 1/4 length. Cirrophores expanded from chaetigers 10-18 (Fig.4d). Dorsal region smooth throughout. Notochaetae supra-aciculars homogomph spinigers and subaciculars homogomph and sesquigomph spinigers (Figs.4h). Neurochaetae supra-aciculars spinigers homogomph; neurochaetae subaciculars homo- and sesquigomph spinigers (Figs.4h-j) and falcigers (Fig.4g). Falcigers appear only in the three first chaetigers.

Remarks – *Ceratocephale rocaensis* is only known from Rocas Atoll. Within co-generic species, *C. setosa* Hutchings & Reid, 1990, known only from Australia, is the most similar concerning to parapodia morphology and kind of chaetae. They differ on the presence of bifid ventral cirri from chaetiger 3 and neuropodial papillae in *C. setosa*.

Ceratocephale oculata Banse, 1977, reported from several localities in the Atlantic Ocean and similar to *C. rocaensis*, was reported in Northeastern coast of Brazil by Santos & Lana (2001). The main feature distinguishing *C. oculata* from *C. rocaensis* is the absence of falcigers chaetae and presence of ridges on dorsal region in the former.

Habitat – Intertidal pools, calcareous bottom.

Distribution – Only known from Rocas Atoll.

Genus *Perinereis* Kinberg, 1866

Diagnosis – Four tentacular cirri; a pair of frontal antennae; proboscis with conical paragnaths o

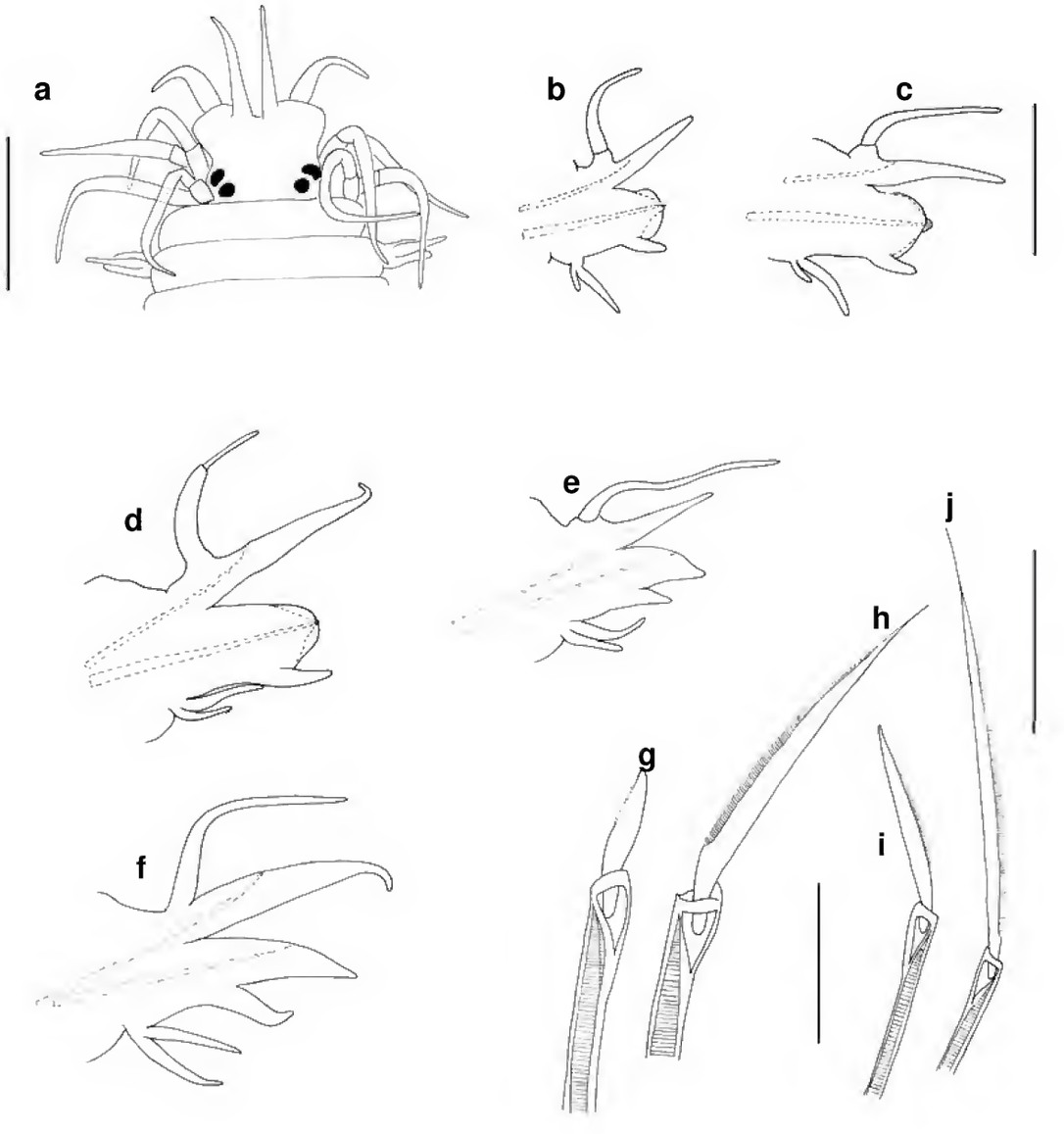

Fig.4- *Ceratocephale rocaensis*: (a) anterior end, dorsal view; (b) parapodium 1, posterior view; (c) parapodium 5, posterior view; (d) parapodium 10, posterior view; (e) parapodium 21, posterior view; (f) parapodium 15, posterior view; (g) neurochaeta sesquigomph falciger, parapodium 3; (h-i) notochaetae sesquigomph spiniger from parapodium 3. Scale bars: a=100μm, b-f=450μm, j=45μm.

maxillary ring and conical and bar-shaped paragnaths on oral ring, parapodia with noto and neuroaciculae supporting noto- and neuropodia, respectively; notopodial ligulae present; notopodia with homogomph spinigers throughout; neuropodia with homogomph spinigers, heterogomph spinigers and falcigers.

Perinereis floridana Ehlers, 1868
(Fig.5)

Perinereis floridana, HARTMAN, 1951:47; DE LEÓN-GONZÁLEZ, 1997:200, figs.117a-e, 118 a-b.

Examined material – Rio Grande do Norte, Rocas Atoll: IBUFRJ 619 "Lama" Bay, 10/17/2000, 1 specimen; IBUFRJ 620 - Near " Farol" pools, under rocks, 12/30/2000, F.Pitombo and R.Barroso Coll., 11 specimens; IBUFRJ 621 - Near Farol, under rocks, P.S.Young, P.C.Paiva and A.C.Aguiar Coll., 3 specimens. Size varied from 74mm long and 105 chaetigers in complete individuals to 35mm long and 74 chaetigers.

Diagnosis – Long postero-dorsal tentacular cirri reaching chaetiger 4-5 (Figs.5a); one pair of cirriform frontal antennae almost as long as palps; small black eyes arranged in rectangle (Fig.5a); proboscis with conical and bar-shaped paragnaths; Area I. 4 in a row; areas II. 7-8 in row; area III. 10 in oval arrangement; areas IV. 10; area V. 3; areas VI. bar-shaped paragnaths; areas VII-VIII. 2 rows of conical paragnaths ±30. Notopodial ligulae subigual to notopodial lobe throughout.

Remarks – Species differs from *P. anderssoni*, previously registered to Rocas Atoll (SANTOS, 1996), by the posterior parapodial ligulae shorter and subigual to notopodial lobe, resembling those of median segments, whereas *Perinereis anderssoni* has posterior notopodial ligulae longer than lobe, the length of tentacular cirri and the small black eyes.

Distribution – Previous records are restricted to Florida, Mexico and Madeira Island (Portugal).

Genus *Ceratonereis* Kinberg, 1866

Diagnosis – Four tentacular cirri; a pair of frontal antennae; proboscis with conical paragnaths on maxillary ring, parapodia with noto and neuroaciculae supporting noto- and neuropodia, respectively; notopodial ligulae present; notopodia with homogomph spinigers and sesquigomph falcigers present on posterior parapodia; neuropodia with homogomph spinigers, heterogomph spinigers and falcigers.

Ceratonereis cf. singularis Treadwell, 1929
(Fig. 6)

Ceratonereis singularis TREADWELL, 1929:1, figs.1-8; DE LEON-GONZÁLEZ, 1997:52,55-57, figs.26-27.

Examined material – Rio Grande do Norte, Rocas Atoll : IBUFRJ 622 "Barretão", 10/19/2000, calcareous algae, 5 specimens; IBUFRJ 623 - 3°57'148" S - 33°48'407" W; calcareous algae, 10/05/2000, 2 specimens; IBUFRJ 624 - 3°51'751" S - 33°49'066" W, 3 specimens; IBUFRJ 625 - 03°51'643 S - 33°47'679W, calcareous algae, P.Young, P.Paiva and P.Aguiar coll., 15 specimens; "Rocas" pool, R8, calcareous algae, 10/07/2000, 1 specimen. Specimens varied from 17mm and 48 chaetigers to 6mm and 16 chaetigers, all incomplete.

Diagnosis – Prostomium orange to brown, body with orange color segmental bands on dorsum. Longest tentacular cirri reaching chaetigers 13-14. Prostomium anteriorly incised with antennae and palps slightly longer than prostomial width (Fig.6a). Antennae with foliaceous aspect and fine tips (Fig.6a). Proboscis with paragnaths absent on area I, II. 16, single group on area III. 10. Presence of notopodial ligulae longer than lobe on anterior chaetigers, reduced in posterior parapodia to small papillae (Figs.6b-e), sometimes difficult to visualize in small specimens. Ventral cirri extending about to tips of neuropodial ligule. Notochaetae sesquigomph spinigers on anterior parapodia, replaced by sesquigomph falcigers slightly concave in posterior parapodia (Fig.6f). Neuropodial falcigers unidentate (Fig.6g).

Remarks – According to PERKINS (1980), six species (*C. japonica*, *C. excisa*, *C. longicirrata*, *C. singularis*, and *C. tentaculata*) are very similar and have been mixed. Characters of importance in distinguishing atokous members of this group are: body dimensions, development of parapodial lobes along the body; shape and possible number of falcigers; features of stiff hairs on the blades of compound falcigers and gross differences and number, arrangement and size of paragnaths. As for *C. singularis*, the diagnostic features are antennae shape, not

seen in any other Ceratonereis, notopodial ligules reduced to papillae in posterior parapodia and blades of notopodial and neuropodial falcigers unidentate.

Morphology of specimens from Rocas Atoll corresponds to *C. singularis* description in a general way, except for the presence of notopodial falcigers slightly bidentate or concave.

Habitat – Found in hard bottoms: coral reefs and carbonate rocks.

Distribution – Western Atlantic: from North Carolina to Brazil (09°S), Pacific: Mexico, Gulf of California.

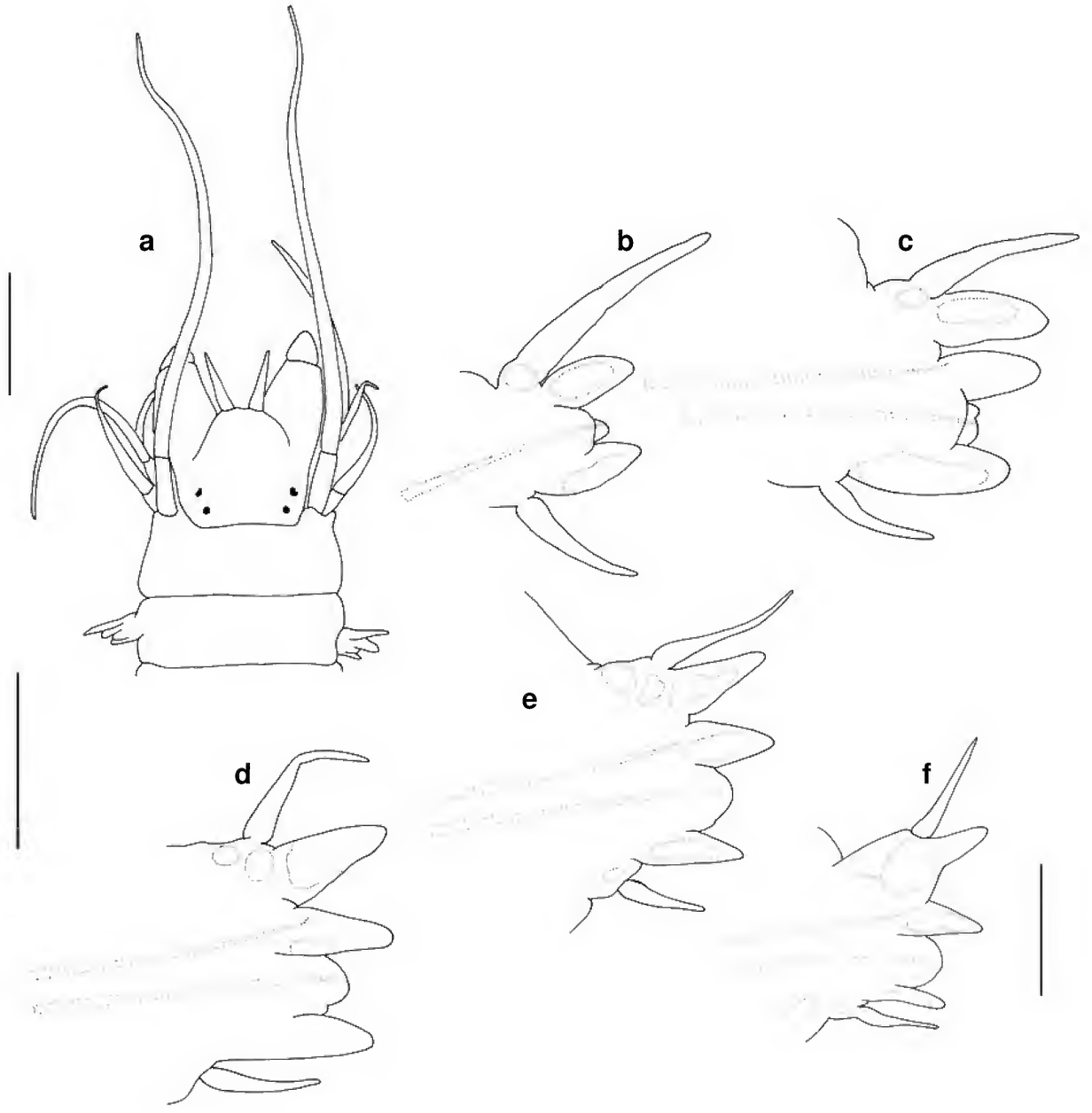

Fig.5- *Perinereis cf. floridana*: (a) anterior end, dorsal view; (b) parapodium 1, posterior view; (c) parapodium 5, posterior view; (d) parapodium 15, posterior view; (e) parapodium 30, posterior view; (f) parapodium 100, posterior view. Scale bars: a=1mm, b-f=450µm.

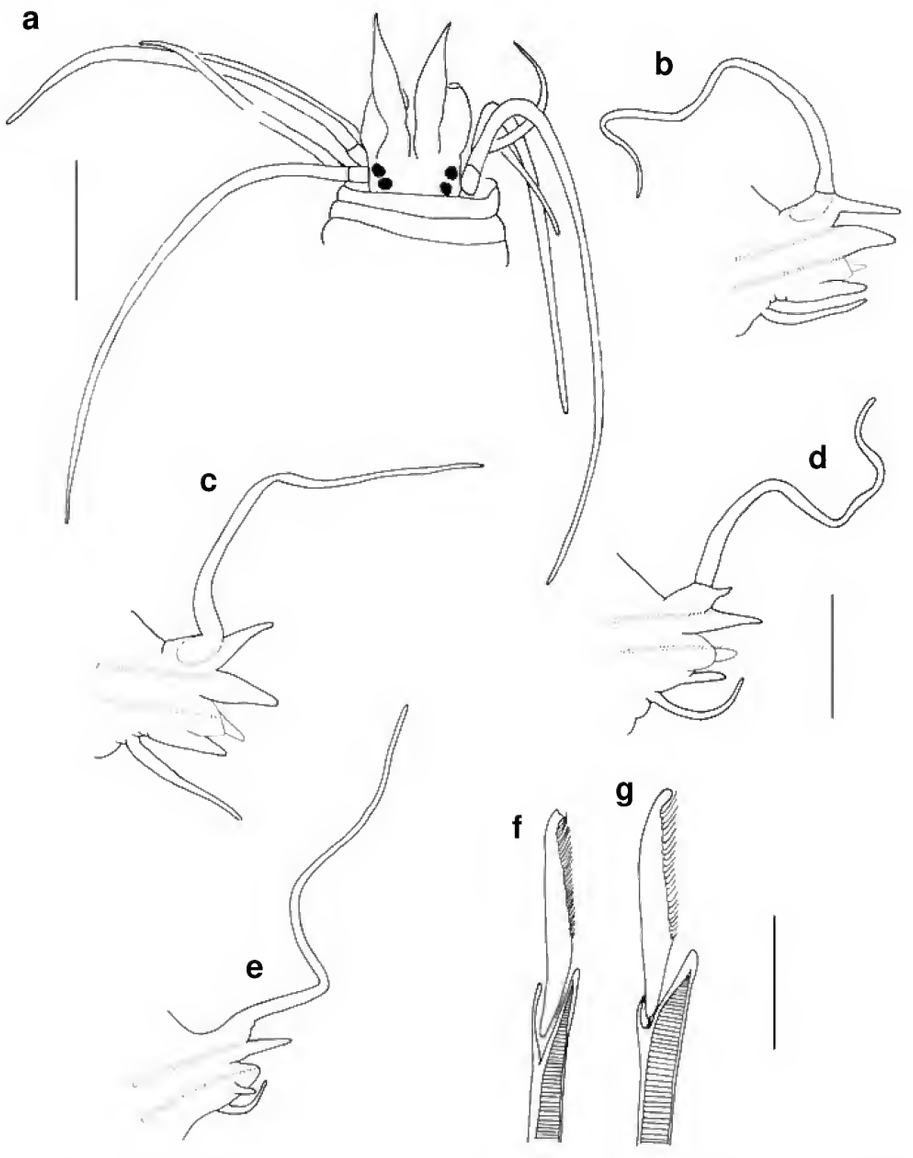

Fig.6- *Ceratonereis singularis*: (a) anterior end; dorsal view; (b) parapodium 5, posterior view; (c) parapodium 10, posterior view; (d) parapodium 15, posterior view; (e) parapodium 25?, posterior view; (f) notochaeta sesquigomph falciger bidentate; (g) subacicular neurochaeta heterogomph falciger. Scale bars: a=1.25mm, b-e=450μm, f-g=45μm.

Ceratonereis longicirrata Perkins, 1980
(Fig.7)

Examined material – Rio Grande do Norte, Rocas Atoll: IBUFRJ 626 - "Rocas" Pool, 12/22/2000, F.Pitombo and R.Barroso Coll., 2 specimens; IBUFRJ 627- "Rocas" pool, 10/26/2000, 1 specimen; IBUFRJ 628 - "Barreta" chanel, calcareous algae, 10/10/2000, 11 specimens, all exemplars without tentacular and dorsal cirri. Specimens size from 35 chaetigers and 7 mm long to 41 chaetigers, 22mm long, all incomplete.

Diagnosis – Colorless in alcohol. Prostomium anteriorly incised with antennae and palps as longer as prostomial width (Fig.7a). Longest anterior cirri reaching chaetiger 13, conspicuous cirrophores; proboscis with paragnaths absent on maxillary ring but was not possible to count them. Presence of notopodial ligulae slightly longer than lobe on anterior chaetigers, absent in posterior parapodia disappearing by chaetiger

29-30 (Figs.7b-d). Ventral cirri extending about to tips of neuropodial ligulae in anterior parapodia and three to four times longer than neuropodial ligulae in posterior parapodia. Notochaetae sesquigomph spinigers in anterior parapodia are replaced by sesquigomph falcigers bidentate in posterior parapodia (Fig.7e). Neuropodial falcigers with distal tips distinctly bidentate (Fig.6g).

Remarks – According to HARTMANN-SCHRÖDER (1985) revision, *C. longicirrata* is the only species with incised prostomium that have notopodial chaetae bidentate and lack notopodial ligulae in posterior parapodia. Besides diagnostic features, material from Rocas Atoll is also similar to *C. longicirrata* on the presence of dorsal cirri longer than segmental width, anterior dorsal cirri in the first chaetiger slightly longer than notopodial ligulae.

Habitat – Usually found in coarse calcareous sand, among rocks and algae.

Distribution – Western Atlantic: Florida, Gulf of Mexico, Bahamas, Puerto Rico and Barbados and Rocas Atoll.

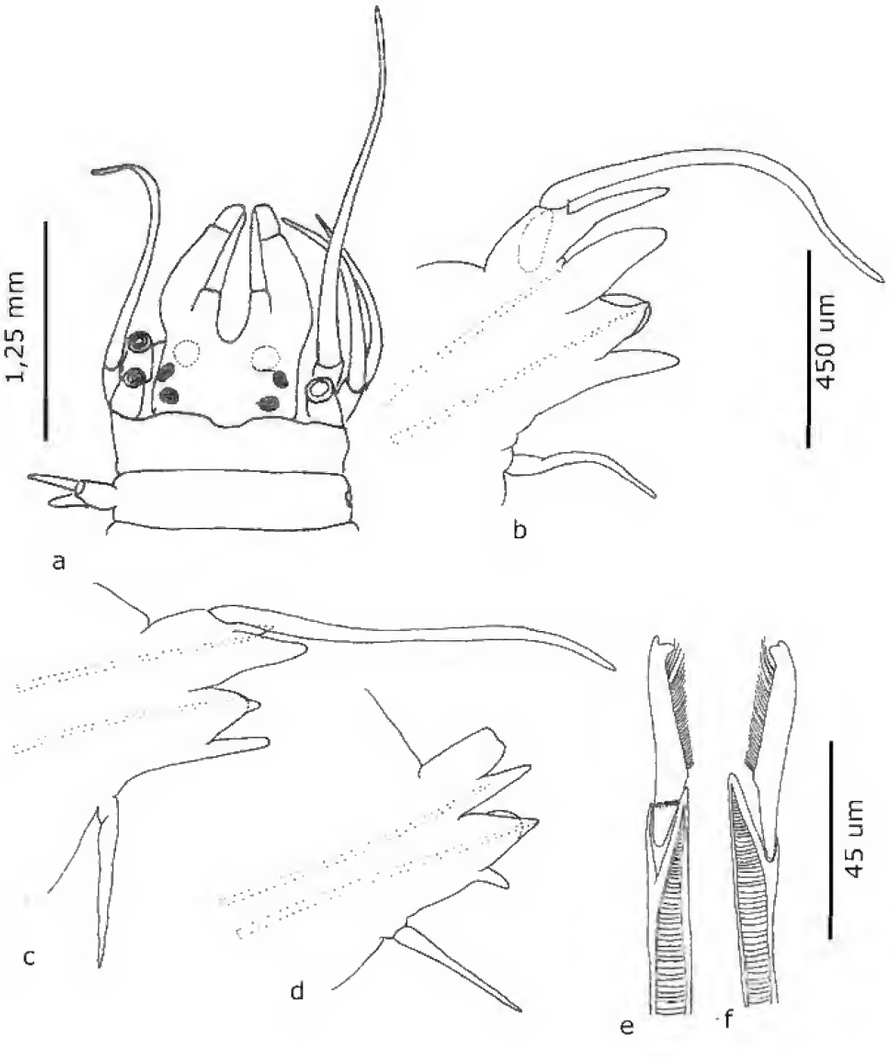

Fig.7- *Ceratonereis longicirrata*: (a) anterior end; dorsal view; (b) parapodium 5, posterior view; (c) parapodium 20, posterior view; (d) parapodium 30, posterior view; (e) notochaeta sesquigomph falciger bi-dentate; (f) subacicular neurochaeta heterogomph falciger bidentate.

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