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## THREE NEW SPECIES OF *MUNIDA* (CRUSTACEA: ANOMURA: GALATHEIDAE) FROM THE BRAZILIAN COAST

GUSTAVO AUGUSTO S. DE MELO-FILHO<sup>1,3</sup>  
GUSTAVO AUGUSTO S. DE MELO<sup>2,3</sup>

### ABSTRACT

*Three new species of Munida: M. atlantica (from off Aracati, Ceará, Brazil), M. heblingi (from off Espírito Santo, Brasil) and M. petronioi (from off Caiçara, Rio Grande do Norte, Brasil) are described. M. atlantica is distinguished from M. angulata by the relatively longer chelipeds and palm longer than the fingers. M. heblingi is compared to M. spinifrons, and is easily recognized by its pectinate fingers and different number of transverse lines on the abdominal tergites. Similarities exist between M. petronioi and M. spinifrons but the two species differ in the number of spines on external margin of the antennular peduncle and spinulation of rostrum.*

Keywords: Anomura, Brazilian coast, Galatheidae, *Munida*, new species.

### INTRODUCTION

Henderson (1888) studying specimens of *Munida* collected by H. M. S. "Challenger" (1872-1876), cited for the first time the occurrence of this genus along the Brazilian coast. He reported four species: *Munida sanctipauli* Henderson, *M. spinifrons* Henderson, *M. stimpsoni* A. Milne Edwards, and *M. miles* A. Milne Edwards, which were subsequently confirmed by Moreira

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1. Pós-Graduação em Zoologia, Doutorado, Instituto de Biociências, Universidade de São Paulo.
  2. Museu de Zoologia, Universidade de São Paulo, Av. Nazareth, 481, 04263-000, São Paulo, SP, Brasil.
  3. Bolsista do Conselho Nacional de Desenvolvimento Científico e Tecnológico, CNPq.

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(1901). However, a reexamination of Henderson's material of these species by Melo-Filho & Melo (1992) established that *M. stimpsoni* is actually *M. flinti* Benedict, and that the material determined as *M. miles* consisted of three other species: *M. constricta* A. Milne Edwards, *M. forceps* A. Milne Edwards and *M. valida* Smith.

The contribution of Brazilian authors towards the knowledge of this genus is not extensive: Coelho & Ramos (1972) reported *M. iris* and *M. irrasa* for the first time from the Brazilian coast, and Coelho (1973) described *M. brasiliae* (= *M. angulata* Benedict). Only recently all species of the genus *Munida* of the Brazilian coast have been treated by Melo-Filho (1992).

During a revision of the extensive material of *Munida* collected along the Brazilian coast, one of us (GASMF) had the opportunity to examine the carcinological collection of the Departamento de Oceanografia da Universidade Federal de Pernambuco (DOUFP). This collection consists principally of specimens collected to the north and northeast of Brazil by the vessels "Alm. Saldanha", "Canopus", "Akaroa" and "Pesquisador IV". Among the material examined three new species were discovered: *Munida atlantica*, *M. heblingi*, and *M. petronioi*, which are herein described and compared with other species of the genus.

Family Galatheidae Samouelle, 1819

Genus *Munida* Leach, 1820

***Munida atlantica*, sp. n.**

(Figs. 1 - 7)

*Munida spinifrons*; Coelho, 1967/69: 232 (part.); Coelho & Ramos, 1972: 344 (part.).

*Munida brasiliae*; Coelho & Ramos-Porto, 1980, Tab. XIII (part.).

Material examined. Holotype: male (MZUSP II.387), "Canopus", st. 45, off Aracati, Ceará, 04° 14' S: 37° 22' W, 58 m.

Diagnosis. Carapace strongly convex, with oblique anterior margin. Outer orbital spines on frontal margin of carapace followed by 6 lateral spines. Epigastric area with transverse row of spines; 1 para-hepatic spine on either side of carapace; anterior branchial regions armed. Remainder of carapace without ornament. Rostrum short, distal 1/3 with indistinct serrations on upper surface. Supra-ocular spines short. Basal segment of antennular peduncle

with inner terminal spine longer than outer terminal spine, and with 1 spine on ventral face near outer lateral margin. Peduncle of antenna with first and second segment armed. Chelipeds long, with palm longer than fingers, which are set with hair at distal end. Chela bent downward at the base of the fingers. Fingers not in contact throughout the length of their prehensile edges. Sternum smooth and unarmed.

**Description.** Carapace slightly longer than broad, with arched margins, strongly convex and with oblique anterior margin. Greatest breadth at level of meso-cardiac groove. Outer orbital spines anterior to antero-lateral angle, followed by 6 lateral spines: 1 on posterior part of hepatic border, 3 on anterior branchial border, and 2 on posterior branchial border. Gastric area with transverse row of spines on epigastric region: 1 median pair in line with supra-ocular spines followed by 2 smaller pairs outside line of supra-oculars. One para-hepatic spine on either side of carapace. Hepatic area unarmed. Anterior branchial areas each with 1 spine. Remainder of carapace unarmed. Transverse lines well spaced and marked, with short setae.

Rostrum short, projecting horizontally, slightly sinuous, distal 1/3 with indistinct serrations on upper and lateral surface. Supra-ocular spines short and slightly divergent, reaching only proximal part of cornea. Eyes with corneas wider than peduncle; margins of peduncles ornamented with setae of medium length.

Second abdominal tergite with 2 spines, and 1 transverse line. Third and fourth tergites unarmed, with 1 and 2 transverse lines respectively.

Antennular peduncle with inner terminal spine longer than outer terminal spine. Outer lateral margin with 2 spines: 1 short proximal spine, and another long, distal dorsolateral spine. Ventral face with 1 small spine near outer lateral margin.

Antennal peduncle with outer border of segment 1 (basis) roundish and crenulate. Second segment with 2 terminal spines, inner spine much shorter than outer spine. Remaining segments unarmed.

Third maxilliped with ischium armed with 1 terminal dorsal spine and another ventral spine, and with denticulate inner dorsal margin; merus with 1 distal dorsal spine and 2 spines on ventral border: 1 median spine and another subterminal spine. Hair-bearing line extending from ischium to dactylus.

Chelipeds unequal: measured from the ischial fracture they are from 4 to 4.5 times as long as carapace exclusive of rostrum, and with chela bent downward at base of fingers. Right cheliped with well developed proximal hiatus on cutting edge. Fingers not in contact throughout length of prehensile edges. Merus with several lines of spines and 3 terminal spines. Carpus with some scattered spines, without terminal spines. Palm longer than carapace, its

length 4 times height, and 1.5 times length of fingers, with some lines of spinules and 2 spines on ventral and dorsal sides near articulation with movable finger. Junction between palm and fingers with characteristic angle. Movable finger with curved terminal spine, 1 subterminal spine and 2 lines of spinules on dorsal-mesial and ventral-mesial margins; mesial surface with 1 proximal spine. Fixed finger with curved terminal spine, 1 subterminal spine and 1 line of spinules on ventral margin. Cutting surface of fingers with scattered spinules and 1 proximal molar at movable finger. Left cheliped less robust, with discrete proximal hiatus. Merus with spinulation nearly equal to spinulation of merus of the right cheliped. Carpus with 2 terminal spines. Palm longer than carapace and 1.5 times the length of the fingers. Spinulation of palm and fingers similar to that of right chela, but with more evident pilosity, mainly at distal end of fingers.

Ambulatory legs laterally compressed. Merus with row of spines on dorsal surface and 2 terminal spines. Carpus with spinulation similar to that of merus. Propodus and dactylus with row of movable spines on ventral surface.

Sternum smooth, without spines. Anterior margin of sternite of third maxilliped and remaining sternites crenulate. Dividing lines of sternites well marked and with median-sized setae.

Measurements of holotype (mm). Carapace length excluding rostrum 3.5; carapace breadth 2.9; rostrum length 1.5; supra-ocular spines length 0.9; cornea diameter 0.9; right cheliped: length 16.3, palm height 1.2, length of dactyl and fixed finger 3.2; left cheliped: length 15.9, palm length 4.5, palm height 0.9, length of dactyl and fixed finger 3.3.

Type locality. Off Aracati, Ceará, 04° 14' S : 37° 22' W, 58 m.

Etymology. The specific name *M. atlantica* refers to the Atlantic Ocean where this species is found.

Remarks. *Munida atlantica* and *M. angulata* are very similar species, both presenting chelae bent downward at the base of the fingers, and 1 spine on the ventral surface of the antennular peduncle.

The collection of the Departamento de Oceanografia da Universidade Federal de Pernambuco, rich in examples of *M. angulata*, has made possible the evaluation of the range of morphological variation of this species. The specimen from "Canopus" station 45, used to describe this new species, clearly is outside the range of variation of *M. angulata*. Such characters as: relatively longer chelipeds, palms distinctly longer than fingers, and cutting edges of fingers not in contact excepted at distal extremities. Therefore, although mor-

phologically similar in carapace and abdomen, these species are clearly different in the form and morphometry of the chelipeds.

***Munida heblingi*, sp. n.**

(Figs. 8-14)

Material examined. Holotype: male (MZUSP II.388), Project Leste I, "Alm. Saldanha", station 1953A, Espírito Santo, 20° 01' S : 38° 20' W, 83 m.

Diagnosis. Carapace convex with arched margins and with oblique anterior margin. Outer orbital spines followed by 6 spines. Epigastric region with transverse row of spines: 1 parahepatic spine on either side of carapace. Anterior branchial regions armed. Remainder of carapace unarmed. Median-sized rostrum with indistinct spinules on margin. Supra-ocular spines short. Basal segment of antennular peduncle with inner terminal spine longer than outer terminal spine. Peduncle of antenna with first and second segments armed. Chela with strongly developed spinules on cutting edges giving pectinate appearance. Sternum smooth, unarmed.

Description. Small specimen. Carapace slightly longer than broad, convex and with oblique anterior margin. Greatest breadth at level of meso-cardiac groove. Outer orbital spines anterior to antero-lateral angle, followed by 6 lateral spines: 1 on hepatic border at antero-lateral angle, 3 on anterior branchial border and 2 on posterior branchial border. Gastric area with transverse row of epigastric spines: 1 prominent median pair in line with supra-ocular spines followed by 3 smaller pairs outside line of supra-oculars. One parahepatic spine on each side of carapace. Hepatic area unarmed. Anterior branchial areas each with 2 spines. Remainder of carapace unarmed. Transverse lines well spaced and marked, with short iridescent cilia.

Rostrum slightly ascendant and sinuous, with distinct spinules on lateral surfaces and distal half with indistinct serrations on upper surface. Supra-ocular spines subparallel, short, reaching only middle of ocular peduncle.

Eyes with rounded corneas, wider than peduncles which have short cilia.

Second abdominal tergite armed with 1 median pair of spines and with 1 transverse line. Third and fourth tergites unarmed, third tergite with 1 transverse line, fourth tergite with none.

Antennular peduncle with inner terminal spine much longer than outer terminal spine. Outer lateral margin with 2 spines: 1 short proximal and another long distal dorso-lateral spine.

Antennal peduncle with outer border of segment 1 (basis) rounded and strongly crenulate; inner border crenulate and with 1 terminal spine. Second segment with 2 spines and with small distal spines on inner and outer mar-

gins. Fourth segment unarmed..

Third maxilliped with ischium armed with 1 terminal dorsal spine and another ventral spine ; inner dorsal margin denticulate. Merus with 1 distal dorsal spine and 3 strong spines on ventral border: 1 median spine and another subterminal spine, with 1 spinule between them. Hair-bearing line extending from ischium to dactylus.

Chelipeds unequal, but both with fingers slightly curved inward. Left cheliped 3.5 times the length of the carapace, with discrete proximal hiatus. Merus with several lines of strong spines and 4 terminal spines. Palm 5 times longer than height, length 0.8 times length of fingers, and with 3 lines of spinules: on ventral-mesial, dorsal-mesial and dorsal lateral margins. One long and slender spine on each side, near articulation with movable finger, finger with ventral-mesial line of spines, but without terminal spine; fixed finger without terminal spine or any other spine on the cutting face. Cutting faces of both fingers with long slender spinules, claw thus pectinate in appearance. Right cheliped without hiatus, about 3 times longer than the carapace. Merus and carpus with spinulation similar to that of left cheliped. Palm about 4 times longer than height, length 0.8 times length of fingers, and with spinulation similar to that of left palm. Movable finger with ventral-mesial row of spines and with 1 terminal spine; fixed finger with 1 short terminal spine, and another subterminal spine; prehensile edges of fingers with long slender spinules, more developed than spinules of left chela.

Ambulatory legs missing.

Sternum smooth. Anterior margin of sternite of third maxilliped and anterior border of sternite of cheliped with short spinules. Dividing lines of sternites conspicuously marked and with short cilia.

Measurements of holotype (mm). Carapace length excluding rostrum 4.3; carapace breadth 3.6; rostrum length 2.3; supra-ocular spines length 0.4; cornea diameter 1.2; right cheliped: length 13.4, palm length 2.8, length of dactyl and fixed finger 3.3, palm height 0.7; left cheliped: length 15.9, palm length 3.3, length of dactyl and fixed finger 3.9, palm height 0.7.

Type locality. Off Espírito Santo, 20° 01' S : 38° 20' W, 83 m.

Etymology. This species is dedicated to Dr. Nilton José Hebling, Instituto de Biociências, UNESP-Rio Claro, in recognition of his great contribution to the knowledge of the Anomura from the Brazilian coast.

Remarks. *Munida heblingi* is very similar to *M. spinifrons* but is differ-

entiated at once from the latter species by the pectinate fingers of its chelipeds. In addition, *M. heblingi* has only 1 transverse line on the second and third abdominal tergites, and none on the fourth, whereas *M. spinifrons* has 3, 2 and 1 lines on those tergites respectively.

***Munida petronioi*, sp. n.**

(Figs. 15-21)

*Munida spinifrons*; Coelho & Ramos, 1972: 171 (part.); Coelho, 1973: 344 (part.); Coelho, Ramos-Porto & Calado, 1986: 88 (part.).

Material examined. Holotype male (MZUSP II.389), Project Norte-Nordeste I, "Alm. Saldanha", station 1684 B, off Caiçara, Rio Grande do Norte, 03° 59' S: 35° 53' W, 75 m.

Diagnosis. Carapace strongly convex, with oblique anterior margin and with arched borders. Outer orbital spines followed by 6 lateral spines. Epigastric area with transverse row of spines. One para-hepatic spine on either side of carapace. Anterior branchial regions armed. Remainder of carapace unarmed. Rostrum long, with strong lateral spines. Supra-ocular spines long. Antennular peduncle with inner terminal spine longer than outer terminal spine; outer lateral margin with 3 spines. Peduncle of antenna with first, second and third segments armed. Chela with short spinules on cutting edges of fingers.

Description. Carapace slightly longer than broad, convex, with arched margins and with oblique anterior margin. Greatest breadth at level of separating line of cardiac and intestinal regions. Outer orbital spine anterior to antero-lateral angle of carapace, followed by 6 spines: 1 on hepatic border at antero-lateral angle, 3 on anterior branchial border and 2 on posterior branchial border. Gastric area with transverse row of spines on epigastric region: 1 proeminent median pair in line with supra-ocular spines, followed by 4 smaller pairs outside line of supra-oculars. One para-hepatic spine on either side of carapace. Hepatic area unarmed. Anterior branchial areas each with 2 spines. Remainder of carapace unarmed.

Rostrum long, slightly ascendant and sinuous, strongly flattened dorsoventrally, with strong dorsal keel. Lateral margins with strong spines forward, distal half with indistinct serrations on upper surface. Supra-ocular spines long, reaching distal part of cornea, subparallel and projecting horizontally.

Eyes with rounded corneas, wider than peduncles which have short setae.

Second abdominal tergite armed with 1 median pair of spines. Third and fourth tergites unarmed and with 2 transverse lines each.

Antennular peduncle with inner terminal spine much longer than outer terminal spine. Outer lateral margin with 3 spines: 2 strong proximal spines and another long dorso-lateral spine.

Antennal peduncle with outer border of first segment (basis) rounded and slightly crenulate; inner border smooth, with 1 terminal spine. Second segment with 2 spines: outer distal spine longer than inner distal spine. Third segment with 1 short distal spine and 1 inner distal spinule. Fourth segment unarmed.

Third maxilliped with ischium armed with 1 terminal dorsal spine and another ventral spine. Merus with 1 distal dorsal spine and 3 spines on ventral border: 1 strong median spine, 1 distal and another subterminal spine. Hair-bearing line extending from ischium to dactylus.

Chelipeds similar, without hiatus, 2 times length of carapace; merus with 3 lines of spines and 3 terminal spines; carpus with few scattered spines; palm about 4 times longer than height, shorter than fingers, with 1 row of spines on ventral mesial margin, several scattered short spines and 1 spine on ventral and dorsal sides near articulation with movable finger, which has 1 curved terminal spine and 2 subterminal spines; 1 proximal spine on mesial surface and 1 row of spines on ventral-mesial margin extending from palm to half of movable finger. Fixed finger with curved terminal spine and 2 subterminal spines. Cutting surface of fingers with scattered spinules and 1 proximal molar.

Ambulatory legs laterally compressed. Merus with row of spines on dorsal surface and 2 terminal spines. Carpus with spinulation similar to that of merus. Propodus with row of movable spinules on ventral surface. Dactylus covered with hair and a row of strong movable spinules on ventral margin.

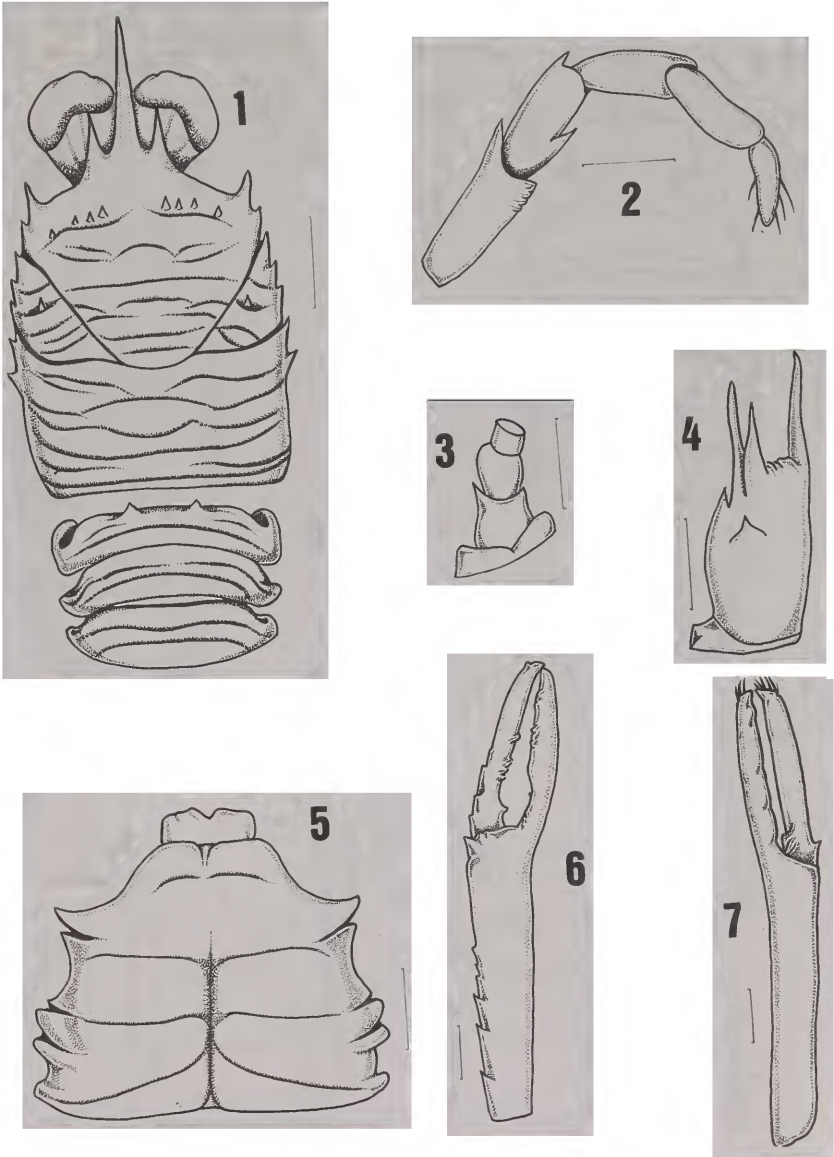
Sternum smooth save with some crenulations on sternite of chelipeds. Anterior margin of sternites of third maxilliped and anterior border of sternites of chelipeds with short spinules. Dividing lines of sternites well marked and with short setae.

Measurements of holotype (mm). Carapace length excluding rostrum 7.8; carapace breadth 6.4; rostrum length 7.0; supra-ocular spines length 1.1; cornea diameter 1.6; right cheliped (detached): length 16.1, palm length 3.3, palm height 0.9, length of dactyl and fixed finger 4.3; left cheliped (detached): length 16.3, palm length 3.3, palm height 0.9, length of dactyl and fixed finger 4.4.

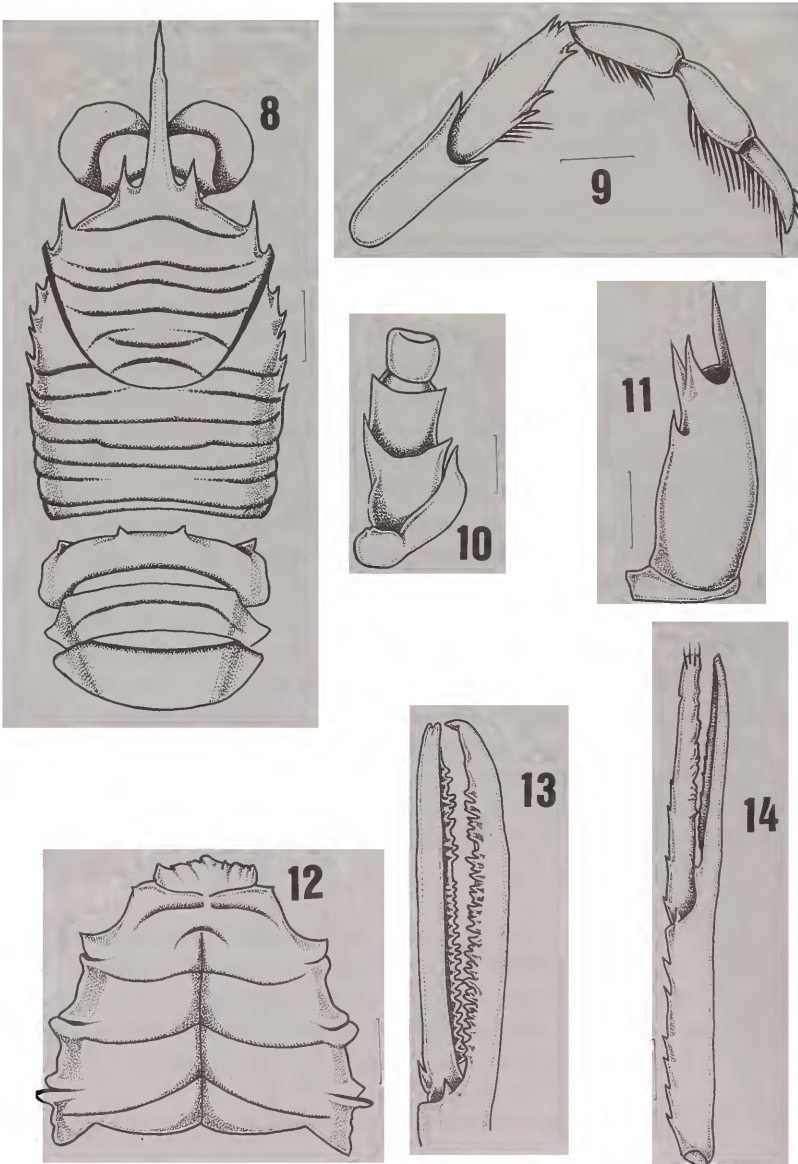
Type locality. Off Caiçara, Rio Grande do Norte, 03° 59' S; 35° 53' W, 75 m.

Etymology. This species is named in honor of Dr. Petrônio Alves Coelho, Universidade Federal de Pernambuco, in recognition of his valuable contributions to our knowledge of the Decapoda from northern and northeastern Brazil.

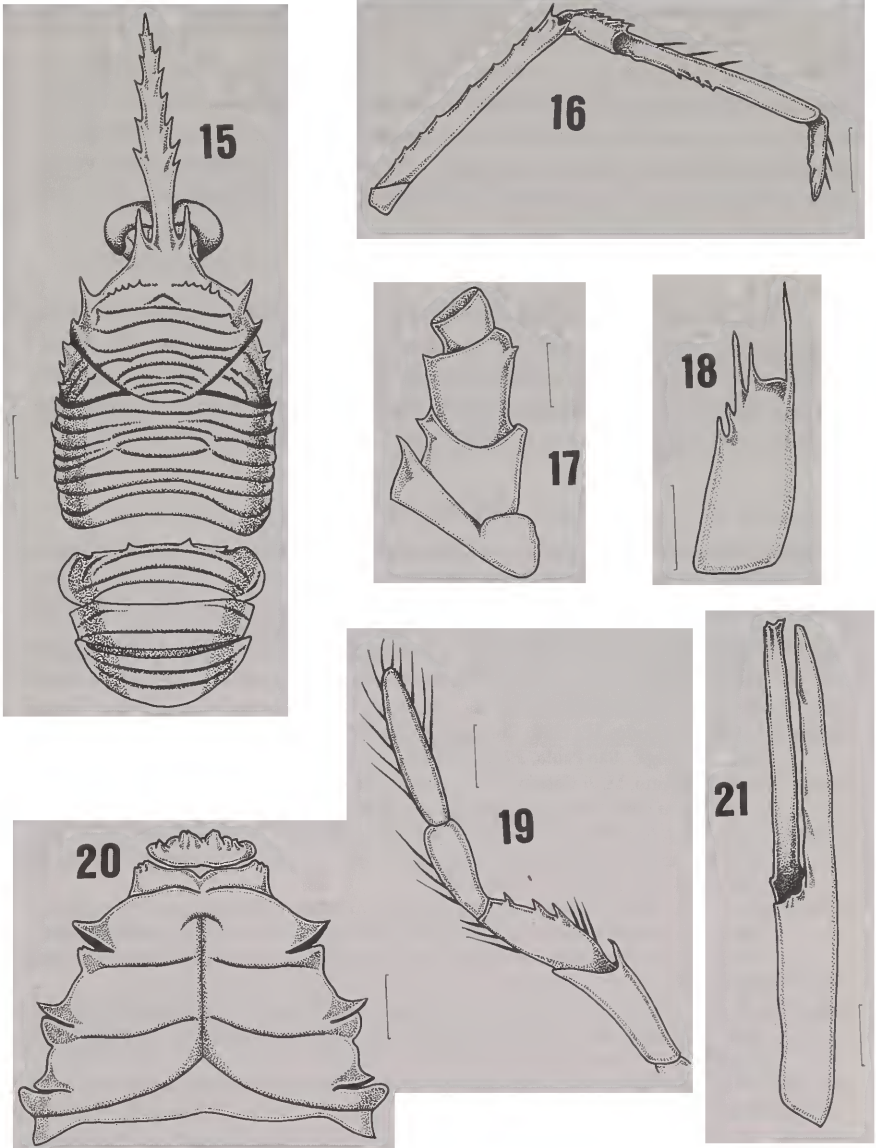




Figs. 1-7. *Munida atlantica*, new species. Holotype male: 1. carapace and abdominal somites 2-4, dorsal view; 2. third maxilliped; 3. antennular peduncle; 4. antennular peduncle; 5. sternum; 6. right cheliped; 7. left cheliped. Scales equal: 0.5 mm (2,3,4,5), 1.0 mm (1,6,7).



Figs. 8-14. *Munida heblingi*, new species. Holotype male: 8. carapace and abdominal somites 2-4, dorsal view; 9. third maxilliped; 10. antennular peduncle; 11. antennular peduncle; 12. sternum; 13. right cheliped; 14. left cheliped. Scales equal: 0.3 mm (10), 0.5 mm (9,11,12), 1.0 mm (8,13,14).



Figs. 15-21. *Munida petronioi*, new species. Holotype male: 15. carapace and abdominal somites 2-4, dorsal view; 16. ambulatory leg; 17. antennular peduncle; 18. antennular peduncle; 19. third maxilliped; 20. sternum; 21. right cheliped. Scales equal : 0.5 mm (17), 1.0 mm (18,19,20), 2.0 mm (15,16,21).

Remarks. *Munida petronioi* most resembles *M. spinifrons*, differing in number of spines on the outer margin of antennular peduncle: *M. petronioi* has 3 spines, whereas *M. spinifrons* has 2. This character was shown to be constant within the species studied. Additionally, *M. petronioi* differs in possessing a much more developed rostral spinulation, longer supra-ocular spines, and second to fourth abdominal tergites with a different number of transversal lines (2-2-2 lines in *M. petronioi*, 3-2-1 lines in *M. spinifrons*).

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