Zootaxa 3765 (5): 418–434
www.mapress.com/zootaxa/

Article

ISSN 1175-5326 (print edition)
ZOOTAXA
ISSN 1175-5334 (online edition)

http://dx.doi.org/10.11646/zootaxa.3765.5.2
http://zoobank.org/urn:lsid:zoobank.org:pub:044B90E3-933D-4F1C-A247-2AF49D3B9AEC

Squat lobsters (Crustacea: Anomura) from Mauritanian waters (West Africa), with the description of a new species of *Munidopsis*

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Abstract

This paper is the result of the study of a squat lobsters collection obtained along the Mauritanian coast, between 91 and 1867 m depth, during the 'MAURIT' surveys carried out in the period from 2007 to 2010. *Eumunida bella* de Saint Laurent & Macpherson, 1990 (Chirostyloidea) and six species of *Munida* and *Munidopsis* (Galatheoidea) are reported in the present work.

A new species, *Munidopsis anaramosae* **n. sp.** collected off northwestern Banc d'Arguin at 1000–1012 m depth, is described and illustrated. The presence of an eyespine that arises distally from the middle end of the cornea, walking legs merus spinose on dorsal and ventral margins and cheliped merus ventrally unarmed distinguish it from related species. *Munida chunii* Balss, 1913 is redescribed here and the new records of *Munida guineae* Miyake & Baba, 1970, *M. speciosa* von Martens, 1878 and *Munidopsis chunii* Balss, 1913 extend their geographical distribution northwards, and in the case of the last species, increase its bathymetric range.

Key words: Chirostyloidea, Galatheoidea, *Eumunida*, *Munida*, *Munidopsis*, new species, Mauritanian waters, distribution

Introduction

Squat lobsters are an abundant, speciose and worldwide distributed group of colourful anomuran decapod crustaceans. They comprise two superfamilies, Chirostyloidea and Galatheoidea (Ahyong *et al.* 2010; Schnabel & Ahyong 2010) and both are represented in the present work.

The genus *Eumunida* (family Chirostylidae) comprises 28 species (Puillandre *et al.* 2011) mainly distributed in the Indo-Pacific region with only three occurring in the Atlantic: *Eumunida bella* de Saint Laurent & Macpherson, 1990, *Eumunida picta* Smith, 1883 and *Eumunida squamifera* de Saint Laurent & Macpherson, 1990. Of these, only *Eumunida bella* has been recorded in the Central East Atlantic but not in Mauritanian waters (Saint Laurent & Macpherson 1990; Baba *et al.* 2008).

Within the superfamily Galatheoidea, the taxonomic effort deployed during the last years has increased the 242 species of *Munida* (family Munididae) recognized by Baba *et al.* (2008), with the description of an additional 28 new species (Macpherson 2009; Cabezas *et al.* 2009; Hendrickx & Parente 2010; Cabezas *et al.* 2011; Komai 2011a, b; Komai 2012). Similarly with *Munidopsis* (family Munidopsidae), eight new species were recently described, raising to 232 the total number of valid species (Baba *et al.* 2008; Osawa *et al.* 2008; Taylor *et al.* 2010; Macpherson 2011; Komai 2011c; Lin & Chan 2011; Ahyong 2013). Nevertheless only 12 species of *Munida* and 17 of *Munidopsis* have been reported in the central Eastern Atlantic.

The knowledge of the families Munididae and Munidopsidae in Mauritanian waters is scarce, and only one species of *Munida*: *Munida rutllanti* Zariquiey Álvarez, 1952 (Anadón 1981) and four species of *Munidopsis*: *Munidopsis aries* (A. Milne Edwards, 1880), *M. curvirostra* Whiteaves, 1874, *M. hirtella* Macpherson & Segonzac, 2005 and *M. thieli* Türkay, 1975 (Anadón 1981; Macpherson & Segonzac 2005) were previously reported in this area.

This paper is based on the study of a collection of squat lobsters gathered during the four Ecosystem Surveys

 Accepted by S. Ahyong: 29 Dec. 2013; published: 20 Feb. 2014

carried out by the Instituto Español de Oceanografía along the Mauritanian coast, and include the identification of seven squat lobster species, some of them not previously recorded from this area.

Material and methods

The four 'MAURIT' Ecosystem Surveys were carried out in the years 2007–2010 onboard R/V 'Vizconde de Eza', in the continental margins of Mauritania.

The samples were collected with a Lofoten otter trawl between 91 and 1867 m depth. The effective trawling time on the bottom for each trawl was 60 minutes. The invertebrates caught in each station were minutely sorted to species level whenever it was possible and the crustaceans were preserved in 70% alcohol for further studies. The station list and species collected by station are summarized in Table 1.

The terminology adopted herein follows mainly Baba (2005) and Macpherson (2011).

The size of the carapace is indicated as the postorbital carapace length (CL), measured along the dorsal midline from the posterior orbital margin to the posterior margin of the carapace. The terms flexor and extensor margins are only used for the maxillipeds merus and walking legs dactylus. The abbreviations used in the descriptions are as follows: Mxp, maxilliped; P1, pereiopod 1 (cheliped); P2–P4, pereiopods 2–4, second to fourth pereiopods (walking legs).

The holotype of *Munidopsis anaramosae* **n. sp.** is deposited in the 'Museo Nacional de Ciencias Naturales (CSIC)', Madrid (MNCN). The remaining material is largely deposited in the collections of the Instituto Español de Oceanografía (Oceanographic Centers of Cádiz and Málaga) and University of Vigo (Faculty of Marine Sciences, Marine Zoology Laboratory).

Systematics

Order Decapoda Latreille, 1803

Infraorder Anomura MacLeay, 1838

Superfamily Chirostyloidea Ortmann, 1892

Family Eumunididae A. Milne Edwards & Bouvier, 1900

Genus *Eumunida* Smith, 1883

Eumunida bella de Saint Laurent & Macpherson, 1990

Eumunida bella de Saint Laurent & Macpherson, 1990: 660, figs 2b, 3, 4b, 5b, 6b, 8b and f, 9b, 10b.—Baba *et al.* 2008: 16 (list of references and synonymies).—Gonzalez *et al.* 2009: 2, fig. 1 (Cape Verde Islands, Canary Islands, 489–630 m).

Material examined. MAURIT 0811, Stn L96, 618–850 m, 1 male 40.1 mm.

Remarks. Our specimen agrees well with the description provided in Saint Laurent & Macpherson (1990).

Distribution. Morocco to Congo, including Canary and Cape Verde Islands; bathymetrical range from 150 to 640 m deep (Saint Laurent & Macpherson 1990); our specimen was collected between 618 and 850 m deep.

Superfamily Galatheoidea Samouelle, 1819

Family Munididae Ahyong, Baba, Macpherson, Poore, 2010

Genus *Munida Leach,* 1820

TABLE 1. Survey, station data and squat lobsters collected by station.

Survey	Station	Date	Latitude (N) start	Longitude (W) start	Depth start (m)	Latitude (N) end	Longitude (W) end	Depth end (m)	Species
MAURIT 1107	L04	18 November 2007	20°34′43"	18°32′26"	1812	20°31′49"	18°33′25"	1824	*Munidopsis curvirostra*
MAURIT 1107	L14	21 November 2007	20°39′01"	17°50′15"	502	20°36′18"	17°51′50"	511	*Munida speciosa*
MAURIT 1107	L51	3 December 2007	17°47′32"	16°39′47"	464	17°49′51"	16°39′13"	468	*Munida speciosa*
MAURIT 1107	L59	5 December 2007	16°47′37"	16°59′49"	1215	16°50′38"	16°58′34"	1282	*Munidopsis chunii*
MAURIT 1107	L60	5 December 2007	16°32′34"	17°06′28"	1512	16°29′45"	17°07′31"	1530	*Munidopsis chunii*
MAURIT 1107	L64	6 December 2007	16°23′28"	16°51′44"	452	16°26′24"	16°51′01"	468	*Munida guineae*
MAURIT 1107	L66	7 December 2007	16°23′09"	17°00′18"	1243	16°26′16"	17°00′20"	1317	*Munidopsis chunii*
MAURIT 1107	L68	7 December 2007	16°38′19"	16°59′29"	1136	16°41′10"	17°00′05"	1146	*Munidopsis chunii*
MAURIT 1107	L79	11 December 2007	18°04′20"	16°36′39"	554	18°07′20"	16°36′07"	576	*Munida speciosa*
MAURIT 0811	L07	19 November 2008	20°44′40"	17°37′37"	91	20°41′40"	17°38′19"	103	*Munida speciosa*
MAURIT 0811	L09	19 November 2008	20°29′25"	17°39′03"	94	20°26′46"	17°40′35"	120	*Munida speciosa*
MAURIT 0811	L10	20 November 2008	20°20′50"	17°53′30"	1012	20°18′23"	17°52′03"	1000	*Munidopsis anaramosae*
MAURIT 0811	L11	20 November 2008	20°09′23"	17°36′47"	110	20°06′30"	17°36′48"	110	*Munida speciosa*
MAURIT 0811	L13	21 November 2008	19°55′41"	18°01′07"	1808	19°530′5"	18°02′01"	1862	*Munidopsis curvirostra*
MAURIT 0811	L26	24 November 2008	17°58′21"	16°34′32"	343	17°55′27"	16°35′19"	346	*Munida speciosa*
MAURIT 0811	L33	26 November 2008	16°58′15"	16°53′52"	1331	16°53′20"	16°54′58"	1347	*Munidopsis chunii*
MAURIT 0811	L38	28 November 2008	16°31′47"	17°00′14"	1124	16°29′09"	16°58′47"	1010	*Munidopsis chunii*
MAURIT 0811	L39	29 November 2008	17°29′17"	16°37′14"	231	17°32′06"	16°36′04"	224	*Munida speciosa*
MAURIT 0811	L41	30 November 2008	16°05′49"	16°51′20"	109	16°08′23"	16°49′32"	105	*Munida speciosa*
MAURIT 0811	L49	1 December 2008	16°33′15"	16°48′07"	218	16°31′09"	16°48′27"	404	*Munida speciosa*
MAURIT 0811	L52	2 December 2008	17°00′55"	16°43′21"	102	17°03′33"	16°41′50"	104	*Munida speciosa*
MAURIT 0811	L96	13 December 2008	19°47′30"	17°18′26"	618	19°48′07"	17°20′32"	850	*Eumunida bella*
MAURIT 0911	L01	16 November 2009	18°48′25"	16°45′59"	303	18°46′46"	16°45′23"	304	*Munida speciosa*
MAURIT 0911	L15	22 November 2009	19°59′28"	17°57′28"	1746	19°59′01"	17°59′07"	1749	*Munidopsis curvirostra*
MAURIT 0911	L20	24 November 2009	20°42′48"	17°56′47"	975	20°39′26"	17°58′19"	984	*Munidopsis serricornis*
MAURIT 1011	L04	17 November 2010	20°18′09"	18°12′47"	1765	20°17′35"	18°09′47"	1773	*Munidopsis curvirostra*
MAURIT 1011	L05	18 November 2010	20°26′46"	17°40′13"	106	20°28′30"	17°40′19"	108	*Munida speciosa*
MAURIT 1011	L08	20 November 2010	20°10′10"	17°42′28"	827	20°11′26"	17°45′21"	850	*Munida speciosa*
MAURIT 1011	L09	20 November 2010	20°06′53"	17°39′08"	271	20°05′10"	17°38′37"	257	*Munida speciosa*
MAURIT 1011	L15	21 November 2010	19°43′50"	17°42′29"	1747	19°41′56"	17°40′08"	1867	*Munidopsis curvirostra*
MAURIT 1011	L40	6 December 2012	16°24′07"	17°00′32"	1275	16°27′04"	17°00′37"	1214	*Munidopsis chunii*
MAURIT 1011	L56	14 December 2010	18°26′32"	16°29′17"	106	18°26′22"	16°31′18"	137	*Munida speciosa*

Munida guineae Miyake & Baba, 1970

Munida guineae Miyake & Baba, 1970: 81, fig 7.—Baba *et al.* 2008: 98 (compilation).—Muñoz *et al.* 2012: 482 (Guinea-Bissau, 603–869 m).

Material examined. MAURIT 1107, Stn L64, 452–468 m, 1 male 19.1 mm.

Remarks. Our specimen agrees well with the holotype description. The spinulation and the morphology of the abdominal tergite 4 and maxilliped 3 point out that this material belongs undoubtedly to *M. guineae*.

Distribution. Only known from off Rio Muni (Equatorial Guinea) (Type locality) and Guinea-Bissau, between 260 and 869 m deep (Miyake & Baba 1970; Muñoz *et al.* 2012). This record extends the northern distribution to Mauritania.

Munida speciosa von Martens, 1878

Munida speciosa von Martens, 1878: 133.—Baba *et al.* 2008: 122 (compilation).—Muñoz *et al.* 2012: 482 (Guinea-Bissau, 75–809 m).

Material examined. MAURIT 1107, Stn L14, 502–511 m, 1 male 16.6 mm, 3 females 13.3–19.2 mm; Stn L51, 464–468 m, 1 male 13.4 mm, 1 female 16.2 mm; Stn L79, 554–576 m, 5 males 14.8–22.4 mm, 1 female 15.2 mm. MAURIT 0811, Stn L07, 91–103 m, 6 males 12.4–19.6 mm, 3 females 14.8–16.7 mm, 2 ovigerous females 15.6–16.9 mm; Stn L09, 94–120 m, 1 male 17.8 mm, 1 ovigerous female 17.1 mm; Stn L41, 105–109 m, 3 males 12.5–16.2 mm, 1 female 11.2, 1 ovigerous female 11.9 mm ; Stn L49, 218-404 m, 2 males 17.6–18.1 mm, 1 female 16.2 mm; Stn L52, 102–104 m, 5 ovigerous females, 9.3–10.7 mm. MAURIT 0911, Stn L01, 303–304 m, 3 males 12.1–17.1 mm, 1 female 12.8 mm. MAURIT 1011, Stn L05, 106–108 m, 2 males 17.0–18.7 mm, 2 ovigerous females 13.3–14.6 mm; Stn L09, 257–271 m, 1 male 22.7 mm, 1 ovigerous female 20.9 mm; Stn L56, 106–137 m, 7 males 10.9–18.6 mm, 3 females 10.2–11.5 mm, 1 ovigerous female 15.4 mm.

Remarks. Our specimens agree well with the detailed description of this species given in Miyake & Baba (1970).

The dorsal series of tubercles on the abdominal tergite 3 and maxilliped 3 merus spinulation ensures the identification of this material as *M. speciosa* separating it, at the same time, from the allied *Munida rutllanti* Zariquiey Álvarez, 1952 not represented in our collection but reported in previous works from Mauritanian waters. In our opinion, the similarity of both species and potential misidentifications make it difficult to provide a clear picture of the distribution of each species in northwest Africa.

Distribution. Senegal to north of Namibia, in depths from 108 to 809 m (Baba *et al.* 2008; Muñoz *et al.* 2012). Our records increase the northern distribution to Mauritania.

Family Munidopsidae Ortmann, 1898

Genus *Munidopsis* Whiteaves, 1874

Munidopsis chunii Balss, 1913

(Figs. 1–5)

Munidopsis chuni Balss, 1913: 224.
Munidopsis chunii.—Baba *et al.* 2008: 137 (compilation)

Material examined. MAURIT 1107, Stn L59, 1215–1282 m, 6 males 8.8–12.7 mm, 2 females 7.8–10.1 mm, 5 ovigerous females 8.0–11.4 mm; Stn L60, 1512–1530 m, 6 males 6.4–11.4 mm, 1 female 9.4 mm, 1 ovigerous female 8.1–10.3 mm; Stn L66, 1243–1317 m, 2 males 5.4–6.4 mm, 3 females 6.4–6.7 mm; Stn L68, 1136–1146 m, 31 males 7.6–12.4 mm, 24 ovigerous females 8.6–15.3 mm. MAURIT 0811, Stn L33, 1331–1347 m, 1 male 8.5 mm, 1 female 6.4 mm; Stn L38, 1010–1124 m, 6 males 10.9–13.5 mm, 3 ovigerous females 11.3–13.3 mm.

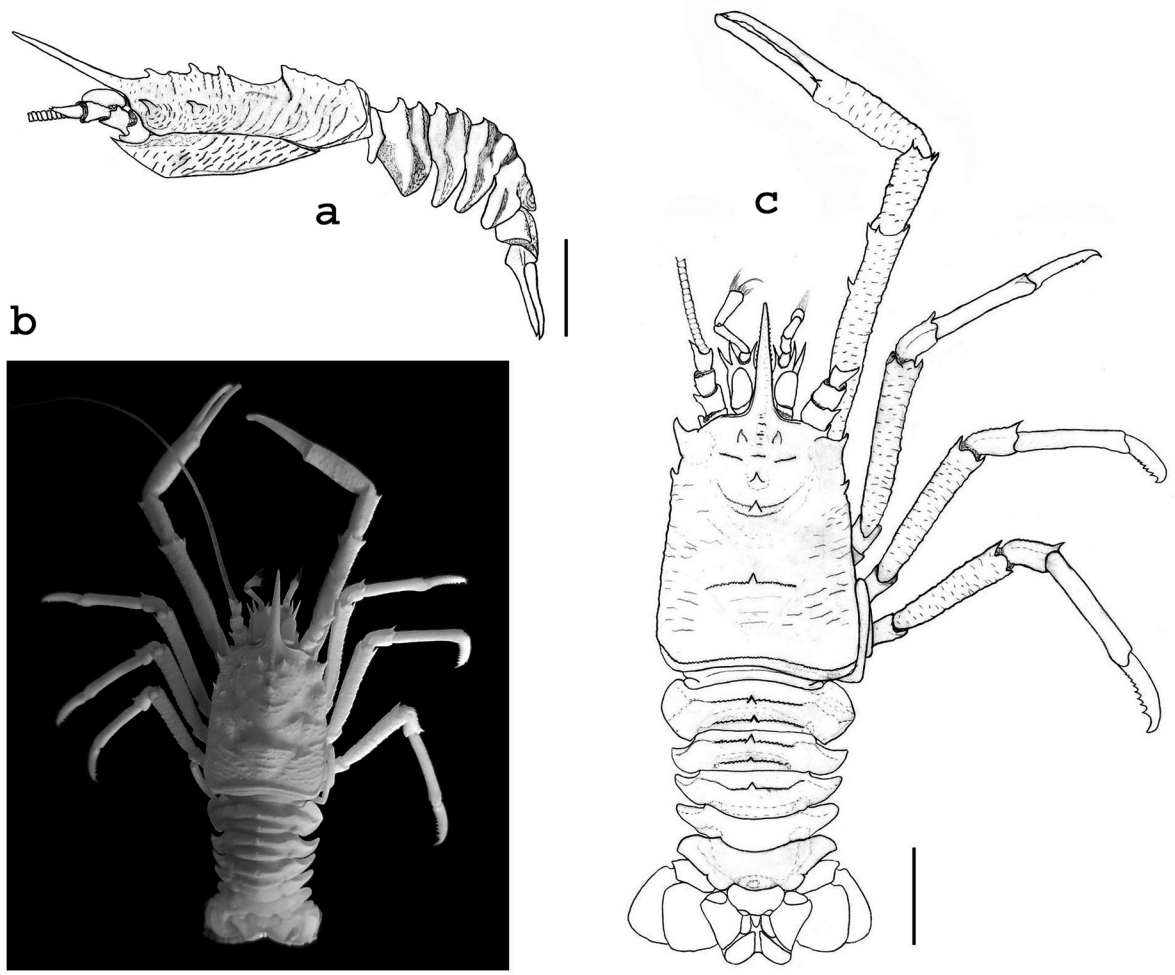

FIGURE 1. *Munidopsis chunii* Balss, 1913, MAURIT1107 Stn L68, male CL 11.8 mm. Entire animal a) lateral view, P1–4 removed b) dorsal view c) dorsal view. Scale bar a, c, 5 mm; a, c: all setae omitted.

MAURIT 1011, Stn L40, 1214–1275 m, 3 males 7.7–8.2 mm, 1 female 8.3 mm, 6 ovigerous females 8.6–11.0 mm.

Description. The following description is based on a male (11.8 mm) from MAURIT 1107 Stn L68, for variations of this species, unless otherwise specified, see below.

General: Carapace and legs covered with tuberculate transverse striae supporting bases of setae; setae scarce and short in the carapace, denser and somewhat long and plumose in the legs (Fig. 1b).

Carapace: Carapace longer than broad, with lateral margins somewhat diverging posteriorly. Dorsal surface with the different regions demarcated. Epigastric region with 2 transversal spines, each one followed apart by a minutely denticulate transverse striae at each side of the middle line; middle line from posterior to the base of the rostrum until protogastric region, with a weak longitudinal carina that is furnished with 3 or 4 separated and very short minutely tuberculate transverse striae (sometimes this carina can not be well appreciated). Mesogastric region with one median spine that arises from short minutely tuberculated transverse stria. Metagastric region with a median spine that arises from the anterior of 2 medium size minutely denticulated transverse striae that are curved anteriorly following the cervical sinus. Cardiac region with a median spine on a transversal ridge, the crest of this ridge is minutely denticulated. Frontal margin unarmed; weakly carinated at the base of the rostrum and minutely denticulated just behind antennal peduncle. Lateral margins with 2 prominent spines, the biggest one on the anterolateral margin over a conspicuous mamelon, the other one located on the anterobranchial region, over a smaller and rounded prominence too (Fig. 2e). Posterior margin with a minutely denticulated carina . All carapace spines are anteriorly directed (Fig. 1c). Pterygostomian flap surface with spaced minutely tuberculate transverse striae; ending anteriorly in 4–7 small and irregular teeth.

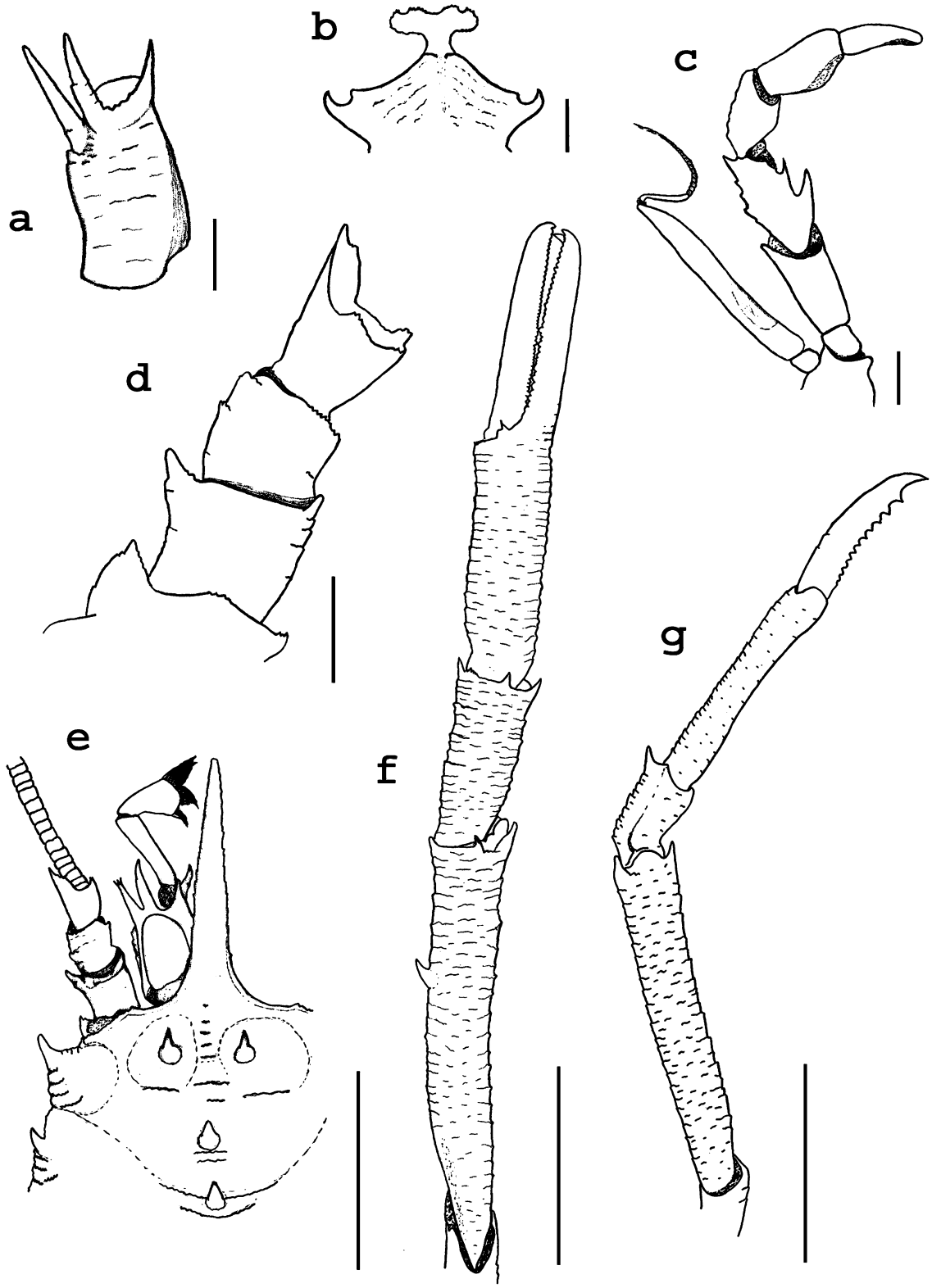

FIGURE 2. *Munidopsis chunii* Balss, 1913, MAURIT1107 Stn L68, male CL 11.8 mm a) right antennule peduncle, ventral view b) anterior sternum c) right mxp3, ventral view d) right antenna peduncle, ventral view e) anterior carapace, left detailed f) right cheliped, dorsal view g) right P2. Scale bar a–d 1 mm, e–g 5 mm; a–g: all setae omitted.

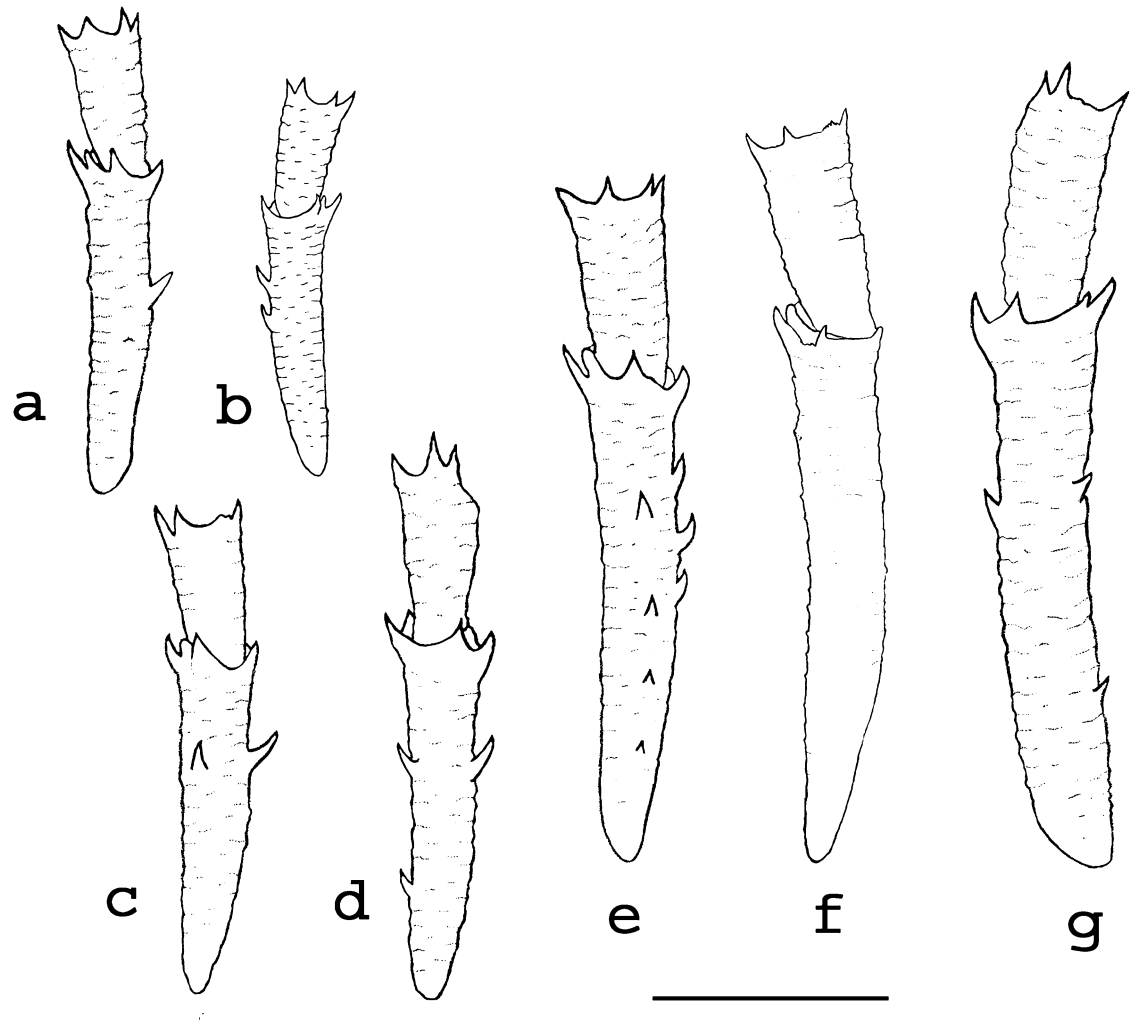

FIGURE 3. *Munidopsis chunii* Balss, 1913, variations on P1 carpus and merus spinulation. MAURIT 1011 Stn L40: a) left cheliped, dorsal view, male CL 8.3 mm b) right cheliped, dorsal view, ovigerous female CL: 8.64 mm. MAURIT 1107 Stn L59: c) left cheliped, dorsal view, male CL 8.8 mm d) left cheliped, dorsomesial view, ovigerous female CL 10.5 mm; Stn L60: e) left cheliped, dorsal view, male CL 11.4 mm; Stn L68: f) left cheliped, dorsal view, male CL: 11.8 mm. MAURIT 0811 Stn L38: g) right cheliped, dorsal view, male CL 13.3 mm. Scale bar 1 mm; a–g: all setae omitted.

Rostrum: Spiniform and running slightly upwards; about 1/2 (1/3 in females) length of the carapace; lateral margins furnished with denticles that are bigger and placed more apart each other in the base while they are smaller and closely placed distally; dorsally furnished with some short minutely tuberculate transverse striae, no carina neither dorsally nor lateral (Fig. 2e).

Sternum: Sternite 3 rectangular with rounded corners, about 4 times wider than high, anterior margin with a wide median concavity that is flanked laterally by 3–5 irregular denticles, this denticles are followed laterally by a small and rounded perforation in which the third maxilliped is articulated (Fig. 2b). Sternite 4 about 2.5 times as broad as the preceding one, narrowing anteriorly and with a rounded hollow on each side in which the P1 is articulated (Fig. 2b).

Abdomen: Tergites 2–4 each with 2 transverse ridges, anterior ones running laterally up to the tip of the pleuron; each ridge supports a row of small denticles in the crest on somites 2 and 3, while on somite 4 is unarmed and rounded. 2 median spines on tergites 2 and 3 arising respectively from anterior and posterior ridges; 1 spine over anterior ridge on tergite 4. Tergite 6 having posterior margin flanked by 2 conspicuous lobes with a rounded depression between the lobes (Figs. 1a, c). The uropod exopod margin, the lower and inner laterals of uropod endopod and free margins of the telson posterior plates, furnished with long plumose setae and with movable teeth;

exposed endopod dorsal surface when uropods retracted, with very short minutely tuberculate transverse striae suporting bases of simple setae. Telson composed of 12 plates (Fig. 1c); lateral plate free margin (outer lateral) with bristle setae in adult males and short plumose setae in adult females.

Eye: Ocular peduncles movable and very short. Cornea rather cylindrical, rounded distally and with smooth surface (Fig. 2e).

Antennule: Basal article armed with three large spines: one lateral, one distolateral and one distomesial; ventrodistal margin between these last 2 spines denticulate. The tip of the lateral spine on left antennule is trifid (this trifid tip was found only in this specimen, in the rest of the specimens examined was simple) (Figs. 2a, e).

Antenna: Basal article immovable, with triangular outer lateral margin and with the distal margin rounded and denticulate. Article 2 with a dorsodistolateral triangular prolongation with the rounded margin denticulate, one ventrodistolateral spine and one small subterminal ventrodistomesial spine. No distinct spines on article 3, but distomesial and distolateral margins denticulate. Article 4 with the lateral expansion spinose (Figs. 2d, e).

Maxilliped 3: Ischium about the same lenght of merus and with 18–21 denticles on the inner mesial ridge. Merus extensor margin with one distal spine, followed by 3 or 4 weak denticles (1 more notorious, 2 weak and 1 minute) each one furnished with 1 single setae, merus flexor margin with 2 strong spines and distal margin denticulate. Carpus, propodus and dactylus unarmed (Fig. 2c).

Pereopod 1 (cheliped): Chelipeds subequal, about 2.5 times the carapace length (without rostrum) in males, and 2 times in females. Ischium with one dorsodistal spine and a small distomesial submarginal spine. Merus with 4 distal spines: dorsomesial, dorsolateral, ventrolateral (subterminal) and ventromesial; one dorsomesial spine on distal half (in this specimen absent on left cheliped, see variations). Carpus about twice long as broad, with 4 distal spines: dorsomesial (sometimes double, see variations), dorsolateral, ventrolateral and a subterminal ventromesial one; the ventral and ventromesial distal margins minutely denticulated. Palm about 1.5 times carpus length, cylindrical and with a notorious spine at the distal dorsal margin, where the movable finger articulates. Fingers as long as palm, somewhat depressed and with cutting edges furnished with a row of irregular sized denticles (Fig. 2f). Epipod absent.

Pereopods 2–4: P2 overreaching P1 carpus when extended forward, P3 and P4 diminishing in length and overreaching carpus of the preceding leg (Fig. 1b). Merus with 2 distal spines (dorsal and ventrolateral). Carpus with 1 distodorsal spine and the ventral margin minutely denticulate and 2 weak carinae-like composed by very short transversal striae, one following the distodorsal spine, the other one parallel laterally and less notorious on P4. Propodus elongate, smooth and unarmed. Dactylus particularly setose on the extensor margin; flexor margin armed with 10-12 teeth decreasing in size proximally; each teeth is furnished subapically with a single seta (Fig. 2g). Epipods absent.

Color. Yellow cornea and orange-red exoskeleton with a white spot covering the central distal carapace and proximal rostrum in living specimens; whitish in alcohol.

Variations. In the foregoing description the basic spinulation of carapace, abdomen and chelipeds is detailed. Nevertheless, in the 102 specimens studied, we found many variations from this basic pattern. One or more of these variations, not related to sex, age or size of the animal, can appear together in the same specimen. These variations are summarized as follows: 69 specimens show a double distal dorsomesial spine on P1 carpus (Figs. 3a, b, d, e, g) instead of a single spine (Figs. 3c, f); 53 specimens display variations in the carapace dorsal gastric, cardiac and branchial spinulation pattern. The most common variations involve the presence of one additional spine over the protogastric region and/or over the posterior ridge on the metagastric region (Figs. 4b, d, f, g). Additional spines can be developed from the minutely dentate transverse striae on the anterior protogastric, lateral epigastric, mesogastric, metagastric, cardiac and dorsobranchial regions (Figs. 4a, c, e, h); these spines can be bifid (Fig 4f). The metagastric spine was absent in 3 specimens (Fig. 4i).

The spinulation along the P1 merus dorsal and ventromesial margins in 32 of the studied specimens varies, including either the absence of the typical spines from the basic pattern or the presence of additional ones (Figs. 3a–g).

The spinulation over abdominal tergites 2, 3 and 4 varies in 16 specimens, usually with additional spines formed by enlargement of some of the denticles over the transverse ridges, but in 5 of them, the spine on tergite 4 is absent. One specimen lacks spines on the posterior ridge of tergite 3 and on tergite 4. Another specimen shows the posterior ridge of the abdominal tergites 2 and 3 devoid of spines.

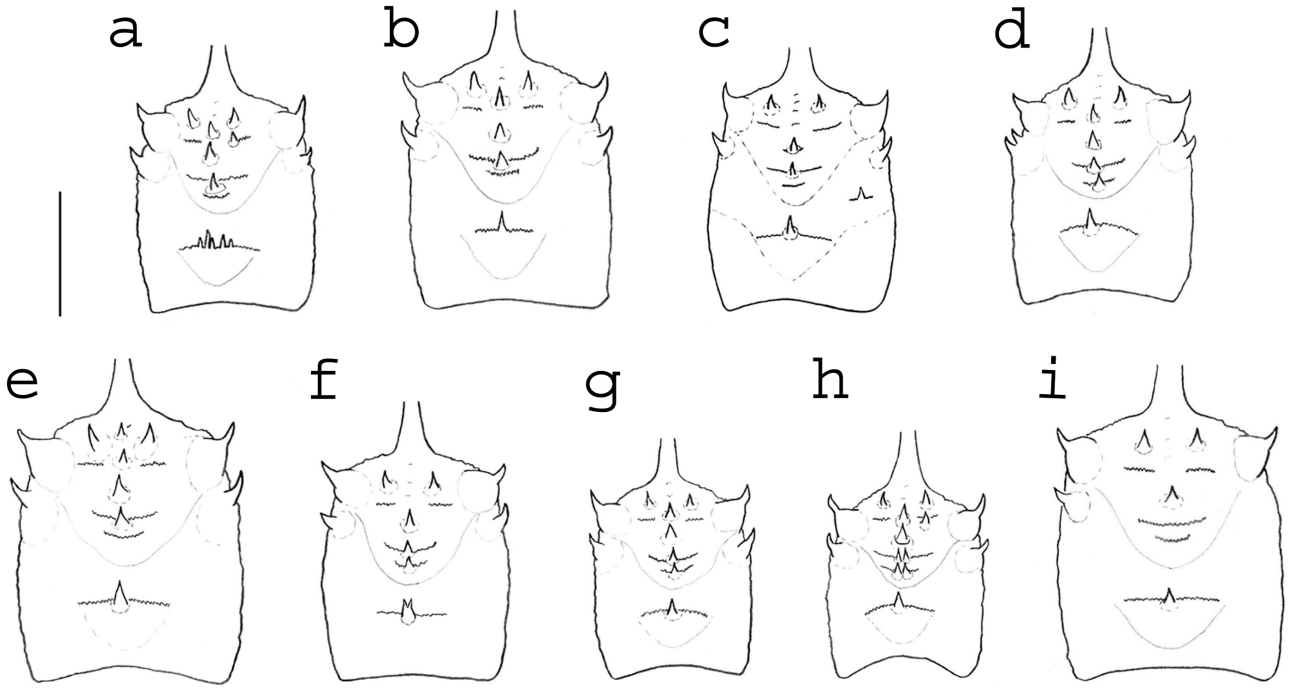

FIGURE 4. *Munidopsis chunii* Balss, 1913, variations on dorsal and lateral carapace spinulation. MAURIT 1107 Stn L68: a) male CL 8.8 mm b) ovigerous female CL 9.9 mm c) male CL 9.0 mm. MAURIT 1011 Stn L40: d) ovigerous female CL 9.0 mm. MAURIT 1107, Stn L59: e) ovigerous female CL 10.5 mm f) male CL 8.8 mm g) female CL 7.8 mm; Stn L60: h) male CL 7.6 mm i) ovigerous female CL 10.3 mm. Scale bar 5 mm; a–i: all setae omitted.

Variations in the anterolateral and laterobranchial spinulation of the carapace were observed in four individuals, including either the absence or the presence of additional spines (Figs. 4 d, i). One specimen shows a double distodorsal spine on right P4 merus and another exhibits an abnormal T-shaped fixed finger on right cheliped. Furthermore, we found too that the denticles on the mxp3 extensor margin are variable and related to the size of the animal. In this way, those with CL around 6 mm have two denticles (Fig. 5a); with CL: 8–10 mm they have two denticles (Fig. 5b), two denticles and one seta (Fig. 5c) or even three denticles (Fig. 5d); with CL over 10 mm they can have three denticles (Fig. 5f), three denticles and one seta (Fig. 5e) or four denticles (Fig. 5c); all denticles are furnished with one seta. Mxp3 flexor margin spinulation displays some variations too, involving several small spines developed from the denticulate distal margin, and also additional spines between the major ones, in this case always related with the biggest specimens (Fig. 5g).

Distribution. Only recorded from two areas: near Victoria, Cameroon (type locality) and along Namibia, in depths from 400 to 710 m (Doflein & Balss 1913; Macpherson 1983). Our records extend the geographical distribution northwards to Mauritania and also increase its bathymetrical range from 710 to 1530 m deep.

Remarks. The first description of this species is only a brief diagnosis (Balss 1913). Later, Doflein & Balss (1913) provide a little more extended description of the same specimens and they add a figure of this species too. These descriptions were based only in two specimens, one male and one small female and no further description are reported in the literature. Our specimens, both males and females, agree well with the male description given by Doflein & Balss (1913), and the differences appreciated, in both males and females, can be explained after the variations above mentioned.

This species has been confused with *Munidopsis bispinata* Miyake & Baba, 1970; but the two species can be separated by the following features:

The rostrum is about 1/3–1/2 length of the carapace in *M. chunii*, but about 1/4–1/3 in *M. bispinata*.

The abdominal tergites 2 and 3 carry two spines, one on the anterior and one on the posterior transverse ridge in *M. chunii* but only a single spine on the anterior transverse ridge in *M. bispinata*. Both species have a single spine on abdominal tergite 4 anterior ridge.

The antennal peduncle basal article has a small tubercular tooth and article 3 has a minute spine on the outer distal margin in *M. bispinata*; these are absent in *M. chunii*.

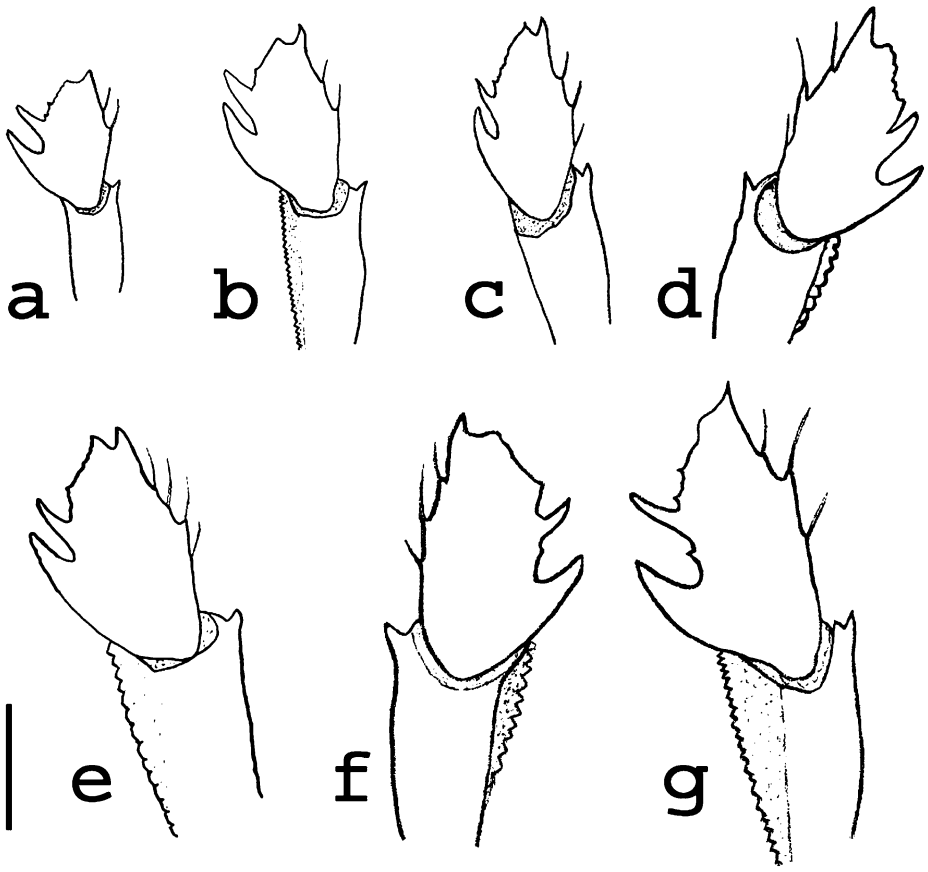

FIGURE 5. *Munidopsis chunii* Balss, 1913, variations on mxp3 merus flexor and extensor margins. MAURIT 0811 Stn L33: a) left mxp3 merus, ovigerous female CL 6.4 mm. MAURIT 1011 Stn L40: b) left mxp3 merus, female CL 8.3 mm c) left mxp3 merus, female CL 8.3 mm d) right mxp3 merus, male CL 8.9 mm. MAURIT 1107 Stn L68: e) left mxp3 merus, ovigerous female CL 10.5 mm f) right mxp3 merus, ovigerous female CL 11.8 mm g) left mxp3 merus, ovigerous female CL 12.2 mm. Scale bar 1 mm.

The mxp3 merus extensor margin has 2–4 small denticles or setae in *M. chunii* but only one seta and no denticles in *M. bispinata*. The meral flexor margin has 2 strong spines and the distal margin is most denticulate in *M. chunii,* whereas in *M. bispinata,* there are three spines, the distal one being very minute.

The P2 carpus has one dorsal spine (the distal one) in *M. chunii* while it has two dorsal spines in *M. bispinata*.

The P2–4 dactylus flexor margin is armed with 10–12 teeth in *M. chunii* but only seven in *M. bispinata*.

Some of these features, mainly those applicable to the spinulation of the abdominal somites and mxp3 merus, can be very variable as we have explained above. In consequence, to ensure the correct identification of the species, consideration of the combination of these features is required.

The records for this species in the literature cited depths of 400 to 710 m, whereas all our specimens were captured at depths greater than 1000 m.

Munidopsis curvirostra Whiteaves, 1874

Munidopsis curvirostra Whiteaves, 1874: 212.—Baba *et al.* 2008: 138 (list of references and synonymies).

Material examined. MAURIT 1107, Stn L04, 1812–1824 m, 1 ovigerous female 8.6 mm. MAURIT 0811, Stn L13, 1808–1862 m, 3 males 7.2–8.2 mm. MAURIT 0911, Stn L15, 1746–1749 m, 1 female 7.1 mm. MAURIT 1011, Stn L04, 1765–1773 m, 1 ovigerous female 11.7 mm, Stn L15, 1747–1867 m, 1 ovigerous female 7.6 mm.

Remarks. Our specimens agree well with those described for the East Atlantic Ocean by Selbie (1914) and Macpherson & Segonzac (2005).

Distribution. This species is known from Iceland to Mauritania in the eastern Atlantic and from Davis Straits to North Carolina in the western Atlantic; this species has been also cited at the Lord Howe Ridge, southwest Pacific (Khodkina 1981). Its bathymetrical range varies between 329 (Whiteaves 1874) and 2430 m.

Munidopsis serricornis (Lovén, 1852)

Galathea serricornis Lovén, 1852: 22
Munidopsis serricornis.—Baba *et al.* 2008: 159 (list of references and synonymies).

Material examined. MAURIT 0911, Stn L20, 975–984 m, 1 male 7.7 mm.

Remarks. Our specimen agrees well with those described for the Atlantic Ocean by Selbie (1914, as *Munidopsis* (*Galathodes*) *tridentata*), Mayo (1974), Baba (1988) and Baba & Poore (2002).

Distribution. In the Atlantic Ocean, *M. serricornis* has been recorded from the Scandinavian coast and Iceland to Cape Verde Islands including the Mediterranean Sea, Mid-Atlantic Ridge and from off Georgia to Dominica in the west side. In the Indo-Pacific, it is reported from Madagascar to Sri Lanka, Malay Archipelago and southwestern Australia. The bathymetrical range varies between 145 to 2165 m deep. This is the first record from the Mauritania coast.

Munidopsis anaramosae n. sp.
(Figs. 6–7)

Holotype. MNCN 20.04/9118, one male 15.4 mm (Total length, rostrum included, 39.2 mm; maximum wide, 13.1 mm); MAURIT 0811, Stn L10, off NW Banc d'Arguin (Mauritania) 20°20´50"N, 17°53´30"W to 20°18´23"N, 17°52´03"W, 1012–1000 m, 20 November 2008.

Etymology. This species is devoted to Dr. Ana Ramos in appreciation and recognition of her genuine enthusiasm, hard work and dedication in order to improve the knowledge of benthic fauna in African coasts.

Diagnosis. Carapace dorsally unarmed, abdomen smooth, unarmed; eye immovable, eyespine arising distally from the middle end of the cornea; no ventral spines on cheliped merus, P2–4 merus with strong spines on dorsal and ventral margins; sternite 4 anterolateral margin denticulate with a strong acute distal spine.

Description. *General*: Most carapace, legs, telson and endopod of uropods covered with numerous short ridges supporting bases of plumose setae (Fig. 6b); setation denser on legs; two spots hairless on dorsal carapace behind antennal spines and two other triangular ones lateral to cardiac ridge; ventral carapace and abdomen mostly hairless. Dorsal abdomen moderately setose not on ridges but over the exoskeleton, as occurs on dorsal anterior part of carapace.

Carapace: 1/3 longer than wide (rostrum included) with lateral margin somewhat diverging posteriorly, dorsally spineless, although with 1 low tubercle over each hepatic mesobranchial, post-cardiac and metabranchial regions can be recognized (Fig. 6c). Dorsal regions well delimitated by distinct grooves; anterior to cervical groove almost smooth with some scarce granulation on epigastric and hepatic regions. Cardiac region with moderately elevated transverse ridge about 1/3 as wide as carapace. Low, short and closely placed transverse ridges supporting bases of setae on upper posterolateral region. Frontal margin oblique with well-developed antennal spine. Lateral margin with the anterolateral spine small, acute and ventral to level of lateral margin; the lateral anterobranchial spine as large as antennal spine and followed backwards by 5 small conspicuous denticles (Figs. 6a, c, 7g). Posterior carapace ridge unarmed. Pterygostomian flap with an anterior small and acute spine; surface covered with low and short ridges.

Rostrum: Triangular, somewhat wider proximally; about 1/3 of carapace length and slightly overreaching cheliped merus in dorsal view. Distolateral margins minutely dentate. Horizontal in lateral view and with a weak dorsal longitudinal carina.

Sternum: Sternite 3 about 2 times wider than long and with rounded margins; anterior margin with shallow median notch flanked by a pair of spines followed laterally by an irregular dentition (Fig. 7f). Sternite 4 about 3

times as broad as preceding one, narrowing anteriorly, with anterolateral margins denticulate and preceded by a strong spine; some short setose midline ridges in the distal middle surface can be observed too (Fig. 7f).

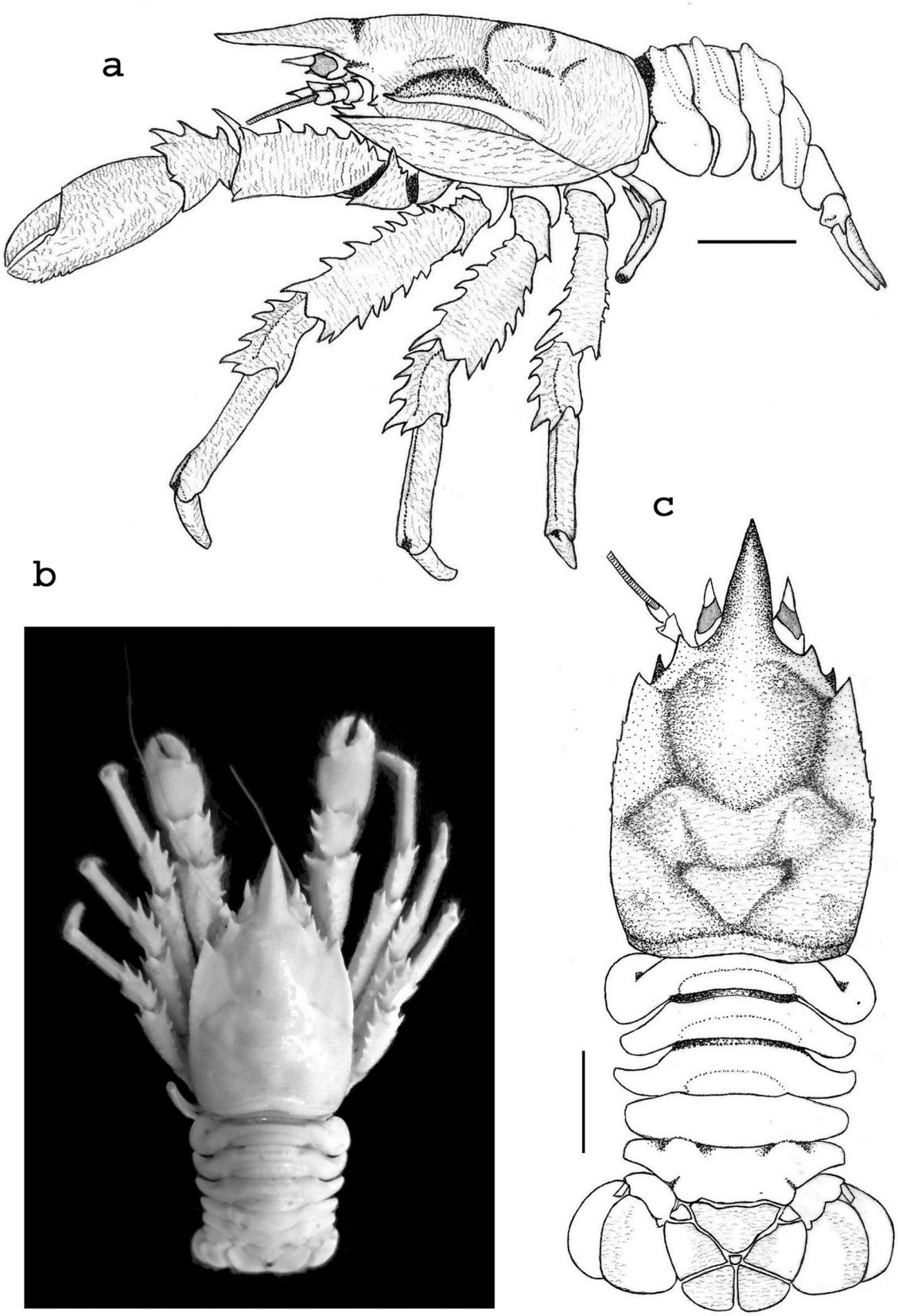

FIGURE 6. *Munidopsis anaramosae* **n. sp.**, male, holotype MNCN 20.04/9118, MAURIT 0811 Stn L10. Entire animal a) lateral view b) dorsal view c) dorsal view, P1–4 removed. Scale bar a, c, 5 mm; a, c: all setae omitted.

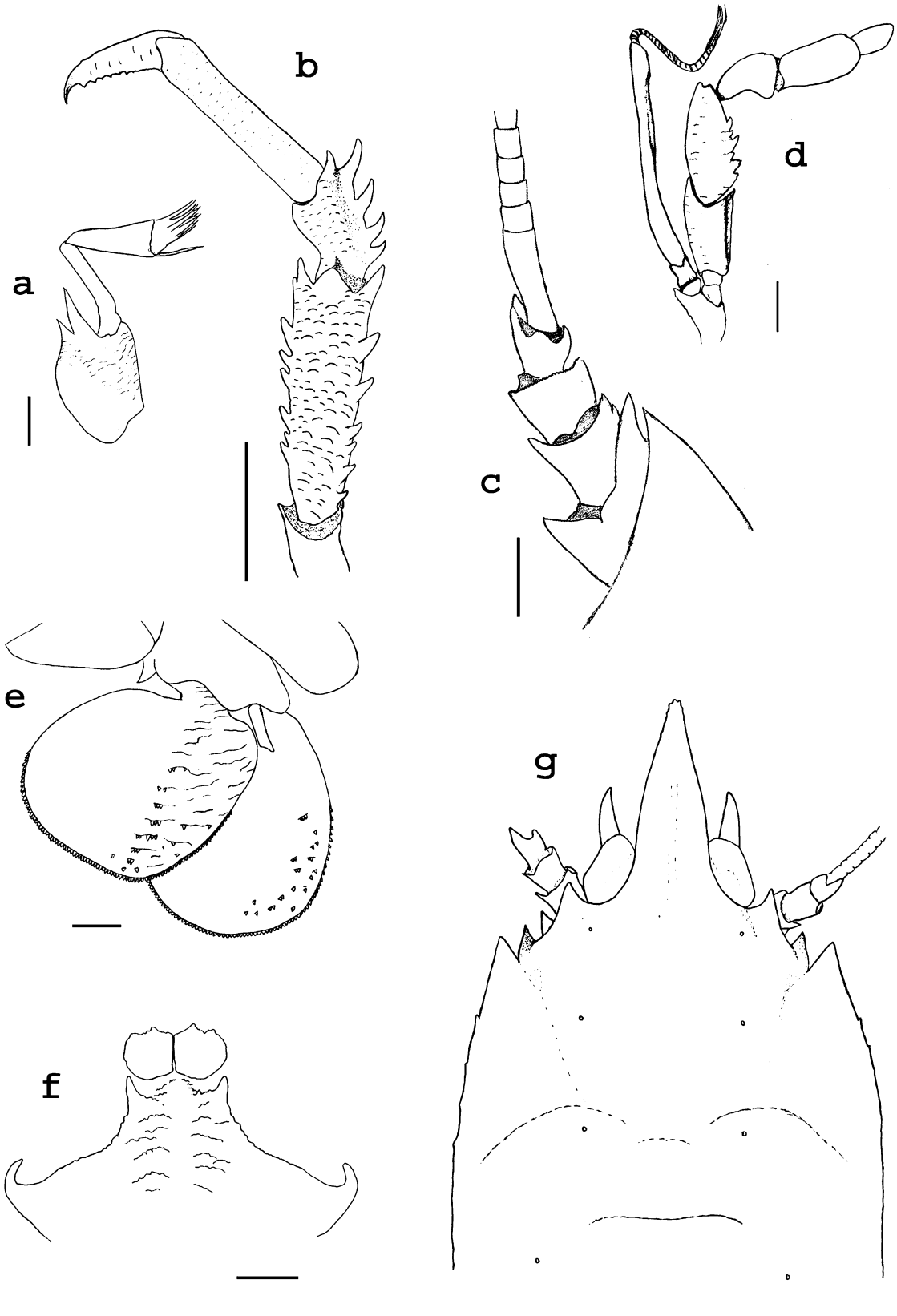

FIGURE 7. *Munidopsis anaramosae* **n. sp.**, male, holotype MNCN 20.04/9118, MAURIT 0811 Stn L10 a) right antennula, ventral view b) left P2 c) right antenna, ventral view d) right mxp 3, ventral view e) right uropod, dorsal view f) anterior sternum g) anterior carapace. Scale bar: a, c, d–f, 1 mm; b and g, 5 mm; all setae omitted.

Abomen: Dorsal surface unarmed. Tergites 2–4 bearing 2 transverse ridges each, the anterior narrower and raised than posterior one and reaching the pleuron (Fig. 6a). Tergite 6 with transverse posterior margin flanked by 2 conspicuous lobes. Distolateral and posterior margins of uropods exopod and endopod are provided with minute movable spines; uropods endopod dorsolateral surface with short ridges supporting bases of plumose setae and some scattered movable spines isolated or in groups of 2 or 3; uropods exopod with some few of these groups of movable spines on dorsolateral surface (Fig. 7e). Telson composed of 8 plates (Fig. 6c).

Eye: Ocular peduncles immovable. Cornea obliquely oval in dorsal view, non-pigmented (orange when alive). 2 eyespines, one well-developed arising from distal end of cornea, little short than eyestalk in dorsal view; the other one mesioventral and smaller, hardly visible in dorsal view.

Antennule: Basal article of antennula with 2 spines, one distodorsal and the other distolateral (Fig. 7a).

Antenna: Antennal peduncle short, reaching the middle of the main eye spine. Article 1 with one distolateral discrete spine and a strong distomesial spine. Article 2 with distolateral spine, mesial margin minutely serrated. Article 3 with 1 distomesial spine (Fig. 7c).

Maxilliped 3: Merus slighty broader than ischium, bearing 4 or 5 irregular spines on flexor margin and 2 low denticles on dorsodistal extensor margin. Ischium with one distoventral spine and 21 denticles on *crista dentata*. Carpus, propodus and dactylus unarmed (Fig. 7d).

Pereopod 1 (cheliped): Chelipeds subequal, about the same length as carapace (rostrum included), with short pilosum ridges all over dorsal surface. Ischium with distodorsal, distoventral and distomesial spines, distodorsal one followed by another blunt spine; distomesial margin serrated. Merus with 4 distal spines (dorsal, lateral, mesiodorsal and mesioventral); dorsal spine joined proximally with a longitudinal row of 5 other spines on dorsal crest; ventral surface unarmed. Carpus as long as broad, bearing 3 spines (dorsolateral, dorsal and mesiodorsal), the latter followed mesiodorsally by an oblique crest of 2 strong spines; ventral distomesial margin minutely denticulate. Palm as long as broad, spineless; fixed finger denticulate on anteroexternal margin; movable finger as long as palm; prehensile margin of the fingers spooned distally and followed proximally by a weakly crenulated carina, more notorious on fixed finger. Epipod absent.

Pereopods 2–4: P2–4 covered with short setose ridges more abundant on dorsal surface. P2 almost reaching the tip of chelipeds when extended forward. P3 and P4 diminishing in lenght and reaching middle propodus of the preceding leg. P2–4 meri relatively broad and compressed, with 7, 5 and 4 strong and acute spines respectively on dorsal margin and 4–5 spines on ventral margin (Fig. 6a). Each carpus with 2 dorsodistal spines: strong dorsal one followed by 3 other strong dorsal spines and the other one less strong and followed laterally by a conspicuous carina; ventral distomesial margin denticulate. Propodus less than twice length of dactylus, ventral margin ending in 3 movable spines. Dactylus ending in relatively short, strongly curved claw, flexor margin with 10 teeth decreasing in size proximally (Fig. 7b). Right P5 lost. Epipods absent.

Color. Whitish exoskeleton with orange cornea when alive; setae often covered with mud particles giving a dark appearance to the whole animal. Whitish in alcohol.

Distribution. Only known from the type locality: off northwestern Banc d'Arguin, Mauritania, 1006–1012 m deep.

Remarks. Chace (1942), aiming to compare and identify the species in the speciose genus *Munidopsis*, subdivided it into artificial groups, bringing together related species using some relevant morphological features. In this way *M. spinoculata* (A. Milne Edwards, 1880) and *M. hendersoniana* Faxon, 1893 were grouped by "the huge terminal spine of the eyestalk practically passes through the cornea". Baba (1988) described two new species, *M. bispinoculata* and *M. similior*, that he included in this group, and he added three more species: *M. pilosa* Henderson, 1885, *M. ramahtaylorae* Pequegnat and Pequegnat, 1971 and *M. subspinoculata* Pequegnat and Pequegnat, 1971. Other species that can be referred to this group too are: *M. victoriae* Baba & Poore, 2002, *M. rotundior*, Baba, 2005 and now *M. anaramosae* **n. sp.**, raising to ten the number of *Munidopsis* species provided with a well-developed eyespine arising from the distal end of the cornea.

Munidopsis victoriae (type locality off Portland, Victoria, southeastern Australia, 990 m), *M. hendersoniana* (see Baba 2005: 152; Gulf of Panama, Pacific Ocean, 915–1897 m) and *M. pilosa* (Indian and western Pacific Oceans, 732–1600 m) are provided with spines on the dorsal and ventral margins of the P2–4 merus; nevertheless in *M. hendersoniana* and *M. pilosa* the cornea become divided into mesial and lateral lobes by ocular peduncle but not in our species. *Munidopsis victoriae* shows the cornea undivided like in *M. anaramosae*, but cheliped merus bears 2–4 ventral spines while is unarmed in *M. anaramosae*. Moreover, these three species show a different morphology and sculpture on sternites 3 and 4.

Munidopsis ramahtaylorae Pequegnat & Pequegnat, 1971, *M. spinoculata* (A. Milne Edwards, 1880) and *M. subspinoculata* Pequegnat & Pequegnat, 1971 were recorded from the Atlantic Ocean but none of them have spines on the dorsal and ventral margins of the P2–4 carpus.

Munidopsis bispinoculata Baba, 1988, *M. rotundior* Baba, 2005 and *M. similior* Baba, 1988, known from the Indian and Pacific Oceans, have the P2–4 merus spinose but only on the dorsal margin. The absence of spines on the ventral margins of the P2–4 merus in these three species separates them from *M. anaramosae* **n. sp** in which the P2–4 meri are provided with spines on the dorsal and ventral margins. None of the last three species have been recorded from Atlantic Ocean. Therefore, *M. anaramosae* **n. sp.** is the first species of the genus, having the eyespine arising from distal end of the cornea and with the dorsal and ventral margins of the P2–4 merus spinose, recorded in the Atlantic Ocean.

Acknowledgements

The authors wish to express their sincere gratitude to the authorities of *Instituto Español de Oceanografía* that made possible our participation in 'MAURIT' surveys and carry out the study of this material. We are grateful to all people, both scientific and crew, for their collaboration in the field works on board R/V Vizconde de Eza. We want to thank Mrs. Sara Castillo Oñate for her help in drawing some of the figures. Finally, we are especially grateful to Dr. Enrique Macpherson for his guide, support, suggestions and constructive reviews of the manuscript. This work was undertaken in the framework of the ECOAFRIK project and was partially funded by the Galician government (Project Ref. 10MMA602020PR) and by the MAVA FOUNDATION POUR LA NATURE (MAVA contract 12/87 AO C4/2012). This is ECOAFRIK publication number 4.

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