

MACROCRUSTACEANS FROM PONTA DO CABO BRANCO, JOÃO PESSOA, PARAÍBA, BRAZIL, THE EASTERNMOST POINT OF SOUTH AMERICA

Pablo Riul¹

pabloriul@yahoo.com.br

Fabiolla Maria de Alencar Rodrigues¹

Eraldo Sátiro Xavier-Filho

Robson Guimarães dos Santos

Rosa Maria da Veiga Leonel

Martin Lindsey Christoffersen

mlchrist@dse.ufpb.br

Departamento de Sistemática e Ecologia, CCEN, Universidade Federal da Paraíba, Cidade Universitária, 58059-900, João Pessoa, Paraíba, Brasil.

RESUMO

Macro crustáceos da Ponta do Cabo Branco, João Pessoa, Paraíba, Brasil, o extremo oriental da América do Sul. A Ponta do Cabo Branco apresenta, na sua região de entre-marés e na parte rasa do sublitoral, uma grande quantidade de rochas arenítico-ferruginosas, formando diversos habitats para crustáceos escavadores e habitantes de fendas. Um inventário da fauna e da flora nesta área justifica-se por duas razões principais: (i) pelo impacto decorrente da urbanização (poluição, pisoteio de banhistas, presença de curiosos e colecionadores amadores) sobre a estrutura das comunidades e (ii) pelo fato de ser uma área estratégica e prioritária para a conservação do ambiente marinho. O objetivo deste trabalho é fornecer uma lista das espécies de crustáceos coletados na Ponta do Cabo Branco e depositados na Coleção de Invertebrados Marinhos Paulo Young. Um total de setenta e cinco espécies agrupadas em cinqüenta e um gêneros e vinte e seis famílias foi encontrado, incluindo nove espécies sem referência prévia para o Estado da Paraíba, nordeste do Brasil. Embora preliminar, esta lista indica que a Ponta do Cabo Branco apresenta uma biodiversidade singular, requerendo estudos ecológicos quantitativos de seus organismos marinhos e uma avaliação adequada de sua biodiversidade.

Palavras-chave: Crustáceos, biodiversidade, lista de espécies, Cabo Branco, Paraíba.

ABSTRACT

Macrocrustaceans from Ponta do Cabo Branco, João Pessoa, Paraíba, Brazil, the easternmost point of South America. The Ponta do Cabo Branco has abundant ferruginous arenitic rocks in the intertidal and shallow subtidal regions, forming diversified habitats for crevice-dwelling crustaceans. An inventory

¹Programa de Pós Graduação em Ciências Biológicas, UFPB.

Send correspondence to Pablo Riul.

of the fauna and flora of the area is justified by two main reasons: (i) The impact of urbanization, (pollution, treading of bathers, and curious amateur collectors), who may provoke alterations in the community structure and; (ii) Because this area is considered a strategic area deserving priority for marine conservation. The goal of this paper is to provide a list the crustaceans deposited in the Coleção de Invertebrados Paulo Young. Seventy-five species, grouped into fifty-one genera and twenty-six families, were found. Nine species with no previous references for the State of Paraíba, northeastern Brazil, are presented here. Although preliminary, this first list of crustaceans indicates that the Ponta do Cabo Branco has a singular biodiversity, requiring quantitative studies of the ecology of its marine organisms and an adequate evaluation its biodiversity.

Key Words: Crustacea, biodiversity, species list, Cabo Branco, Paraíba.

INTRODUCTION

The Ponta do Cabo Branco (07° 08' 50" S; 34° 47' 51" W) is located on the south portion of the Cabo Branco Beach in João Pessoa, Paraíba, Brazil. In this place, as in other beaches of Northeastern Brazil, the limit between costal and subtidal regions is a live cliff (BARRETO *et al.*, 2004), belonging to the Barreiras Group, a Brazilian Tertiary Formation (SUGUIO and NOGUEIRA, 1999). Abundant ferruginous arenitic rocks, deposited following the gradual erosion of the Barreiras Formation in geological time (MABESONE and COUTINHO, 1970), constitute the intertidal and shallow subtidal region at this most eastern coastal formation in South America.

This depositional terrace extends several hundred meters into the sea, falling short of the arenitic sandstone fringing reefs running parallel to the coastline, a second important biological substrate so typical of the northeastern coast of Brazil. The arrangement of these small to medium-sized rocks, forming piles several meters high in some spots, is responsible for a particularly heterogeneous hydrodynamism. Together with other important factors, such as substrate composition and heterogeneity, and the overall availability of organic matter, these conditions are known as being determinant of the community structure (NUCCI *et al.*, 2001). This heterogeneous collection of local conditions form an array of patches capable of sustaining a rich biodiversity of marine organisms, possibly unrivalled by other similar, but usually less extensive and less diverse habitats.

The need for an inventory of the fauna and flora of the Ponta do Cabo Branco is justified by the rapid impact of urbanization of the city of João Pessoa and by the fragility of the habitats, exposed and affected by the treading of bathers and curious amateur collectors, who easily overturn the stones in search of bait, food, or ornamental organisms. This continuous trampling provokes alterations in the structure and composition of the local communities (ECKRICH and HOLMQUIST, 2000; MILAZZO *et al.*, 2002). This area is considered a strategic area deserving priority for marine conservation (MMA,

2002). Finally, we stress that the main information on the carcinological biodiversity of the State of Paraíba is based on the fauna from the estuaries of the Paraíba do Norte River (COELHO, 1971; KOENING, 1971; RAMOS, 1971). For strictly marine environments, BARBOSA and LEONEL (2003) and MELO and VELOSO (2005) are the only published papers focusing on the brachyuran crabs, the former, on forms associated with intertidal algae, and the later, on the material from "PROJETO ALGAS-PB", collected systematically more than 20 years ago along the entire continental shelf of our state.

The aim of this paper is to provide a list of all species of Crustacea collected at Ponta do Cabo Branco, and deposited in the Coleção de Invertebrados Marinhos Paulo Young, Departamento de Sistemática e Ecologia, Universidade Federal da Paraíba (CIMPY-DSE-UFPB). We thus make this information available for the first time, allowing local studies on biodiversity and future work on ecology and conservation.

MATERIAL AND METHODS

A large portion of the crustacean collection at CIMPY-DSE-UFPB was identified by the following specialists: Melo, G.A.S. (Brachyura); Christoffersen,

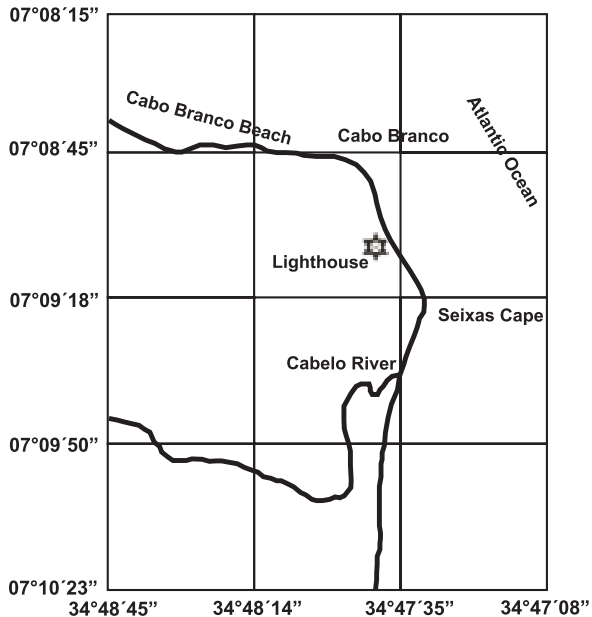


Figure 1 - Map of the study area.

M.L. (Caridea); Young, P. (Cirripedia); Werding, B. (Porcellanidae); Rodrigues, S.A. (Callianassidea). Other samples were identified by students working on the organization of the collections, either in comparison with the samples identified by the above mentioned specialists, or as part of their undergraduate and graduate work. The authors identified the remaining samples. The taxonomic arrangement follows MARTIN and DAVIS (2001). Figure 1 shows the geographical localization of the study area.

RESULTS

The seventy-five species of crustaceans referred to Ponta do Cabo Branco are arranged into fifty-one genera and twenty-six families. The list of these species follows below. Species without prior references for the Paraíba State are marked with an asterisk (*). For each species, the catalogue number in the cimpy collection, and the number of specimens, are marked in bold and normal type, respectively.

Class Maxillopoda Dahl, 1956
Order Pedunculata Lamarck, 1818
Family Lepadidae Darwin, 1852

Lepas anserifera Linnaeus, 1767 - **174** 11 spec.

Order Sessilia Lamarck, 1818
Family Balanidae Leach, 1817

Megabalanus tintinnabulum (Linnaeus, 1758) - **129** 1 spec., **5041** 2 spec., **2087** 1 spec.

Class Malacostraca Latreille, 1802
Order Stomatopoda Latreille, 1817
Family Gonodactylidae Giesbrecht, 1910

Gonodactylus bredini Manning, 1969 - **2359** 1 spec., **5025** 3 spec.

Family Pseudosquillidae Manning, 1977

Pseudosquilla ciliata (Fabricius, 1787) - **155** 1 spec.

P. oculata (Brullé, 1837) - **152** 1 spec., **153** 1 spec., **2361** 1 spec., **3515** 2 spec.

Family Nannosquillidae Manning, 1980

Acanthosquilla digueti (Coutière, 1905) - **4229** 2 spec.

Order Isopoda Latreille, 1817
Infraorder Ligiamorpha Vandel, 1943
Family Ligiidae Leach, 1814

* *Ligia exotica* Roux, 1828 - **4949** 1 spec.

Order Decapoda Latreille, 1802
Infraorder Caridea Dana, 1852
Family Palaemonidae Rafinesque, 1815

Brachicarpus biunguiculatus (Lucas, 1849) - **5022** 1 spec.

Leander paulensis Ortmann, 1897 - **4773** 4 spec.

Palaemon (Palaeander) northropi (Rankin, 1898) - **4808** 13 spec., **4498** 14 spec., **4508** 4 spec., **4807** 14 spec., **4504** 2 spec., **4484** 1 spec., **4473** 1 spec., **4500** 2 spec., **4502** 1 spec., **4511** 1 spec., **4510** 1 spec., **4505** 3 spec., **4503** 2 spec., **4483** 1 spec., **4472** 1 spec., **4485** 3 spec., **4499** 1 spec.

Periclemenes americanus (Kingsley, 1878) - **4546** 2 spec., **4540** 1 spec.

Typton carneus Holthuis, 1951 - **728** 1 spec.

Family Alpheidae Rafinesque, 1815

Alpheus armillatus H. Milne Edwards, 1837 - **5031** 2 spec., **5035** 2 spec., **5037** 19 spec.

A. bouvieri A. Milne Edwards, 1878 - **857** 2 spec., **858** 1 spec.

A. formosus Gibbes, 1850 - **5036** 1 spec.

A. normanni Kingsley, 1878 - **2164** 2 spec.

* *A. nuttingi* (Schmitt, 1924) - **710** 3 spec., **715** 9 spec., **2170** 2 spec., **4792** 1 spec.

* *A. thomasi* Hendrix & Gore, 1973 - **7952** spec., **994** 2 spec., **5040** 1 spec.

* *Leptalpheus forceps* Williams, 1965 - **2178** 1 spec.

* *Synalpheus apioceros* Coutière, 1909 - **839** 1 spec., **5029** 2 spec.

S. brevicarpus (Herrick, 1891) - **2200** 1 spec.

S. brooksi Coutière, 1909 - **2202** 87 spec.

S. fritzmuelleri Coutière, 1909 - **5026** 2 spec., **5027** 3 spec., **5034** 3 spec., **5038** 23 spec., **5039** 1 spec.

S. tenuispina Coutière, 1909 - **2163** 1 spec.

S. scaphoceris Coutière, 1910 - **792** 1 spec., **793** 1 spec.

Family Hippolytidae Dana, 1852

* *Hippolyte curacaoensis* Schmitt, 1924 - **758** 4 spec., **761** 12 spec., **1048** 1 spec., **2158** 1 spec.

Latreutes parvulus (Stimpson, 1866) - **764** 3 spec., **765** 1 spec.

* *Lysmata intermedia* (Kingsley, 1878) - **105** 5 spec., **106** 2 spec.

L. moorei (Rathbun, 1902) - **842** 1 spec.

* *L. wurdemanni* (Gibbes, 1850): **769** 3 spec.

Thor manningi Chace, 1972 - **5023** 1 spec.

Family Processidae Ortmann, 1896

* *Ambidexter symmetricus* Manning & Chace, 1971 - **2153** 1 spec., **5043** 1 spec.

Processa fimbriata Manning & Chace, 1971 - **2204** 1 spec.

Infraorder Thalassinidea Latreille, 1831

Family Callianassidae Dana, 1852

Lepidophthalmus siriboia Felder & Rodrigues, 1993 - **4216** 1 spec.

Family Upogebiidae Borradaile, 1903

Upogebia omissa Gomes Corrêa, 1968 - **2250** 1 spec., **2252** 6 spec., **2253** 18 spec., **2254** 12 spec., **2255** 6 spec., **2256** 12 spec., **2258** 5 spec., **2259** 12 spec., **2260** 27 spec., **2261** 8 spec., **2263** 13 spec., **2264** 21 spec., **2715** 9 spec., **4950** 1 spec., **5021** 2 spec.

U. noronhensis Fausto-Filho, 1969 - **2267** 2 spec., **2269** 5 spec., **2270** 18 spec., **2271** 9 spec., **2272** 27 spec., **2273** 24 spec., **2275** 20 spec., **2276** 22 spec., **2277** 20 spec., **2278** 5 spec., **2274** 1 spec., **2279** 2 spec., **2280** 11 spec., **2281** 23 spec., **5004** 1 spec., **5059** 2 spec.

Infraorder Palinura Latreille, 1802

Family Palinuridae Latreille, 1802

Panulirus argus (Latreille, 1804) - **4984** 1 spec.

P. echinatus Smith, 1869 - **4986** 1 spec.

P. laevicauda (Latreille, 1817) - **4982** 7 spec., **4983** 7 spec.

Family Scyllaridae Latreille, 1825

Parribacus antarcticus (Lund, 1793) - **4989** 1 spec., **4990** 1 spec.

Infraorder Anomura MacLeay, 1838

Family Porcellanidae Haworth, 1825

Megalobrachium roseum (Rathbun, 1900) - **2298** 1 spec.

Pachycheles greeleyi (Rathbun, 1900) - **2297** 5 spec.

Petrolisthes armatus (Gibbes, 1850) - **4750** 12 spec., **4944** 1 spec., **4945** 2 spec.

P. galathinus (Bosc, 1801-1802) - **2290** 86 spec., **4816** 1 spec., **5045** 8 spec.

Family Hippidae Latreille, 1817

Emerita portoricensis Schmitt, 1935 - **5274** 1 spec.

Family Diogenidae Ortmann, 1892

Calcinus tibicen (Herbst, 1791) - **458** 1 spec., **460** 4 spec., **461** 1 spec., **462** 1 spec., **463** 1 spec., **2302** 3 spec., **2303** 1 spec., **2304** 1 spec., **2305** 3 spec., **5025** 5 spec.

Clibanarius antillensis Stimpson, 1859 - **446** 1 spec., **447** 7 spec., **448** 10 spec., **2299** 2 spec., **2300** 1 spec., **2301** 8 spec., **4946** 3 spec.

C. sclopetarius (Herbst, 1796) - **4947** 1 spec., **4948** 3 spec., **5042** 4 spec.

C. cubensis (Saussure, 1858) - **444** 1 spec.

Dardanus venosus H. Milne Edwards, 1848 - **456** 2 spec., **5028** 1 spec.

Family Paguridae Latreille, 1803

Pagurus criniticornis (Dana, 1852) - **2750** 3 spec.

Infraorder Brachyura Latreille, 1802

Family Dromiidae De Haan, 1833

Moreiradromia antillensis (Stimpson, 1858) - **5062** 1 spec., **5063** 1 spec.

Family Calappidae De Haan, 1833

Calappa ocellata Holthuis, 1958 - **5061** 1 spec.

Family Epialtidae MacLeay, 1838

Acanthonyx dissimulatus Coelho, 1991-1993 – **5287** 1 spec.

Epialtus brasiliensis Dana, 1852 - **5288 85** spec.

Family Mithracidae Balss, 1929

Microphrys bicornutus (Latreille, 1825) - **1750** 1 spec., **1841** 1 spec.

Mithraculus forceps (A. Milne Edwards, 1875) - **2615** 1 spec.

Mithrax hemphilli Rathbun, 1892 - **2614** 2 spec.

M. hispidus (Herbst, 1790) - **5060** 1 spec.

Family Portunidae Rafinesque, 1815

Callinectes bocourti A. Milne Edwards, 1879 - **5279** 1 spec.

C. larvatus Ordway, 1863 - **5275** 1 spec.

C. sapidus Rathbun, 1895 - **5280** 1 spec., **5281** 1 spec.

Cronius ruber (Lamarck, 1818) - **5276** 1 spec.

Family Xanthidae MacLeay, 1838

Carpilius corallinus (Herbst, 1783) - **5007** 1 spec., **5008** 1 spec.

Eriphia gonagra (Fabricius, 1781) - **2340** 1 spec., **4926** 1 spec., **4927** 2 spec., **4928** 1 spec., **4929** 3 spec., **4994** 3 spec., **4995** 1 spec.

Eurypanopeus abbreviatus (Stimpson, 1860) - **2310** 12 spec., **2311** 7 spec., **2312** 17 spec., **2313** 4 spec., **2314** 4 spec., **2315** 23 spec., **2316** 4 spec., **2317** 14 spec., **2318** 12 spec., **2319** 6 spec., **2320** 3 spec., **2321** 3 spec., **2322** 2 spec., **2323** 6 spec., **2324** 19 spec., **4993** 1 spec.

Garthiope spinipes (A. Milne Edwards, 1880) - **2385** 4 spec.

Menippe nodifrons Stimpson, 1859 - **2338** 1 spec., **2339** 1 spec., **2387** 1 spec., **2388** 1 spec., **2389** 1 spec., **2390** 1 spec., **2391** 2 spec., **2392** 3

spec., **2393** 8 spec., **2790** 2 spec., **4930** 1 spec., **4931** 1 spec., **4996** 15 spec., **4997** 2 spec., **4998** 1 spec., **4999** 1 spec., **5000** 1 spec., **5001** 2 spec., **5003** 1 spec.

P. americanus Sussure, 1857 - **4932** 2 spec.

Panopeus harttii Smith, 1869 - **2325** 4 spec., **2326** 4 spec., **2328** 17 spec., **2329** 21 spec., **2331** 2 spec., **2332** 4 spec., **2333** 5 spec., **2334** 1 spec., **2336** 12 spec., **5005** 2 spec.

P. occidentalis Sussure, 1857 - **4933** 2 spec., **4934** 4 spec., **4935** 1 spec., **4936** 3 spec.

Xanthodius denticulatus (White, 1847) - **2342** 1 spec.

Family Ocypodidae Rafinesque, 1815

Ocypode quadrata (Fabricius, 1787) - **5020** 1 spec.

Family Grapsidae MacLeay, 1838

Pachygrapsus transversus (Gibbes, 1850) - **2345** 1 spec., **2347** 4 spec., **2349** 1 spec., **2354** 1 spec., **4937** 2 spec., **4938** 1 spec., **4939** 1 spec., **4940** 8 spec., **4941** 4 spec., **4942** 1 spec., **4943** 2 spec., **5013** 6 spec., **5014** 1 spec., **5015** 2 spec., **5017** 4 spec.

Plagusia depressa (Fabricius, 1775) - **5009** 1 spec., **5010** 1 spec., **5011** 1 spec., **5012** 1 spec.

COMMENTS

Nowadays, the taxonomic identification of biological organisms to species level has been increasingly neglected in both ecological and conservation papers. This is certainly the consequence of the general trend to loose taxonomic expertise in biology and to the growing costs and required time-effort needed in the taxonomic enterprise (GIANGRANDE, 2003). Supra-specific identification is considered sufficient for the assessment of environmental changes (WARWICK, 1988). In these studies, higher taxonomic levels such as families are considered to be just as satisfactory as species-level identifications for some groups of organisms (OLSGARD and SOMERFIELD, 2000). Notwithstanding, the role of species taxonomy for conservation biology should not be entirely ignored. In our opinion, the increasing resources available on the World Wide Web as species lists, descriptions, and bibliography will gradually make alpha taxonomy easier than at present.

This list includes mainly macrocrustaceans living in rocky habitats

in the intertidal and subtidal region. Although seventy-five species were presented here, this list does not represent the local diversity. A conspicuous set of habitats, such as non-consolidated substrata, phytal, intertidal pools and a large part of the subtidal zone, have not yet been sufficiently sampled. Consequently, we expect the present list to be considerably increased in the future.

Even though preliminary, this list of crustaceans already indicates that the Ponta do Cabo Branco has a singular biodiversity, requiring quantitative studies of the ecology of its marine organisms and adequate methodologies for evaluating its true species biodiversity.

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REFERENCES

- BARBOSA, J.H.A. and LEONEL, R.M.V. 2003 - Sobre a comunidade de crustáceos em algas de entre-marés: uma ênfase aos Brachyura. *Cad. Camill.* 4:19-29.
- BARRETO, A.M.F.; SUGUIO, K.; BEZERRA, F.H.R.; TATUMI, S.H.; YEE, M. and GUANNINI, P.C.F. 2004 - Geologia e Geomorfologia do Quaternário costeiro do Rio Grande do Norte. *Geol. USP Sér. Cient.* 4(2): 1-12.
- COELHO, P.A. 1971 - Os crustáceos decápodos reptantes do estuário do Rio Paraíba do Norte. *Arq. Mus. Nac. Rio Jan.* 54: 283-284.
- ECKRICH, C.E. and HOLMQUIST J.G. 2000 - Trampling in a seagrass assemblage: direct effects, response of associated fauna, and the role of substrate characteristics. *Mar. Ecol. Prog. Ser.* 201: 199-209.
- GIANGRANDE, A. 2003 - Biodiversity, conservation and the "taxonomic impediment". *Aquat. Cons. Mar. Fresh. Ecos.* 13: 451-459.
- KOENING, M.L. 1971 - Os crustáceos isópodos do estuário do Rio Paraíba do Norte. *Arq. Mus. Nac. Rio Jan.* 54: 51-53.
- MABESOONE, J.M. and COUTINHO, P.N. 1970 - Littoral and shallow marine geology of northern and northeastern Brazil. *Trab. Oceanogr. Univ. Fed. Pern.* 12: 1-214.
- MARTIN, J.W. and DAVIS, G.E. 2001 - An updated classification of the recent Crustacea. *Nat. Hist. Mus. Los Angeles County, Sci. Ser.*, 39: 1-132 p.
- MELO, G.A.S. DE and VELOSO, V.G. 2005 - The Brachyura (Crustacea, Decapoda) of the coast of the State of Paraíba Brazil, collected by

- Project Algas. *Rev. Bras. Zool.* 22(3): 796-805.
- MILAZZO, M.; CHEMELLO, R.; BADALAMENTI, F.; CAMARDA, R. and RIGGIO, S. 2002 - The impact of human recreational activities in marine protected areas: what lessons should be learnt in the Mediterranean Sea? *Mar. Ecol.* 23:s1-s280.
- MMA. 2002 - **Avaliação e identificação de áreas e ações prioritárias para a conservação, utilização sustentável e repartição dos benefícios da biodiversidade nos biomas brasileiros.** Ministério do Meio Ambiente/SBF, Brasília, 404p.
- NUCCI, P.R.; TURRA, A. and MORGADO, E.H. 2001 - Diversity and distribution of crustaceans from 13 sheltered sandy beaches along São Sebastião Channel, south-eastern Brazil. *J. Mar. Biol. Ass. UK.* 81: 475-484.
- OLSGARD, F. and SOMERFIELD, P.J. 2000 - Surrogates in marine benthic investigations – which taxonomic unit to target? *J. Aquat. Ecos. Str. Rec.* 7: 25-42.
- RAMOS, M.A. 1971 - Os crustáceos decápodos do estuário do Rio Paraíba do Norte. *Arq. Mus. Nac. Rio Jan.* 54: 43-44.
- SUGUIO K. and NOGUEIRA A.C.R. 1999 - Revisão crítica dos conhecimentos geológicos sobre a Formação (ou Grupo?) Barreiras do Neógeno e o seu possível significado como testemunho de alguns eventos geológicos mundiais. *Rev. Bras. Geocienc.* 18: 461-479.
- WARWICK, R.M. 1988 - The level of taxonomic discrimination required to detect pollution effects on marine benthic communities. *Mar. Poll. Bull.* 19: 259-268.