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Contributions on the Biology of the Gulf of Mexico

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New Species and New Records of Munidopsis (Decapoda: Galatheidae) From the Gulf of Mexico and Caribbean Sea

The deep-sea Galatheoidea of the Gulf of Mexico collected by the Texas A&M University Research Vessel ALAMINOS between 1964 and 1970 were reported on by Pequegnat and Pequegnat (1970). In that report three new species of *Munidopsis* are described, and a total of 39 species of Galatheoidea from the Gulf are discussed.

Subsequent to that report, the authors extended their study of these deep-sea crustaceans to ALAMINOS, OREGON*, and SILVER BAY* collections in the Gulf of Mexico and Caribbean Sea in depths ranging from 200 to 4600 meters.

In the course of this study, several apparently new species were discovered, both in the recent Gulf and Caribbean collections of the ALAMINOS and OREGON and in other earlier galatheid collections made available to us at the U.S. National Museum of Natural History.

The present study, as a supplement to the earlier report, contains a revision of the key to western Atlantic species of *Munidopsis*, descriptions of five additional new species, extensions of range for eight previously known species, and new records of three rare species of *Munidopsis*.

GENUS MUNIDOPSIS WHITEAVES, 1874

The reader is referred to Chace (1942) and Pequegnat & Pequegnat (1970) for descriptions and diagnoses of the genus *Munidopsis*. The following species are presented in this study:

*Research vessels of the National Marine Fisheries Laboratory, Pascagoula, Mississippi.

New Species		Page	
<i>Munidopsis bradleyi</i>		7	No abnormally large spine on dorsal surface of carapace
<i>Munidopsis colombiana</i>		9	
<i>Munidopsis ramahtaylorae</i>		11	4. Rostrum armed with a pair of distinct lateral teeth at end of horizontal portion.
<i>Munidopsis subspinoculata</i>		13	<i>M. rostrata</i> (A. Milne-Edwards, 1880)
<i>Munidopsis transtridens</i>		15	Rostrum laterally unarmed. <i>M. spinosa</i> (A. Milne-Edwards, 1880)
Extensions of Range		Page	
<i>Munidopsis alaminos</i> Pequegnat & Pequegnat, 1970		18	5. Eyestalks cylindrical, movable, and unarmed
<i>Munidopsis crassa</i> Smith, 1885		18	Eyestalks very short, broad and immovably fused to surrounding regions
<i>Munidopsis expansa</i> Benedict, 1902		19	6. Rostrum strongly upturned in distal half with pair of lateral spines at end of horizontal portion
<i>Munidopsis geyeri</i> Pequegnat & Pequegnat, 1970		19	
<i>Munidopsis gulfensis</i> Pequegnat & Pequegnat, 1970		19	Rostrum little upturned and unarmed <i>M. abbreviata</i> (A. Milne-Edwards, 1880)
<i>Munidopsis livida</i> (A. Milne-Edwards, 1886)		19	7. Abdomen armed with a single median spine on second, third, and fourth somites
<i>Munidopsis polita</i> (Smith, 1883)		21	<i>M. gilli</i> Benedict, 1902
<i>Munidopsis riveroi</i> Chace, 1939		21	Abdomen armed with two median spines on second somite and one on third; fourth somite unarmed
<i>Munidopsis sundi</i> Sivertsen & Holthuis, 1956		22	<i>M. cubensis</i> Chace, 1942
New Records of Rare Species			
<i>Munidopsis bermudezi</i> Chace 1939		22	8. Eyestalks unarmed
<i>Munidopsis reynoldsi</i> (A. Milne-Edwards, 1880)		22	Eyestalks armed with one or more teeth
<i>Munidopsis spinoculata</i> (A. Milne-Edwards, 1880)		23	9. Dorsal surface of carapace punctate; anterolateral tooth broad and exceeding base of rostrum
The following key has been modified from Chace (1942) and Pequegnat & Pequegnat (1970) to include the above listed species in addition to the other known western Atlantic species.			<i>M. espinis</i> Benedict, 1902
Key to the Western Atlantic Species of <i>Munidopsis</i>			Dorsal surface of carapace lacks punctations though roughened; anterolateral tooth acuminate and scarcely attaining base of rostrum
1. Epipods on chelipeds, at least		2	<i>M. gulfensis</i> (p.19)
No epipods on chelipeds or ambulatory legs		17	10. Dorsal surface of carapace at most sharply granulate
2. Epipods on chelipeds and first two pairs of ambulatory legs		3	<i>M. squamosa</i> (A. Milne-Edwards, 1880)
No epipods on second pair of ambulatory legs		11	Dorsal surface of carapace covered with regularly arranged short, sharp spines
3. A huge, laterally compressed spine extending upward from gastric region of carapace		4	<i>M. barbarae</i> (Boone, 1927)
			11. Epipods on first pair of ambulatory legs; rostrum strongly upturned in distal half and armed with pair of lateral spines at end of horizontal portion
			<i>M. expansa</i> (p.19)
			No epipods on ambulatory legs

- | | | | |
|--|----|---|----|
| 12. Eyestalks armed with one or more teeth or spines that extend beyond cornea | 13 | Rostrum not armed with lateral spines | 21 |
| Eyestalks unarmed | 16 | 21. Abdomen armed with spines on second, third, and fourth somites | |
| 13. A single inner spine or tooth on eyestalk | 14 | <i>M. serratifrons</i> (A. Milne-Edwards, 1880) | |
| A small or minute spine on outer side of cornea, as well as a long one on inner side | 15 | Abdomen unarmed | 22 |
| 14. Body and appendages covered with short, dense pubescence, which conceals surface beneath; lateral spine just behind anterior hepatic groove about same size as anterolateral spine | | 22. Merus of third maxilliped armed on inner margin with four or more irregular denticles | |
| <i>M. bermudezi</i> (p.22) | | <i>M. reynoldsi</i> (p.22) | |
| Body not covered with dense pubescence; lateral spine just behind anterior hepatic groove about twice the size of anterolateral spine | | Merus of third maxilliped with two long spines on inner margin | |
| <i>M. geyeri</i> (p.19) | | <i>M. sharreri</i> (A. Milne-Edwards, 1880) | |
| 15. Two pairs of enlarged spines on gastric region | | 23. Eyestalks armed with a short tooth at inner side of cornea | |
| <i>M. crassa</i> (p.18) | | <i>M. aries</i> (A. Milne-Edwards, 1880) | |
| One pair of gastric spines or none on gastric region | 43 | Eyestalks armed with a long spine at inner side of cornea | 47 |
| 16. Rostrum a simple spine; posterior margin of carapace armed with from one to five spines | | 24. Rostrum either armed with strong lateral spines or teeth or abruptly constricted in its distal portion to form a pair of blunt teeth | 25 |
| <i>M. sigsbei</i> (A. Milne-Edwards, 1880) | | Rostrum not armed with strong lateral spines or teeth; at most, minutely serrate or with small scattered spines; usually more or less triangular or spinelike | 32 |
| Rostrum broader and tridentate; posterior margin of carapace armed or unarmed | 42 | 25. Rostrum broad and flat with more or less subparallel margins in its basal portion and ending in a trident | 26 |
| 17. Eye spines present | 18 | Rostrum not broadly tridentate | 30 |
| No tooth or spine arising from eyestalk or cornea | 24 | 26. A pair of spines on anterior gastric region | 46 |
| 18. A forward-pointing spine on center of cornea proper | 44 | No dorsal spines on carapace | 27 |
| Center of cornea unarmed | 19 | 27. A submarginal spine on pleuron of second abdominal somite | |
| 19. Ridge along posterior margin of carapace bearing spines | 20 | <i>M. latifrons</i> (A. Milne-Edwards, 1880) | |
| Posterior margin of carapace not bearing spines | 23 | Abdomen completely unarmed | 28 |
| 20. Rostrum a long, slender spine irregularly armed with a few lateral spines | 41 | 28. Rostrum comparatively narrow | |
| | | <i>M. tenuirostris</i> Benedict, 1902 | |
| | | Rostrum broad | 29 |
| | | 29. Chelipeds and ambulatory legs moderately slender | |
| | | <i>M. tridentata</i> (Esmark, 1857) | |
| | | Chelipeds and ambulatory legs robust | |
| | | <i>M. bahamensis</i> Benedict, 1902 | |

30. Rostrum constricted in distal portion to form a pair of obtuse teeth; carapace and abdomen dorsally unarmed
M. armata (A. Milne-Edwards, 1880)
 Rostrum armed with a pair of sharp lateral spines; carapace and second, third, and fourth abdominal somites armed with regularly placed sharp spines
 31
31. Posterior margin of carapace unarmed
M. erinaceus (A. Milne-Edwards, 1880)
 Ridge along posterior margin of carapace armed with from four to eight spines
M. spinifer (A. Milne-Edwards, 1880)
32. Abdomen either armed with a median spine or tooth on second and third somites, or carinae on those somites are produced dorsally into broad, laminate lobes or form prominent tuberosities
 33
 Abdomen unarmed and not abnormally carinate or produced into large tuberosities
 39
33. A sharp median spine on second and third abdominal somites; rostrum either spinelike or thick and simply triangular
 34
 Carinae of second and third abdominal somites more or less strongly produced dorsally, often with a median tooth or tubercle, but no sharp spine; rostrum broad
 36
34. Frontal margin of carapace with triangular denticulate lobe behind base of antenna; blunt median tooth on posterior margin
M. robusta (A. Milne-Edwards, 1880)
 Frontal and posterior margins of carapace unarmed
 35
35. Rostrum more than two-thirds as long as remainder of carapace and strongly upcurved; antennal peduncle unarmed
M. curvirostra Whiteaves, 1874
 Rostrum about one-half as long as remainder of carapace and less strongly upcurved; antennal peduncle spinose
M. simplex (A. Milne-Edwards, 1880)
36. Dorsal surface of carapace roughened by large inflated areas
 37
 Dorsal surface not particularly inflated or roughened
 38
37. Rostrum bearing scattered small spines, not excavate
M. alaminos (p.18)
 Rostrum unarmed, but excavate
M. riveroi (p.21)
38. Chelipeds rather long and slender; lateral margins of carapace subparallel
M. longimanus (A. Milne-Edwards, 1880)
 Chelipeds shorter and stouter; lateral margins of carapace convex
M. brevimanus (A. Milne-Edwards, 1880)
39. Two small spines on anterior gastric region
M. platirostris (A. Milne-Edwards & Bouvier, 1894)
 Carapace unarmed dorsally
 40
40. Merus of third maxillipeds armed with long spines
M. abdominalis (A. Milne-Edwards, 1880)
 Merus of third maxillipeds armed with low, blunt teeth
M. polita (p.21)
41. Antennal spines present; more than seven spines on gastric region
M. colombiana n. sp. (p. 9)
 Antennal spines absent; less than seven spines on gastric region
M. bairdii (Smith, 1884)
42. Abdomen and posterior margin of carapace unarmed; no gastric spines
M. acuminata Benedict, 1902
 Abdomen and posterior margin of carapace armed with 2-3 spines; gastric spines present.
M. bradleyi n. sp. (p. 7)
43. One pair of enlarged spines on gastric region
M. nitida (A. Milne-Edwards, 1880)
 No gastric spines
M. livida (p.19)
44. Length of eyespine about equal to diameter of eye
 45
 Length of eyespine no more than one-third of diameter of eye
M. subspinoculata n. sp. (p.13)
45. Rostrum narrow, carinate, and slightly recurved; sharp spine on coxa of cheliped
M. spinoculata (p.23)

Rostrum broader, acarinate, and straight; no spine on coxa of cheliped

M. ramahtaylorae n. sp. (p.11)

46. Sides of rostrum from base to lateral spines straight; merus of cheliped shorter than carapace length (excluding rostrum) and with only one spine on proximal half of external surface

M. tridens (A. Milne-Edwards, 1880)

Sides of rostrum from base to lateral spines convex; merus of cheliped equal to carapace length (excluding rostrum) and with 3-4 spines on proximal half of external surface

M. transtridens n. sp. (p.15)

47. Short, sharp outer eyespine on cornea; rostrum with no dorsal carina

M. similis Smith, 1885

No outer eyespine on cornea; rostrum dorsally carinate

M. sundi Sivertsen & Holthuis, 1956

New Species

Munidopsis bradleyi new species

Figures 1, 2

Material—OREGON Sta. 4854 (11 10.8 N, 74 28.5 W) Caribbean Sea off Colombia, 549 m, 18 May 1964: 1 ovigerous female (Holotype, USNM No. 138227). OREGON Sta. 5928 (15 28 N, 61 12 W) Lesser Antilles, 585 m, 4 March 1966: 1 female (Paratype). OREGON Sta. 6696 (17 46 N, 62 59 W) Lesser Antilles off St. Barthélemy, 649-667 m, 18 May 1967: 1 male (Allotype, USNM No. 138228). OREGON Sta. 10843 (17 06 N, 62 17 W) Lesser Antilles off Nevis Island, 590 m, 8 Dec. 1969: 1 male (Paratype). OREGON Sta. 10844 (17 24 N, 62 28 W) Lesser Antilles, 620 m, 8 Dec. 1969: 1 male (Paratype). SILVER BAY Sta. 5146 (19 55.5 N, 72 00 W) western Atlantic Ocean north of Haiti, 860-914 m, 14 Dec. 1964: 2 females (Paratypes).

Diagnosis—A relatively large pubescent species of the *Galathodes* group with trident rostrum that is recurved in front of lateral spines; spines present on gastric and cardiac areas of carapace as well as on lateral and posterior margins; paired spines on second and third abdominal somites; epipods on chelipeds only.

Description—Rostrum broad at base, tapering gradually for 2/3 of its length where a single pair

of lateral spines arises; anteriorly rostrum becomes styliform and recurved; dorsal surface carinate and evenly pubescent; ventral surface glabrous to level of lateral spines and lightly pubescent anteriorly.

Gastric region of carapace armed with prominent pair of anterior gastric spines and a median unpaired spine behind, the latter followed by groups of tri- or quadri-denticulate protuberances; a pair of prominent spines near mid-line in posterior gastric region; cardiac region with a single median spine anteriorly. Dorsal surface uniformly pubescent, darker in female.

Anterior margin of carapace bears a prominent inwardly curving antennal spine; well-developed, curved antero-lateral spines equalling or exceeding size of those directly behind on lateral margin. Lateral border with 7-8 sharp spines: 3-4 are between anterior and posterior branches of cervical groove and the first two are the largest in size. Of the four spines behind posterior branch of cervical groove, the first is the largest. Posterior border of carapace with 2-4 spines near midline.

Abdomen pubescent over dorsal surface; second and third somites each bear a pair of sharp, forwardly pointing spines near mid-line.

Eyes small, movable, and spineless; partially covered by base of rostrum so as to be barely visible from above unless pulled out; separated from base of antenna by strong epistomial spine.

Basal article of antennular peduncle weakly inflated and bearing a long, thin dorso-lateral spine, a long, flattened ventro-lateral spine, a short triangular median spine, and a mid-ventral triangular denticulate extension.

Basal segment of antennal peduncle bears a very long, strong medial spine and a rounded lateral lobe at anterior margin. Second segment bears a strong spine on both lateral and medial aspects of anterior margin. No spines on third segment; dorsal gap bordered by denticled prominences. Fourth segment with blunt double tooth on lateral side of anterior margin and with deep notch dorsally.

Exopod of third maxilliped barely exceeds spine on distal edge of merus of endopod. Inner border of latter has two large spines on proximal half and one short spine preceding a rounded prominence on distal end.

Chelipeds markedly longer than ambulatory legs. On female holotype first ambulatory leg

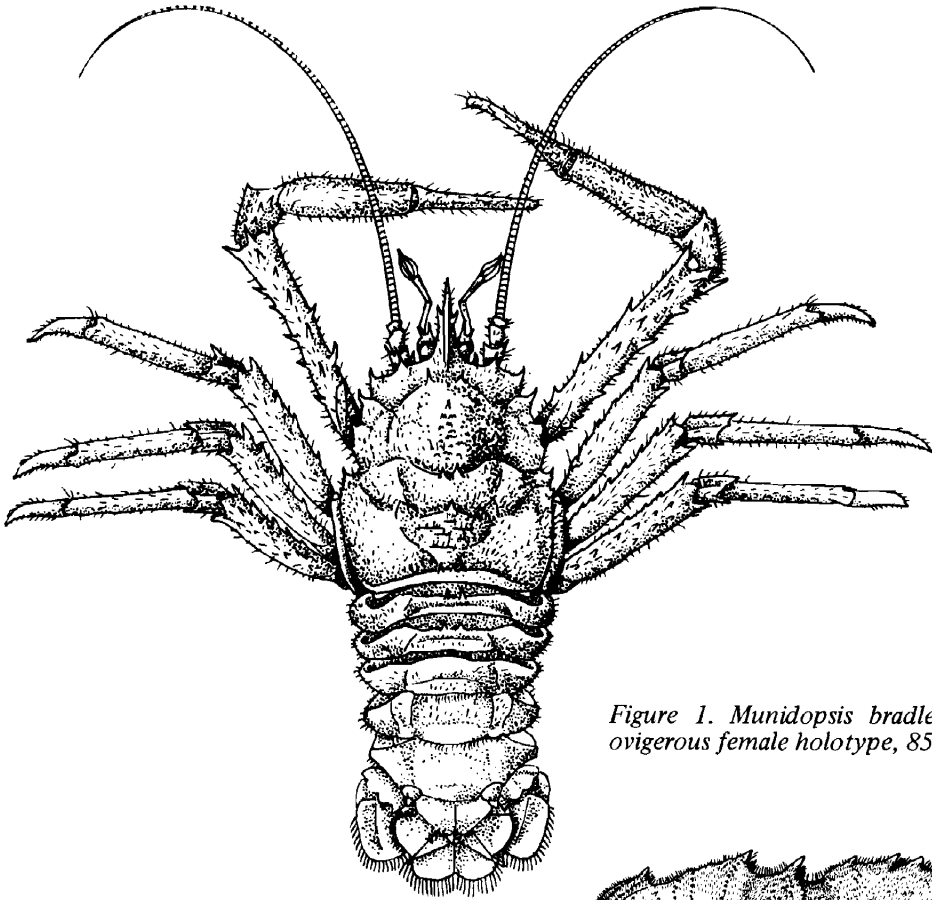


Figure 1. *Munidopsis bradleyi* n. sp., dorsal view of ovigerous female holotype, 85% of actual size.

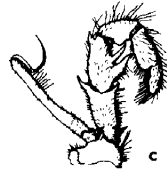
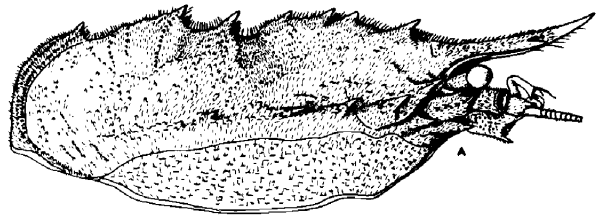


Figure 2. *Munidopsis bradleyi* n. sp.: a) lateral view of carapace of male paratype X 1.9; b) right antennal peduncle of male allotype X 3; c) right third maxilliped of male allotype, ventral view X 3; d) right antennule of male paratype, ventral view X 3; e) right cheliped of male allotype X 1.05.



reaches just beyond carpus of cheliped, second reaches middle of carpus, and third to anterior end of merus. In smaller male specimens first ambulatory leg reaches only to middle of carpus and other two are proportionately shorter. All pereopods are pubescent. Chelae are long, narrow, and spineless; palm flattened and 1.3 times as long as fingers; no gape in female holotype or in the somewhat smaller male specimens. Carpus of cheliped bears two spinose ridges on outer surface, as does merus (4-8 spines in each row); in addition the merus has three spines on medial aspect, two proximal and one distal. Carpus of ambulatory legs has 2-3 spines on leading edge; merus similarly spinose (5-7 spines). Epipods present on chelipeds only.

Inner angle of protopod of uropod with v-shaped notch bordered on each side by one or more spines.

Size—Specimens examined range in size from 12 to 33 mm c.l. Largest male is 31 mm. The holotype and only ovigerous female measures 33 mm c.l. (43 mm with rostrum); width, 31 mm; cheliped, 95 mm; chela, 38.5 mm. More than 100 eggs present on abdomen; size of eggs approximately 1 mm diameter. Male allotype measures 26.5 mm c.l.

Remarks—*Munidopsis bradleyi* is similar to *M. gilli* Benedict, 1902 and *M. cubensis* Chace, 1942 but epipods are present only on chelipeds and not on first two ambulatory legs as in those two species. In addition, *M. bradleyi* has paired median spines on third abdominal somite while they are single in *M. cubensis* and *M. gilli*.

M. bradleyi may be distinguished from *M. acuminata* Benedict, 1902 by the presence of spines on the gastric region, posterior margin of carapace, and on second and third abdominal somites.

Dorsal spines on male paratypes are short and blunt, apparently having been broken off. The male specimens in the type series are smaller than the ovigerous female holotype and may not be mature specimens.

Munidopsis bradleyi is named for Donald O. Bradley, student of carcinology, University of Southern Mississippi, who first recognized this form as a new species.

Distribution—Western Atlantic Ocean and Caribbean Sea between 11° N and 20° N. Depth range: 549-914 m.

Munidopsis colombiana new species

Figures 3,4

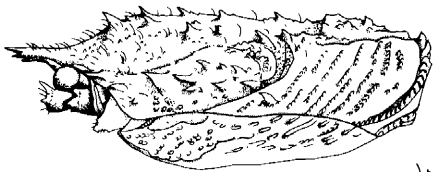
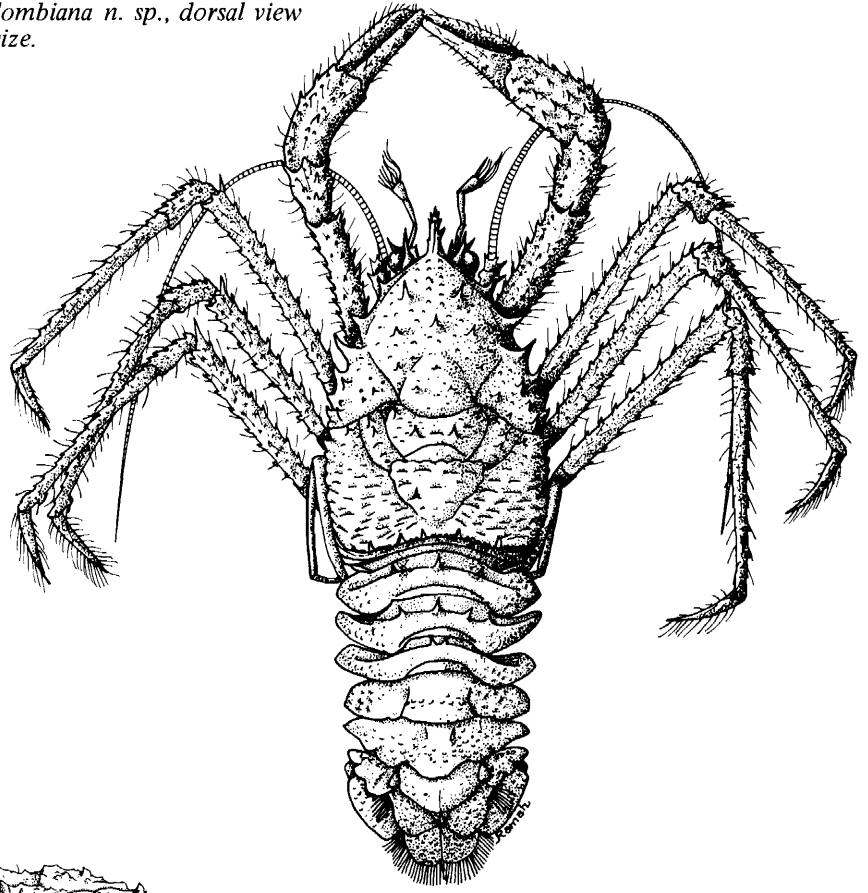
Material—ALAMINOS Sta. 70A10-48 (14 29.5° N, 74 24.8° W) Caribbean Sea, Colombian Basin, 4151 m, 24 July 1970: 2 males (Holotype, USNM No. 138229), 3 ovigerous females (Allotype, USNM No. 138230 and Paratypes, USNM No. 138231).

Diagnosis—Three ambulatory legs extending to or beyond tip of chelipeds; narrow, recurved rostrum with 1-3 lateral teeth per side; spinous carapace and abdomen. A very deep-water form (over 4000 m).

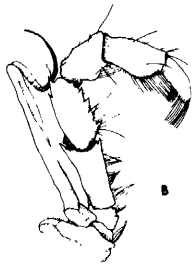
Description—Rostrum styliform, moderately recurved, strongly vaulted dorsally, and with 1-3 pairs of lateral spines. When three pairs of spines are present (as in the male holotype) two strong pairs are located on anterior one-third of rostrum, and proximal to these is a third unequal pair. Carapace longer than broad and widest in posterior one-third. Dorsal surface of carapace moderately spinose, with spines often imperfectly paired and varying between specimens. The 25 or so spines borne on the dorsum are subdivided on regions as follows: approximately 10-15 on gastric region, 3-6 on triangular area between anterior and posterior branches of cervical groove (excluding teeth on lateral border), approximately 5-10 spines on cardiac region, and 3-4 on branchial region adjacent to cardiac portion. No spines on posterolateral surface of carapace. In addition, dorsum is moderately hairy, with hairs arranged in transverse lines of 2-5 hairs each.

Anterior border of carapace oblique; lateral to rostrum it bears a sharp antennal spine and a slightly larger antero-lateral spine. Lateral border of carapace bears a large spine twice the size of antero-lateral spine just posterior to anterior branch of cervical groove, and is followed by 2-5 smaller spines before posterior branch of cervical groove. Immediately behind this groove are 1-2 more spines with the larger one about the size of antero-lateral spine. Remainder of lateral border of carapace is spineless. Triangular area outlined by anterior and posterior branches of cervical groove with as many as 12 spines, including lateral spines. Posterior border of carapace bears 4-10 forwardly curved spines, with medial pair the strongest.

Figure 3. *Munidopsis colombiana* n. sp., dorsal view of male holotype, actual size.



A



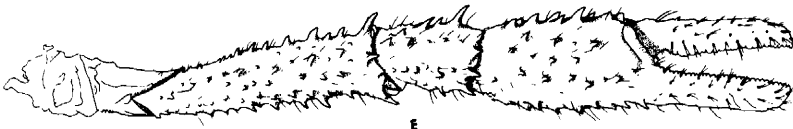
B



C



D



E

Figure 4. *Munidopsis colombiana* n. sp., male holotype: a) lateral view of carapace and rostrum X 1.4; b) right third maxilliped, ventral view X 2.25; c) right antennal peduncle, ventral view X 2.25; d) right antennule, ventral view X 2.25; e) right cheliped X 1.3.

Segments of sternum separated by strong tuberculate ridges, each bearing a single row of hairs.

Second, third, and fourth abdominal somites are spinose. Second and third somites with three strong spines on a transverse line along middle. Fourth somite with one or two spines near midline. Posterior margin of sixth abdominal somite strongly sinuate.

Eyestalk prolonged medially into sharp spine as long as diameter of eye and extending to midpoint of rostrum; some specimens have a short, outward-pointing spine at lateral base of eyestalk on right side but not on left.

Spination on peduncular segments of antennule and antenna is quite variable between specimens and on right and left sides of any one specimen. Middle portion of ventral surface of basal antennular segment bears a transverse row of small spines. Distal border with 4-5 long spines, 2-3 of which are medial and two are lateral. Each of these spines may bear accessory spinules.

Basal segment of antennal peduncle bears a broad serrated ventro-medial tooth with a bifid tip and a smaller lateral tooth which may also be bifid. Distal margin of second antennal segment with a strong lateral spine, a short mid-dorsal spine which may be bifid, and a ventro-medial spine which may also be bifid. Third antennal segment with 4-5 spines on distal margin: 1 mid-dorsal, 1-2 ventral, and 1 each on medial and lateral edges. The medial spine is the strongest. The same is true of the fourth antennal segment.

Antepenultimate joint of exopod of third maxilliped extends beyond merus of endopod. Outer margin of merus terminates in a sharp spine and a second spine is found a short distance proximally; inner margin bears 5-8 teeth of which 3-5 are larger than the remaining ones.

Chelipeds in females shorter than first ambulatory legs and slightly more than three-fourths the length of fully extended body including rostrum. In male holotype right cheliped is larger than left, and first ambulatory legs exceed both chelipeds. In smaller male paratype, chelipeds are of equal size. Upper surface of chela spinose; lower surface with five longitudinal rows of tubercles; palm about as long as fingers and about twice as long as carpus; upper surface of carpus with two forwardly diverging rows of spines; lower surface minutely

tuberculate; merus strongly spinose on both surfaces.

First ambulatory leg considerably longer than remaining legs; dactylus compressed and with two rows of long setae on upper margin. Remainder of articles, which tend to be flattened, are spinose on all surfaces, but more strongly on anterior edges. No epipods on chelipeds or ambulatory legs.

Uropod with both exopod and endopod longitudinally carinate; tuberculate and setose lateral to carina, smooth medially.

Size—Carapace length of male holotype, 34 mm (41 mm including rostrum); carapace width, 26 mm; right cheliped, 77 mm; left cheliped, 62 mm; body length fully extended including rostrum, 77 mm. Ovigerous female allotype, 31 mm c.l.; other ovigerous females: 28.5 & 26 mm c.l. Male paratype, 22 mm c.l.

Remarks—*Munidopsis colombiana* is a member of the Orophorhynchus group of *Munidopsis* and most closely resembles *M. bairdii* (Smith, 1884) from which it differs as follows: (1) rostrum relatively shorter and with lateral spines more variable (1-3 pairs, with two pairs most common) in contrast to the three pairs of evenly distributed lateral spines in *M. bairdii*; (2) dorsal surface of carapace more spinose; (3) antennal spines present in *M. colombiana*, absent in *M. bairdii*; (4) second, third, and fourth abdominal somites spinose in *M. colombiana* in contrast to no abdominal spines in *M. bairdii*; and (5) merus of third maxillipeds with 5-8 teeth on inner margin, 3-5 of which are larger, in contrast to four teeth of like size in *M. bairdii*.

Munidopsis colombiana is named for the Colombian Basin, from which location it was collected in the Caribbean Sea.

Munidopsis ramahtaylorae new species

Figures 5,6

Material. OREGON Sta. 6696 (17 46 N, 62 59 W) Lesser Antilles, 649-667 m, 18 May 1967: 1 male (Holotype, USNM No. 138232). ALBATROSS Sta. 2131 (19 56 44 N, 75 50 49 W) south of Cuba, 368 m, 27 Feb. 1884: 1 male (Paratype, USNM No. 7807).

Diagnosis.—A relatively small species characterized by absence of spines on dorsal surfaces of carapace and abdomen and presence of uniformly

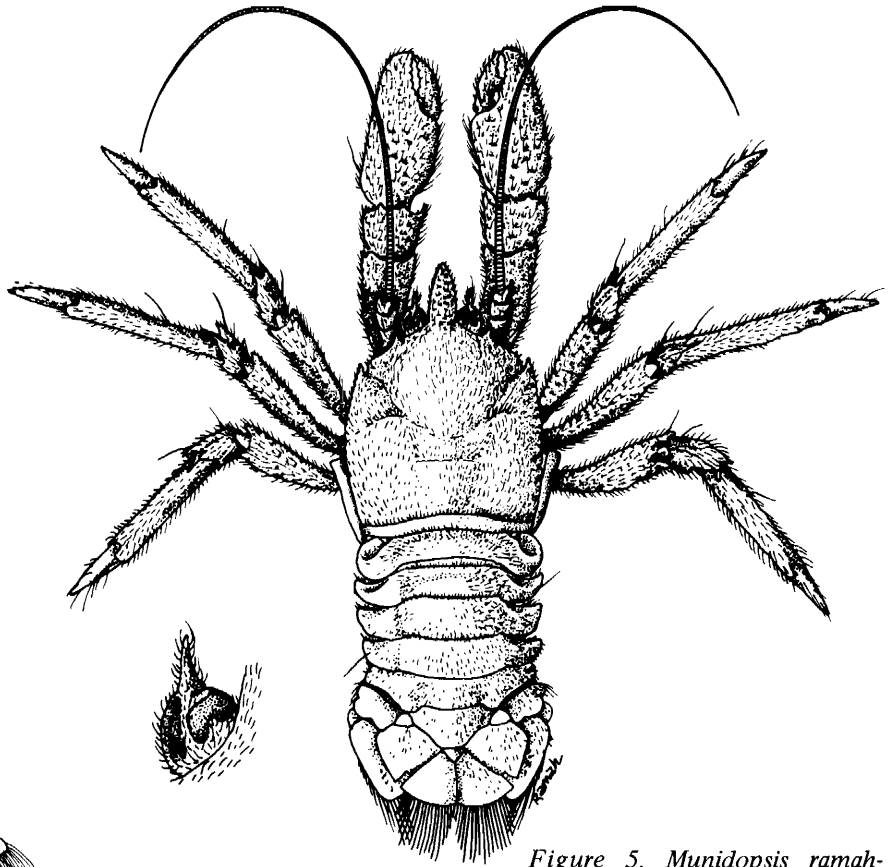
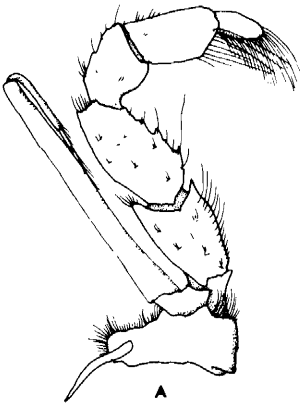
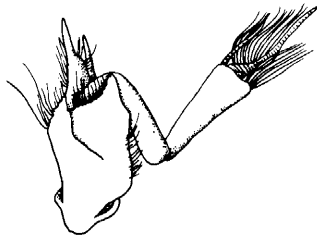


Figure 5. *Munidopsis ramah-taylorae* n. sp., male holotype: entire animal, dorsal view X 2.5, and enlargement of left eye, dorsal view X 8.5.

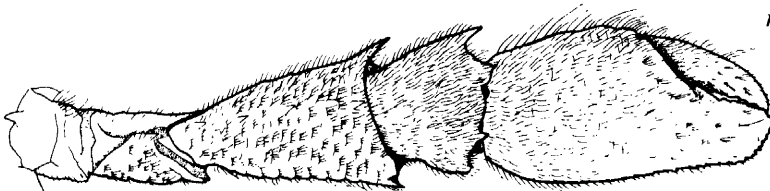


A



B

Figure 6. *Munidopsis ramah-taylorae* n. sp., male holotype: a) right third maxilliped X 10.5; b) right antennule X 10.5; c) right cheliped X 4.5.



C

distributed pubescence; rostrum fairly broad and acarinate; eye relatively large and adorned with calcified bridges between eyestalk and central eyespine; ambulatory legs do not exceed chelipeds; chelae relatively large and broad.

Description—Rostrum relatively broad and acarinate; sides parallel for half their length and then turn gradually to the middle producing a sword-like blade bearing a terminal spine (spine broken in holotype); edges weakly serrate anteriorly; slightly deflexed so that tip is level with lower part of eye. Dorsal surface pubescent; ventral surface smooth, but pubescent anteriorly.

Carapace slightly longer than broad, spineless on dorsal surface, usually covered with a moderately dense pubescence. Cervical groove more strongly developed along its anterior branch. Anterior margin of carapace marked by large antennal spine and the absence of an antero-lateral spine. Lateral margin of carapace bears a single spine just behind anterior branch of cervical groove. Posterior margin spineless, marked by a single broad ridge.

Sternum smooth and glabrous except for delicate ciliated lines between segments and pubescence on anterior sternal plate; the latter bears two pairs of sharp spines, of which the inner is the longer and is separated from outer by a space twice the width of the spine.

Dorsal surface of abdomen is spineless throughout, faintly pubescent, and with transverse sculpturing weakly developed.

Eyes immovable and armed with a conical pubescent spine in middle of cornea that is approximately equal in length to diameter of eye. Eyespine connected to eyestalk by a narrow calcified bridge overgrowing cornea; the same overgrowth forms additional incomplete bridges around base of cornea.

Antennular peduncle weakly inflated and bearing the usual pair of lateral spines, of which the ventral spine is much the larger; also a short tooth-like spine on medial edge.

Basal segment of antennal peduncle has two sharp spines: one medial, one lateral; the former is the longer. Second segment is pubescent and bears a spine on antero-lateral border and a smaller one on medial border. Third and fourth segments pubescent and with lateral spines.

Third maxilliped relatively smooth and nearly hairless. Antepenultimate segment of exopod

reaches beyond middle of carpus of endopod. Inner margin of merus of endopod bears two closely pressed spines on its proximal half, and two minute spines distally.

Chelipeds extend beyond ambulatory legs. Chelae moderately inflated and pubescent but spineless; fingers slightly shorter than palm; outer border of immovable finger serrate; cutting edges carry only a few blunt teeth resulting in a small gape. Distal margin of carpus with three spines on upper surface: one external, one internal, and one mid-dorsal; lower surface marked by weak crenulations with a sharpened articulation point mid-ventrally. Distal margin of merus bears five spines: a strong dorso-internal, a strong ventro-internal, a small mid-dorsal, a ventro-external, and a blunt, tooth-like dorso-external spine. Distal margin of ischium with one sharp spine dorsally and one or two small ventro-external spines.

Ambulatory legs pubescent; distal margin of carpi marked by acute double spines dorsally. Upper margin of middle section of carpus of first ambulatory leg bears a sharp spine on the leading edge of right leg only, but it appears to be missing from left leg.

Size—The male holotype measures 11 mm c.l. (15 mm including rostrum); carapace width, 10 mm; total length with rostrum, 28 mm; cheliped, 21 mm. The male paratype measures 10 mm c.l. (14 mm including rostrum).

Remarks—*M. ramahtaylorae* is similar to *M. spinocolata* (A. Milne-Edwards, 1880) except for the following differences: (1) more pubescent; (2) carapace proportionately broader; (3) rostrum broader, more deflexed, and less sharply carinate; (4) chelipeds shorter, broader, and more robust; (5) no spine on coxa of cheliped; (6) ornamentation of eye more developed.

The ALBATROSS specimen from south of Cuba was found on the shelves of the U.S. National Museum of Natural History under the label of "*Munidopsis spinocolata* A. Milne-Edwards" but has not been reported in the literature to our knowledge.

Named for Mrs. Ramah Taylor, artist, whose drawings have been an aid to this work.

***Munidopsis subspinocolata* new species**
Figures 7, 8

Munidopsis spinocolata.—Pequegnat & Pequegnat, 1970, p. 158 (part).



Figure 7. *Munidopsis subspinoculata* n. sp.: a) lateral view of carapace and rostrum of male holotype X 3.4; b) dorsal view of male holotype X 2.55; c) *M. spinoculata* (A. Milne Edwards, 1880) dorsal view of carapace of holotype X 2.55.

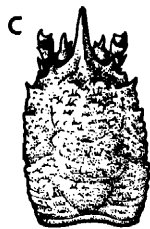
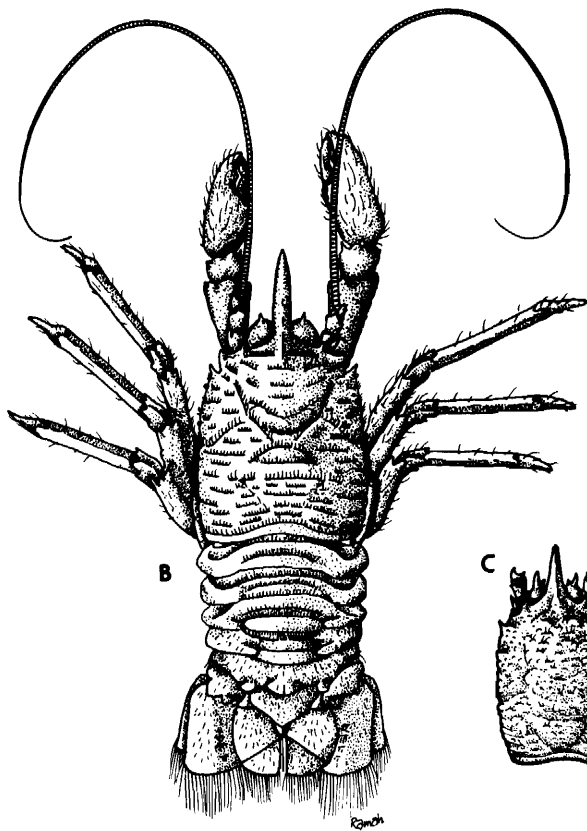


Figure 8. *Munidopsis subspinoculata* n. sp., male holotype: a) right third maxilliped, ventral view X 10.1; b) right antennule, ventral view X 9; c) right chela X 4.5; d) right antennular peduncle, ventral view X 4.05.

Material—OREGON Sta. 4902 (09 02.4 N, 76 31.5 W) Caribbean Sea off Colombia, 732 m, 28 May 1964: 1 ovigerous female (Allotype, USNM No. 138234). ALAMINOS Sta. 69A11-27 (18 54 N, 94 58.8 W) SW Gulf of Mexico, 777-823 m, 14 Aug. 1969: 1 male (Paratype, USNM No. 138235). ALAMINOS Sta. 70A10-31 (11 33.8 N, 73 45.1 W) Caribbean Sea off Colombia, 732 m, 17 July 1970: 1 male (Holotype, USNM No. 138233).

Diagnosis—A moderately small species (up to 11 mm c.l.); proportionately large, transversely ovoid eyes; short spine rising from center of cornea; long, narrow rostrum slightly constricted at base; closely related to *M. spinocolata*.

Description—Rostrum narrow, slightly constricted at base, extending past end of antennal peduncle and beyond middle of carpus of chelipeds, with a median dorsal carina and a faint ventral carina. Frontal margin of carapace with antennal spine 2-3 times larger than forward-pointing antero-lateral spine.

Carapace longer than broad, broadest in posterior region; dorsal surface spineless but covered with numerous straight or arched ciliated ridges; lateral margin with a small, sharp spine behind anterior branch of cervical groove; no other spines on lateral margin. Posterior margin unarmed, bordered with a wide, flat, sinuous ridge.

Sternum smooth, segments separated by faintly setose lines; first sternal plate bears a pair of long, very sharp spines on antero-medial edge, sometimes a smaller anterior spine present on one side only; some specimens bear a tiny spine or a series of small serrations just posterior and lateral to the long spines.

Abdomen spineless and otherwise smooth except for lines of cilia arising from a deep transverse groove on each somite.

Eyes large, their widths together equaling about half the width of anterior margin of carapace; a sharp short spine arising from center of cornea, its length little more than 1/3 of corneal width; surface of cornea provided with scattered hairs.

Basal segment of antennular peduncle armed anteriorly with two lateral spines: one short acute dorsal spine and one stout ventral spine three times as long; midventrally there is a broadly triangular tooth.

Basal segment of antennal peduncle with a long, strong medial and a short triangular lateral

spine; anterior margin on ventral side is notched, less deeply in female specimen. Second segment has a sharp lateral spine at anterior margin and a rounded medial lobe. Third segment bears a small, sharp medial spine. Fourth segment has a relatively large lateral tooth along base of flagellum.

Antepenultimate segment of exopod of third maxilliped long and narrow, especially in male, reaching past merus of endopod and overlapping base of antennular peduncle; inner margin of merus of endopod bears 3-4 small teeth, of which proximal two are the larger.

Chelipeds slightly unequal in size and moderately inflated; fingers nearly equal to length of palm; immovable finger denticulate on outer edge; distal margin of carpus bears a sharp internal spine; merus armed with three distal spines: one dorso-internal, one ventro-internal, and one ventro-external. First pair of ambulatory legs extend to tip of the longer cheliped; remaining legs progressively shorter; propodi, carpi, and meri dorsally carinate and terminate in distal spines on carpus and merus.

Size—Male holotype: 11 mm carapace length (15 mm including rostrum); carapace width, 9 mm; left cheliped, 13 mm; left chela, 4.5 mm; right cheliped, 15.5 mm; right chela, 7 mm. Ovigerous female allotype: 10 mm c.l. (14 mm including rostrum), carapace width, 8 mm. Male paratype: 10 mm c.l. (14 mm with rostrum); carapace width, 8.5 mm.

Remarks—*Munidopsis subspinocolata* is very closely related to *M. spinocolata* (A. Milne-Edwards, 1880) but differs as follows: (1) larger eye with relatively shorter eyespine; (2) rostrum narrower and less recurved; (3) chelipeds slightly unequal in size; (4) chelipeds longer, more inflated and with less gape at base of fingers; (5) carapace more inflated and less narrow anteriorly; (6) antero-lateral spine of carapace larger and more acute; (7) only one pair of elongate anterior spines on first thoracic sternite in contrast to two pairs in *M. spinocolata*; (8) transverse ciliated ridges on dorsal surfaces of carapace and abdomen more strongly developed.

***Munidopsis transtridens* new species**

Figures 9, 10

Material—OREGON Sta. 4566 (23 05 N, 86 09 W) SE Gulf of Mexico, 1280 m, 6 Dec. 1963: 1 female (Holotype, USNM No. 138236).

Figure 9. *Munidopsis transtridens* n. sp., dorsal view of female holotype X 3.8.

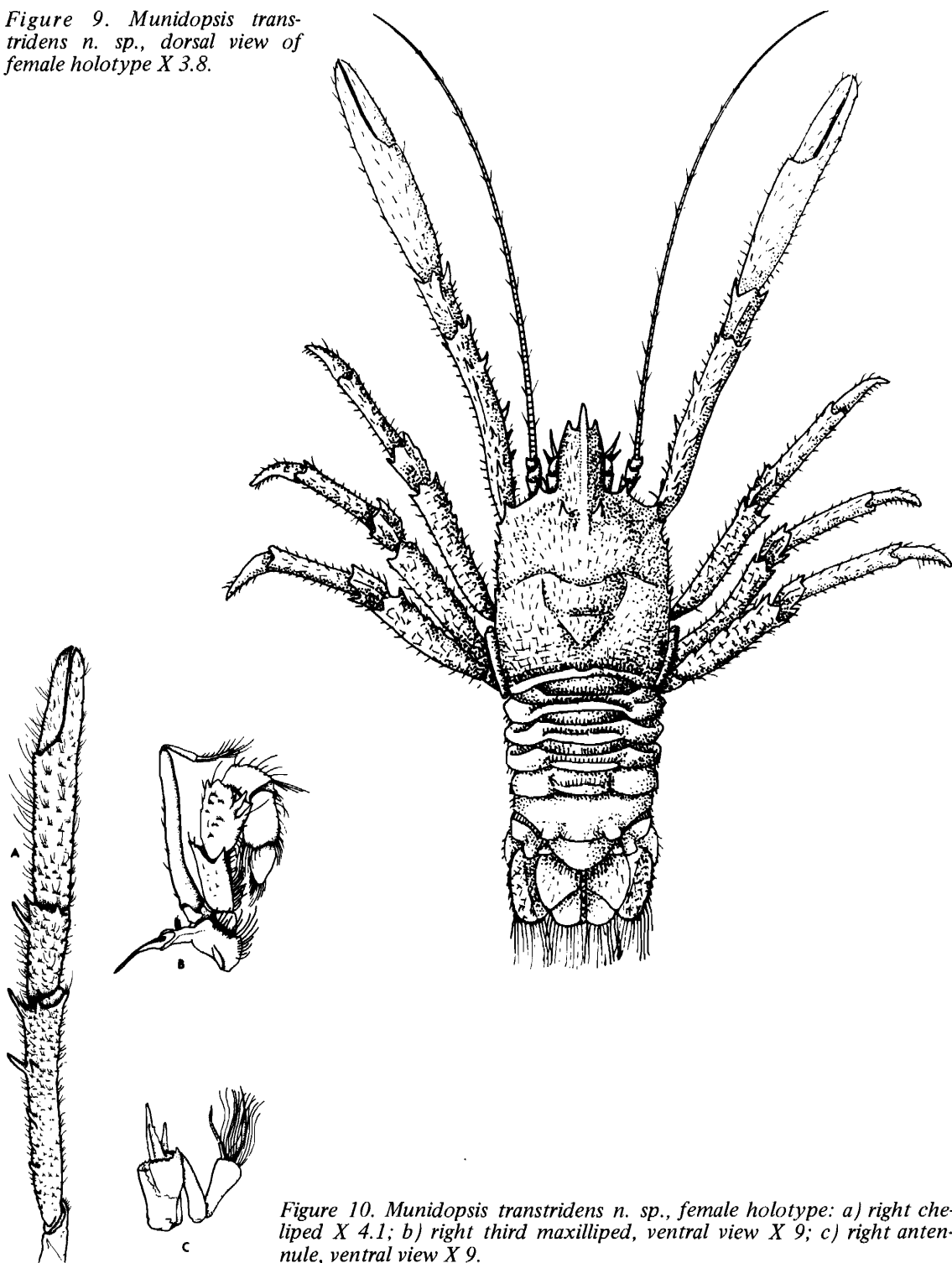


Figure 10. *Munidopsis transtridens* n. sp., female holotype: a) right cheliped X 4.1; b) right third maxilliped, ventral view X 9; c) right antennule, ventral view X 9.

Diagnosis—A member of the *Galathodes* group of *Munidopsis* with tridentate rostrum having dorsal carina and convex sides between base and lateral spines; long, slender chelipeds, merus equal to carapace length and provided with four internal spines. No epipods on pereopods.

Description—Rostrum broad, tridentate, carinate dorsally, and with convex sides that are minutely serrate beyond eyes; several small denticles occur on the gap between central and lateral spines. Dorsal surface bears evenly spaced hairs; ventral surface glabrous, slightly arched, and faintly carinate. Frontal margin runs transversely between rostrum and antennal spine, then slopes at 45° angle to the conspicuous and slightly diverging antero-lateral spine. A small, acute epistomial spine lies between the eyes and antennal peduncle.

Carapace slightly longer than broad; a pair of anterior gastric spines are only spines on dorsal surface of carapace, which is covered with widely spaced long hairs. Anterior branch of cervical groove only faintly evident, posterior branch stronger. Lateral margin bears four spines, three of which lie between branches of cervical groove and fourth behind posterior branch. Posterior margin slightly sinuous and unarmed.

Sternum smooth and spinous.

Abdomen spineless; terga of second and third somites transversely ridged, separating two transverse lines of hairs.

Eyes movable, ovoid in longitudinal axis, and reaching to midpoint of rostrum.

Basal segment of antennular peduncle armed with two long slender spines on anterior margin (one dorso-lateral and one ventro-lateral), a short dorso-medial spine, and a denticulate ventro-medial ridge. Antennular flagellum, when folded, disappears completely beneath rostrum.

Basal segment of antennal peduncle wide, armed with a ventro-lateral spine and a slightly longer ventro-medial spine. Second segment with one medial and one lateral spine. Third segment minutely denticulate on medial side of anterior border. Fourth segment with ventro-lateral denticulate lobe, a slightly more produced dorso-lateral lobe, and a denticulate medial ridge.

Inner margin of third maxilliped armed with two long spines proximally and 3-4 denticles distally.

Chelipeds long, narrow, setose, and more than two times length of carapace. Chela unarmed ex-

cept for denticles at tips of fingers; fingers slightly shorter than palm, cutting edges crenulate. Distal margin of carpus with a prominent dorso-internal spine, a smaller dorso-internal spine above articulation point, and a dorso-external spine; ventral surface denticulate anteriorly on each side of articulation point. Merus equal to carapace length; distal margin with four spines: two prominent internal spines separated by an internal lobe, a smaller dorso-external spine, and a ventro-external spine. Proximally on the merus there is an internal row of three spines, a single prominent dorso-internal spine, and a mid-dorsal row of five smaller spines.

First ambulatory leg reaches almost to distal end of carpus of cheliped; remaining legs progressively shorter. Carpi with three carinae: dorsal (terminating in a distal spine), dorso-external, and external. Meri with dorsal row of 5-7 spines.

Exopod of uropod with rounded margin and smooth dorsal surface, except for few minute spinules on external side of dorsal surface; endopod serrate on external and posterior margins, dorsal surface smooth medially, tuberculate laterally.

Size—The female type specimen has a carapace length of 8 mm (11.5 mm including rostrum); carapace width, 7 mm; length of cheliped, 19 mm; merus of cheliped, 8 mm; chela, 9.5 mm.

Remarks—As the name implies, *M. transtridens* is related to *M. tridens* (A. Milne-Edwards, 1880) except for the following differences: (1) sides of rostrum from base to lateral spines convex compared to straight in *M. tridens*; (2) rostrum less recurved; (3) eyes less pigmented; (4) chelipeds more slender, not as robust, and relatively shorter (two times carapace length) than in *M. tridens* (2.6 times carapace length); (5) merus of cheliped relatively longer (equal to carapace length) than in *M. tridens* (shorter than carapace length) and with 3-4 internal spines in contrast to only one in *M. tridens* (6) distal portion of ischium of cheliped with a ventro-medial serrate ridge instead of an acute spine; (7) inner margin of merus of third maxilliped with two large spines proximally followed by 2-3 denticles distally instead of two spines and one denticle (in the *M. tridens* holotype) or two fused spines and one denticle (in Chace's ATLANTIS specimen of *M. tridens*); (8) a deeper-dwelling species (1260 m versus 360-540 m for *M. tridens*).

M. transtridens is perhaps even more similar to *M. mina* Benedict, 1902 from the Pacific (off Galapagos Islands) except that (1) sides of rostrum are

convex, not straight; (2) dorsal carina of rostrum more prominent; (3) merus of cheliped relatively longer and with greater number of internal spines; and (4) spination of anterior border of carpus of cheliped differs in that the ventro-external spine is absent in *M. transtridens* present in *M. mina*.

Extensions of Range

Munidopsis alaminos

Pequegnat & Pequegnat, 1970

Figure 11

Munidopsis alaminos Pequegnat & Pequegnat, 1970, p. 142, text-figs. 5-5, 5-6, & 5-7.

Material—OREGON Sta. 4293 (07 14 N, 52 55 W) tropical Atlantic off French Guiana, 732 m, 21 March 1963; 2 males. OREGON Sta. 5929 (15 39 N, 61 10 W), off Dominica, 649 m, 5 March 1966; 1 male. OREGON Sta. 10606 (07 41 N, 53 48 W) tropical Atlantic off French Guiana, 677 m, 10 May 1969; 1 female. OREGON Sta. 10799 (07 31 N, 53 11 W) tropical Atlantic off French Guiana, 716 m, 17 Nov. 1969; 1 ovigerous female. OREGON Sta. 10801 (07 37 N, 53 24 W) tropical Atlantic off French Guiana, 657 m, 18 Nov. 1969; 1 male. WESTERN GULF Sta. 32 (27 36 N, 95 14 W) NW Gulf of Mexico, 810-828 m, 20 July 1969; 1 ovigerous female.

Remarks—*M. alaminos*, previously known only from the NE and NW Gulf of Mexico between 25 and 30 degrees N latitude, has now been taken in the Caribbean Sea and tropical Atlantic as far south as 7 N.

The larger male specimen from OREGON station 4293 (Figure 11) from off French Guiana differs from the male holotype of *M. alaminos* from the Gulf of Mexico in that the cheliped is two and one-half times the length of the carapace instead of one and one-half times as long, and the chela is enlarged with a wide gap between the fingers. These differences may be accounted for by the fact that the southern specimen is a larger and more mature male, indicating that the type, unfortunately, is not a mature specimen.

It should be noted that, although the holotype and allotype have relatively smooth eyestalks, the degree of spination on the eyestalks varies among specimens of *M. alaminos* from both the Gulf and Caribbean.

The following four specimens, all from off French Guiana, have a straight (not sinuate) posterior margin on the carapace and a more rounded (not parallel) appearance to the lateral margins of the carapace due to inflation of the branchial areas:

OREGON Sta. 4293 2 males (12.5 & 8.5 mm c.l.)

OREGON Sta. 10606 1 female

OREGON Sta. 10801 1 male (13.5 mm c.l.)

The ovigerous female from OREGON Sta. 10799, also from off French Guiana, has the rounded lateral margins of the carapace, but the posterior margin is sinuate, as in the more northern forms, and not straight as in the other French Guiana specimens.

The key to the identification of western Atlantic specimens of *Munidopsis* has been modified in this paper to account for the long chelipeds in mature *M. alaminos* males.

Known size range: 8.5 to 14 mm c.l. (excluding rostrum). Smallest ovigerous female, 9 mm c.l.

Distribution—NE and NW Gulf of Mexico, Caribbean Sea, and tropical Atlantic off French Guiana in 504 to 828 m.

Munidopsis crassa Smith, 1885

Munidopsis crassa Smith, 1885, p. 494; 1886, p. 645, pl. 4—Bouvier, 1922, p. 47, pl. 1 fig. 5—Gordon, 1955, p. 238. —Sivertsen & Holthuis, 1956, p. 46, pl. 4 fig. 1.

Material—ALAMINOS Sta. 70A10-48 (14 29.5 N, 74 24.8 W) Colombian Basin, 4150 m, 24 July 1970; 3 males, 3 females. ALAMINOS Sta. 70A10-54 (20 30 N, 85 34 W) Yucatan Basin, 4554 m, 28 July 1970; 1 female.

Size—Male specimens range in size from 19 to 25 mm c.l.; females range from 23-28 mm c.l. No ovigerous females are known.

Remarks—*Munidopsis crassa*, previously known only from the Atlantic Ocean off the east coast of the United States between 36 and 41 degrees N latitude and in the eastern Atlantic between 29 and 46 degrees N latitudes (from the Bay of Biscay, off the Azores, and off the Canary Islands), has now been taken from two deeps of the Caribbean Sea. Depth range, 3100-4700 m.

M. crassa is very similar to *M. geyeri* Pequegnat & Pequegnat, 1970 but differs in that there are two pairs of large spines on the anterior gastric

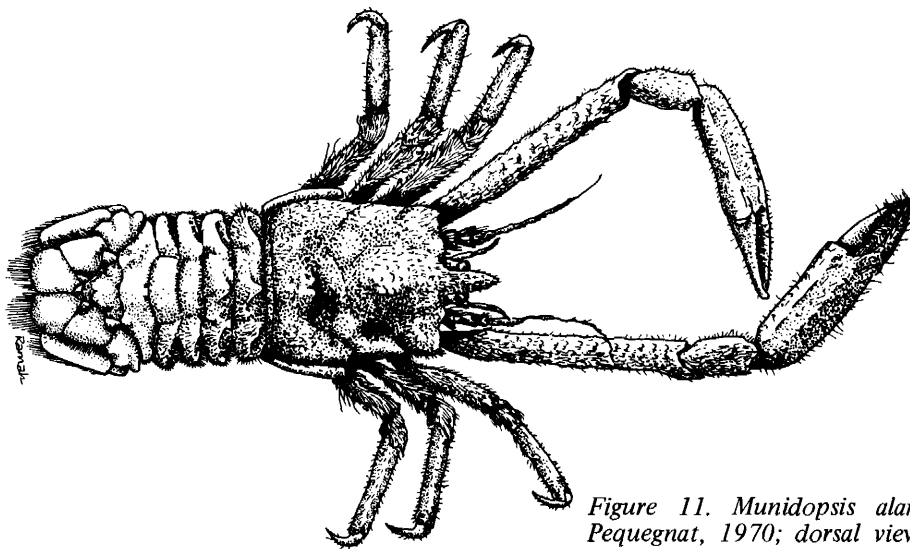


Figure 11. *Munidopsis alaminos* Pequegnat & Pequegnat, 1970; dorsal view of male specimen from OREGON Station 4293, actual size.

region of the carapace in contrast to only one pair in *M. geyeri*. Also the carapace, especially the gastric region, is more spinous and there are more lateral spines on the carapace. A small or minute external eyespine is present in *M. crassa*, absent in *M. geyeri*. They occupy similar depth ranges and, in fact, were taken at the same location at ALAMINOS Sta. 70A10-48 in the Colombian Basin.

***Munidopsis expansa* Benedict, 1902**

Munidopsis expansa Benedict, 1902, p. 282, text-fig. 26.—Chace, 1942, p. 81.—Pequegnat & Pequegnat, 1970, p. 147.

Material—OREGON Sta. 3635 (16 58 N, 87 53 W) Caribbean Sea off British Honduras, 457-732 m, 10 June 1962: 1 female.

Remarks—This is the first record of this species in the Caribbean Sea. The three previously known specimens came from the Atlantic Ocean off northern Florida (ALBATROSS Sta. 2663) and from the Florida Straits (ATLANTIS Sta. 2995 and 3306). Known size range: 15.1 mm-21.5 mm c.l. Depth range: 600-900 m.

Munidopsis geyeri

Pequegnat & Pequegnat, 1970

Munidopsis geyeri Pequegnat & Pequegnat, 1970, p. 149, text-figs. 5-9 & 5-10.

Material—ALAMINOS Sta. 70A10-48 (14 29.5 N, 74 24.8 W) Colombian Basin, 4151 m, 24

July 1970: 2 males. ALAMINOS Sta. 70A10-50 (15 50 N, 77 24.5 W) south of Jamaica, 2790-2650 m, 25 July 1970: 2 males.

Remarks—Previously known only from the holotype taken in the SW Gulf of Mexico, *M. geyeri* has now been taken in the Caribbean Sea. These records also extend its depth range from 2926 m to 4151 m. See remarks under *M. crassa* for differences between these two species.

Munidopsis gulfensis

Pequegnat & Pequegnat, 1970

Munidopsis gulfensis Pequegnat & Pequegnat, 1970, p. 151, fig. 5-11.

Material—ALAMINOS Sta. 70A10-51 (17 17.1 N, 79 50.6 W) SW of Jamaica, 1097 m, 26 July 1970: 1 male.

Remarks—Known previously only from the male holotype taken in the SW Gulf of Mexico at 1400 m, *M. gulfensis* has now been taken in the Caribbean Sea SW of Jamaica at 1097 m. Known size range: 6.5 to 9.0 mm c.l.

Munidopsis livida

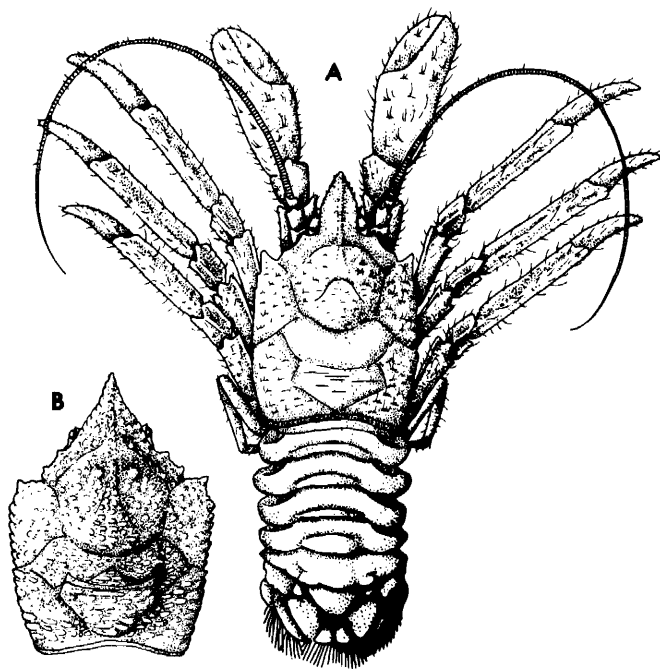
(A. Milne-Edwards, 1886)

Figure 12

Elasmonotus lividus A. Milne-Edwards, in Perrier, 1886, fig. 242.

Orophorhynchus lividus—Milne-Edwards & Bouvier, 1894, p. 287, 208 fig. 12; 1900, p. 343,

Figure 12. (a) *Munidopsis livida* dorsal view of ovigerous female specimen from ALAMINOS Station 70A10-50, X 2.55. (b) *Munidopsis aries* (A. Milne-Edwards, 1880) dorsal view of carapace and rostrum of male holotype X 1.5.



pl. 4 fig. 3, pl. 31 figs. 17-22.

Munidopsis livida—Benedict, 1902 p. 322.

Material—ALAMINOS Sta. 70A10-50 (15 50 N, 77 24.5 W) south of Jamaica, 2790-2650 m, 25 July 1970: 1 ovigerous female. OREGON Sta. 1303 (28 47 N, 87 50 W) NE Gulf of Mexico, 2070-2160 m, 26 May 1955: 8 females (2 ovigerous), 1 male.

Diagnosis—Small size; relatively smooth bodied; inner and outer eyespines present, outer pair minute; rostrum broad, tapering to point beyond eyes; short, stout chelipeds; epipods on chelipeds only. A very deep-water form (below 2000 m).

Description—Because of the uncertainty of these specimens in relation to previously known specimens of *M. livida*, a detailed description of the Gulf and Caribbean specimens is given here.

Rostrum broad, slightly upturned, obscurely carinate dorsally, and extending past middle of carpus of cheliped; sides parallel at base, tapering to a point beyond eyes and minutely serrate anteriorly; ventral surface smooth.

Carapace without rostrum is slightly longer than broad; no spines and very few tubercles on dorsal surface; a few small ciliated ridges present on posterior branchial region. Antennal spines present but antero-lateral spines are obscure; no other spines present on anterior margin of carapace. Robust lateral spine just behind anterior branch of cervical groove followed by one or two small denticles. Posterior margin ending in a spineless transverse ridge with short forward-directed hairs.

Sternum smooth except for lines of ciliated tubercles separating segments; anterior edge of first sternal plate is bifid.

Abdomen spineless and smooth on dorsal surface except for scattered minute pits.

Eyes immovable (or slightly movable in some specimens but only in a restricted dorso-ventral direction); inner and outer spines present, outer pair minute, inner pair bifid and extending beyond cornea.

Basal segment of antennular peduncle not unusually inflated, bearing two lateral spines, of which the ventral is the longer.

Basal segment of antennal peduncle short, three times as broad as long in center line, external and internal margins produced with internal twice the length of external. Anterior margin of second segment bears one lateral spine. Third segment spineless but bearing two dorsal denticulated lobes. Last segment has a rather prominent lateral spine and denticulate ventral lobe.

Inner margin of merus of third maxilliped weakly and irregularly denticulate.

Chelipeds short, stout, about equal in length to carapace with rostrum, spinous, and with weakly carinate merus. First ambulatory legs extending beyond chelipeds by two-thirds the length of dactylus. Propodi, carpi, and meri of three ambulatory legs are dorsally carinate and sparsely setose. Epipods present on chelipeds only.

Size—Size range: 7-19.8 mm (including rostrum). Smallest ovigerous female, 9 mm c.l. (13.0 with rostrum). The ALAMINOS ovigerous female specimen measures 10 mm c.l. (13.5 mm including rostrum); carapace width, 9 mm; length of cheliped, 13 mm; chela, 4.5 mm; movable finger, 2 mm. The OREGON male specimen measures 8 mm c.l. (11 mm with rostrum); width, 7 mm. The ALAMINOS ovigerous female has six proportionately large eggs approximately 2 mm diameter.

Remarks—We have not been able to examine the types of *M. livida*, but from the description and figures of Milne-Edwards and Bouvier (1900), it appears that the Gulf and Caribbean specimens agree very well except that (1) the internal eye-spine is usually bifid in the Gulf and Caribbean specimens; (2) basal article of antennal peduncle is wider and with a much longer ventro-medial spine; (3) antennal flagellum provided with hairs.

In spite of these differences and the wide geographical distance separating them, we are assigning the Gulf and Caribbean specimens to *M. livida* until closer comparisons can be made with the type material.

These specimens are similar to *M. aries* (A. Milne-Edwards, 1880) (see Figure 12), but differ from it as follows: (1) epipods present on chelipeds; (2) antero-lateral spine on carapace weaker; (3) sides of rostrum at base are parallel, not diverging; (4) eyes with minute spine on outer margin in addition to larger inner one; (5) carapace not as broad, especially behind cervical groove (width 90 percent of length compared to 93 per-

cent in *M. aries*); (6) chelipeds less spinous and not as heavy and inflated as in *M. aries*.

Distribution—Previously known only from the two Talisman specimens (a male and a female) from the eastern Atlantic off the Canary Islands (30 01 N, 14 06 W) in 2115 m. Its range is now extended to the Gulf of Mexico and Caribbean Sea in 2070-2790 m, if these specimens are correctly assigned.

Munidopsis polita (Smith, 1883)

Anoplomotus politus Smith, 1883, p. 50, pl. 2 fig. 1, pl. 3 figs. 1-5.

Munidopsis polita.—Benedict, 1902, p. 324.—Pequegnat & Pequegnat, 1970, p. 155.

Material—ALAMINOS Sta. 70A10-27 (15 02 N, 81 05 W) East of Nicaragua, 439-631 m, 13 July 1970: 1 ovigerous female.

Remarks—Previously known from off the east coast of the United States off Martha's Vineyard (40 N) and from the NW Gulf of Mexico (25 to 27 N). This record extends the range southward into the Caribbean to 15 N.

The Gulf and Caribbean specimens live deeper (366-800 m) than the FISH HAWK type material from the North Atlantic (145-245 m). Although the southern specimens vary in the following ways from the type material, we have chosen not to relegate them to new species at this time, because some of the differences may be explained by the deeper depths at which they live: (1) relatively larger eyes and shorter, wider eyestalks; (2) basal segment of antennular peduncle with longer spines (basal segment, including spines, reaches to or beyond tip of rostrum in southern forms, does not reach tip of rostrum in northern forms); (3) merus of cheliped longer than carapace (including rostrum), equal to carapace in northern forms; (4) frontal margin of carapace with less pronounced rounded lobe above antennal peduncle; (5) rostrum slightly narrower.

The Caribbean specimen measures 9 mm carapace length. Known depth range: 145-800 m.

Munidopsis riveroi Chace, 1939

Munidopsis riveroi Chace, 1939, p. 48; 1942, p. 93, figs. 31, 32.

Material—ALAMINOS Stations: 70A10-15 (16 08.2 N, 84 41.2 W) off Honduras, 338-530 m, 10 July 1970: 6 males, 4 ovigerous females; 70A10-25 (16 43 N, 82 38.5 W) off Honduras, 430-612 m, 12 July 1970: 1 ovigerous female; 70A10-31 (11 33.8 N, 73 45.1 W) off Colombia, 732 m, 17 July 1970: 1 female; 70A10-35 (11 29 N, 73 33 W) off Colombia, 476 m, 17 July 1970: 16 females (15 ovigerous), 11 males; 70A10-40 (12 40 N, 72 00 W) off Colombia, 622-658 m, 18 July 1970: 4 females (2 ovigerous), 1 male.

OREGON Stations: 4419 (11 43 N, 69 13 W) off Venezuela, 457 m, 4 Oct. 1963: 1 female; 4448 (10 55 N, 67 56 W) off Venezuela, 549 m, 10 Oct. 1963: 1 ovigerous female; 4854 (11 10.8 N, 74 28.5 W) off Colombia, 549 m, 18 May 1964: 2 ovigerous females, 1 male; 4882 (10 16.2 N, 75 54.4 W) off Colombia, 549 m, 25 May 1964: 1 ovigerous female; 5928 (15 38 N, 61 12 W) Lesser Antilles, off Dominica, 585 m, 4 March 1966: 1 ovigerous female; 5929 (15 39 N, 61 10 W) Lesser Antilles, off Dominica, 649 m, 5 March 1966: 1 male; 6696 (17 46 N, 62 59 W) Lesser Antilles, off St. Barthélemy, 649-667 m, 18 May 1967: 1 male.

SILVER BAY Sta. 5146 (19 55.5 N, 72 00 W) north of Haiti, 860-914 m, 13 Oct. 1963: 2 ovigerous females, 1 male.

Remarks—*M. riveroi* was known previously only from Chace's type material—three specimens from the north coast of Cuba at 23 N. The new material consisting of 56 specimens from 13 stations in the Caribbean, extends its known range southward to 10 N and increases its known abundance many fold. Depth range: ~450 m — ~900 m. Size range: 6-18 mm c.l.

***Munidopsis sundi* Sivertsen & Holthuis, 1956**

Figure 13

Munidopsis sundi Sivertsen & Holthuis, 1956, p. 44, pl. 4, figs. 2,4.

Material—ALAMINOS Sta. 70A10-48 (14 29.5 N, 74 28.8 W) Caribbean Sea, Colombian Basin, 4151 m, 24 July 1970: 1 male.

Remarks—The ALAMINOS male specimen measures 70 mm c.l. (88.5 mm including rostrum). The carapace is 66 mm wide. Its total length is 162 mm.

Previously known only from the female type specimen taken south of the Azores in 2615 m,

ALAMINOS male specimen extends its geographical range to the Caribbean Sea and its depth range to 4151 m.*

New Records of Rare Species

***Munidopsis bermudezi* Chace, 1939**

Munidopsis bermudezi Chace, 1939, p. 46; 1942, p. 83, figs. 29, 30.—Sivertsen & Holthuis, 1956, p. 44, pl. 4 fig. 3.—Pequegnat & Pequegnat, 1970, p. 145, fig. 5-8.

Material—ALAMINOS Sta. 70A10-58 (25 21.3 N, 86 06.5 W) NE Gulf of Mexico, 3246 m, 30 July 1970: 1 male.

Remarks—This record increases the known number of specimens of this species from four to five. Previously it was known from Chace's two female type specimens off Cuba, one male from south of the Azores (Sivertsen & Holthuis, 1956), and one female from the NW Gulf of Mexico. The present male specimen measures 23 mm carapace length (29 mm including rostrum). Known size range: 15-40 mm carapace length including rostrum. Known depth range: 2400-3300 m.

Munidopsis reynoldsi

(A. Milne-Edwards, 1880)

Galathodes reynoldsi A. Milne-Edwards, 1880, p. 56.

Munidopsis reynoldsi—A. Milne-Edwards & Bouvier, 1894, p. 275; 1897, p. 80, pl. 6 figs. 1-5.

Material—ALAMINOS Sta. 70A10-48 (14 29.5 N, 74 24.8 W) Caribbean Sea, Colombian Basin, 4151 m, 24 July 1970: 1 male.

Remarks—The ALAMINOS specimen was compared with the male holotype and agrees very well except that ours is more hirsute. The two spines on the posterior margin of the carapace, which are present on the type as well as on the

*As this paper goes to press a third specimen of *M. sundi* has been discovered from the NW Gulf of Mexico (ALAMINOS station 71A8-13) on 31 July 1971 at 25 51.8 N, 93 08 W in 3254 m depth. This specimen is an ovigerous female measuring 119 mm c.l. including rostrum (diameter of eggs 4.2 mm) and is a new record for this species in the Gulf of Mexico.

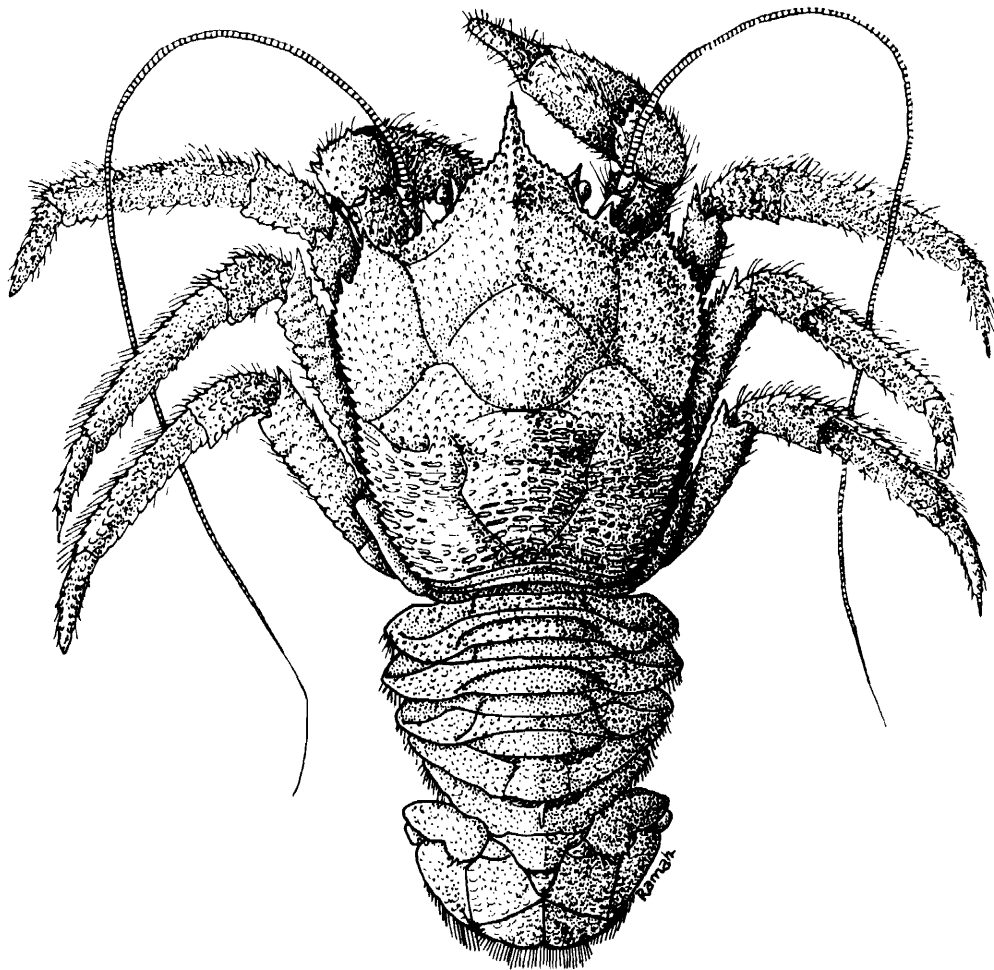


Figure 13. *Munidopsis sundi* Sivertsen und Holthuis, 1956. Dorsal view of male specimen from ALAMINOS Station 70A10-48, 2/3 actual size.

ALAMINOS specimen, are not shown on Milne-Edwards' 1897 drawing (plate 6 figure 1) which is in error.

Munidopsis spinoculata
(A. Milne-Edwards, 1880)

Orophorhynchus spinoculatus A. Milne-Edwards, 1880, p. 59.

Munidopsis spinoculata—A. Milne-Edwards & Bouvier, 1894, p. 275; 1897, p. 75, pl. 6 figs. 8-11.—Benedict, 1902, p. 276.—Chace, 1942, p. 86.—Pequegnat & Pequegnat, 1970, p. 158 (part).

Material—ALAMINOS Sta. 70A10-16 (16 11.1 N, 84 48 W) off British Honduras, 819-864 m, 11 July 1970: 1 male. ALBATROSS Sta. 2140 (17 36 10 N, 76 46 05 W) near Jamaica, 1738 m, 11 March 1884: 1 male.

Remarks—The ALAMINOS specimen from off British Honduras, a male of 9 mm c.l. (13 mm with the rostrum), is slightly larger than the BLAKE type and varies from it in that the chela is more massive, the gape is more pronounced, and the antero-lateral spine is obscure or absent. The two ALAMINOS males taken previously in the SW Gulf of Mexico (Pequegnat & Pequegnat, 1970) also vary in the extent of development of the antero-lateral spine. It should be noted that the

male specimen listed from ALAMINOS Sta. 69A11-27 in the SW Gulf of Mexico by Pequegnat & Pequegnat (1970) is not this species but a closely related new species, *M. subspinoculata*, described in this paper on page 13.

The ALBATROSS male from off Jamaica is a small specimen measuring 6.5 mm c.l. which was apparently not reported previously in the literature.

In all there are six known specimens of *M. spinoculata*: five males (BLAKE, ALBATROSS, and ALAMINOS) and one female (ATLANTIS specimen reported by Chace, 1942). Size range: 6-9 mm c.l.; ovigerous female, 7 mm c.l.

Distribution—Caribbean Sea and Gulf of Mexico as follows: off Dominica, off Honduras, off Jamaica, off north coast of Cuba, and in SW Gulf of Mexico; depth range, 837-1738 m.

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