



*BATHYNOMUS* A. MILNE EDWARDS, 1879 (ISOPODA, CIROLANIDAE)  
FROM THE BRAZILIAN COAST, WITH DESCRIPTION OF A NEW SPECIES <sup>1</sup>

(With 14 figures)

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**ABSTRACT:** In this study two species of *Bathynomus* are redescribed from Brazil: *B. giganteus* and *B. miyarei*. Furthermore, *Bathynomus obtusus* new species is described, which is characterized by having coxal plates 4-7 with setae on posterior margin, coxal plate 7 with posterior margin straight; pleotelson with posterior margin with 7 teeth; pereopod 1-7 with setae on dorsal margins of uropod basis with inner and distal margins of endopod forming and angle of 115°. *Bathynomus giganteus* is recorded from the Western Atlantic from Florida Strait south to northern of Rio de Janeiro, Brazil; *B. miyarei* from Ceará to Rio Grande do Sul; and *B. obtusus* sp.nov. from Bahia and Espírito Santo states.

**Key words:** Crustacea, Isopoda, Taxonomy, Deep Sea, Brazil, *Bathynomus*.

**RESUMO:** *Bathynomus* (Isopoda, Cirolanidae) da costa do Brasil, incluindo a descrição de uma nova espécie. O presente estudo redescreve duas espécies registradas para o Brasil: *B. giganteus* e *B. miyarei*. Além disso, *B. obtusus* espécie nova é descrita e é caracterizada por possuir placas coxais 4 a 7 com cerdas na margem posterior, placa coxal 7 com margem posterior reta; pleotelson com margem posterior com 7 dentes; pereópodos 1 a 7 com cerdas na margem dorsal das bases e urópodo com margens interna e distal do endópodo formando ângulo de 115°. *Bathynomus giganteus* é registrada para o Atlântico ocidental desde o Estreito da Flórida ao norte do Rio de Janeiro, Brasil; *B. miyarei* do Ceará ao Rio Grande do Sul; e *Bathynomus obtusus* sp.nov. da Bahia ao Espírito Santo.

**Palavras-chave:** Crustacea, Isopoda, Taxonomia, Mar Profundo, Brasil, *Bathynomus*.

## INTRODUCTION

Nine species of *Bathynomus* are known: *B. giganteus* A. Milne Edwards, 1879, occurring in all oceans (A. MILNE EDWARDS, 1879; A. MILNE EDWARDS & BOUVIER, 1902; HANSEN 1903; RICHARDSON, 1905; LLOYD, 1908; SHIH, 1972; HOLTHUIS & MIKULKA, 1972; COELHO & REGIS, 1987; PIRES-VANIN, 1998); *B. doederleini* Ortmann, 1894; *B. affinis* Richardson, 1910, and *B. propinquus* Richardson, 1910, from Philippines (ORTMANN, 1894; A. MILNE EDWARDS & BOUVIER, 1902; RICHARDSON, 1910; HALE, 1940; SHIH, 1972; HOLTHUIS & MIKULKA, 1972); *B. decemspinus* Shih, 1972, from Taiwan (SHIH, 1972); *B. miyarei* Lemos de Castro, 1978, from Brazil (LEMONS DE CASTRO, 1978; COELHO & REGIS, 1987; PIRES-VANIN, 1998); *B. immanis* Griffin, 1975; *B. kapala* Bruce, 1986, and *B. pelor* Bruce, 1986, from Australia (GRIFFIN, 1975; BRUCE, 1986). Therefore, from

Brazil only two species are recorded: *B. giganteus* and *B. miyarei*, the former occurring in Brazil from the Amazonas estuary south to Rio de Janeiro and the late from Ceará to Rio Grande do Sul.

During the trawlings executed during the Revizee Program (Section Bahia I) several specimens of *Bathynomus* were collected between 19°S to 21°S, in depths varying from 518 to 910m, and during the Bahia II Section they were collected between 13°S and 21°S and from 233 to 2271m. During, another cruise using traps, a large number of specimens of *Bathynomus* were collected (>1500), between 15°S and 38°S in depths from 252 to 840m. This study includes the redescription of *B. giganteus* and *B. miyarei* including new records off Brazilian coast, while, a new species is described. All the specimens are deposited in the Crustacean Collection of the Museu Nacional, Rio de Janeiro (MNRJ).

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## TAXONOMIC PART

Genus *Bathynomus* A.Milne Edwards, 1879

Diagnosis – Frontal lamina triangular; eyes present, but not conspicuous dorsally; pleonites 3-4 with postero-lateral margins projected to posterior portion of pleon; posterior margin of pleotelson dentate; antenna 1 with small exopod on distal margin of peduncle article 3; peduncle of antenna 2 with articles 3-4 subequal in length, 5 longer; endite of maxilliped with 4-7 coupling hooks; ischium and merus of pereopods 1-3 with projected dorsal margin; pleopods 2-5 with marginal setae and branchiae on both sides of endopods peduncle, except first one where branchiae are restricted to dorsal surface; appendix masculina situated medially between peduncles of pleopods 2.

*Bathynomus giganteus* A.Milne Edwards, 1879  
(Figs.1-5)

*Bathynomus giganteus* A. Milne Edwards, 1879; A. MILNE EDWARDS & BOUVIER, 1902:133, pls.1-2, fig.1; pl.3, figs.1-2; pl.4, figs.1-11; pl.5, figs.1-13; pl.6, figs.1-8; pl.7, figs.1-7; pl.8, figs.1-7; ORTMANN, 1894:191-193; HANSEN, 1903:19, pl.4, figs.1-9; RICHARDSON, 1905:130, figs.112-118; 1910:3; LLOYD, 1908:81, figs.1-8; pl.10, figs.1-6; pl.11, figs.1-8; pl.12, figs.1-7; HOLTHUIS & MIKULKA, 1972:576, fig.1; SHIH, 1972:3; LEMOS DE CASTRO, 1978:41, figs.20-23; MARTIN & KUCK, 1990:27; PIRES-VANIN, 1998:608.

Material examined – Revizee Program, 19°42.736'S, 38°36.472'W, 910m, 1♂ and 1♀, MNRJ13713; 21°48.496'S, 40°01.539'W, 592-618m, 1♀ and 1♂, MNRJ13712; 19°42.684'S, 38°44.568'W, 895-1004m, 1♀, MNRJ15178; 19°47.581'S, 38°59.827'W, 1183-1318m, 1♀, MNRJ15179; 13°08.058'S, 38°24.582'W, 736-803m, 4♂ and 1 immature, MNRJ15181; 13°24.968'S, 38°38.277'W, 727-801m, 3♂, MNRJ15184; 15°07.158'S, 38°40.542'W, 1012-1035m, 2♂ and 2♀, MNRJ15185; 14°16.764'S, 38°38.978'W, 1591-1709m, 2♂ and 2♀, MNRJ15186; 21°10.040'S, 40°13.601'W, 545-579m, 1♂, MNRJ15187; 14°34.565'S, 38°51.672'W, 714-822m, 1♂, MNRJ15188; 13°24.968'S, 38°38.277'W, 727-801m, 3♂, MNRJ15189; 15°30.548'S, 38°37.821'W, 2♀ and 2♂, MNRJ16327-16328.

Diagnosis – Coxal plates 2-3 slightly flexed laterally.

Coxal plates 7 with posterior margin convex. Posterior margin of pleotelson with 11 or 13 teeth. Uropod endopod with inner and distal margins forming an angle of 75°; exopod paddle-shaped, inner margin straight and lateral margin convex, setulae on  $\frac{3}{4}$  of its distal portion.

Description – Specimens from 7 up to 34cm of body length. Body (Figs.1A, 1C, 2A) oval, with length approximately 2.5 times its width (excluding the plates). Tergites strongly arched, recovered by small pits.

Head (Figs.1A-B) wider than long, semicircular, fused at posterior margin with the first segment of pereon; anterior margin slightly concave, forming a wide ridge projecting above antenna 1.

Clypeus (Fig.3A) flat and parallel in relation to body plan; antero-median portion triangular, projected beyond frontal lamina, conspicuous dorsally; posterior portion squared, projecting posteriorly.

Frontal lamina (Fig.1B) flat, sessile, triangular, transverse in relation to the body, separating basis of antenna and hidden by anterior portion of clypeus in ventral view.

Eye (Fig.1B) lateral, convex and triangular; lateral margin concave, dorsal margin straight and ventral margin slightly convex; situated at the antero-ventral portion of head, totally hidden dorsally by a ridge.

Pereon (Figs.1A, 1C, 2A) about half length of body. Pereonite 1 wider than the others, antero-lateral margin with parallel ridges. Pereonites 5-7 shortening progressively.

Coxal plate 1 (Figs.1A, 1C, 3B) fused to pereonite 1. Coxal plates 2-7 conspicuous, separated from tergites by well marked dorsal sutures; each coxal plate with oblique carina. Coxal plates 2-3 slightly flexed dorsally, 4-7 directed posteriorly, with postero-lateral angles progressively acute. Coxal plates 5-7 with few setae on ventral surface. Posterior margin of coxal plate 7 convex.

Pleon (Figs.1A, 1C, 2A, 2D) about  $\frac{1}{5}$  of body length, with five free pleonites. Pleonite 1 reaching  $\frac{1}{3}$  of anterior margin of pleonite 2; pleonite 2 reaching half of anterior margin of pleonite 3; pleonites 3-5 reaching the anterior margin of pleotelson. Pleonites 2-5 with ridged lateral margins. Pleonites 1-5 with plumose setae on ventral surface.

Pleotelson (Figs.1A, 3C) with about  $\frac{1}{4}$  of body length, wider than long, with median dorsal carina; posterior margin dentate, with 9 or 11 large medial teeth, followed by 2 small lateral

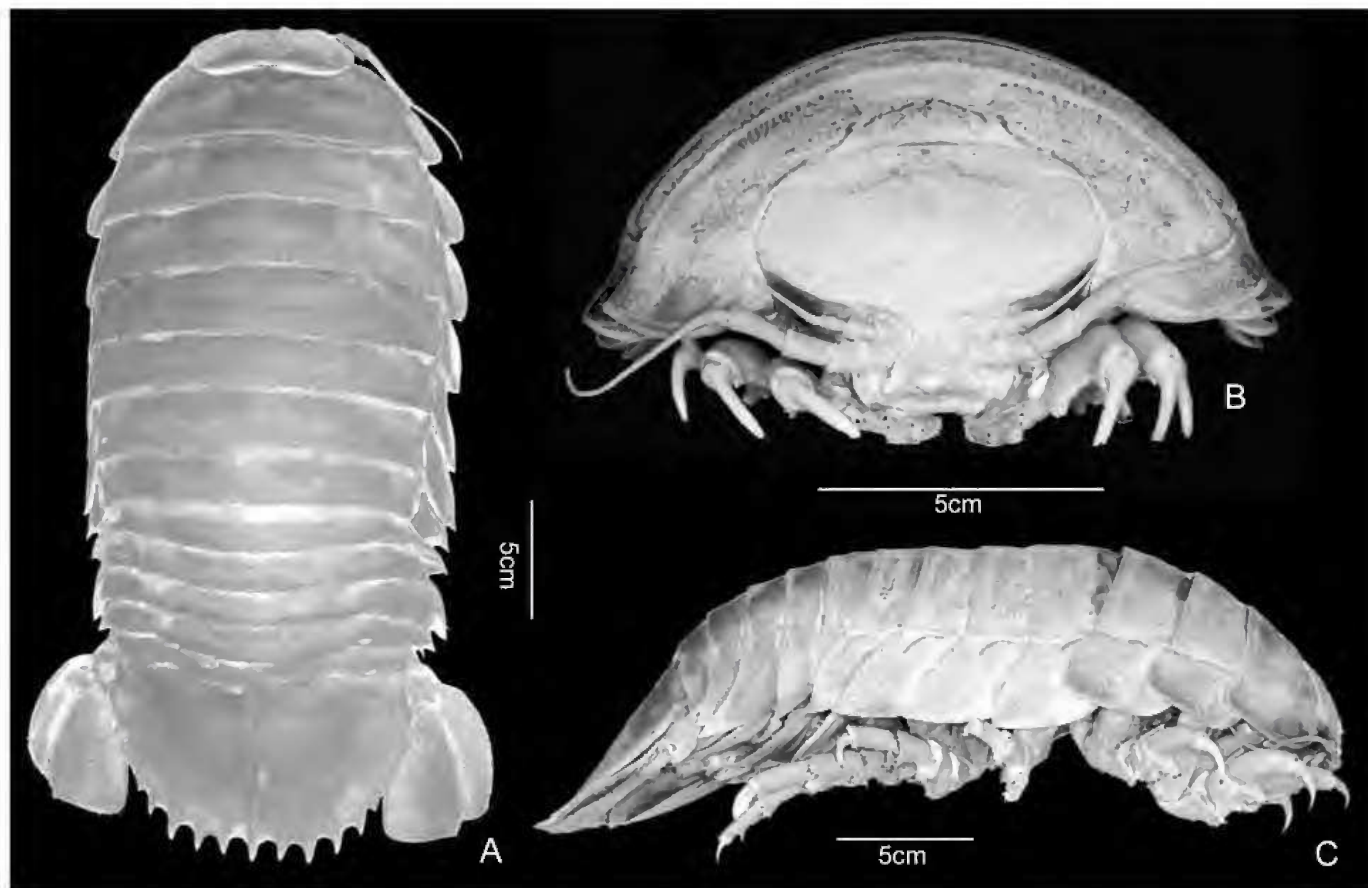


Fig.1- *Bathynomus giganteus* A. Milne Edwards, 1879; ♂, 32cm, MNRJ13712: (A) dorsal view; (B) head, frontal view; (C) lateral view.

teeth, setulae distributed between teeth.

Antenna 1 (Figs.1B, 3D)  $\frac{1}{3}$  of antenna 2 length. Peduncle with 3 articles decreasing in length from base to flagellum; exopod vestigial. Flagellum reaching eyes posteriorly; varying from 46 to 50 articles, each article with a disto-lateral setose projection, except articles 1-2, which lack projections and are longer than others.

Antenna 2 (Figs.1A-C, 3E-F) peduncle with 5 conspicuous articles besides one article very reduced at basal position. Flagellum with about 60 articles, reaching anterior margin of pereonite 2.

Mandible (Figs.4A-B) with tridentate incisor, posterior tooth curving ventrally; row with 8-10 stout setae, equal in size, arranged in a semicircle. Left mandible with lacinia mobilis on anterior margin of setae row. Molar process well developed, with acute spines on upper margin. Palp with proximal article short, smaller than half of median article length; median article with several simple setae on distal half of anterior margin; distal article short and flattened, with simple setae on lateral

margin and long setae distally.

Maxilla 1 (Fig.4D), outer lobe with 11 stout setae on cutting margin, forming a semicircle at distal portion, with setulae central to semicircle; inner lobe with 4 circumplumose setae and a simple thin setae between them on cutting edge.

Maxilla 2 (Fig.4E) with similar outer and inner lobes. Outer lobe slender and biarticulated, with 10 long, simple setae distally and 5 smaller setae on lateral margin. Inner lobe slender, with 12 long, simple setae distally and 4 small setae on lateral margin. Inner lobe thick, with several short, simple setae apically and longer circumplumose setae below.

Maxilliped (Fig.2B), palp with 5 articles, inner margin with simple setae and lateral margin with plumose setae; distal article triangular; endite short, cylindrical with 5 coupling hooks. Mature female with marsupium (Fig.2A), distinguished from immature female by the presence of projecting lobule on external surface of second basal article, with setae along margins (Fig.2B).



Pereopods (Figs.1B-C, 2A, 2C) 1-3 similar. Pereopod 1 ischium with stout setae and thin setae and merus with stout setae on dorsal projection; carpus narrow with stout setae on a small ventral projection; propodus with row of stout setae on palm; dactylus prominent and robust. Merus of

pereopods 2-3 with dorsal elongated projection than in P1 and with row of stout setae reaching half length of propodus; carpus narrow, with ventral projection a little larger and more spinulose than in P1. Pereopods 4-7 similar, without projections, with stout setae along inferior

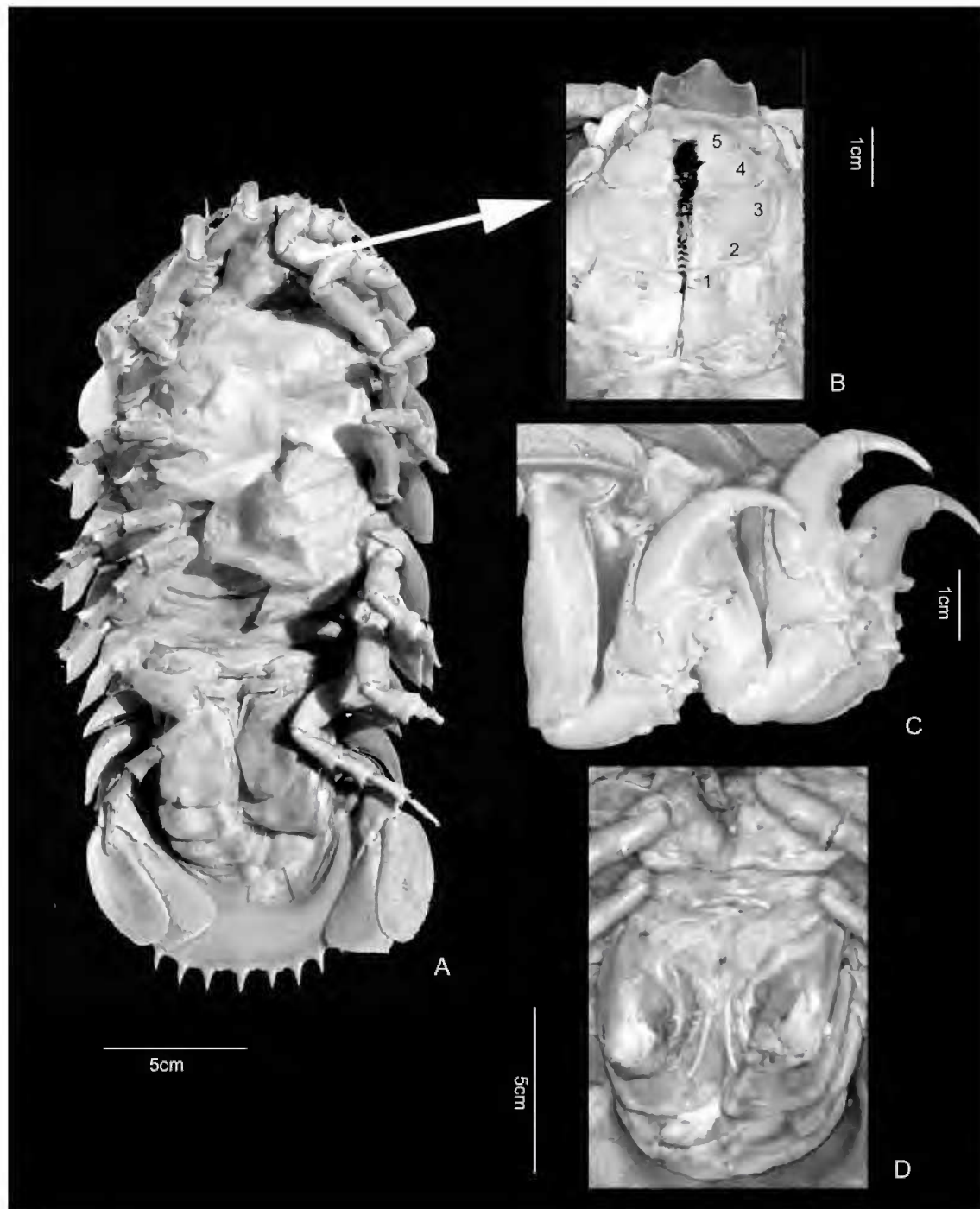


Fig.2- *Bathynomus giganteus* A. Milne Edwards, 1879; ♀, 30cm, MNRJ13712: (A) ventral view with oostegites; (B) maxilliped of mature female (with lobe on second basal article); (C) pereopods 1-3. ♂, 30cm, MNRJ13712; (D) second pleopod with appendix masculina.



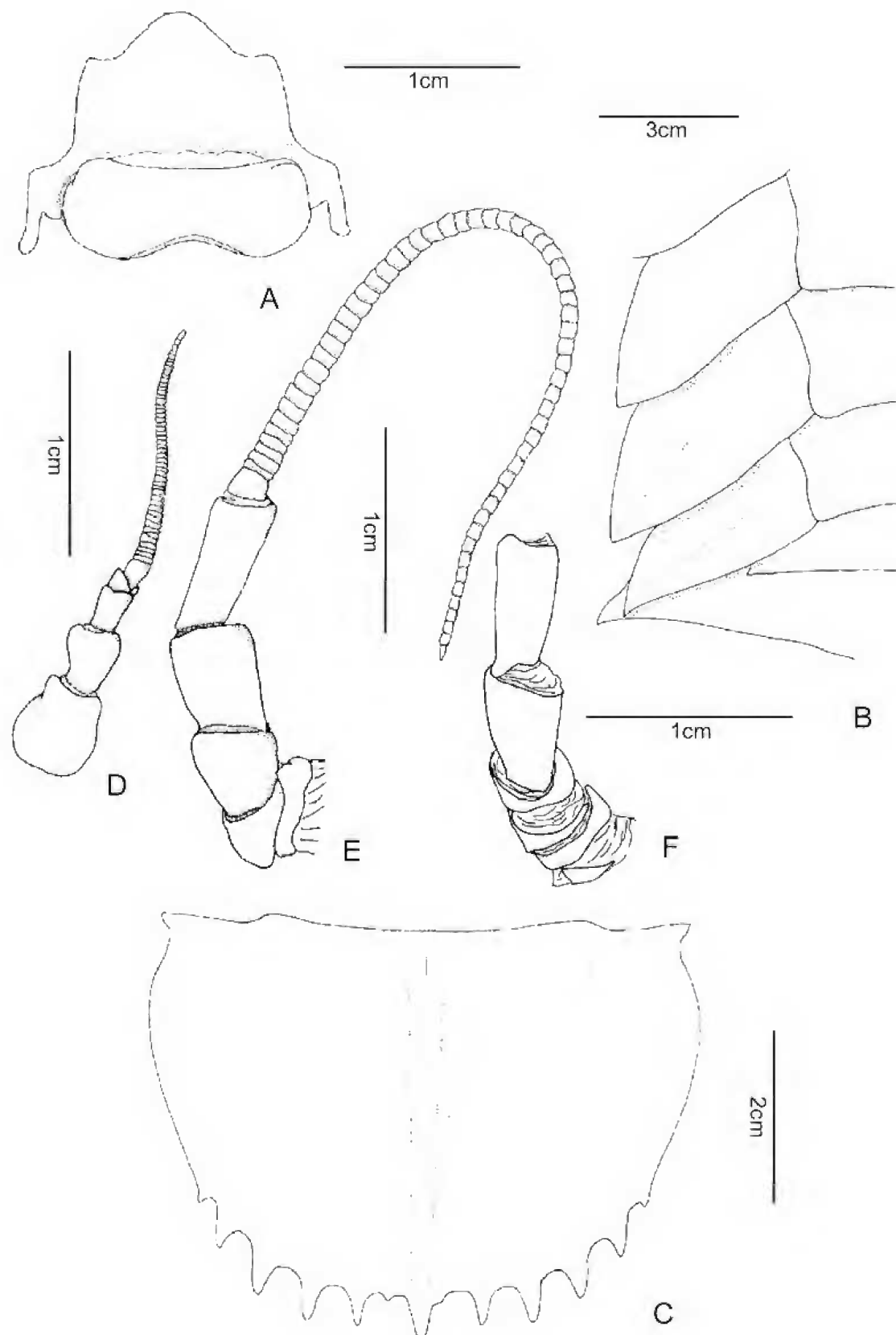


Fig.3- *Bathynomus giganteus* A. Milne Edwards, 1879; ♂, 18cm, MNRJ15186: (A) clypeus and labrum, ventral view; (B) coxal plates 5-7, dorsal view; (C) pleotelson, dorsal view; (D) antenna 1, outer view; (E) antenna 2, outer view; (F) antenna 2 peduncle, inner view.

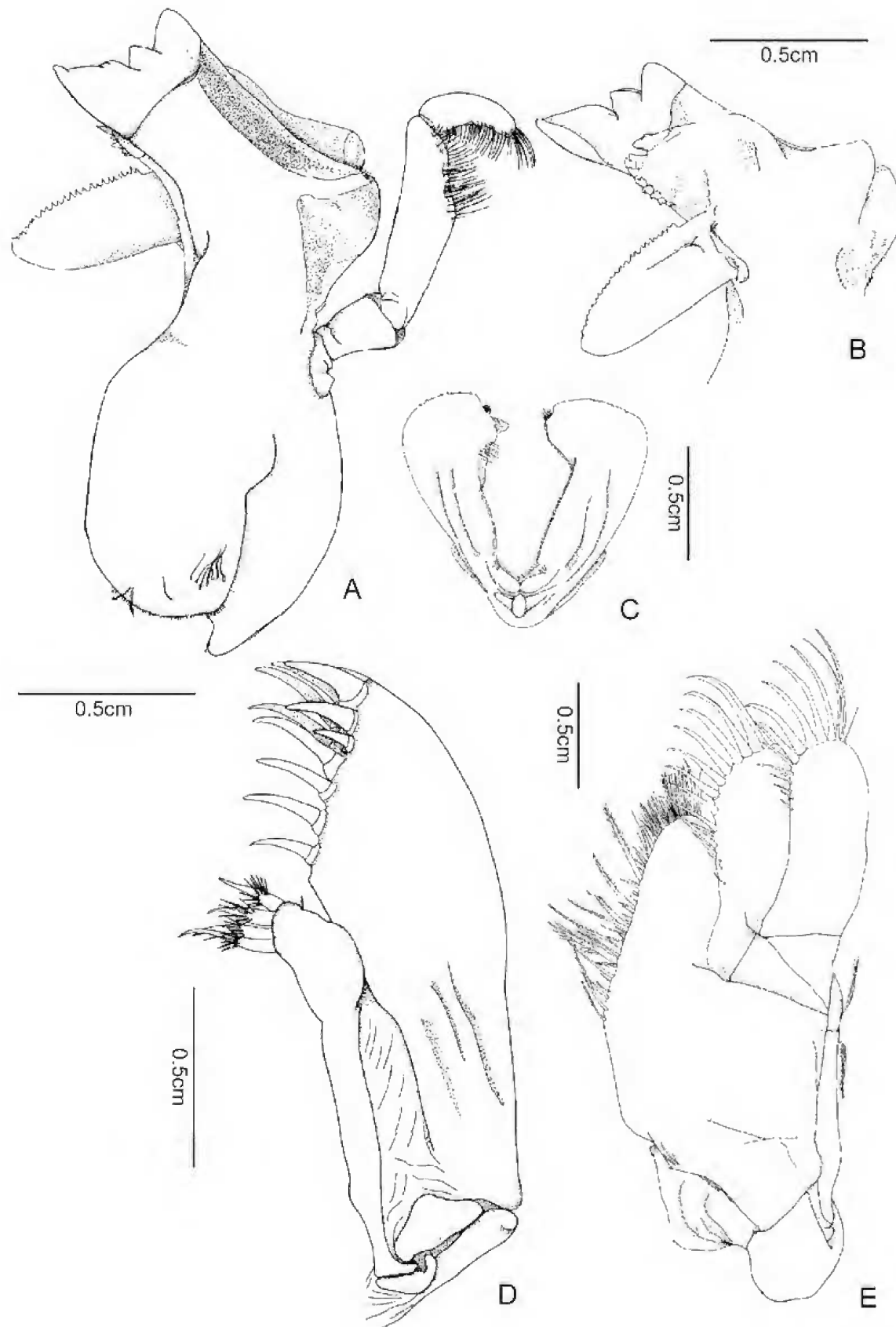


Fig.4- *Bathynomus giganteus* A. Milne Edwards, 1879; ♂, 18cm, MNRJ15186: (A) left mandible, outer view; (B) right mandible, inner view; (C) labium, outer view; (D) maxilla 1, outer view; (E) maxilla 2, outer view.

margin of each article. Basis of pereopods 6-7 with setae on posterior margin.

Pleopods 2-5 (Figs.2A, 2D) with branchiae at dorsal and ventral surfaces of endopods, larger at dorsal surface; pleopod 1 with branchiae only on dorsal surface. Appendix masculina (Figs.2D, 5A) articulating on medial margin of endopod of pleopod 2, smaller than endopod. Pleopods membranous and setose.

Uropod (Figs.1A, 2A, 5B) not extending beyond posterior margin of pleotelson; both rami developed. Endopod triangular with stout setae on distal margin; inner and distal margins forming an angle of 75°, both with long, simple setae; exopod paddle-like with uniform width, inner margin straight, and outer margin convex, with stout setae and thin setae along  $\frac{3}{4}$  of its distal portion, distal margin with stout setae.

Remarks – A. MILNE EDWARDS (1879) described *Bathynomus giganteus* briefly, without illustrations, describing only the size, respiratory structures, and eyes, and placed it in a new genus. A. MILNE EDWARDS & BOUVIER (1902) provided a complete study of *B. giganteus*, well illustrated and, later, HANSEN (1903) added new information to the description. LLOYD (1908) described its inner anatomy and HOLTHUIS & MIKULKA (1972) gave data on color, size, development and alimentary habit.

RICHARDSON (1905) redescribed the species and noted that antenna 2 reached half the length of pereonite 4. In specimens examined here the antenna 2 reached pereonite 2.

The body shape and the number of teeth from pleotelson are similar in *B. giganteus* and *B. propinquus* (RICHARDSON, 1910), the shape of pleotelson, the exopod of uropod, and the frontal lamina, besides the size of antenna 2 are distinct, justifying the separation of these species. The similarities and distinctions between both species are discussed by SHIH (1972) and SOONG (1992).

Beyond, the characteristic length-width ratio and the number of teeth on posterior margin of telson, *B. giganteus* can be distinguished from the other species by the shape of posterior margin of coxal plate 7 (Figs.1B, 2B), by the angle of the inner and distal margins of the endopod of uropod, by the length of the uropod in relation to telson length, and by the shape of the telson (Tab.1). Despite the 11 or 13 teeth on posterior margin of pleotelson that characterize

*B. giganteus*, two females (8 and 12cm) and two males (10 and 13 cm) presented only nine teeth. All the other characteristics agree with the diagnosis of this species.

Of the fourth demersal dredges by the Program Revizee (Central Pesca Bahia I) and of 58 demersal dredges realized during Bahia II Section, *B. giganteus* was present in two samples of Bahia I and in nine of Bahia II. During the Program Revizee (Pesca Covos), which used traps, most samples had specimens of *B. giganteus*, proving this to be an efficient method to catch those animals.

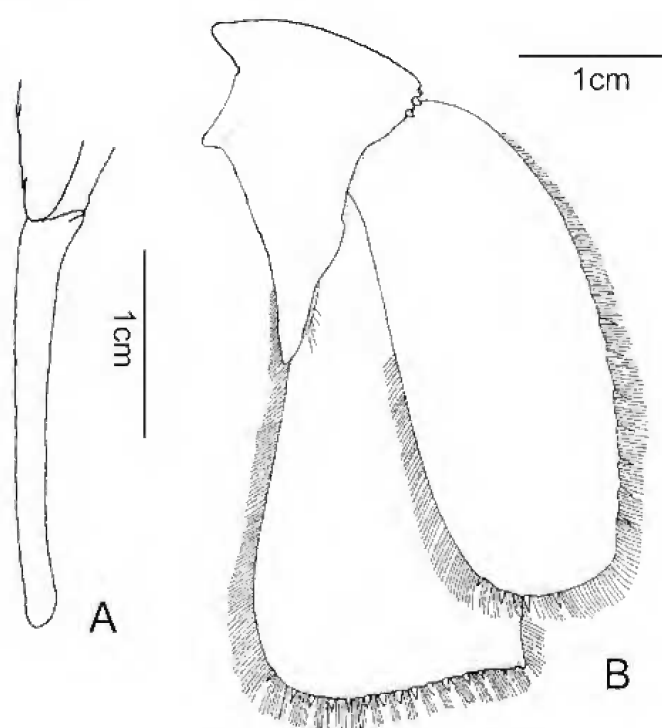


Fig.5- *Bathynomus giganteus* A. Milne Edwards, 1879; ♂, 18cm, MNRJ15186: (A) pleopod with appendix masculina; (B) uropod.

*Bathynomus giganteus* has a world wide distribution, occurring in the Western Atlantic, Indian Ocean (Arabian coast, Laccadive Sea and Bengal Bay) (HOLTHUIS & MIKULKA, 1972) and Pacific Ocean (Southwest of Taiwan) (SOONG, 1992).

With these new records, *B. giganteus* is recorded in the Western Atlantic from Florida Strait (23°N 82°W, 26°N 79°W) (HOLTHUIS & MIKULKA, 1972) south to north of Rio de Janeiro State (21°S), thus enlarging its meridional distribution. *B. giganteus* has a bathymetric range from about 200 to 1800m of depth.



TABLE 1

Distinguishing characters of *Bathynomus* species from (1) A. MILNE EDWARDS & BOUVIER, 1902; (2) RICHARDSON, 1910; (3) SHIH, 1972; (4) GRIFFIN, 1975; (5) LEMOS DE CASTRO, 1978 AND (6) BRUCE, 1986

Species characters	<i>B. giganteus</i> (1)	<i>B. dodereini</i> (1, 3, 6)	<i>B. propinquus</i> (2, 6)	<i>B. affinis</i> (2, 3, 6)	<i>B. decempinosus</i> (3, 6)	<i>B. mijarei</i> (5)	<i>B. immanis</i> (6)	<i>B. kapala</i> (6)	<i>B. pelor</i> (6)	<i>B. obtusus</i> sp.nov.
Angle of uropod endopod	75°	106°	± 55°	83° - 86°	92°	90°	90°-95°	±80°	±100°	115°
Uropod length	shorter than telson	equal to telson	shorter than telson	shorter than telson	shorter than telson	shorter than telson	shorter than telson	equal to telson	equal to telson	longer than telson
Shape of coxal plate 7 posterior margin	convex	-	-	-	concave	convex	little convex	convex	convex	straight
Number of pleotelson teeth	11	7	11	9	7	9	7	7	11	9
Distribution of the setae along the exopod uropod lateral margin	<sup>3</sup> / <sub>4</sub> distally	<sup>4</sup> / <sub>5</sub> distally	all extension	-	-	<sup>2</sup> / <sub>3</sub> distally	<sup>2</sup> / <sub>3</sub> distally	-	<sup>3</sup> / <sub>4</sub> distally	almost all extension
Shape of distal portion of exopod uropod	rounded, without angles	acuminate d, with obtuse angle	angulose externally and rounded internally	acuminate d, with obtuse angle	acuminated, with obtuse angle	angulose externally and rounded internally	angulose externally and rounded internally	squared, with two angles	angulose externally and rounded internally	squared, with two angles
Number of teeth on maxilla 2	11	11	11	11	10	11	10	11	11	11
Number of coupling teeth	5	5	-	5	4	5	7	6	4	5

*Bathynomus miyarei* Lemos de Castro, 1978  
(Figs.6-10)

*Bathynomus miyarei* Lemos de Castro, 1978:41,  
figs.1-23; PIRES-VANIN, 1998:608.

Material examined – Holotype, 29°20'S, 48°W, 280m, 1♂, MNRJ6444. Paratypes, Ceará, Acaraú, 80m, 1♂, MNRJ13385; Rio Grande do Norte, Natal, 22m, 1♂, MNRJ13386. Other material: 29°20'S, 48°W, 1♂, MNRJ6445; Brazil, without detailed locality, 1♂, MNRJ191. Revizee Program, 21°48.496'S, 40°01.539'W, 592-618 m, 2♀, 1 manca, MNRJ13712; 13°30.909'S, 38°41.131'W, 339-799m, 1♀, 1♂, MNRJ15190; 13°24.353'S, 38°39.782'W, 457-607m, 1♀, MNRJ15191; 14°34.565'S, 38°51.672'W, 714-822, 1♀, 4♂, 1 manca, MNRJ15192; 19°43.828'S, 39°24.583'W, 605-619m, 2♀, 3♂, 1 juvenile, MNRJ15195; 13°08.058'S, 38°24.582'W, 614-629m, 1♂, MNRJ15197; 14°24.831'S, 38°53.006'W, 461-567m, 2♀, 9♂, MNRJ15199; 19°45'S, 39°28.7'W, 240-324m, 1♂, MNRJ15530; 20°40.3'S, 39°57.7'W, 264-407m, 12♀, 8♂, 1 juvenile, MNRJ15531; 20°57.2'S, 40°07.5'W, 232-555m, 10♀, 10♂, 4 juveniles, 5 mancas, MNRJ15532; 20°57.2'S, 40°07.5'W, 232-555m, 11♀, 8♂, 8 juveniles, 5 mancas, MNRJ15533.

Diagnosis – Antero-lateral margin of pereonite 1 with bifid ridges distally. Coxal plates 7 with posterior margin concave. Posterior margin of pleotelson with 9 teeth. Uropod endopod with inner and distal margins forming an angle of 90°; exopod paddle-shaped tapering distally, with inner margin straight and lateral margin convex, setulae on  $\frac{2}{3}$  of its distal portion.

Description – Specimens from 4 up to 28cm of body length. Body (Figs.6A, 6C, 7A) oval, with length approximately 3 times its width (excluding the plates). Tergites strongly arched, bearing small pits.

Head (Figs.6A-C) wider than long, semicircular, fused at posterior margin with first segment of pereon; anterior margin slightly concave, forming a wide ridge projecting above antenna 1.

Clypeus (Fig.8A) flat and parallel in relation to body plan; antero-medial portion triangular, projected beyond frontal lamina, conspicuous dorsally; posterior portion squared, projecting posteriorly.

Frontal lamina (Fig.6B) sessile, triangular, flat, transverse in relation to body, separating bases of antenna and hidden by anterior portion of clypeus in ventral view.

Eye (Figs.6B-C) lateral, convex, triangular; lateral margin concave, dorsal margin straight and ventral margin slightly convex; situated at antero-ventral portion of head, totally hidden dorsally by a ridge.

Pereon (Figs.6A, 6C, 7A) about half length of body. Pereonite 1 wider than others, antero-lateral margin with bifid ridges distally. Pereonites 5-7 shortening progressively.

Coxal plate 1 (Figs.6A, 6C, 8B) fused to pereonite 1. Coxal plates 2-7 conspicuous, separated from tergites by well marked dorsal sutures; each coxal plate with oblique carina. Coxal plates 4-7 directed posteriorly, with postero-lateral angles progressively acute. Coxal plates 4-7 with plumose setae on ventral surface. Posterior margin of coxal plate 7 concave.

Pleon (Figs.6A, 6C, 7A, 7C) about  $\frac{1}{5}$  of body length, with five free pleonites. Pleonite 1 reaching  $\frac{1}{3}$  of anterior margin of pleonite 2; pleonite 2 reaching half of anterior margin of pleonite 3; pleonites 3-5 reaching anterior margin of pleotelson. Pleonites 2-5 with ridged lateral margins. Pleonites 1-5 with plumose setae on ventral surface.

Pleotelson (Figs.6A, 8C) about  $\frac{1}{4}$  of body length, longer than wide, with median dorsal carina; posterior margin dentate, with 7 large medial teeth, followed by 2 small lateral teeth, plumose setulae distributed between teeth.

Antenna 1 (Figs.6B, 8D) about  $\frac{1}{4}$  length of antenna 2; peduncle with 3 articles, decreasing in size from base to flagellum; exopod vestigial. Flagellum reaching eyes posteriorly, varying from 48 to 50 articles; each article with a disto-lateral setose projection, except articles 1-2, which lack projections and larger than others.

Antenna 2 (Figs.6A-C, 7A, 8E-F) with peduncle with 5 conspicuous articles besides one article very reduced at basal position. Flagellum with about 70 articles, reaching anterior margin of pereonite 3.

Mandible (Figs.9A-B) with tridentated incisor; posterior tooth curving ventrally; row with 8-10 stout setae, equal in size, arranged in a semicircle. Left mandible with lacinia mobilis on anterior margin of setae row. Molar process well developed, with acute spines on upper margin. Palp with proximal article short, smaller than half of median article length; median article with several simple setae on distal half of anterior margin; distal article short and flattened, with simple setae on lateral margin and long setae distally.

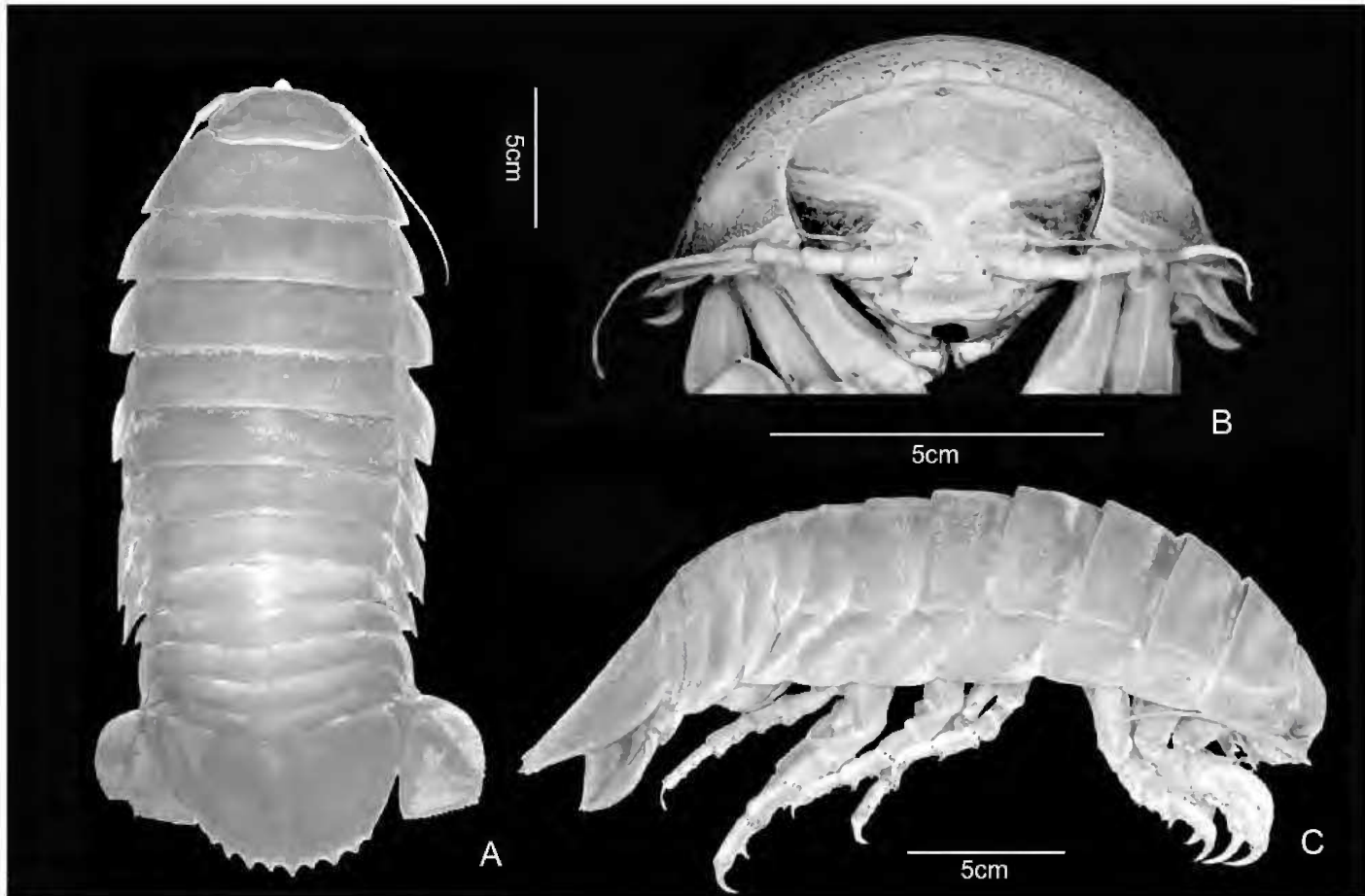


Fig.6- *Bathynomus miyarei* Lemos de Castro, 1978; ♂, 28cm, MNRJ15532: (A) dorsal view; (B) head, frontal view; (C) lateral view.

Maxilla 1 (Fig.9D), outer lobe with 11 stout setae on cutting margin, forming a semicircle at distal portion, with setulae central to semicircle; inner lobe with 4 circumplumose setae and a thin setae between them on cutting edge.

Maxilla 2 (Fig.9E) with outer and inner lobes similar. Outer lobe slender and biarticulate, with 9 long, simple setae distally and 2 smaller on lateral margin. Inner lobe slender, with 12 long, simple setae distally and 2 small setae on lateral margin. Inner lobe thick, with several short, simple setae apically and longer circumplumose setae below.

Maxilliped palp with 5 articles, inner margin with simple setae and lateral margin with plumose setae; distal article triangular; endite short, cylindrical with 5 coupling hooks. Mature female with marsupium and distinguished from immature female by presence of projecting lobule on external surface of second basal article, with setae along margins.

Pereopods (Figs.6C, 7A-B) 1-3 similar. Pereopod 1, ischium with stout setae and thin setae, merus with stout setae on dorsal projection; carpus narrow with stout setae on small ventral projection; propodus with row of stout setae on palm; dactylus prominent and robust. Merus of pereopods 2-3 with dorsal elongated projection and with row of stout setae reaching half length of propodus; carpus narrow, with ventral projection a little larger and more spinulose. Pereopods 4-7 similar, without projections, with stout setae along inferior margin of each article. Basis of pereopods 5-7 with setae on posterior margin of basis.

Pleopods 2-5 (Figs.7A, 7C) with branchiae at dorsal and ventral surfaces of endopods, larger at dorsal surface; pleopod 1 with branchiae, only on dorsal surface. Appendix masculina (Figs.7C, 10A) articulating on medial margin of endopod of pleopod 2, smaller than endopod. Pleopods membranous and setose.



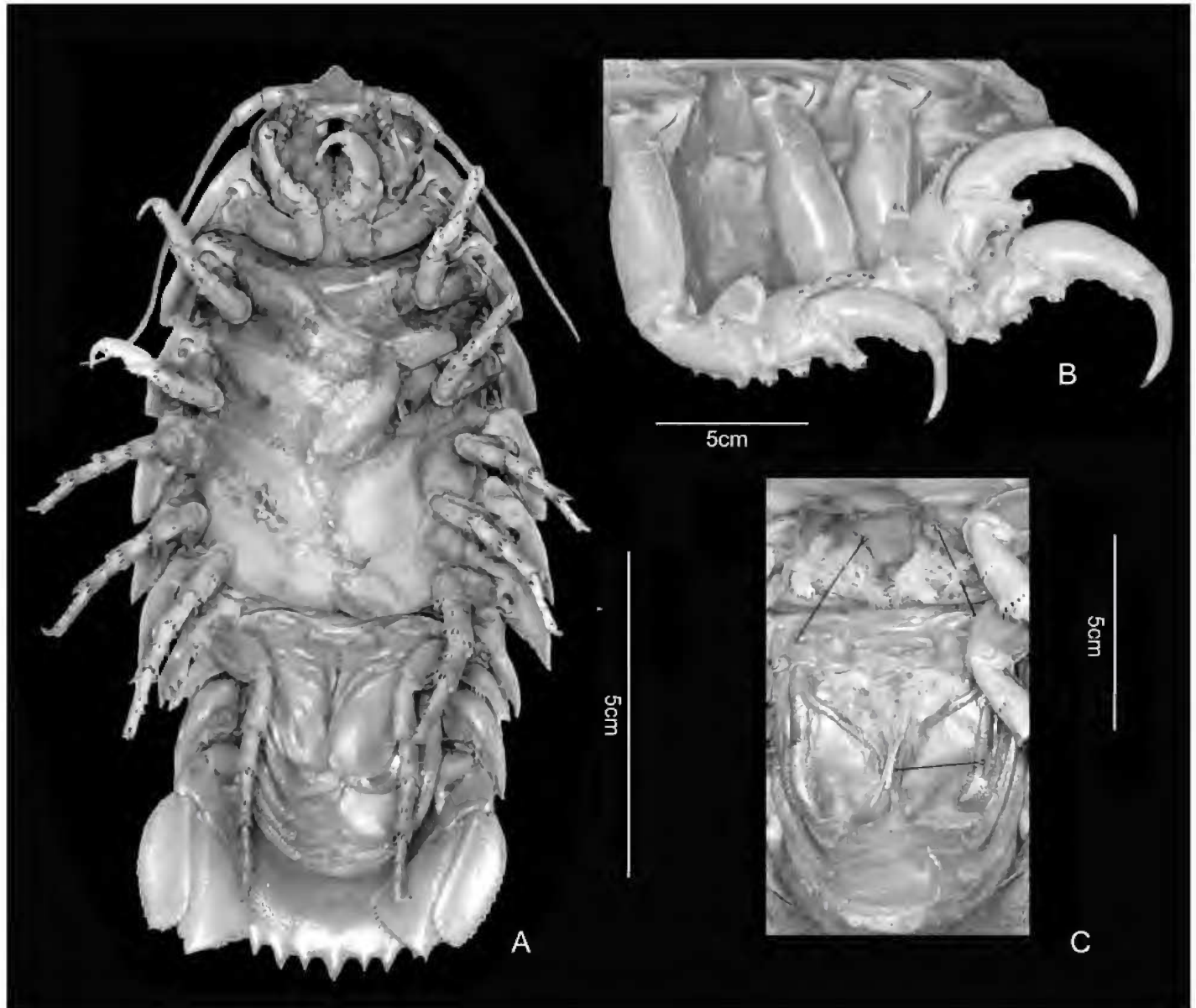


Fig.7- *Bathynomus miyarei* Lemos de Castro, 1978; ♀, 12.5cm MNRJ15532: (A) ventral view, with oostegites; (B) pereopods 1-3. ♂, 28cm, MNRJ15532: (C) second pleopod with appendix masculina.

Uropod (Figs.6A, 7A, 10B) not extending beyond posterior margin of pleotelson; both rami developed. Endopod triangular with stout setae on distal margin; inner and distal margins forming an angle of  $90^\circ$ , with long, simple setae; exopod paddle-like with uniform width, inner margin straight, and outer margin convex, with stout setae and thin setae along  $\frac{2}{3}$  of its distal portion, distal margin with stout setae.

Remarks - LEMOS DE CASTRO (1978) distinguished *B. miyarei* by the number of teeth on posterior margin of pleotelson and the shape of the uropod. New observed characters, such as

the concavity of the posterior margin of coxal plate 7, the number of coupling hooks of maxilliped, the length of uropod and the presence of setae on the margin of uropod, listed in table 1 are used to distinguish this species.

*Bathynomus miyarei* was recorded from off Ceará, Rio Grande do Norte, and Rio Grande do Sul by LEMOS DE CASTRO (1978) and from off Piauí by COELHO & REGIS (1987), occurring between depths of 80 and 280m. These new samples extended the distribution of this species to the states of Bahia, Espírito Santo and Rio de Janeiro, between 230 and 800m depth.

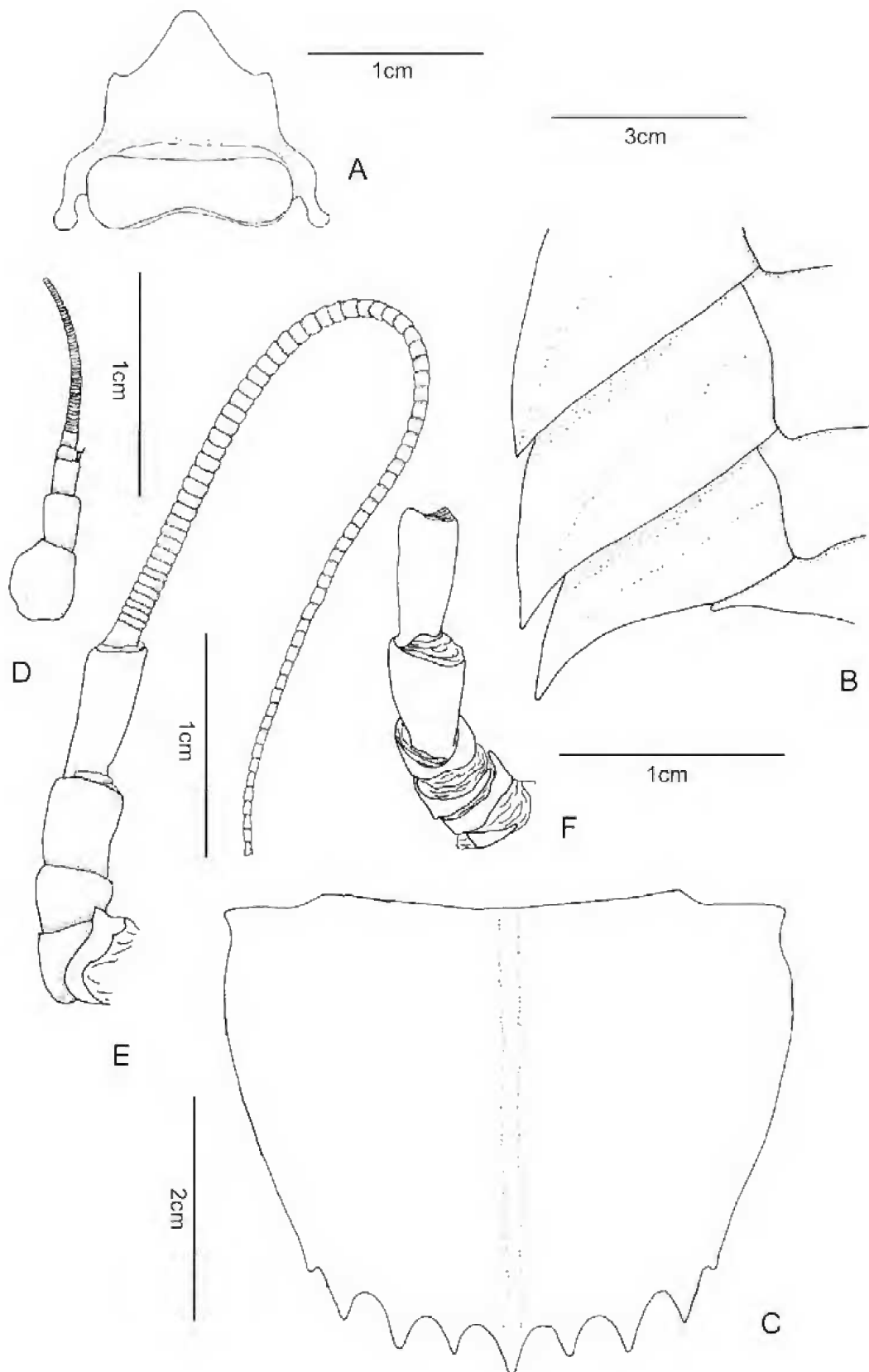


Fig.8- *Bathynomus miyarei* Lemos de Castro, 1978; ♂, 11cm, MNRJ15199: (A) clypeus and labrum, ventral view; (B) coxal plates 5-7, dorsal view; (C) pleotelson, dorsal view; (D) antenna 1, outer view; (E) antenna 2, outer view; (F) antenna 2 peduncle, inner view.

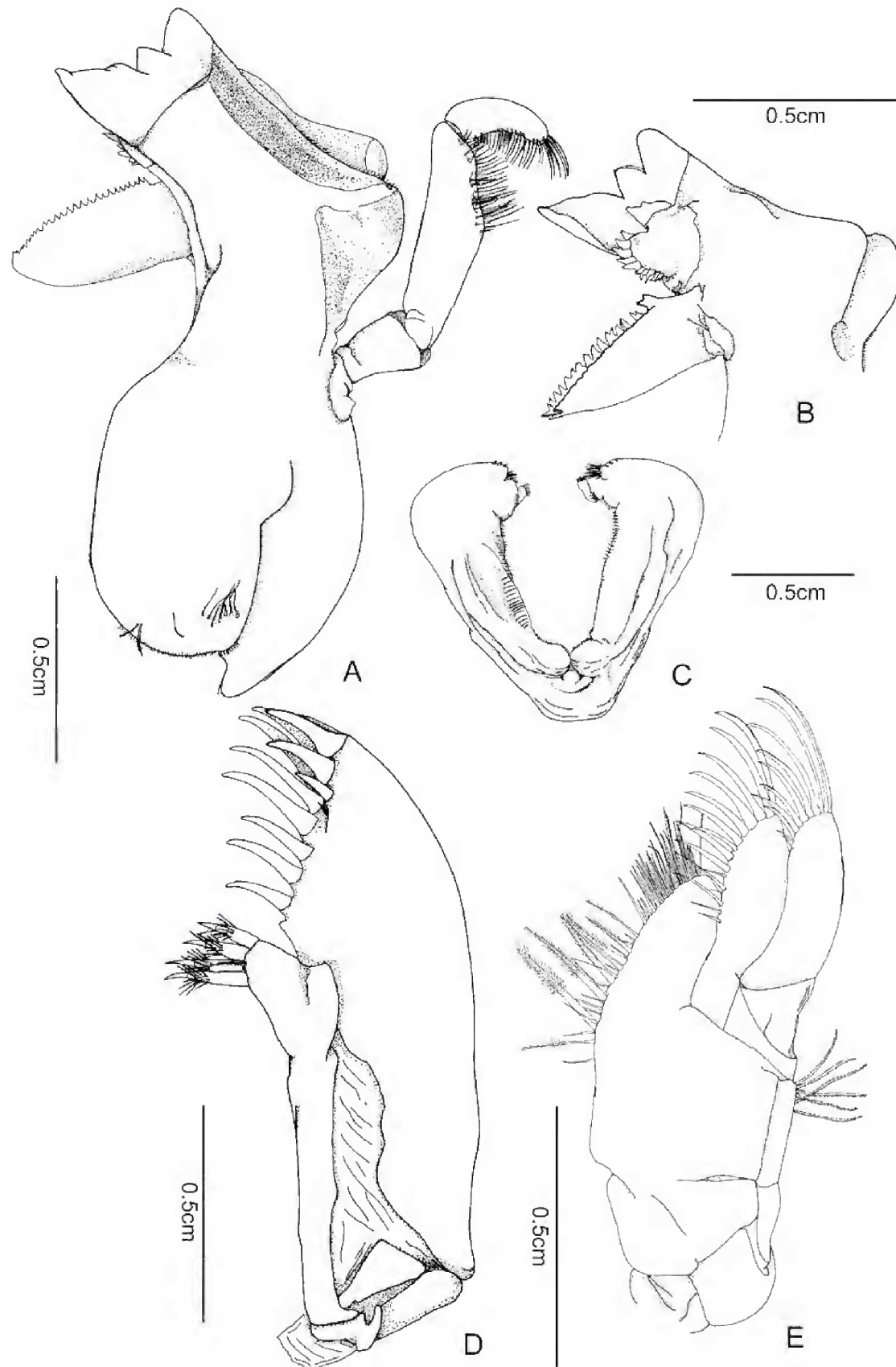


Fig.9- *Bathynomus miyarei* Lemos de Castro, 1978; ♂, 11cm, MNRJ15199: (A) left mandible, outer view; (B) right mandible, inner view; (C) labium, outer view; (D) maxilla 1, outer view; (E) maxilla 2, outer view.



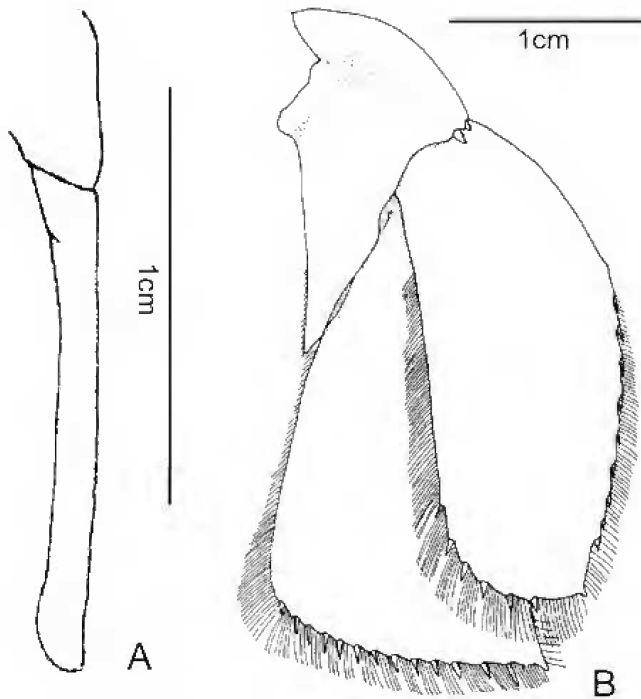


Fig.10- *Bathynomus miyarei* Lemos de Castro, 1978; ♂, 11cm, MNRJ15199: (A) second pleopod with appendix masculina; (B) uropod, dorsal view.

*Bathynomus obtusus* sp.nov.  
(Figs.11-14)

Material examined – Revizee Program. Holotype, BRAZIL: ESPÍRITO SANTO, off Anchieta, 20°57.5'S, 40°07'8"W 232-555m, 08/IV/2000, 1♂, length: 10cm, MNRJ15810. Paratypes, 21°48.496'S, 40°01.539'W, 592-618m, 2♀ and 1 juvenile, length: 7 to 10cm, MNRJ16342; 20°40.3'S, 39°54.8'W, 264-407m, 1♂, length: 9,5cm, MNRJ15534; 20°57.5'S, 40°07.8'W 232-555m, 1♂, length: 10cm, MNRJ15535; 14°37.834'S, 38°52.029'W a 14°34.565'S, 38°51.672'W, 740m, 1 manca, length: 4cm, MNRJ15536; 15°30.906'S, 38°37.872'W, 675-840m, 169 juveniles, 64♀, 73♂, length: 3 to 15cm, MNRJ16088.

Diagnosis – Coxal plates 4-7 with setae on posterior margin, posterior margin straight. Posterior margin of pleotelson with 7 teeth and with half length of anterior margin. Pereopods 1-7 with setae on dorsal margin of basis. Uropod endopod with inner and distal margins forming an angle of 115°; exopod rectangular, with inner and lateral margins almost straight and parallel.

Description – Specimens from 3 up to 15cm of body length. Body (Figs.11A-B, 11D) oval, with length approximately 3 times its width (excluding plates).

Tergites strongly arched, recovered by small pits.

Head (Figs.11A-B, 12A-B) wider than long, semicircular, fused at posterior margin with first segment of pereon; anterior margin slightly concave, forming a wide ridge projected above antenna 1.

Clypeus (Fig.12A) flat and parallel in relation to the body plan; antero-median portion triangular, projecting beyond frontal lamina, conspicuous dorsally; posterior portion squared, projected posteriorly.

Frontal lamina (Fig.12A) sessile, triangular, flat, transversal in relation to body, separating bases of antenna and hidden by anterior portion of clypeus in ventral view.

Eye (Figs.12A-B) lateral, convex, triangular; lateral margin concave, dorsal margin straight and ventral margin slightly convex; situated at antero-ventral portion of head, totally hidden dorsally by a ridge.

Pereon (Figs.11A-B, 11D) about half length of body. Pereonite 1 wider than others, antero-lateral margin with parallel ridges. Pereonites 5-7 shortening progressively.

Coxal plate 1 (Figs.11A-B, 12C) fused to pereonite 1. Coxal plates 2-7 conspicuous, separated from tergites by well marked dorsal sutures; each coxal plate with oblique carina. Coxal plates 4-7 directed posteriorly, with postero-lateral angles progressively acute and ventrally projecting. Coxal plates 4-7 with plumose setae on ventral surface and posterior margin. Posterior margin of coxal plate 7 straight.

Pleon (Figs.11A, 11D) about  $\frac{1}{5}$  of body length; with five free pleonites. Pleonite 1 reaching  $\frac{1}{3}$  of anterior margin of pleonite 2; pleonite 2 reaching half of anterior margin of pleonite 3; pleonites 3-5 reaching the anterior margin of pleotelson. Pleonites 2-5 with ridged lateral margins. Pleonites 1-5 with plumose setae on ventral surface.

Pleotelson (Figs.11A, 12D) about  $\frac{1}{4}$  of body length, with median dorsal carina; posterior margin with half length of anterior margin; dentate with 7 large medial teeth, followed by 2 small lateral teeth, plumose setulae distributed between teeth.

Antenna 1 (Figs.12A-B)  $\frac{1}{3}$  of antenna 2 length. Peduncle with 3 articles, decreasing in size from base to flagellum; exopod vestigial. Flagellum reaching eyes posteriorly; varying from 30 to 34 articles, articles with a disto-lateral setose projection, except articles 1-2, which lack projection, longer than others.

Antenna 2 (Figs.11A-B, 12A-B) peduncle with 5 conspicuous articles, and one article very reduced at basal position. Flagellum with about 70 articles, reaching pereonite 2.



Fig.11- *Bathynomus obtusus* sp.nov. Holotype, ♂, 10.5cm; MNRJ15810: (A) dorsal view; (B) lateral view; (C) second pleopod with appendix masculina. Paratype, ♀, 10cm; MNRJ16087: (D) ventral view with oostegites.

Mandible (Figs.13A-B) with tridentate incisor; posterior tooth curving ventrally; row with 9-13 stout setae, equal in size, arranged in a semicircle. Left mandible with lacinia mobilis on anterior margin of setae row. Molar process well developed, with acute spines on upper margin. Palp with proximal article short, smaller than half of median article length; median article with several simple setae on distal half on anterior margin; distal article short and flattened, with simple setae on lateral margin and long setae distally.

Maxilla 1 (Fig.13C) outer lobe with 11 prominent stout setae on cutting margin, forming a semicircle at distal portion, with setulae central to semicircle; inner lobe with 4 circumplumose setae and a thin seta between them on cutting edge.

Maxilla 2 (Fig.13D) with outer and inner lobes similar. Outer lobe slender and biarticulated, with 8 long, simple stout setae distally and 5 smaller on lateral margin. Inner lobe slender, with 8 long, simple stout setae distally, 2 small stout setae on lateral margin and 6 stout setae tiny below. Inner lobe thick, with several short, simple setae distally and long circumplumose setae below.

Maxilliped (Figs.14A-B) palp with 5 articles, inner margin with simple setae and lateral margin with plumose setae; distal article triangular; endite short, cylindrical with 5 coupling hooks and several plumose setae on distal portion. Mature female with marsupium (Figs.14A-B) and distinguished from immature female by presence of projected lobule on external surface of second basal article, with setae along margins.

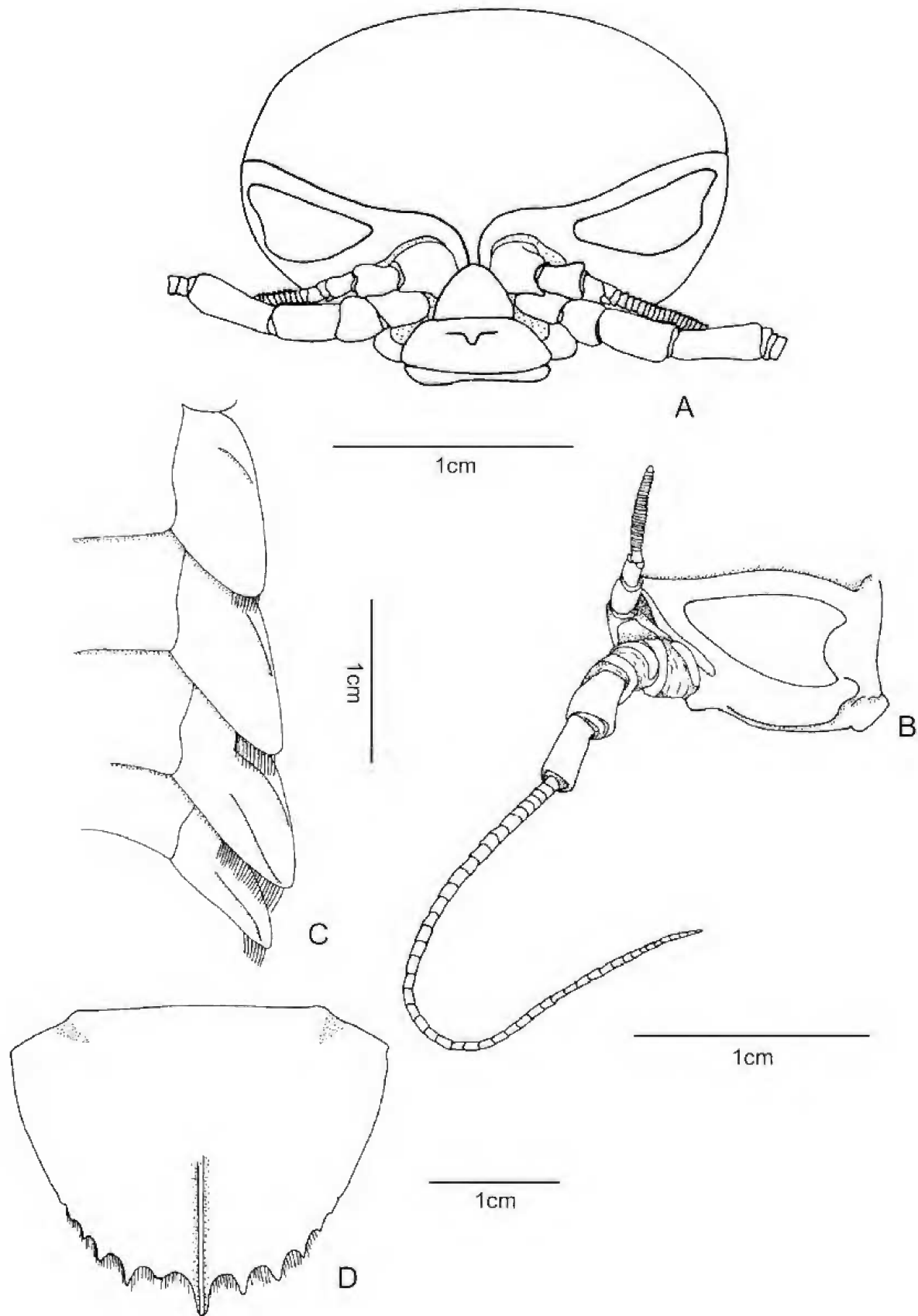


Fig. 12- *Bathynomus obtusus* sp.nov. Paratype, ♀, 11cm, MNRJ16342: (A) head, frontal view; (B) ocular region and antennae, lateral view; (C) coxal plates 4-7, dorsal view; (D) pleotelson, dorsal view.



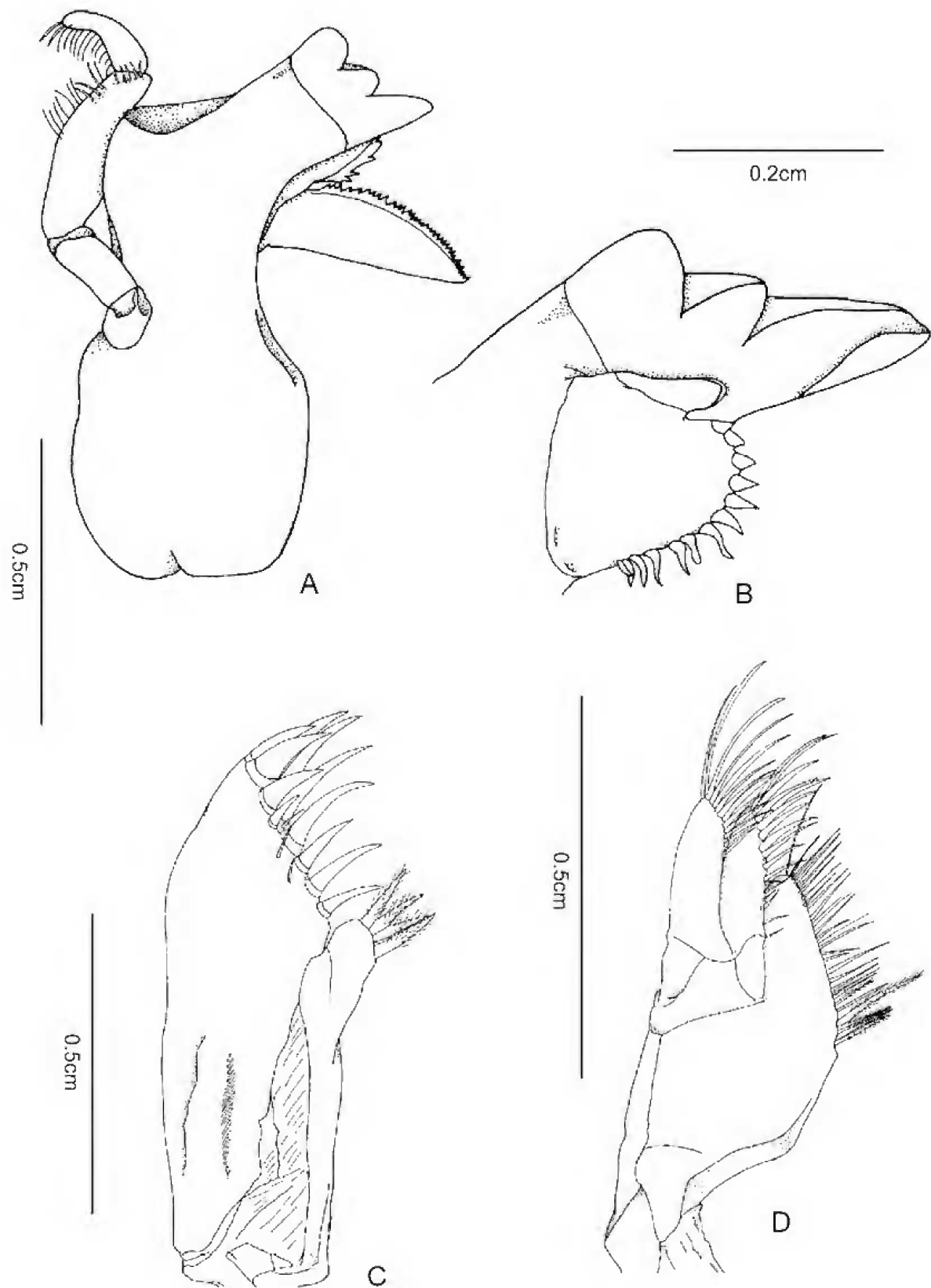


Fig.13- *Bathynomus obtusus* sp.nov. Paratype, ♀ , 11cm, MNRJ16342: (A) right mandible, outer view; (B) left mandible, inner view; (C) maxilla 1, outer view; (D) maxilla 2, outer view.

Pereopods (Figs.11B, 11D) 1-3 similar. Pereopod 1 ischium with stout setae and plumose setae, merus with stout setae at dorsal projections; carpus narrow with stout setae on small ventral projection; propodus with row of stout setae on palm; dactylus prominent and robust. Merus of pereopods 2-3 with dorsal elongated projection and with row of stout setae reaching half length of propodus; carpus narrow, with ventral projection a little larger and more spinulose. Pereopods 4-7 similar, without projections, with stout setae and plumose setae along the distal margin of each article. Basis of pereopods 1-7 with setae on posterior margin.

Pleopods 2-5 (Figs.11C-D) with branchiae at dorsal and ventral surfaces of endopods, being larger at dorsal surface; pleopod 1 with branchiae on dorsal surface. Appendix masculina (Fig.11C) articulating on medial margin of endopod of pleopod 2, smaller than endopod. Pleopods membranous and setose.

Uropod (Figs.11A, 14C) not extending beyond

posterior margin of pleotelson; both rami developed. Endopod triangular with stout setae on distal margin; inner and distal margins forming an angle of 110-115°, both with long, simple setae; exopod rectangular, inner and lateral margins almost straight, parallel, setae on all lateral margin.

**Etymology** – From the latin *obtusus* referring to the obtuse angle between inner and lateral margins of uropod endopod.

**Remarks** – From the nine species described of *Bathynomus*, *B. obtusus* sp.nov. can be distinguished from *B. giganteus* A. Milne Edwards, 1879, *B. doederleini* Ortmann, 1894, *B. propinquus* Richardson, 1910, *B. decemspinus* Shih, 1972, *B. immanis* Griffin, 1975, *B. kapala* Bruce, 1986, and *B. pelor* Bruce, 1986, by the number of teeth on posterior margin of telson. Only *B. affinis* and *B. miyarei* have nine teeth as in *B. obtusus* sp. nov. (Tab.1).

*Bathynomus obtusus* sp.nov. can be distinguished

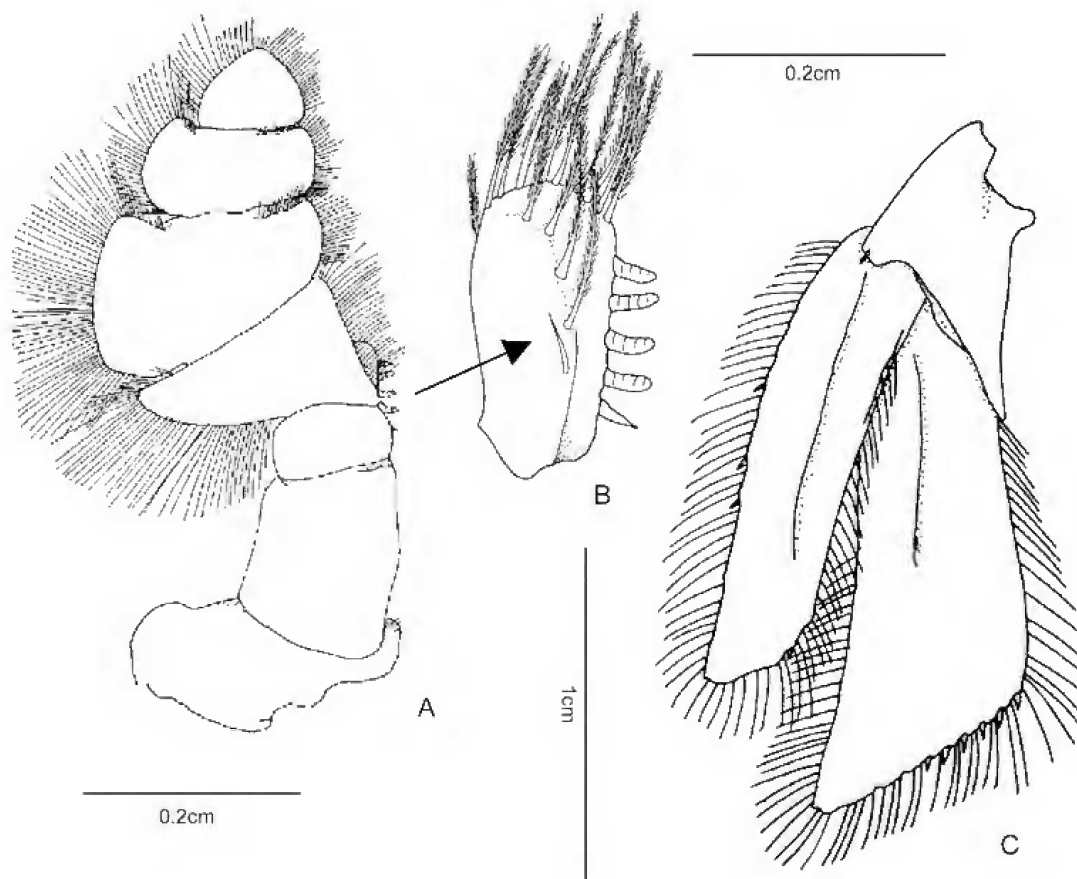


Fig.14- *Bathynomus obtusus* sp.nov. Paratype, ♀, 11cm, MNRJ16342: (A) maxilliped, outer view; (B) maxilliped palp; (C) uropod, dorsal view.

from *B. affinis* and *B. miyarei* by the angle between inner and distal margins of the endopod of uropod and by the shape of the exopod of uropod (Tab.1). During Bahia I and II sampling programs only seven specimens of *B. obtusus* sp.nov. were collected, but during the Revizee Covos more than one thousand specimens were obtained.

*Bathynomus obtusus* sp.nov. has its sexual maturity varying between 10 and 15cm of total length. The others species from Brazil appear to reach maturity only with sizes between 15 and 35cm. Furthermore, we did not find any specimen of *B. obtusus* sp.nov. greater than 15cm. Larger specimens of *B. miyarei* and *B. giganteus* reach sizes of 28cm and 35cm, respectively.

*Bathynomus obtusus* sp.nov. is recorded along the Brazilian coast between Bahia (14°S) and Espírito Santo states (21°S) occurring in depths varying from 232 to 840m.

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