

Synopses of the British Fauna (New Series)

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No. 55

Lobsters, Mud Shrimps and Anomuran Crabs

Keys and Notes for the Identification of the Species

RAY W. INGLE

formerly of

*The Natural History Museum, Cromwell Road,
London SW7 5BD, England*

and

MARIT E. CHRISTIANSEN

*Natural History Museum, University of Oslo,
P.O. Box 1172 Blindern, N-0318 Oslo, Norway*

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Antennal peduncle long, with a spine on ventral margin of segment 3; antennal scale small and triangular, with 2 terminal very small acute spines; flagellum thin.

Pereiopods 1 equal and more robust for male, dactylus with a longitudinal smooth setose carina on outer and inner surface, upper margin and cutting edge with tubercles; propodal extension not reaching into distal half of dactylus, upper margin of propodus smooth with an adjacent longitudinal inner row of small tubercles and 2 distal spines, a similar outer row of tubercles near lower propodal margin, a conspicuous outermost spine above base of short propodal extension; carpus with 2 spines on upper distal margin (one small) and 1 spine on lower distal margin that also bears an outer longitudinal crest; upper margin of merus with a sub-distal spine, lower margin with large prominent proximal spines; lower margin of ischium usually with 2-3 spines; long setae on lower margins of propodus to ischium; propodus of male broader than female's. Pereiopods 2-5 simple with long setae, dactylus of pereopod 2 with a faint setose carina at most on outer surface, upper margin of carpus with a sub-distal spine and lower with a distal spine, merus with 1 sub-distal spine on upper margin and 2 on lower margin near ischium; pereiopods 3 and 4 more slender than pereopod 2; pereopod 5 still more slender.

Uropods broad, margins densely setose and with spinules; dorsal surface of exopod with 2 longitudinal broad ridges, endopod surface with a pair of confluent medial ridges and an outer marginal ridge.

Length: 15.5-22 mm carapace length; 47-106 mm total length (Ngoc-Ho, 2003).

Colour: "Usually dull green, sometimes brown" (Ngoc-Ho, 2003: 528).

Remarks: According to some authors, this species has been reported as far north as Norway, but Poulsen (1940) noted that the species was absent from Norway. The most northerly verified record to date is from the English Channel (Ngoc-Ho, 2003: 527).

Bionomics: *Within the Study Area;* reported occurring in various gradations of sandy mud and with or without algae, often in sheltered bays and lagoons, intertidal and in depths down to about 36 m (d'Udekem d'Acoz, 1999). *Megalopa* larvae recorded in plankton from July to October (Martin, 2001).

Beyond the Study Area; reported in surface sandy mud in sheltered regions and in ?65 m depth (Pèrès & Picard, 1964; García Raso, 1983). Noted ovigerous from June to August (Zariquiey Alvarez, 1968).

Distribution: *Within the Study Area;* western English Channel; Brittany [Trébeurden] (Bourdon, 1980; d'Udekem d'Acoz, 1999; Natural History Museum, London).

Beyond the Study Area; southwards – Bay of Biscay [towards Brest region]; Portugal; south west Spain; Moroccan Atlantic; southwards to Mauritania; Canary Islands: *Mediterranean* (d'Udekem d'Acoz, 1999).

INFRAORDER ANOMURA MACLEAY, 1838

Key to superfamilies of British Anomura

- Body usually 'lobster-shaped'; dorsal surface of carapace and abdomen ornamented with transverse ciliated striae (except for Chirostylidae); distal part of abdomen bent beneath proximal part that is visible from dorsal aspect (Fig. 79). Or body 'crab-shaped' (Fig. 80); carapace without spines; abdomen more or less concealed beneath cephalothorax. Both forms with pereopods 1-4 well developed and pereopods 5 thin and feeble.

..... **Superfamily GALATHEOIDEA** (p. 110).

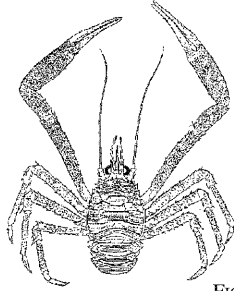


FIG. 79

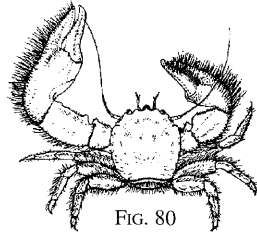


FIG. 80

- Body 'crab-shaped'; carapace spiny; abdomen concealed beneath cephalothorax; pereopods 1-4 long, pereopods 5 very short and thin, often concealed (Fig. 81). Or body not 'crab-shaped'; abdomen soft and concealed within a gastropod shell or enclosed by base of an anemone; only pereopods 1-3 well developed (Fig. 82).

..... **Superfamily PAGUROIDEA** (p. 173).

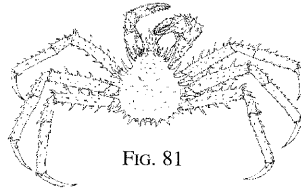


FIG. 81

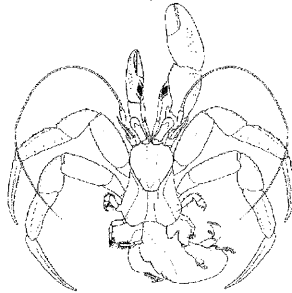


FIG. 82

Superfamily GALATHEOIDEA Samouelle, 1819

Key to families of British Galatheoidea

1. Body 'lobster-shaped'. Rostrum well-developed, usually conspicuous (Fig. 83)
..... 2

- Body 'crab-shaped'. Rostrum hardly developed (Fig. 84).
..... Family **Porcellanidae** (p. 167).

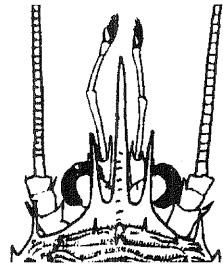


FIG. 83

2. Telson with a transverse suture (Fig. 85). Antennal scale present or absent, antennal peduncle 5-segmented.
..... Family **Chirostylidae** (below).

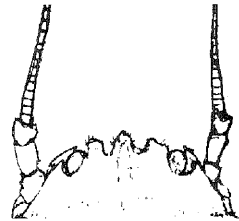


FIG. 84

- Telson with several sutures (Fig. 86). Antennal scale absent, antennal peduncle 4-segmented.
..... Family **Galatheidae** (p. 122).

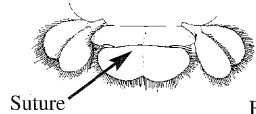


FIG. 85



FIG. 86

Family Chirostylidae Ortmann, 1892

Chirostylidae Ortmann, 1892: 246

Uroptychidae Alcock, 1901: 278

Chirostylidae: Balss, 1957: 1594

Carapace longer than broad. Antenna with 5-segmented peduncle. Maxillipeds 3 and pereopods 1-5 without epipod. Abdomen bent beneath itself, but not folded beneath thorax. Telson and uropods tucked under the last abdominal somite. Telson with a transverse suture.

Key to genera of British Chirostylidae

- Carapace very spiny. Rostrum spiniform (Fig. 87). Antennal scale absent*. Chelipeds often more than 5 times the length of carapace. Pereiopods 2-4 also very long.

..... Genus *Gastroptychus*
[one species: *G. formosus* p. 112].

*According to Selbie's (1914) key to genera, *Gastroptychus* has "no acicle on antennae", but in the description of *Gastroptychus formosus* he writes that the antennal peduncle "has a rudimentary scale".

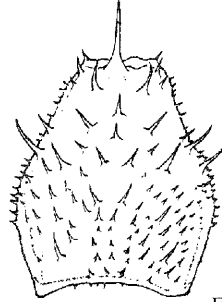


FIG. 87

- Carapace without, or with few, spines. Rostrum triangular (Fig. 88). Antennal scale well developed. Chelipeds less than 5 times the length of carapace. Pereiopods 2-4 of moderate length.

..... Genus *Uroptychus* (p. 114).

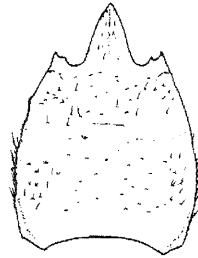


FIG. 88

GENUS *GASTROPTYCHUS* CAULLERY, 1896

Ptychogaster A. Milne-Edwards, 1880: 63

Chirostylus Ortmann, 1892: 246 (not *Chirostylus* in Miyake & Baba, 1968)

Gastroptychus Caullery, 1896: 390

Carapace spiny; rostrum present. Chelipeds very long.

Remarks: The genus *Chirostylus* was subdivided by Miyake & Baba (1968). The true *Chirostylus* group lacks a rostrum, whereas *Gastroptychus* has a rostrum (see also Pohle & Macpherson, 1995).

***Gastroptychus formosus* (Filhol, 1884)**

(Figs 87, 89)

Ptychogaster formosus Filhol, 1884: 231, 233, fig. 3*Ptychogaster formosus*: Filhol, 1885: 135, fig. 43*Ptychogaster formosus*: A. Milne-Edwards & Bouvier, 1900: 350, pl. 3, fig. 2, pl. 12, figs 1-5*Gastroptychus formosus*: Selbie, 1914: 62, pl. 9, figs 2-8, pl. 10, fig. 1*Chirostylus formosus*: Bouvier, 1940: 158, figs 118-119, pl. 5, fig. 8*Chirostylus formosus*: Allen, 1967: 34, 58, 95 (fig.)*Chirostylus formosus*: Zariquiey Alvarez, 1968: 262, fig. 92*Chirostylus formosus*: Moyses & Smaldon, 1990: 529, fig. 10.17*Gastroptychus formosus*: Pohle & Macpherson, 1995: 484, fig. 1

Diagnosis: Carapace much narrower in front than behind, with its broadest part shortly behind the cervical groove that is hardly developed; dorsal surface of carapace with a number of spines, several large spines on gastric, hepatic, epibranchial and cardiac regions and rows of smaller spines on branchial region; rostrum spiniform and upturned; *linea anomurica* distinct, below it on each side of carapace are a number of small irregularly arranged spines.

Abdominal somite 1 narrow and with rudimentary pleura, the other somites broad and with well developed pleura; abdominal tergites 1 and 2 with a transverse row of spines of which some are larger than others, tergites 3 to 5 practically smooth, tergite 6 bears several spines.

Telson and uropods are folded against ventral surface of abdominal somite 6 and the abdomen is bent upon itself. Telson thin and membranous, divided by a transverse suture, slightly concave laterally and posteriorly, dorsal surface with a number of setae, margins fringed with long setae.

Sternum very narrow anteriorly with 2 or 3 large spines at the base of chelipeds.

Antennular peduncle extends past tip of rostrum, segment 3 is the longest.

Antenna only slightly longer than antennule (with flagella extended), peduncle slender, short and extends just beyond the eye, basal segment with a small disto-external process, a slender spine near distal end of terminal segment.

Maxilliped 3 with a strong spine on inner margin of coxa, merus with a short spine near distal end of outer margin, carpus with a larger spine in the same position.

Chelipeds very long (more than 5 times length of carapace and rostrum combined) and thickly covered with sharp spines arranged in longitudinal rows, merus is the longest segment, carpus of about the same length as palm, chela much shorter than palm. Pereiopods 2-4 shorter than chelipeds, sub-equal in length, slender and with spines arranged as for the chelipeds, dactylus ends in a curved claw which has a row of spines on its inner margin. Pereiopod 5 very small and feeble as in other species of Galatheoidea.

Uropods thin and membranous, margins fringed with long setae.

Length: Carapace length of a male and female (Natural History Museum, London) 25 mm and 30 mm respectively (including rostrum), broadest width 19 mm and 24 mm. According to Selbie (1914), a specimen measured 44 mm when the

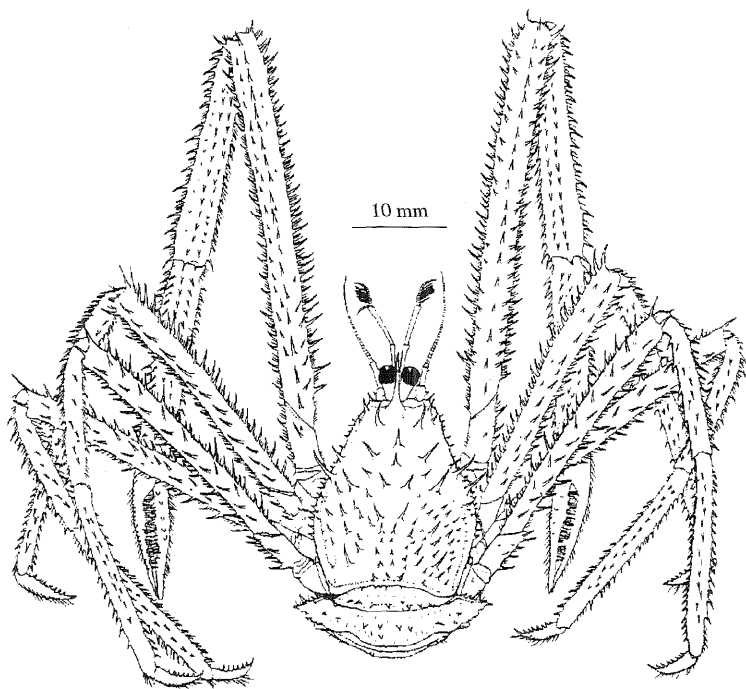


FIG. 89.

Gastroptychus formosus (Filhol), female 25 mm carapace length.

abdomen and telson were fully extended. An ovigerous female measured 20.5 mm carapace length, excluding rostrum (García Raso, 1996).

Colour: Bright scarlet with bronze lustre eyes (Selbie, 1914).

Bionomics: *Within the Study Area;* reported occurring on black corals, hard corals and sea fans and in depths from 699 m to 914 m (Kemp, 1910 *vide* Hickson, 1907; Selbie, 1914). Noted ovigerous in August (Kemp, 1910).

Beyond the Study Area; reported occurring on hard substrates, coral beds, ooze/sand, shells, black spotted sand and rocks, beds of pteropod tests and foraminiferans, and in depths down to 1786 m (A. Milne-Edwards & Bouvier, 1900; Bouvier, 1922; García Raso, 1996).

Distribution: *Within the Study Area;* only a few specimens have been recorded within the Area, namely 77 miles west north west of Achill Head, Co. Mayo, Ireland; 53°07'N, 14°50'W; 54°20'N, 11°27.7'W; 54°17.5'N, 11°34'W and at 48°07'N, 8°13'W (Kemp, 1910; Selbie, 1914; Natural History Museum, London).

Beyond the Study Area; southwards – Bay of Biscay; Moroccan Atlantic; Western Sahara (south of Cape Bojador); Canary Islands; *Western Atlantic* – coast of Canada at 43°56'N, 58°32'W (Pohle & Macpherson, 1995; García Raso, 1996; d'Udekem d'Acoz, 1999).

GENUS *UROPTYCHUS* Henderson, 1888

Uroptychus Henderson, 1888: 173

Diptychus A. Milne-Edwards, 1880: 61

Uroptychus: Türkay, 1976: 31

Carapace without or with a few spines; rostrum triangular. Antennal scale well developed.

Key to British species of *Uroptychus*

1. Dorsal surface of carapace without spines. 2

- Dorsal surface of carapace with few spines. 3

2. Dorsal surface of carapace bearing numerous setae especially on branchial and hepatic regions. Upper and lower surfaces of chelipeds covered with small scales bearing a row of setae. No moveable spines on inner margin of propodus of pereopods 2-4. (Fig. 90)
 *Uroptychus rubrovittatus* (p. 115).

- Dorsal surface of carapace without setae. Chelipeds smooth and without scales or setae, except at tips. Moveable spines present on inner margin of propodus of pereopods 2-4 (Fig 91).
 *Uroptychus concolor* (p. 116).

3. Dorsal surface of carapace with 2 spines on gastric region behind base of rostrum (arrowed in Fig. 92), a smaller spine may occur between the two.
 *Uroptychus bouvieri* (p. 118).

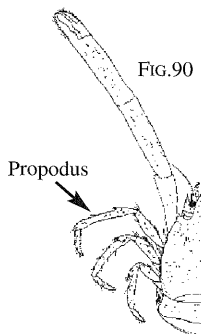


FIG. 90

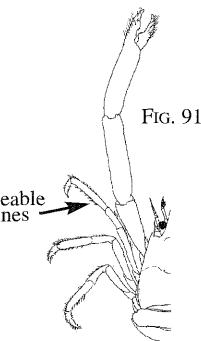


FIG. 91

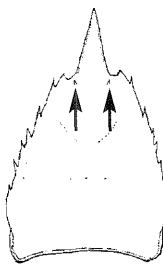


FIG. 92

***Uroptychus rubrovittatus* (A. Milne-Edwards, 1881)**

(Figs 90, 93)

Diptychus rubro-vittatus A. Milne-Edwards, 1881: 933

Diptychus rubro-vittatus: Bonnier, 1888: 170, pl. 14, figs 1-8

Diptychus rubro-vittatus: A. Milne-Edwards & Bouvier, 1894c: 88, pl. 6, figs 1-12

Uroptychus rubro-vittatus: Caullery, 1896: 393, pl. 17, figs 3-6

Diptychus rubro-vittatus: A. Milne-Edwards & Bouvier, 1900: 356, pl. 32, figs 6-14

Uroptychus rubrovittatus: Selbie, 1914: 56, pl. 8, figs 1-4

Uroptychus rubrovittatus: Bouvier, 1940: 160, figs 120, 124 bis, pl. 5, fig. 9

Uroptychus rubrovittatus: Allen, 1967: 34, 58, 95 (fig.)

Uroptychus rubrovittatus: Zariquiey Alvarez, 1968: 264, fig. 93b, c

Uroptychus rubrovittatus: Türkay, 1976: 31, fig. 13.

Uroptychus rubrovittatus: Moyses & Smaldon, 1990: 529, fig. 10.17

Diagnosis: Carapace broadest in branchial region, lateral margins arched and slightly crenulated, posterior margin slightly concave; antero-lateral spines distinct, also a small spine on hepatic margin (above base of antenna); dorsal surface with sparse covering of microscopic scales with tufts of fine setae which are most numerous on branchial and hepatic regions, but also occur on rostrum; rostrum triangular, slightly depressed medially and with very slightly crenulated margins. *Linea anomurica* is distinctly marked.

Abdominal somites smooth with a sparse covering of setae.

Telson and uropods folded against ventral surface of abdominal somite 6.

Telson divided by a transverse suture, proximal part slightly calcified, distal part membranous, lateral margins with a deep sinus opposite the suture, posterior angles rounded and posterior margin concave, lateral and posterior margins fringed with fine setae.

Basal segment of antennule short and with a curved spine at its terminal outer extremity, the spine has a few small spines on its margin.

Antennal flagellum reaches beyond merus of cheliped.

Segments of maxilliped 3 without spines except ischium that has the usual *linea cristata*.

Chelipeds longer than whole body, surfaces covered with small scales, each bearing a few setae pointing forwards; chela about half length of palm; 2 spines present ventrally on distal margins of merus and carpus.

Pereiopods 2-4 sub-equal, with small scales furnished with setae; inner margin of dactylus with a row of spines; pereiopod 5 small and feeble.

Uropod margins fringed with long setae.

Length: Carapace length of a specimen from Cape Bojador (Natural History Museum, London) 11.5 mm (including rostrum). Oviparous female 16 mm carapace length also examined.

Colour: Reddish (A. Milne-Edwards & Bouvier, 1894c).

Bionomics: *Within the Study Area*; reported occurring on black corals, hard corals and sea fans and on ooze, in depths of 750 m to 1463 m (Kemp, 1910 *vide* Hickson, 1907; Selbie, 1914).

Beyond the Study Area; reported occurring on sand, gravel and rock substrates and on ooze with corals and in depths from 300 to 1410 m (A. Milne-Edwards & Bouvier, 1894c, 1900; Caullery, 1896).

Distribution: Within the Study Area; very few specimens of this species have been reported within the Area, namely at 48°07'N, 8°13'W; 53°07'N, 14°50'W; between 51°43' 30"N, 12°15' W and 51°38'N, 12°18'W (Kemp, 1910; Selbie, 1914).

Beyond the Study Area; northwards – south of Iceland: southwards – Bay of Biscay; Spanish coast; west coast of Africa as far as Cape Bojador; Azores and Canary Islands (Hansen, 1908; Selbie, 1914).

***Uroptychus concolor* (A. Milne-Edwards & Bouvier, 1894)**

(Figs 91, 94)

Diptychus nitidus var. *concolor* A. Milne-Edwards & Bouvier, 1894a: 213, 217, 225, 229, 306, 307, figs 16, 21

Diptychus nitidus var. *concolor*: A. Milne-Edwards & Bouvier, 1900: 360, pl. 4, fig. 4, pl. 32, figs 15-19

Uroptychus nitidus var. *concolor*: Selbie, 1914: 59, pl. 8, figs 5-10, pl. 9, fig. 1

Uroptychus nitidus var. *concolor*: Bouvier, 1940: 161, figs 113, 121, pl. 5, figs 10-11

Uroptychus nitidus concolor: Allen, 1967: 34, 58, 95 (fig.)

Uroptychus nitidus var. *concolor*: Zariquiey Alvarez, 1968: 264, fig. 93a

Uroptychus nitidus concolor: Türkay, 1976: 30, figs 6, 8, 10

Uroptychus nitidus concolor: Moyses & Smalton, 1990: 529, fig. 10.17

Uroptychus concolor: d'Udekem d'Acoz, 1999: 159

Diagnosis: Surface of carapace quite smooth, without setae but with sparse punctations (which can be seen only when the carapace is dry); lateral margins slightly (microscopically) granular, antero-lateral spines distinct; rostrum narrower and longer than for *U. rubrovittatus* with quite entire margins and without setae, the proximal part of the rostrum curves downwards and the tip is elevated.

Abdominal somites smooth, punctated as carapace and without setae.

Telson and uropods folded against ventral surface of abdominal somite 6, resembling those of *U. rubrovittatus*.

Basal segment of antennule has a curved spine at terminal outer extremity, the spine bears 2 smaller spines.

Antennal flagellum does not extend beyond the distal end of cheliped merus.

Segments of maxilliped 3 without spines except ischium that has longer and sharper spines on *linea cristata* than *U. rubrovittatus*.

Chelipeds longer than whole body, smooth and without setae except for the tufts on the chelae; ischium with 2 or 3 rows of tubercles and merus with 3 or 4 rows of tubercles (or spinous tubercles) on the lower surface, the rows vary somewhat in distinctness. Chela about half length of palm, inner margin of

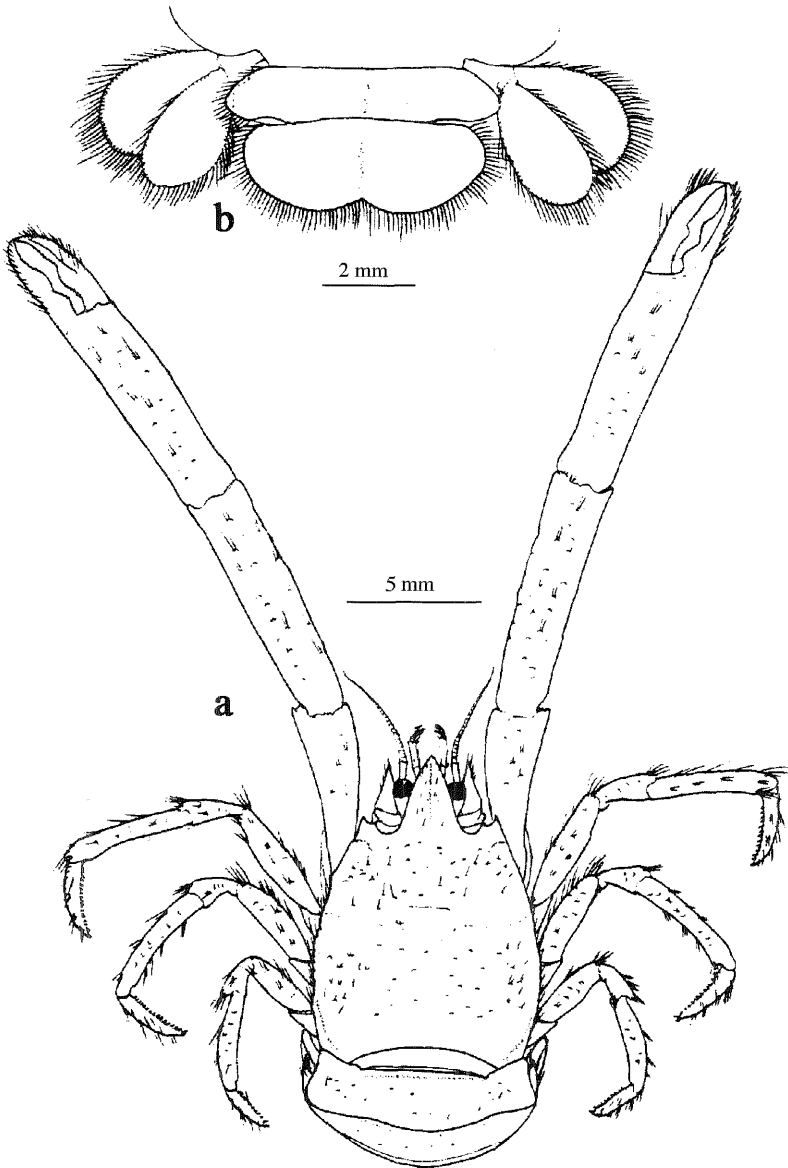


FIG. 93.

Urotychus rubrovittatus (A. Milne-Edwards), female 11 mm carapace length:
(a) dorsal aspect; (b) telson and uropods, dorsal aspect.

dactylus has a formidable process near its base. Pereiopods 2-4 sub-equal and with scattered long setae which are dense on the distal half of propodus and dactylus, inner margin of distal half of propodus with a row of long moveable spines, dactylus strongly curved with a row of spines on inner margin*; pereopod 5 small and feeble.

Length: Carapace length of two females (including rostrum) (Natural History Museum, London) 11 mm and 13.5 mm.

Colour: Thorax and abdomen rose violet, appendages slightly lighter, and verging to a yellowish red (A. Milne-Edwards & Bouvier, 1900).

Bionomics: *Within the Study Area;* reported occurring on black corals, hard corals and sea fans, in depths from 753 m to 1281 m (Kemp, 1910 *vide* Hickson, 1907; Selbie, 1914). Noted ovigerous in September (Selbie, 1914).

Beyond the Study Area; reported occurring on soft and hard substrates and on corals, and in depths of 600 m to 1710 m (Caullery, 1896; A. Milne-Edwards & Bouvier, 1900; Bouvier, 1922; d'Udekem d'Acoz, 1999).

Distribution: *Within the Study Area;* only a limited number of specimens of this species has been collected within the Area, namely at 48°07'N, 8°13'W; 48°31'N, 10°03'W; 51°58'N, 12°25'W; 51°59'N, 12°32'W; 50°52'N, 11°26'W (Kemp, 1910; Selbie, 1914; Natural History Museum, London).

Beyond the Study Area; northwards – south west of Iceland: southwards – off Brittany; Bay of Biscay; Moroccan Atlantic; Mauritania; Azores; Cape Verde Islands (Hansen, 1908; d'Udekem d'Acoz, 1999).

Uroptychus bouvieri Caullery, 1896

(Figs 92, 95)

Uroptychus Bouvieri Caullery, 1896: 394, pl. 17, figs 7-14

Uroptychus Bouvieri: Kemp, 1910: 414

Uroptychus bouvieri: Türkay, 1976: 31, fig. 12

Uroptychus bouvieri: García Raso, 1996: 738

Diagnosis: Carapace somewhat regularly triangular, hardly convex, lateral margins with 5 to 7 spines (posterior seventh may be minute) plus a distinct antero-lateral spine, posterior margin slightly concave, carapace dorsal surface with 2 spines on gastric region behind base of rostrum, a smaller spine may occur between the two; rostrum triangular and medially slightly depressed, margins smooth.

Abdominal somites smooth.

Telson divided by transverse suture, lateral margins with a sinus opposite the

*According to Selbie (1914), the moveable spines on propodus with the spines on dactylus when the joint is bent, form an efficient sub-chela which enables the animal to get a firm grip of the coral on which it lives.

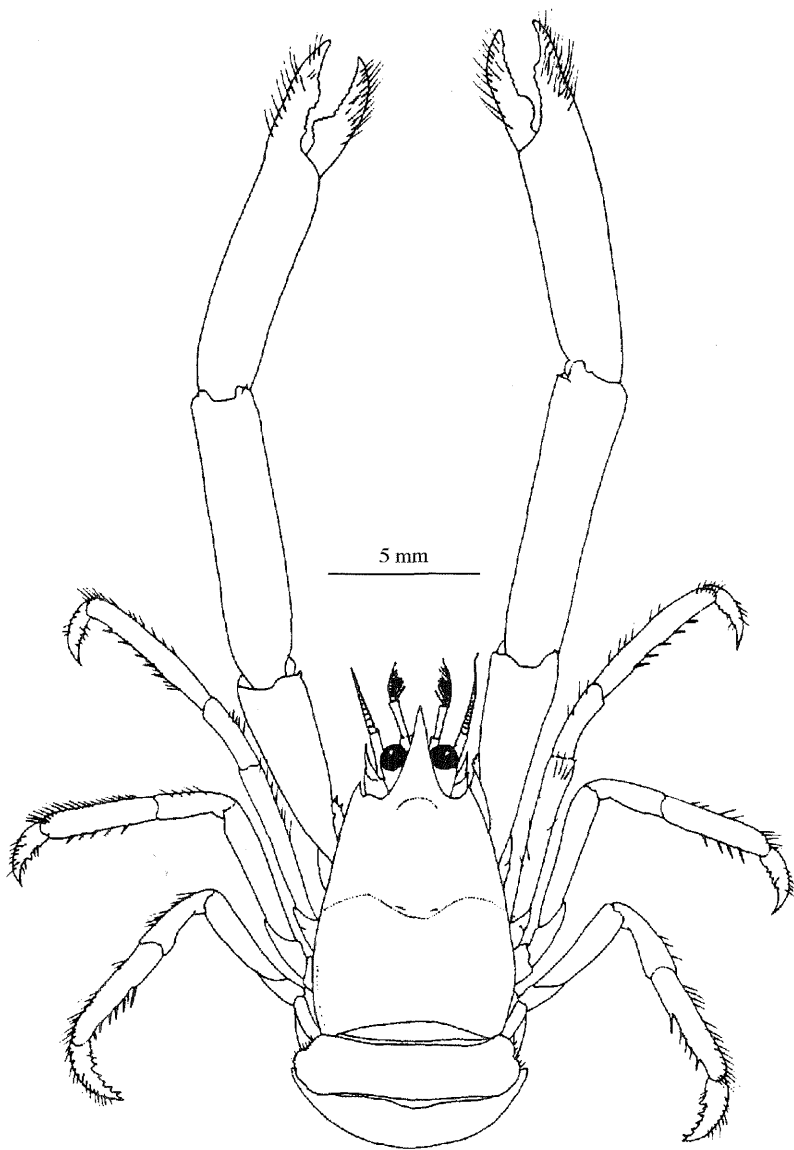


FIG. 94.

Urotychus concolor (A. Milne-Edwards & Bouvier), female 11 mm carapace length.

suture, posterior angles rounded, lateral and posterior margins fringed with fine setae.

Basal segment of antennule with a spine at its terminal outer extremity.

Antennal flagellum short but reaching beyond tip of rostrum.

Segments of maxilliped 3 without spines except ischium which has the usual *linea cristata*.

Chelipeds long, with strong spines arranged in regular rows on ischium, merus and carpus (except on the infero-internal surface which is entirely unarmed); chela short and less than half length of palm, palm laterally compressed and smooth and with only small spines on proximal half of the dorsal margin, or continued distally as very small obtuse processes. Pereiopods 2-4 sub-equal, laterally depressed, with setae and small spines on upper margin, inner margin of propodus and dactylus with strong spines. Pereiopod 5 small and feeble.

Uropods fringed with fine setae.

Length: Total length of two ovigerous females 20.5 mm and 22 mm and a male 14.5 mm (Kemp, 1910); carapace length (excluding rostrum) of an ovigerous female measuring '5 mm' (García Raso, 1996). This specimen (depicted in Fig. 95) has a carapace length of 7.5 mm (including rostrum).

Bionomics: *Within the Study Area;* reported occurring on black corals, hard corals and sea fans and in depth of 753 m (Kemp, 1910 *vide* Hickson, 1907). Noted ovigerous in August (Kemp, 1910).

Beyond the Study Area; reported occurring on beds of shells, pteropod tests and sponges, recorded from depths of 500 m to 948 m (Caullery, 1896; García Raso, 1996).

Distribution: *Within the Study Area;* only three specimens recorded from one locality within the Area, namely at 48°07'N, 8°13'W (Kemp, 1910).

Beyond the Study Area; southwards – west of Bay of Biscay [46°40'N, 6°58'W]; 47°32.5'N, 7° 5.7'W; 43°55.1'N, 6°11.3'W-43°52.5'N, 6°10.9'W; also Moroccan Atlantic (Caullery, 1896; García Raso, 1996; Museum National d'Histoire Naturelle, Paris).

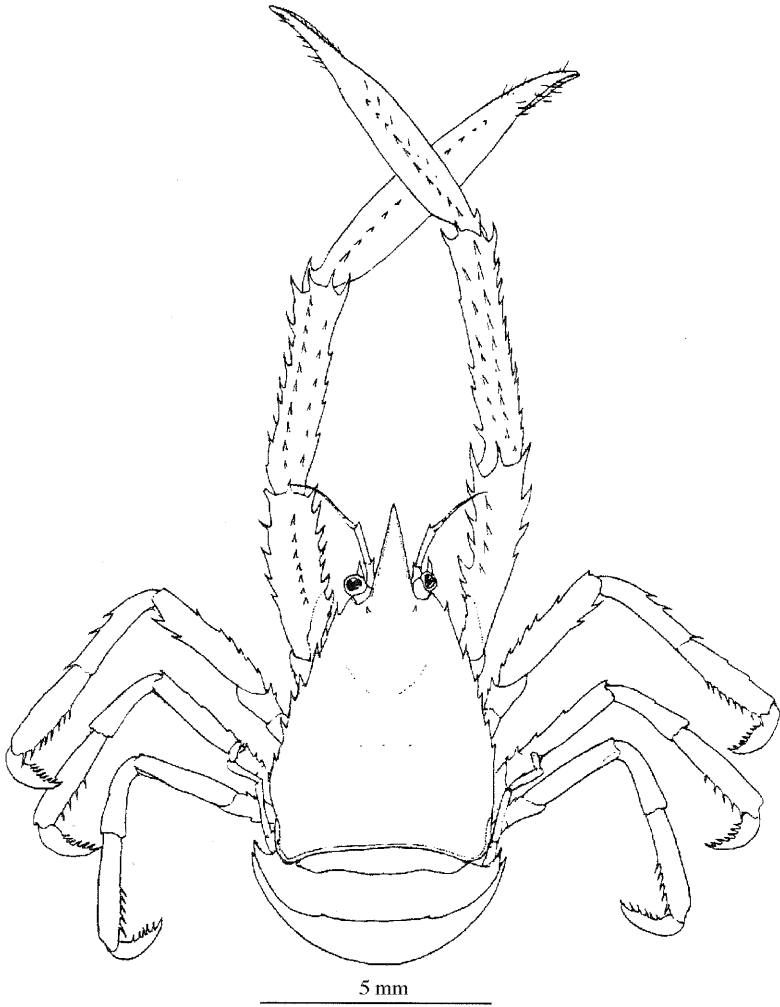


FIG. 95.
Urotychus bouvieri Caullery, female 7.5 mm carapace length.

Family Galatheidae Samouelle, 1819

Galatheidae Samouelle, 1819: 92

Galatheidae: Balss, 1957: 1595

Galatheidae: Zariquiey Alvarez, 1968: 208

Galatheidae: Williams, 1984: 231

Galatheidae: Squires, 1990: 407

Carapace often ornamented with transverse ciliated striae. Rostrum distinct and strongly pointed, projecting beyond the eyes. Antenna with 4-segmented peduncle. Antennal scale absent. Maxillipeds 1-3 with epipod, often also present on pereopods 1 or pereopods 1-3. Chelipeds greatly elongated. Pereiopods 2-4 well developed; pereopods 5 feeble, reduced in size. Abdomen bent beneath itself, but not folded beneath thorax. Telson with several sutures.

Key to genera of British Galatheidae

- 1. Rostrum spiniform; supra-orbital spines long (Fig. 96).
 Genus *Munida* (p. 123).

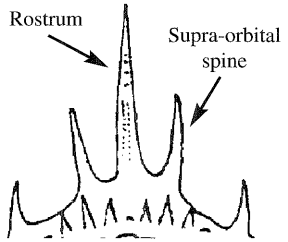


FIG. 96

- Rostrum broad, flattened or if spiniform, without long supra-orbital spines.
 2

- 2. Rostrum broad at base with a longitudinal carina ending in a spine with a shorter spine on each side (Fig. 97) or rostrum spiniform (cf Fig. 96 without the supra-orbital spines).
 Genus *Munidopsis* (p. 142).

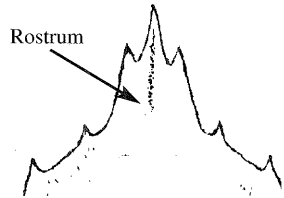


FIG. 97

- Rostrum broad, triangular, margins armed with spines (Fig. 98).
 Genus *Galathea* (p. 151).



FIG. 98

GENUS *MUNIDA* LEACH, 1820

Munida Leach, 1820: 52

Munida: Bell, 1846: 206

Munida: Zariquiey Alvarez, 1968: 281

Munida: Squires, 1990: 408

Carapace with several transverse ciliated striae of various length; lateral margins of carapace with acute spines; spines also present on carapace surface; cervical groove well marked. Rostrum long and spiniform; supra-orbital spines strong, somewhat shorter than rostrum. Abdominal tergites with transverse ciliated striae. Eyes well developed. Antennal peduncle short, flagellum long. Chelipeds long and spiny. Pereiopods 5 feeble and much shorter than the preceding pereiopods, terminating as a small chela.

Remarks: The north-eastern Atlantic and Mediterranean representatives of the genus *Munida* have been a subject of much nomenclatural and taxonomic controversy and confusion, particularly with regard to the specific epithets *rugosa* Fabricius and *banffia* Pennant and a variety of additional names proposed for the same or closely related taxa (Rice & de Saint Laurent, 1986).

Key to British species of *Munida*

1. A row of three pairs of conspicuous spines of more or less equal size on anterior part of gastric region (Fig. 99). Posterior margin of carapace without spines.
 *Munida micropthalma* (p. 125).
- Only one pair of large and conspicuous spines just behind supra-orbital spines on anterior part of gastric region (Fig. 100). Posterior margin of carapace with a variable number of spines.
 2

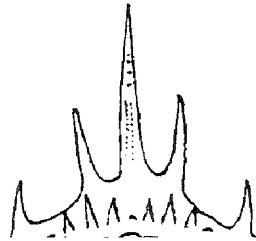


FIG. 99

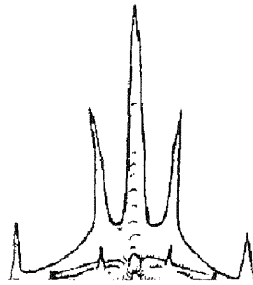
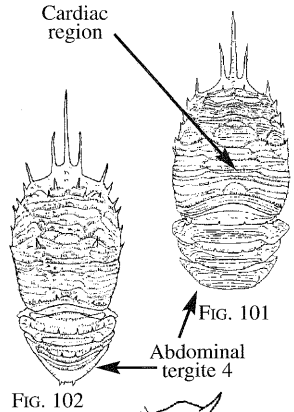


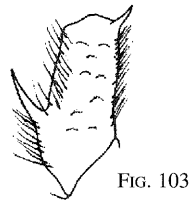
FIG. 100

2. Eyes small, cornea not much broader than the eye-stalks. Principal transverse striae on posterior part of carapace continuous, without interruptions on cardiac region (Fig. 101). Abdominal tergite 4 never armed with spines.
 *Munida rugosa* (p. 126).

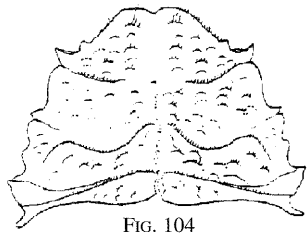


- Eyes large, cornea much broader than the eye-stalks. Principal transverse striae on posterior part of carapace interrupted on cardiac region (Fig. 102). Abdominal tergite 4 with or without spines. 3

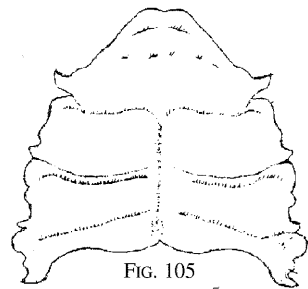
3. Maxilliped 3 with a spine at distal external angle of merus, usually distinct (Fig. 103). Abdominal tergite 4 sometimes with a pair of spines.
 *Munida intermedia* (p. 130).



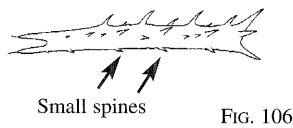
- Maxilliped 3 without a spine at distal external angle of merus, or rarely a spine present. Abdominal tergite 4 almost always with at least one pair of spines. 4



4. Numerous spinules on carapace hepatic and epibranchial regions. Ciliated striae very dense on abdominal tergites. Sternum with numerous short ciliated striae (Fig. 104). Ventral margin of cheliped merus unarmed.
 *Munida sarsi* (p. 132).



- A single spinule usually present on carapace hepatic region; epibranchial region unarmed, except for lateral spines (Fig. 102). Sternum with few short ciliated striae (Fig. 105). Ventral margin of cheliped merus with small spines throughout length (Fig. 106).
 *Munida tenuimana* (p. 136).



***Munida microphthalma* A. Milne-Edwards, 1880**

(Figs 99, 107, 114a)

Munida microphthalma A. Milne-Edwards, 1880: 50*Munida microphthalma*: A. Milne-Edwards & Bouvier, 1897: 32, pl. 2, figs 9-13*Munida microphthalma*: Hansen, 1908: 35*Munida microphthalma*: Hartnoll *et al.*, 1992: 241

Diagnosis: Carapace hardly convex, maximum width at epibranchial region; with transverse ciliated striae; lateral margins with acute spines, posterior margin without spines; a row of 6 prominent spines anteriorly on gastric region, 3 on each side of the median line, behind and outside these groups are some irregular projections; rostrum long and spiniform, slightly upturned at tip; supra-orbital spines diverging slightly.

Eyes relatively small, cornea not broader than the eye-stalks (corneal diameter much less than one-third length of anterior margin of carapace measured between bases of antero-lateral spines); eyes do not reach the middle of antennule basal segment.

Abdominal tergites with transverse ciliated striae; tergite 2 with 8 spines.

Telson broader than long; posterior margin setose with a medial incision; dorsal surface with scales (not completely covered).

Basal segment of antennule elongate, with 3 long spines on antero-external margin, also a small spine at distal internal angle.

Maxilliped 3 with a strong spine behind the middle of inner margin of merus, followed by one or a few spiny tubercles distally.

Chelipeds spiny, furnished with sparse setae. Chela slightly longer to about the same length as palm; dorsal surface of palm slightly elevated in the middle with a row of spines, ventral surface with scaly tubercles, these are also present on ventral surface of carpus and merus; ventral margin of merus with small spines. Pereiopods 2-4 spiny with scattered setae, dorsal surfaces with scaly tubercles; dactylus terminating as a sharp claw; pereiopod 5 thin, terminating as a small setose chela.

Uropods with long setae on posterior margin; endopods with some scales with small spines, otherwise smooth.

Length: Carapace length (including rostrum) of a male 19 mm (Natural History Museum, London). A male measured by A. Milne-Edwards & Bouvier (1897) had a total length of 36 mm, and carapace length including rostrum was 22 mm. Total length of a male measured by Hansen (1908) was 58 mm.

Colour: Reddish yellow with pale red eyes (Hansen, 1908).

Remarks: Besides the lack of spines on posterior margin of carapace, *M. microphthalma* may be distinguished from the other *Munida* species in the Area by the number of spines anteriorly on gastric region and (except for *M. rugosa*) by its small eyes.

Bionomics: *Within the Study Area*; reported from depths from 1630 to 1975-2092 m (Hansen, 1908; Hartnoll *et al.*, 1992).

Beyond the Study Area; reported inhabiting hard substrates, coral beds, globigerine ooze, and sometimes associated with exudates of hydrothermal vents, and in depths from 628 m to 2165 m (A. Milne-Edwards & Bouvier, 1900; Bouvier, 1922; Pérès & Picard, 1964; Chevaldonné & Olu, 1996).

Distribution: Within the Study Area; Only a few specimens of this species have been recorded within the Area namely, south of Iceland (62°10.8'N, 19°36'W) and in the Porcupine Seabight (49°33'N, 13°07'W) (Hansen, 1908; Hartnoll *et al.*, 1992).

Beyond the Study Area; southwards – Bay of Biscay; Moroccan Atlantic (off Mogador); Cape Verde Islands; Ascension Island region: *Western Atlantic* – USA, Antilles, western Gulf of Mexico; Brazil (Pequegnat & Pequegnat, 1970; d'Udekem d'Acoz, 1999).

***Munida rugosa* (Fabricius, 1775)**

(Figs 101, 108, 110a, 114b, 115a)

Pagurus rugosus Fabricius, 1775: 412

Astacus Bamffius Pennant, 1777: 17, pl. 3, fig. 25

Galatea rugosa: Leach, 1815b: pl. 19, figs 1-3

Munida rugosa: Leach, 1820: 52

Munida Rondeletii Bell, 1846: 208, fig.

Munida Rondeletti: G. O. Sars, 1883: 43, pl. 1, fig. 4

Munida bamffia: Bonnier, 1888: 164 (part), pl. 13, figs 7, 8

Munida bamffica: Selbie, 1914: 73 (part)

Munida bamffia: Brinkmann, 1936: 13, pl. 5, figs 13, 16

Munida rugosa: Zariquiey Alvarez, 1968: 285, fig. 101a

Munida rugosa: Christiansen, 1972: 46, fig. 56

Munida rugosa: Rice & de Saint Laurent, 1986: 150, figs 1a, b, 2a, c, 3a, b

Munida rugosa: Moyse & Smaldon, 1990: 526, fig. 10.16

Munida rugosa: Hayward *et al.*, 1995: 440, fig. 8.55

Diagnosis: Carapace with transverse ciliated striae; lateral margins with acute spines, posterior margin with a few spines on each side while central part is unarmed; gastric region with 2 anterior spines; each side of cardiac region with 1 post-cervical spine. The number of spines on dorsal surface may vary slightly. Principal transverse striae on posterior part of carapace continuous, without interruptions on cardiac region; rostrum long and spiniform; supra-orbital spines strong.

Eyes relatively small; cornea not much broader than the eye-stalks, setae arising from the corneal margin are all short and sub-equal in length.

Abdominal tergites with transverse ciliated striae; tergites 2-3 with spines.

Telson broader than long; posterior margin setose, with a medial incision; dorsal surface with scales fringed with short setae.

Ciliated striae on sternum; these are longer than the more numerous striae on *M. sarsi*.

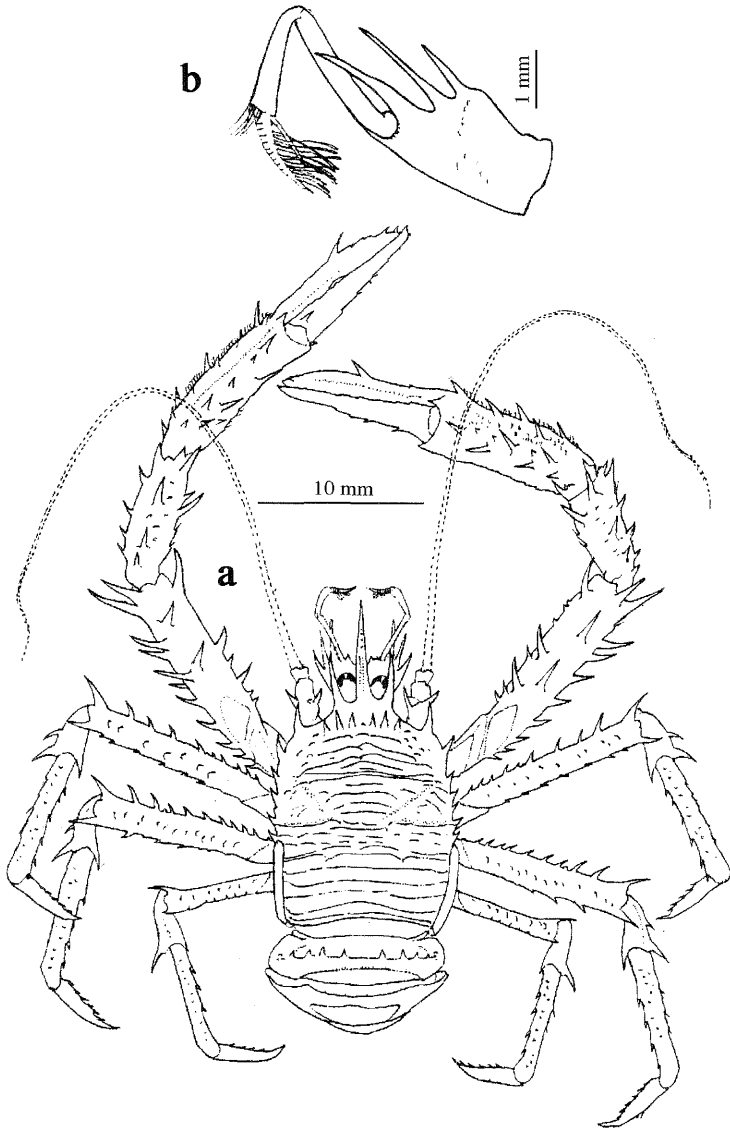


FIG. 107.

Munida microphthalmalms A. Milne-Edwards, male 19 mm carapace length:

(a) dorsal aspect; (b) left antennule, ventral aspect.

(The antennal flagellae are missing in the specimen figured; their approximate length is estimated from the description by A. Milne-Edwards & Bouvier, 1897).

Basal segment of antennule elongate; external margin with 2 spines, the foremost the longest; also 2 spines on distal margin of which that on internal angle is the strongest.

Merus of maxilliped 3 with 1 spine on inner margin and a spine at distal external angle.

Chelipeds spiny. Chela slightly longer or about the same length as palm; ventral margin of merus without spines. Pereiopods 2-4 with spines and setae; dactylus ending as a sharp claw; pereopod 5 feeble, ending as a small setose chela. Uropods with long setae on posterior margin; outer parts of exopods and endopods with scales fringed with short setae, inner part smooth.

Length: Carapace length of some adults examined 32-37 mm (rostrum excluded); 46-54 mm (rostrum included).

Colour: Red to red-brown. Rice & de Saint Laurent (1986) give a detailed description of the colouration.

Remarks: The small eyes and the presence of uninterrupted transverse striae on the posterior part of carapace distinguishes *M. rugosa* from *M. intermedia*, *M. sarsi*, and *M. tenuimana*. The absence of spines on abdominal tergite 4 also distinguishes *M. rugosa* from *M. sarsi* and *M. tenuimana* in which such spines are almost always present, although they may be minute in small specimens of *M. sarsi*. According to Rice & de Saint Laurent (1986: 147), illustrations attributed to *M. bamffica* by Selbie (1914 pl. XI, figs 13, 14) seem to be of *M. sarsi*. However, they suggest that among the material Selbie listed, and collected from depths between 37 and 670 m, there are probably also specimens of true *M. rugosa*. They also regard Pocock's (1889) *Munida bamffia* specimens as synonymous with *M. rugosa*. Pocock's specimens are recorded as collected between 250-315 fathoms (322-576 m). Hartnoll *et al.* (1992: 234) maintains that *M. rugosa* is restricted to relatively shallow water less than about 300 m depth. In the Goban Spur region (see Fig. 1) the maximum depth at which these authors reported the species is 280 m.

Vernacular names: Long-armed munida, rugose squat lobster, plated lobster (United Kingdom).

Bionomics: *Within the Study Area;* reported occurring on rock, stone, gravel and sand substrates and from MLWS region down to 576 m, possibly to 670 m (see *Remarks* above) (Pocock, 1889; Selbie, 1914; Allen, 1967). Noted ovigerous, 'breeding', from winter to early summer, specific months from January to November and with eggs hatching the following March to May; larvae recorded in plankton from January to July, most abundant from March to May (MBA, 1957; O'Ceidigh, 1962; Allen, 1967; Lindley, 1987; Attrill, 1988; Zainal, 1990; Martin, 2001).

Beyond the Study Area; reported sometimes in caves (Grippa, 1993) and chiefly below 50 m depth (Števcíć, 1990).

Distribution: *Within the Study Area;* south and west Norway; Shetland and Orkney Islands; southwards to eastern and western regions of the British Isles and to

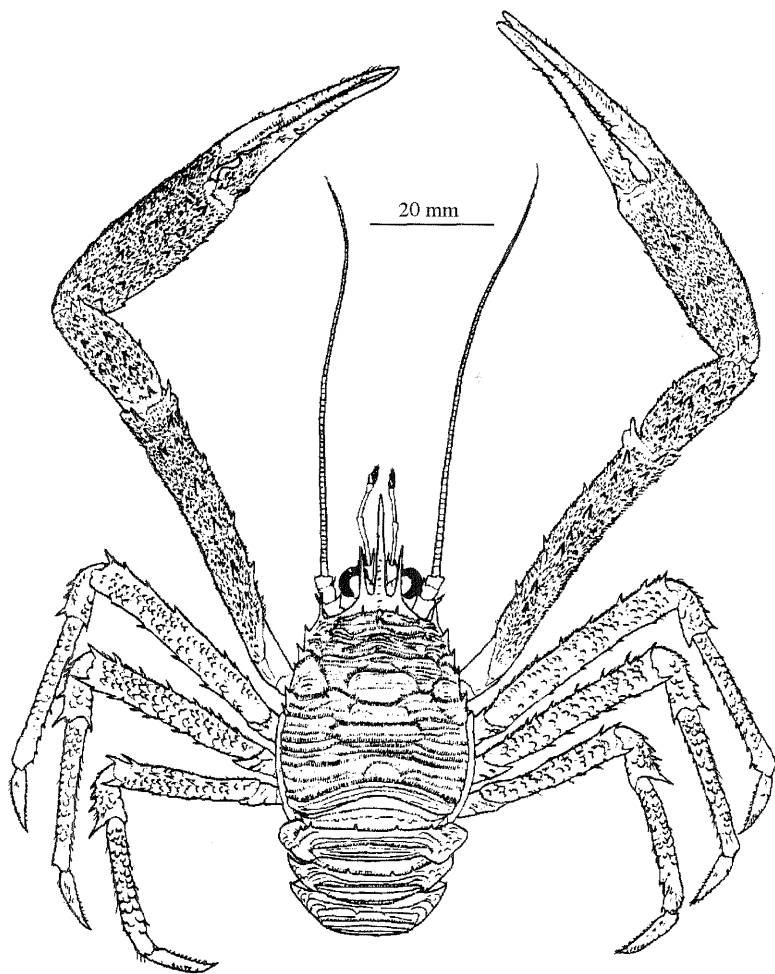


FIG. 108.
Munida rugosa (Fabricius), male 47 mm carapace length.

western English Channel and Brittany, but not recorded from the eastern English Channel or from the southern North Sea (Crothers, 1966; Brattegard & Christiansen, 1997; d'Udekem d'Acoz, 1999).

Beyond the Study Area; northwards – Norway [north to Nordland county-between 66°N and 67°40'N]; *eastwards* – west coast of Sweden, Skagerrak; *southwards* – Bay of Biscay; Portugal; Madeira; *Mediterranean* – western region; Adriatic, Ionian and Aegean Seas; ?Sea of Marmara (Stephensen, 1910; Jägerskiöld, 1971; Enckell, 1980; Brattegard & Christiansen, 1997; d'Udekem d'Acoz, 1999).

***Munida intermedia* A. Milne-Edwards & Bouvier, 1899**

(Figs 103, 109, 110b, 114c, 115b)

Munida bamffica var. *intermedia* A. Milne-Edwards & Bouvier, 1899: 80 (part), pl. 4, fig. 13

Munida bamffica: Bouvier, 1940: 171 (part)

Munida bamffica tenuimana: Bouvier, 1940: pl. 5, fig. 3

Munida intermedia: Zariquiey Alvarez, 1968: 286, figs 101b, c

Munida intermedia: Rice & de Saint Laurent, 1986: 154, figs 1f, 2b, f, 3d, 4b

Diagnosis: Carapace with ciliated transverse striae; lateral margins with acute spines; hepatic region less rugose than in *M. sarsi*, number and size of hepatic and gastric spines, and the number of spines on posterior margin of carapace vary; rostrum long and spiniform; supra-orbital spines strong.

Eyes large, cornea broader than the eye-stalks, usually with a series of long setae originating at the margin of cornea.

Abdominal tergites with transverse ciliated striae; tergites 2-3 with spines, tergite 4 with or without spines.

Telson not much different from that of *M. rugosa*.

The ciliated striae on sternum are intermediate between the short striae of *M. sarsi* and the longer ones of *M. rugosa*.

Basal segment of antennule elongate, external margin with 2 spines of which the foremost is extremely long; also 2 spines on distal margin of which that on internal angle is the strongest.

Merus of maxilliped 3 with a spine on inner margin and a smaller spine at distal external angle.

Chelipeds with spines and setae. Chela longer than palm; dorsal surface of palm with a row of spines; ventral margin of merus without spines. Pereiopods 2-5 and uropods not much different from those of *M. rugosa*.

Length: Carapace length of two specimen 27-28 mm (rostrum excluded); 42-45 mm (rostrum included); male 39 mm (rostrum included).

Colour: Red-brown or orange, rather similar to *M. rugosa*, for detailed description of colouration see Rice & de Saint Laurent (1986).

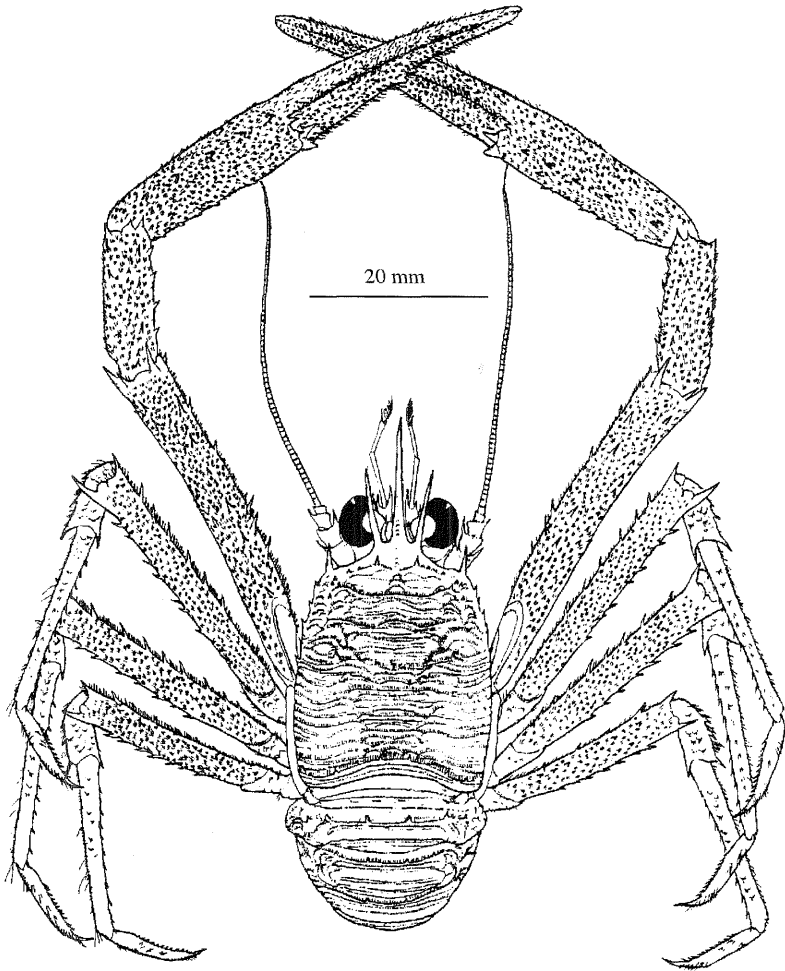


FIG. 109.

Mumida intermedia A. Milne-Edwards & Bouvier, male 39 mm carapace length.

Remarks: *M. intermedia* is distinguished from *M. microphthalmia* and *M. rugosa* by its large eyes, and from *M. sarsi* and *M. tenuimana* in having a spine at distal angle of merus of maxilliped 3 as in *M. rugosa*. Like the other species of *Munida*, *M. intermedia* exhibits considerable geographical variations (see Rice & de Saint Laurent, 1986). According to García Raso (1996: 748), the number of intercalary striae on the abdominal tergites increases with size and in the largest specimens he found a pattern similar to that of medium sized specimens of *M. sarsi*.

Bionomics: *Within the Study Area;* reported from a depth of about 800 m (Rice & de Saint Laurent, 1986).

Beyond the Study Area; reported inhabiting shelly substrates and often on ooze in deep water, and in depths from 120 m to 1360 m (Pérès & Picard, 1964; Rice & de Saint Laurent, 1986; García Raso, 1996). Noted ovigerous from October to March (Zariquiey Alvarez, 1968).

Distribution: *Within the Study Area;* recorded only once within the Area, at the Goban Spur approx. 49°N-50°N, 11°W-12°W (Rice & de Saint Laurent, 1986).

Beyond the Study Area; southwards – Bay of Biscay; north west Spain; west and south Portugal; south west Spain; Moroccan Atlantic; southwards to Dakar, West Africa; Azores, Madeira; *Mediterranean* – western and south central regions; Adriatic and Ionian Seas (d'Udekem d'Acoz, 1999).

Munida sarsi Huus, 1935

(Figs 104, 111, 113a, 114d, 115c, e)

Munida sarsi Huus, 1935: 8, figs 1a, 3b (larvae)

Munida rugosa: G.O. Sars, 1872: 257

Munida rugosa: G.O. Sars, 1883: pl. 1, fig. 5

Munida rugosa: Appellöf, 1906: 139, pl. 2, fig. 1

Munida bamffica: Hansen, 1908: 32 (part), pl. 2, fig. 3a

Munida bamffica: Selbie, 1914: 73 (part), pl. 11, figs 13-14

Munida rugosa: Dons, 1915: 72, figs 21, 22, 24, 26, 29, 32, pl. 2, fig. 10

Munida Sarsi: Brinkmann, 1936: 13, pl. 2, figs 7a, b, pl. 5, figs 1-12, 14a, b, 17b, c

Munida bamffica: Bouvier, 1940: 171 (part)

Munida intermedia var. *sarsi*: Zariquiey Alvarez, 1968: 286

Munida sarsi: Christiansen, 1972: 45, fig. 55

Munida sarsi: Rice & de Saint Laurent, 1986: 152, figs 1c, 2c, 3c, 4a

Munida intermedia var. *sarsi*: Moysse & Smaldon, 1990: 526, not figured.

Diagnosis: Carapace with transverse ciliated striae; lateral margins with acute spines; posterior margin with several spines; a pair of spines anteriorly and a few more small spines (number may vary) on gastric region; numerous spinules on hepatic and epibranchial regions, and 1 post-cervical spine on each side of cardiac region; rostrum long and spiniform; supra-orbital spines strong.

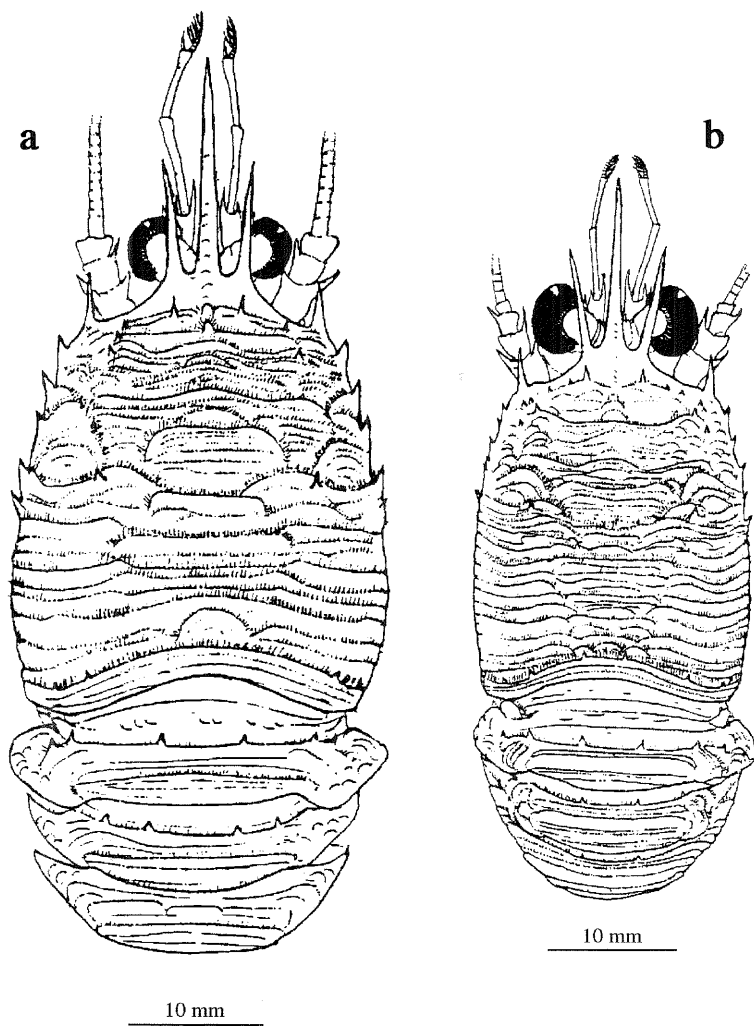


FIG. 110.

Carapace and abdominal tergites 1-4, dorsal aspects of:

(a) *Munida rugosa* (Fabricius), male 47 mm carapace length;

(b) *M. intermedia* A. Milne-Edwards & Bouvier, male 39 mm carapace length.

Eyes large, cornea broader than the eye-stalks, setae arising from the corneal margin are unequal in length and some may extend far out on corneal surface.

Abdominal tergites with many intercalary striae; tergites 2-4 with spines, which may be small or even absent on tergite 4 in juveniles.

Telson not much different from that of *M. rugosa*.

Sternum with numerous short and curved ciliated striae.

Basal segment of antennule not much different from that of *M. rugosa*.

Merus of maxilliped 3 with a spine on inner margin, but, usually, with no spine at distal external angle.

Chelipeds, pereopods 2-5, and uropods not much different from those of *M. rugosa*.

Length: Carapace length of an adult male examined 32 mm (rostrum excluded) 37 mm (rostrum included). Hartnoll *et al.* (1992) measured individuals up to between 32 and 36 mm carapace length.

Colour: Orange-red with some white. Rice & de Saint Laurent (1986) give a detailed description of the colouration.

Remarks: *M. sarsi* differs from *M. microphthalmalma* and *M. rugosa* in its large eyes. From *M. intermedia*, it is distinguished by the absence of a spine at the distal external angle of merus of maxilliped 3, and by having many more intercalary striae on the abdominal tergites, and from *M. tenuimana* by the numerous ciliated striae on sternum.

Because the species and the names *M. sarsi* and *M. rugosa* (synonyms *M. bamffia*, *M. bamffica*) have been confused in past literature, *M. sarsi*'s distribution within the Study Area cannot be easily evaluated from the older published records. For example, some of the specimens listed as *M. bamffica* by Selbie (1914) from the coasts of Ireland are apparently *M. sarsi* (see Rice & de Saint Laurent, 1986).

Bionomics: Throughout region recorded frequently between 200 m and 800 m, seems most abundant between about 250 m and 400 m and occasionally to about 1000 m, exceptionally at 125 m (Brinkmann, 1936; Rice & de Saint Laurent, 1986).

Within the Study Area; reported occurring on soft substrates and in oscula of sponge *Stryphnus ponderosus*, in depths from 91 m to 815 m (Hartnoll *et al.*, 1992; Klitgaard, 1995; personal observation, MEC; Natural History Museum, London). Noted ovigerous from September to hatching time in following March to May; larvae recorded in plankton in June and July (Brinkmann, 1936; Lindley, 1987; Hartnoll *et al.*, 1992).

Beyond the Study Area; reported on substrate of shelly fragments (García Raso, 1996). Noted ovigerous from October to March (Zariquiey Alvarez, 1968).

Distribution: *Within the Study Area;* south of Iceland; Faroe Islands; south and west Norway; Shetland Islands; northern North Sea; east and west Scotland; north west of Hebrides; south west of Ireland; Porcupine Seabight (Stephensen, 1928,

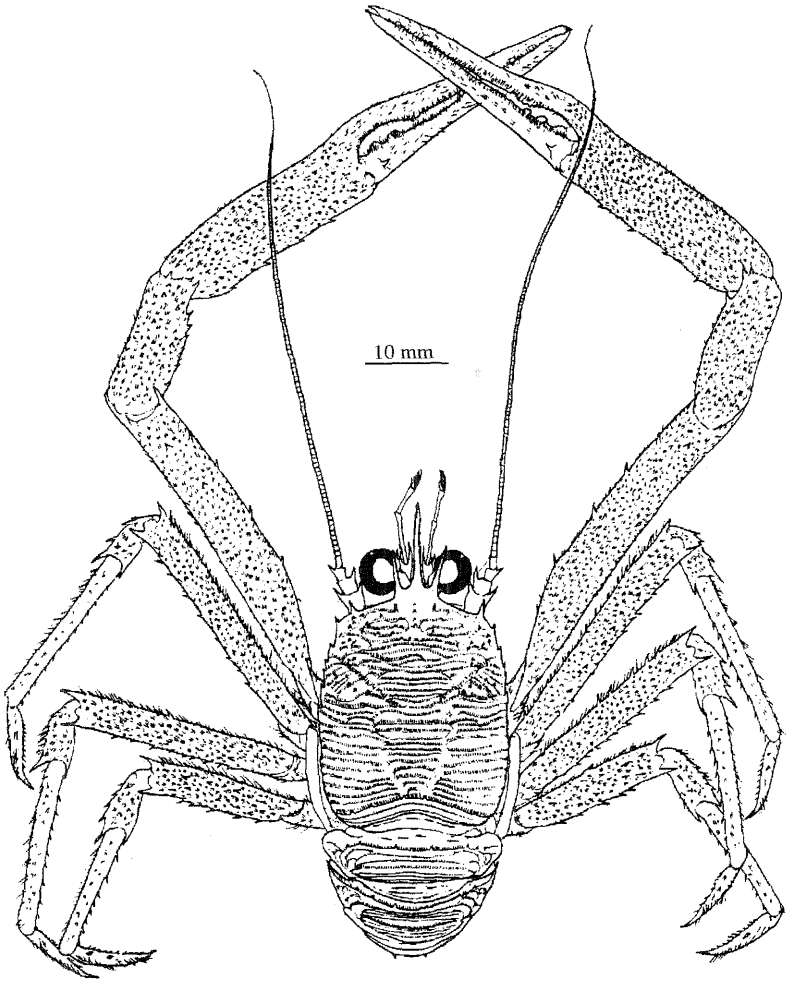


FIG. 111.

Munida sarsi Huus, male 37 mm carapace length.

1939; Hartnoll *et al.*, 1992; Brattegard & Christiansen, 1997; Natural History Museum, London).

Beyond the Study Area; northwards – Iceland; the whole coast of Norway; Barents Sea: *eastwards* – west coast of Sweden, Skagerrak: *southwards* – Bay of Biscay; north west and south west Spain (Lagerberg, 1908; Stephensen, 1939; Jägerskiöld, 1971; Christiansen, 1972; Enckell, 1980; Brattegard & Christiansen, 1997; d'Udekem d'Acoz, 1999).

***Munida tenuimana* G. O. Sars, 1872**

(Figs 102, 105, 106, 112, 113b, 114e, 115d, f)

Munida tenuimana G.O. Sars, 1872: 257

Munida tenuimana: G.O. Sars, 1883: 44, pl. 1, fig. 6

Munida perarmata: A. Milne-Edwards & Bouvier, 1900: 305, pl. 30, fig. 1

Munida tenuimana: Hansen, 1908: 34, pl. 2, fig. 4a, pl. 3, fig. 1a

Munida tenuimana: Selbie, 1914: 77, pl. 11, figs 15-16

Munida tenuimana: Brinkmann, 1936: 14, pl. 5, fig. 18b

Munida perarmata: Bouvier, 1940: 173

Munida perarmata: Zariquiey Alvarez, 1968: 288

Munida tenuimana: Christiansen, 1972: 45, fig. 54

Munida tenuimana: Rice & de Saint Laurent, 1986: 157, figs 1d, e, 2d, h, 3e, f

Munida tenuimana: Squires, 1990: 413, figs 220-221

Diagnosis: Carapace with transverse ciliated striae; lateral margins with acute spines, posterior margin usually with several spines and always with a median pair; gastric region with 2 pairs of anterior spines, the foremost pair being the strongest; usually a small spine on hepatic region; cardiac region may have a few more spines than the two widely spaced post-cervical spines; rostrum long and spiniform; supra-orbital spines strong.

Eyes large, as for *M. sarsi* and *M. intermedia*, cornea broader than the eye-stalks, none of the setae arising from the proximal corneal margin are significantly elongated as in *M. sarsi* and *M. intermedia*.

Abdominal tergites with transverse ciliated striae; tergites 2-4 with spines.

Telson not much different from that of the other *Munida* species.

Sternum with polished appearance, without or with only a few short ciliated striae.

Basal segment of antennule not much different from that of the other *Munida* species.

Merus of maxilliped 3 with a spine on inner margin, but no spine at distal external angle.

Spines on the pereopods are generally better developed than for the other *Munida* species (except for *M. microphthalma*). Chelae of chelipeds about as long or slightly longer than palm; ventral margin of cheliped merus with a row of spines.

Uropods similar to those of the other *Munida* species.

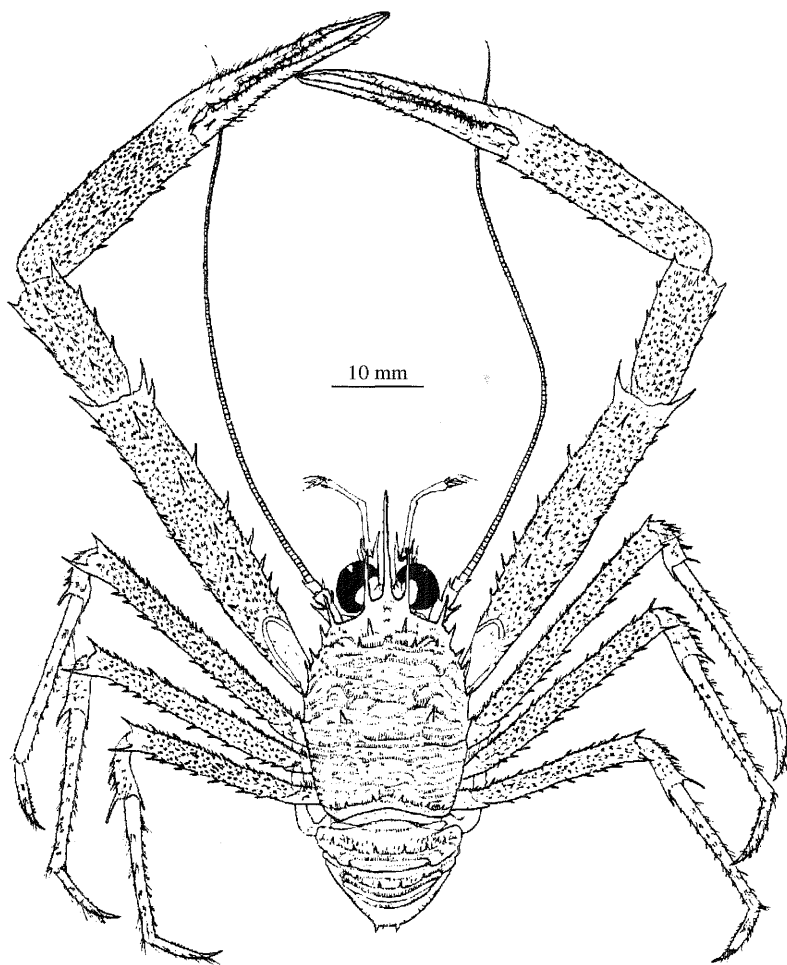


FIG. 112.

Munida tenuimana G. O. Sars, male 38 mm carapace length.

Length: Carapace length of largest specimen examined, an adult male 25 mm (rostrum excluded), 38 mm (rostrum included). The largest specimen cited by Rice & de Saint Laurent (1986) measured 39 mm carapace length (rostrum included).

Colour: According to Rice and de Saint Laurent (1986), the overall appearance of *M. tenuimana* has a pale upper surface and red-tipped spines and a generally orange under surface, with brilliant red tips to the legs in both views.

Remarks: *M. tenuimana* is distinguished from *M. microphthalma* and *M. rugosa* by its large eyes. For *M. tenuimana*, abdominal tergite 4 always carries a pair of spines, at least in adult specimens, and the species has rather few short striae on the sternum. Like *M. sarsi*, the merus of maxilliped 3 has no spine at the distal external angle. A row of spines along the ventral margin of the cheliped merus is always present, whereas such spines are absent in *M. rugosa*, *M. intermedia*, and *M. sarsi*.

Bionomics: According to Hartnoll *et al.* (1992), the upper bathymetric range of this species varies geographically and Rice & de Saint Laurent (1986) concluded that it generally occurs much deeper than the shallowest records.

Within the Study Area; reported inhabiting burrows in substrates and also associated with sponge *Pheronema carpenteri*, even using osculum as artificial burrow; occurs in depths from 250 m to 1410 m (Brinkmann, 1936; Hartnoll *et al.*, 1992). Noted ovigerous from March to hatching time in following March to July; larvae recorded in plankton in June and August (Brinkmann, 1936; Lindley, 1987; Hartnoll *et al.*, 1992).

Beyond the Study Area; reported on substrate of shell fragments in depths from 120 m to 1775 m (Hansen, 1908; Zariquiey Alvarez, 1968). Noted ovigerous in September and October (Zariquiey Alvarez, 1968).

Distribution: *Within the Study Area;* south east of Iceland; Faroe Islands; south and west Norway; Shetland Islands; north west and west of Ireland; Porcupine Seabight; west of Brittany (Hansen, 1908; Selbie, 1914; Stephensen, 1928; Hartnoll *et al.*, 1992; Brattegard & Christiansen, 1997; Natural History Museum, London).

Beyond the Study Area; northwards – Iceland; Norway to north east coast of Finnmark; Barents Sea: eastwards – west coast of Sweden, Skagerrak: southwards – Bay of Biscay; Portugal; south west of Spain: *Mediterranean* – western region; Adriatic Sea: *North western Atlantic* – from Davis Strait to Grand Banks of Newfoundland (Hansen, 1908; Stephensen, 1910, 1939; Jägerskiöld, 1971; Christiansen, 1972; Enckell, 1980; Rice & de Saint Laurent, 1986; Squires, 1990; García Raso, 1996; Brattegard & Christiansen, 1997).

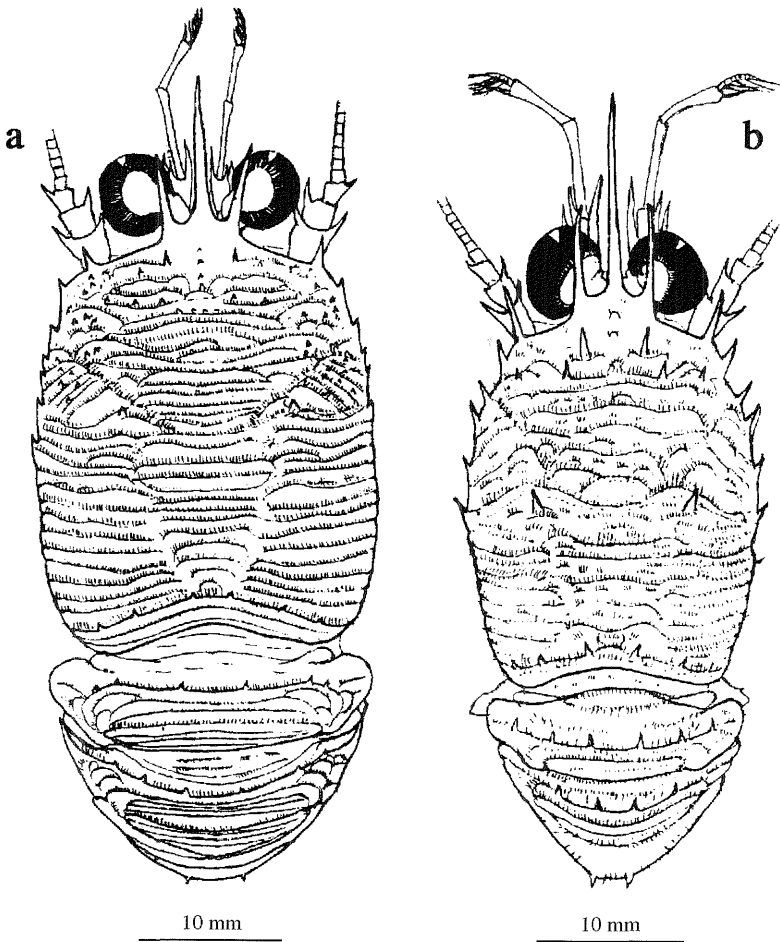


FIG. 113.

Carapace and abdominal tergites 1-4, dorsal aspects, of:
 (a) *Munida sarsi* Huus, male 37 mm carapace length;
 (b) *M. tenuimana* G. O. Sars, male 38 mm carapace length.

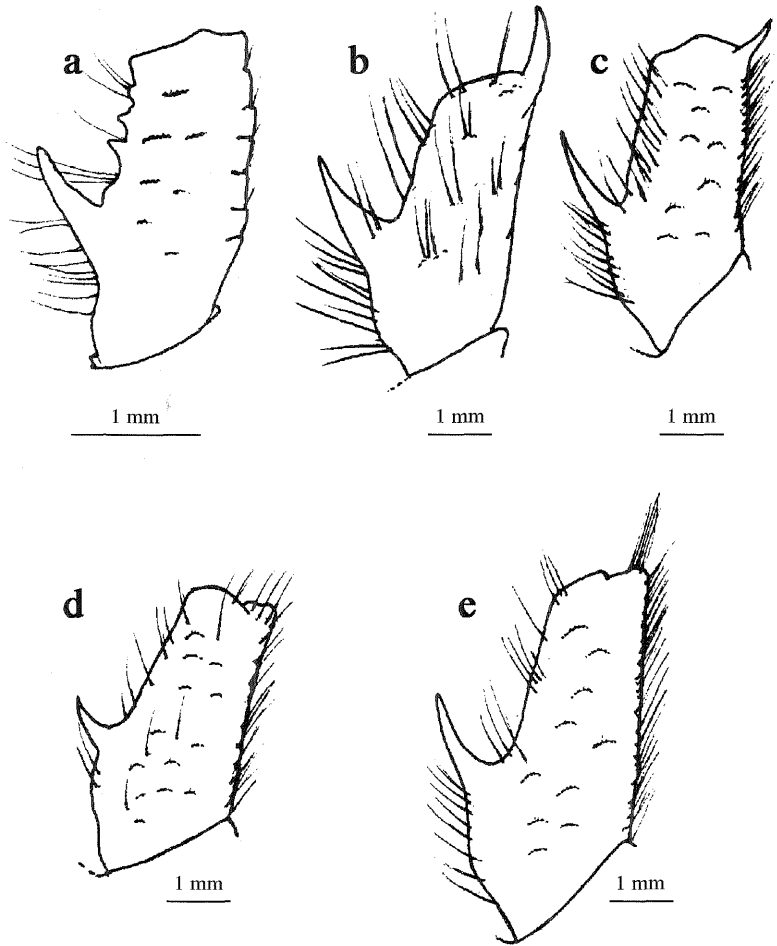


FIG. 114.

- Left maxilliped 3, merus from ventral aspects of:
- (a) *Munida microphthalmma* (A. Milne-Edwards), male 19 mm carapace length;
 - (b) *M. rugosa* (Fabricius), male 47 mm carapace length;
 - (c) *M. intermedia* A. Milne-Edwards & Bouvier, male 39 mm carapace length;
 - (d) *M. sarsi* Huus, male 37 mm carapace length;
 - (e) *M. tenuimana* G. O. Sars, male 38 mm carapace length.

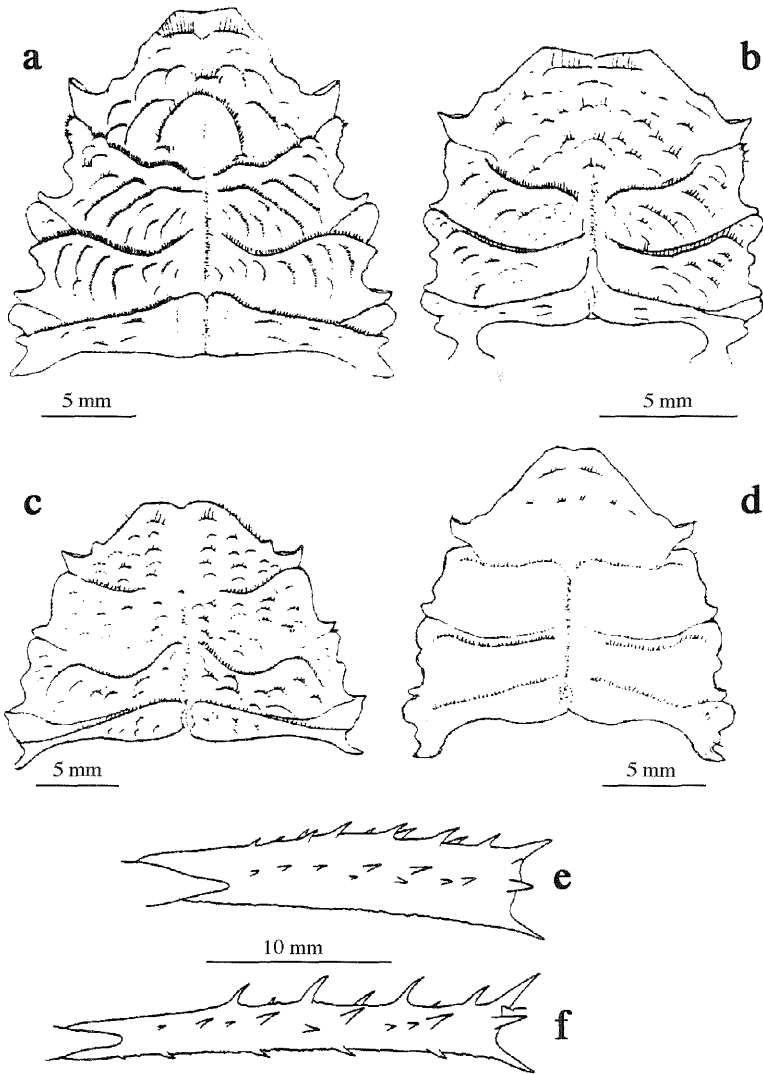


FIG. 115.

- Sternum, ventral aspects of: (a) *Munida rugosa* (Fabricius), male 47 mm carapace length;
 (b) *M. intermedia* A. Milne-Edwards & Bouvier, male 39 mm carapace length;
 (c) *M. sarsi* Huus, male 37 mm carapace length;
 (d) *M. tenuimana* G. O. Sars, male 38 mm carapace length.
- Right cheliped merus from ventral aspects of: (e) *M. sarsi*, male 27.3 mm carapace length;
 (f) *M. tenuimana* female 27.8 mm carapace length.
 (Figs (e) & (f) after Rice & de Saint Laurent, 1986, figs 2g, h).

GENUS *MUNIDOPSIS* WHITEAVES, 1874

Munidopsis Whiteaves, 1874: 212

Galathodes A. Milne-Edwards, 1880: 53

Munidopsis: Balss, 1957: 1597

Munidopsis: Squires, 1990: 423

Carapace roughly rectangular or pentagonal in outline, integument strongly calcified. Eye-stalks free or fused with orbits, eyes without facets or pigment.

One of the species, *M. serricornis*, is different in several aspects from the two other species of this genus treated below; Selbie (1914), for example suggested that *M. serricornis* might be placed in a separate genus.

Key to the British species of *Munidopsis*

1. Rostrum broad, ending in a spine with a shorter spine on each side (Fig. 116).
 *Munidopsis serricornis* (p. 143).

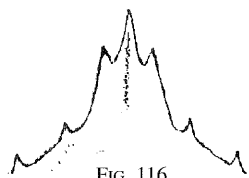


FIG. 116

- Rostrum spiniform, strongly upturned.
 2

2. Rostrum with a pair of distinct lateral spines at the end of the horizontal portion of rostrum (Fig. 117).
 *Munidopsis rostrata* (p. 144).

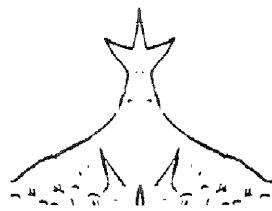


FIG. 117

- Rostrum laterally unarmed (Fig. 118).
 *Munidopsis curvirostra* (p. 148).

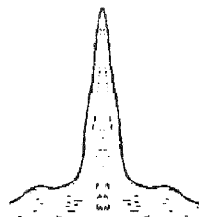


FIG. 118

***Munidopsis serricornis* (Lovén, 1852)**

(Figs 116, 119)

Galatea serricornis Lovén, 1852: 22*Galathea tridentata* Esmark, 1857: 239*Galathea tridentata*: G. O. Sars, 1872: 256*Galathodes tridentata*: G.O. Sars, 1883: 43, pl. 1, fig. 3*Galathodes serricornis*: Lagerberg, 1908: 72, pl. 3, fig. 17*Munidopsis (Galathodes) tridentata*: Selbie, 1914: 81, pl. 12, figs 1-5*Munidopsis tridentata*: Bouvier, 1940: 174, pl. 5, fig. 4*Munidopsis tridentata*: Allen, 1967: 34, 58, 95 (fig.)*Munidopsis tridentata*: Zariquiey Alvarez, 1968: 269, fig. 95a*Munidopsis serricornis*: Christiansen, 1972: 46, fig. 57*Munidopsis tridentata*: Moyses & Smaldon, 1990: 529, fig. 10.17

Diagnosis: Carapace roughly pentagonal; lateral margins slightly convex, 3 lateral spines behind the antero-lateral spine, the posterior spine situated immediately behind the cervical groove; posterior margin slightly concave; rostrum broad and slightly but distinctly carinated in the median line ending in a spine with a shorter spine on each side; between base of rostrum and the antero-lateral spine is a small spine above base of the antenna; surface of carapace, which is covered with setae throughout, appears rugose, especially the branchial region that is striate; cardiac region with a transverse stria medially and a circular depression just in front of each side of the stria (these are not always distinct).

Setation of abdominal somites less dense than that on carapace; abdominal tergites 2-3 each with a medial transverse groove.

Basal part of telson bounded by a straight line anteriorly and a rounded line posteriorly behind which is a very small medial triangular plate; posterior part of telson divided by a deep medial and two oblique lateral grooves; margins with long setae.

Eyes without facets or pigment.

Antennules short, when extended reaching only slightly beyond tip of rostrum. Basal segment of antennule with 2 stout spines distally, segments 2 and 3 about equal in length, inner flagellum short and slender, outer broad at base, but narrowing into a thin distal portion; distal margin of last peduncular segment bears a semicircle of long plumose setae which surrounds the base of the outer flagellum which also has a dense fringe of setae along its inner margin.

Antennal flagellum long and slender.

Merus of maxilliped 3 with 2 stout spines on inner margin (specimens may also have a minute spine anterior of the two).

Shape and dimension of chelipeds extremely variable, well developed in both sexes, but more robust for males, all segments covered with tubercles or scales with setose margins (some of the setae are quite long). Chela without spines; merus and carpus with several spines some of which are very stout. Pereiopods 2-4 all similar in shape; dorsal margin of merus with a row of sharp spines, dactylus terminating as a curved claw; pereiopod 5 small and slender ending in a small setose chela as in the other species of Galatheidæ.

Uropods with marginal spines and fringes of setae; exopod and endopod rough and calcareous towards the outer margin, outer parts armed with transverse groups of small setae and spines, inner parts smooth.

Length: Carapace length of two females 14 and 15 mm (rostrum excluded), 18 and 20 mm (rostrum included). A large male measured 33 mm total length (Selbie, 1914).

Colour: Reddish white, eyes whitish (Lovén, 1852).

Remarks: *M. serricornis* is easily recognisable by its broad straight rostrum.

Vernacular name: Korallkreps (Norway).

Bionomics: *Within the Study Area;* reported as usually occurring on fine sand, on black corals, often on hard coral reefs, *Lophelia pertusa*, on sea fans and gorgonians, in depths from 50 m to 1230-1633 m, usually beyond 300 m depth (Kemp, 1910; *vide* Hickson, 1907; Selbie, 1914; Grieg, 1927; d'Udekem d'Acoz, 1999; Moen & Svensen, 2000; personal observation, MEC). Oviparous females collected in Norway during April, July, September and November (Samuelsen, 1972b; personal observation, MEC).

Beyond the Study Area; reported occurring on substrates where coral is present and on sea fan *Paramuricea macrospina*, and in depths down to 2165 m; always in deep water beyond Scandinavian region (A. Milne-Edwards & Bouvier, 1900; Bouvier, 1922; Noël, 1992; Cartes, 1993; d'Udekem d'Acoz, 1999).

Distribution: *Within the Study Area;* south and west Norway; Faroe; off south west Ireland at 51°12'30"-51°17'30"N, 12°18'-12°16'W; 50°42'N, 11°18'W; 51°22'30"N, 11°44'30"J124

W (Selbie, 1914; Brattegard & Christiansen, 1997; Moen & Svensen, 2000).

Beyond the Study Area; northwards – Norway north to 69°14'N: eastwards – west coast of Sweden: southwards – Bay of Biscay; Moroccan Atlantic; Azores and Cape Verde Islands: *Mediterranean* – western region [Catalan coast]: *Western Atlantic* – Cuba; Gulf of Mexico: ?*Indian Ocean* (Dons, 1937; Jägerskiöld, 1971; Enckell, 1980; d'Udekem d'Acoz, 1999).

***Munidopsis rostrata* (A. Milne-Edwards, 1880)**

(Figs 117, 120)

Galacantha rostrata A. Milne-Edwards, 1880: 52

Galacantha rostrata: Smith, 1882: 21, pl. 9, figs 2, 2a

Munidopsis rostrata: Smith, 1886: 649, pl. 6, figs 1, 1a

Galacantha rostrata: Faxon, 1895: 78, pl. B, figs 1, 1a

Galacantha rostrata: A. Milne-Edwards & Bouvier, 1897: 60, pl. 4, figs 21-24

Galacantha rostrata: A. Milne-Edwards & Bouvier, 1900: 308, pl. 6, fig. 9

Galacantha rostrata: Hansen, 1908: 35

Munidopsis rostrata: Chace, 1942: 75

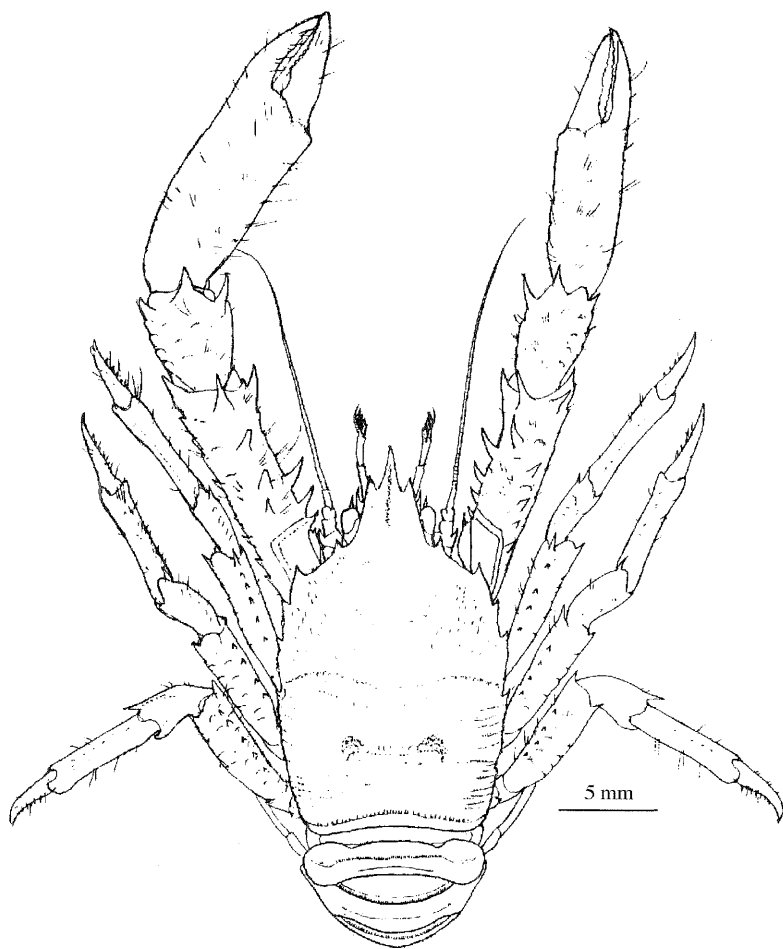


FIG. 119.
Munidopsis serricornis (Lovén), male 19 mm carapace length.

Diagnosis: Carapace roughly pentagonal, broadest at epibranchial region; lateral margins with 1 strong spine on hepatic region behind the strong antero-lateral spine, also a small marginal spine (or process) on epibranchial region, posterior margin fringed with setae; gastric region with a pair of small spines anteriorly and a strong spine in front of the cervical groove; a median spine present anteriorly on cardiac region; rostrum spiniform, strongly upturned, with a pair of distinct lateral spines at the end of the horizontal portion of rostrum*; surface of carapace with numerous tubercles each fringed with several setae; a deep, nearly naked transverse depression in front of the cardiac spine.

Abdominal somites 2-4 each with a median spine, surface covered with tubercles and setae, as on carapace, somites 5-6 with small tubercles.

Telson slightly different from that of *M. serricornis*, basal plate is followed by 3 small plates, of which the central one is prolonged into a narrow process extending to the posterior margin of telson; surface with scaly tubercles, margins with long setae.

Eyes without facets and pigment.

Basal segment of antennule with a strong external spine distally, also a small disto-mesial spine and a blunt process ventrally.

Antennal flagellum very long and slender.

Merus of maxilliped 3 with 2 stout spines on inner margin, a third small spine may also be present anterior to the 2 stout spines.

Chelipeds stout, slightly more robust for male, surfaces with small scale-like tubercles fringed with setae; carpus and merus with several spines of variable size.

Pereiopods 2-4 covered with small scale-like tubercles fringed with short setae; pereiopod 5 feeble ending in a small setose chela.

Uropods smooth, except outer part of endopod surface which is covered with scaly tubercles.

Length: Carapace length of a male examined 23 mm (rostrum excluded and damaged), of female 39 mm.

Colour: According to Hansen (1908) the species is reddish yellow with pale red eyes.

Remarks: Chace (1942) mentioned that *M. rostrata* is a very variable species with a widespread distribution, and that some authors have split the species into several varieties or even distinct species. Chace considered *M. bellis* Henderson (1885) a synonym of *M. rostrata*. One of us (RWI) has compared the syntype specimens of *M. bellis* from Valpariso, Chile, with the two specimens collected in the Rockall region of the Study Area and was unable to find definitive characters that could maintain *M. bellis* as a distinct species. The Rockall specimens are without chelipeds and Fig. 120 is a composite, the chelipeds illustrated are of those from a female (29 mm carapace length) of *M. bellis*.

*Only two specimens of this species have been available for study (see *Remarks*). Only the female of these has the rostrum complete but its shape is slightly asymmetrical as shown in Fig. 120.

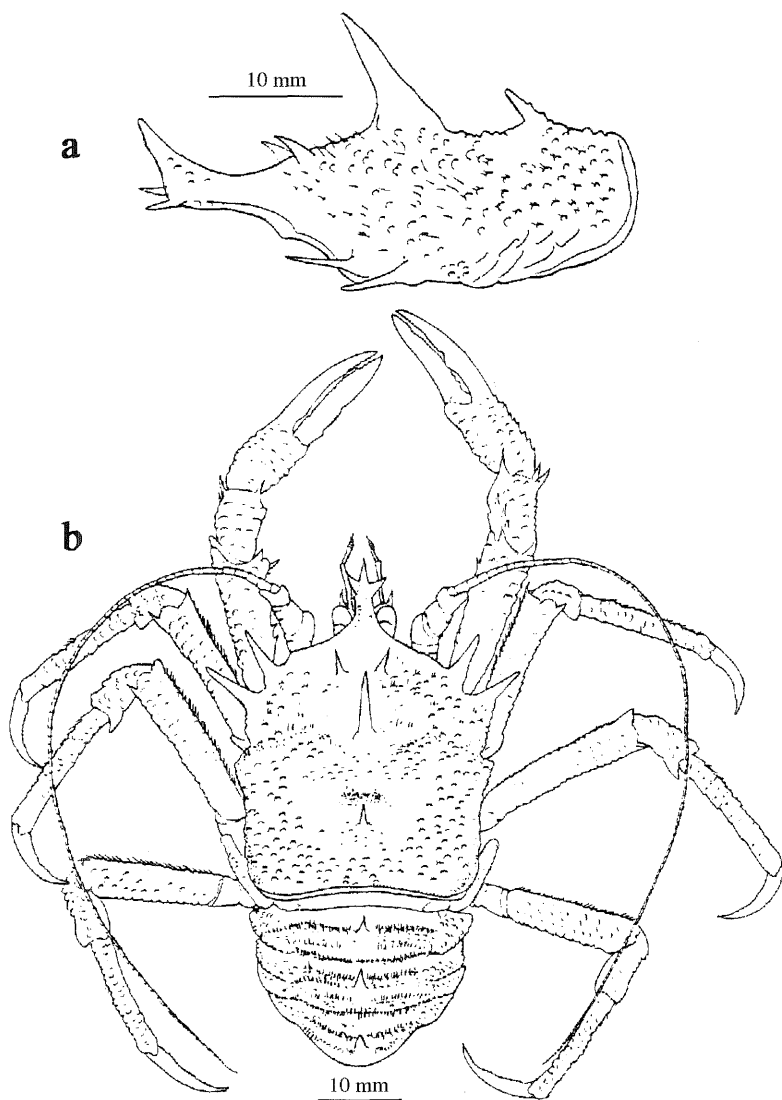


FIG. 120.

Munidopsis rostrata (A. Milne-Edwards), female 39 mm carapace length:
(a) left lateral aspect of carapace; (b) whole specimen, dorsal aspect. The chelipeds illustrated are from a female syntype of *M. bellis* Henderson (see *Remarks*).

Bionomics: Within the Study Area; reported on soft substrate in depth of 2500 m (Natural History Museum, London).

Beyond the Study Area; reported occurring on grey ooze, thick mud and on broken shell substrates in depths between 1920 m and 3800 m (A. Milne-Edwards & Bouvier, 1900; Noël, 1992).

Wenner (1982) noted the bathymetric depths throughout range as 1620 to 3934 m.

Distribution: Within the Study Area; Only one record; namely, two specimens (male and female) collected in 1977 between 56°07'N, 10°58'W and 56°16'N, 10°55'W at 2500 m (Natural History Museum, London).

Beyond the Study Area; northwards – Hansen (1908) cited two specimens west of Iceland at 64°34'N, 31°12'W: *southwards* – recorded from the Bay of Biscay (de Saint Laurent, 1985). According to Chace (1942), *M. rostrata* is found off Morocco in the eastern Atlantic and from New Jersey to Bequia in the Lesser Antillés in the western Atlantic. Also off Cape Point, South Africa; the Arabian Sea and Bay of Bengal. Off the Banda Islands, in the Moluccas, in the eastern Pacific off Galapagos Islands and off Valparaiso, Chile.

***Munidopsis curvirostra* Whiteaves, 1874**

(Figs 118, 121)

Munidopsis curvirostra Whiteaves, 1874: 212

Munidopsis curvirostra: Whiteaves, 1901: 257, figs 1, 1a

Munidopsis curvirostra: Hansen, 1908: 36, pl. 3, figs 2a-e

Munidopsis curvirostra: Selbie, 1914: 84, pl. 13, figs 1-4

Munidopsis curvirostra: Allen, 1967: 34, 59, 95 (fig.)

Munidopsis curvirostra: Moyse & Smaldon, 1990: 529, fig. 10.17

Munidopsis curvirostra: Squires, 1990: 423, figs 226, 227

Diagnosis: Carapace roughly quadrangular, longer than wide, each antero-lateral spine with a broad rounded base, the anterior edge of the spine may have 1 or 2 small accessory spines, posterior margin of carapace feebly concave; gastric region more or less inflated with a variable number of spines (usually there is a pair of spines behind base of rostrum and behind these 1 or 2 median unpaired spines); cardiac region with a sharply defined transverse stria with a median spine; rostrum spiniform and strongly upturned. Almost the entire surface of carapace with short transverse striae which are most numerous near each side.

Abdominal tergites 2-4 each with a transverse stria, tergites 2-3 with a median spine, sometimes a spine is also present on tergite 4.

Telson not much different from that of *M. rostrata*.

Eyes without facets and pigment.

Basal segment of antennule with 3 stout spines distally, the external 2 are equal or slightly unequal in length and the inner spine may have small processes.

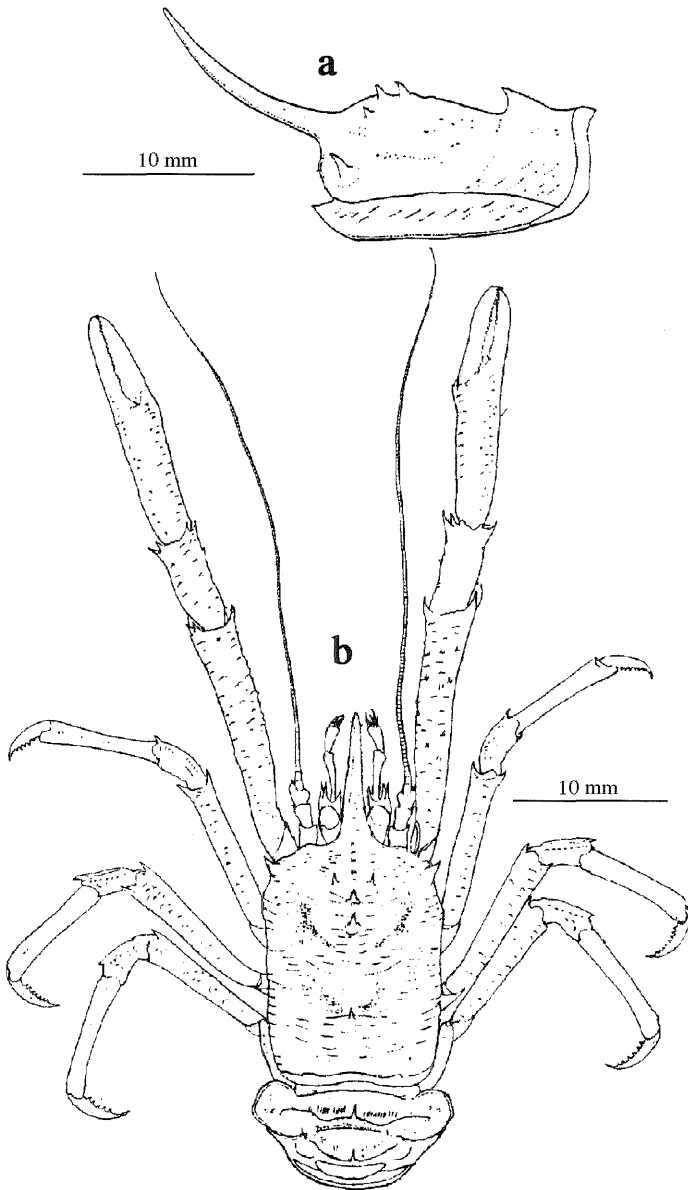


FIG. 121.

Munidopsis curvirostra Whiteaves, male 24 mm carapace length:
(a) left lateral aspect of carapace; (b) whole specimen, dorsal aspect.

Antennal flagellum long and slender.

Merus of maxilliped 3 with 2 spines on inner margin, the basal being the stoutest; there may also be a small spine between the two, and 1 or 2 minute spines anterior to the other spines.

Chelipeds long and slender, covered throughout with small scales some of which are fringed with small setae (but without long setae as in *M. serricornis*); chela shorter than palm. Pereiopods 2-4 covered with small scales; merus unarmed except for 1 or 2 distal spines; dactylus has a row of sharp spines and ends in a tip which has the form of a strongly curved claw; pereopod 5 similar to the other species of Galatheidae.

Uropod margins fringed with setae; surface of both exopod and endopod smooth.

Length: Carapace length (a male) 13 mm (rostrum excluded) 24 mm (rostrum included).

Colour: Greyish white, eyes yellowish (Squires, 1990).

Remarks: The species is easy to separate from *M. rostrata* by differences in rostrum and carapace spinulation.

Bionomics: *Within the Study Area;* reported occurring on ooze in depths from 1463 m and 1796 m (Hansen, 1908; Selbie, 1914). Noted ovigerous in May (Selbie, 1914).

Beyond the Study Area; reported in depths from 135 m to 2322 m (Wenner, 1982). Noted ovigerous in March and August (Squires, 1990).

Distribution: *Within the Study Area;* only a few records known for this species namely, south of Iceland at 62°40'N, 19°05'W, and off south western Ireland at 51°22'N, 12°41'W (Hansen, 1908; Selbie, 1914).

Beyond the Study Area; northwards – south east Greenland; south and south west of Iceland: southwards – Bay of Biscay; between Portugal and Morocco; Moroccan Atlantic: *Western Atlantic* – Davis Strait to North Carolina (Hansen, 1908; Heegaard, 1941; Squires, 1990; d'Udekem d'Acoz, 1999).

GENUS *GALATHEA* FABRICIUS, 1793

Galathea Fabricius, 1793: 471

Galathea: Bell, 1846: 195

Galathea: Holthuis, 1950: 117

Galathea: Zariquiey Alvarez, 1968: 271

Galathea: de Saint-Laurent, 1972b: 722

Carapace with several transverse ciliated striae of various lengths; lateral margins of carapace with a number of acute spines; rostrum broad, triangular, terminating as a sharp point, dorso-ventrally flattened, margins armed with spines. Some abdominal somites with one or few transverse ciliated striae. Telson short and broad. Eyes well developed. Antennal peduncle short, flagellum long. Antennal scale absent. Chelipeds well developed. Pereiopods 2-4 all similar and approximately all equal in size, merus and propodus long, other segments short, dactylus terminating as a sharp claw; pereiopods 5 very thin and much shorter than preceding pereiopods, terminating as a small chela. Uropods short, rounded posteriorly.

Remarks: The taxonomy of many NE Atlantic *Galathea* species poses many problems that need resolving (d'Udekem d'Acoz, 1999:160). The keys and diagnoses given in this *Synopsis* are based upon available literature and a comparatively limited amount of material that we have studied.

Key to British species of *Galathea*

1. Basal segment of antennule with 2 strong spines (Fig. 122).
 *Galathea intermedia* (p. 153).
- Basal segment of antennule with 3 strong spines (Fig. 123). 2



FIG. 122

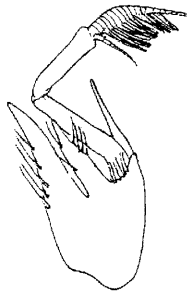


FIG. 123

2. Merus of maxillipeds 3 with 2 strong spines on inner margin (Fig. 124). Pereiopods 1-5 without an *epipod.
 *Galathea strigosa* (p. 154).

* The epipods are often concealed between gill filaments and are not always obvious.

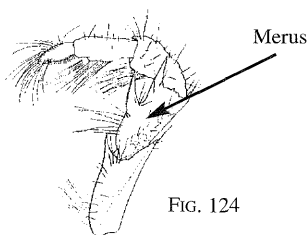


FIG. 124

- Merus of maxillipeds 3 with several spines on inner margin of which the most distal is the strongest, or with the strongest spine situated medially followed by some smaller spines or tubercles of varying size. Pereiopods 1-3 with an epipod. 3

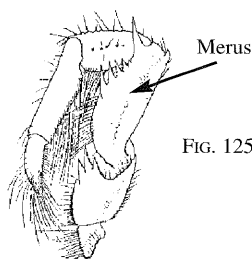


FIG. 125

3. Merus of maxillipeds 3 with several spines on inner margin of which the most distal is the strongest; merus longer than ischium (Fig. 125). Chelipeds covered with scaly tubercles.
 *Galathea squamifera* (p. 158).

- Merus of maxillipeds 3 with the strongest spine situated medially on inner margin; merus almost same length as ischium (Fig. 126). Chelipeds covered with setae or with scales fringed anteriorly with fine setae 4

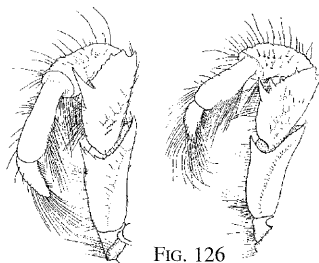


FIG. 126

4. Rostrum almost free from setae. Chelipeds setose†. Dorsal surface of abdominal somites 2 and 3 with 1 transverse stria (Fig. 127).
 *Galathea nexa* (p. 161).



FIG. 127

- Rostrum covered with scales and setae†. Surfaces of chelipeds with scales fringed with fine setae. Dorsal surface of abdominal somites 2 and 3 with 3 transverse striae (Fig. 128).
 *Galathea dispersa* (p. 162).

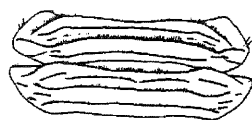


FIG. 128

†Setae may be lost when specimens are kept in alcohol. This concerns many species.

***Galathea intermedia* Liljeborg, 1851**

(Figs 122, 129)

Galathea intermedia Liljeborg, 1851: 21*Galathea Andrewsii* Kinahan, 1860: 58, pl. 16, figs 8,a-d*Galathea intermedia*: Boas, 1880: 124, pl. 1, figs 14, 35, pl. 2, fig. 64, pl. 3, figs 94, 123*Galathea intermedia*: Bonnier, 1888: 130, pl. 10, figs 1, 2, pl. 11, figs 1-14*Galathea intermedia*: Lagerberg, 1908: 71, pl. 4, fig. 2*Galathea intermedia*: Selbie, 1914: 66, pl. 11, figs 1-12*Galathea intermedia*: Holthuis, 1950: 121, figs 6b, 43, 44*Galathea intermedia*: Allen, 1967: 19, 34, 59, 94 (fig.)*Galathea intermedia*: Zariquiey Alvarez, 1968: 279, figs 97e, 98c .f, g, 99b, 100b*Galathea intermedia*: Christiansen, 1972: 43, fig. 50*Galathea intermedia*: Moysé & Smaldon, 1990: 526, fig. 10.16*Galathea intermedia*: Hayward *et al.*, 1995: 440, fig. 8.55

Diagnosis: Carapace with ciliated transverse striae; lateral margins with several spines; 2 small spines on the rostro-gastral stria at base of rostrum; rostrum triangular, terminating as a sharp spine, lateral margins with 4 pairs of spines which may be small, especially the posterior pair, rostrum longer and narrower for males than for females.

Dorsal surfaces of abdominal somites 2-4 each with a single transverse ciliated stria which may be discontinuous on somite 4.

Telson with several sutures, broader than long, narrowing posteriorly and with setose margins, posterior margin with a medial incision; dorsal surface with minute scales fringed with short setae, all pointing backwards.

Antennule short; basal segment with 2 strong spines, segments 2 and 3 about equal in length, shorter and narrower than basal segment; 2 short flagella present, upper much thicker basally than lower flagellum that is shorter and uniformly slender.

Maxilliped 3 with 2 spines on inner margin of merus, one at the distal end, the other near the middle, but rather nearer the distal than the proximal extremity, merus longer than ischium.

Chelae of chelipeds about same length as palm (somewhat shorter for largest specimens). Chelipeds of females and of young males slender; for adult males larger, (about twice length of carapace + folded abdomen) and with thickened dactylus, propodus, carpus and distal part of merus. Surfaces of chelipeds covered with scaly tubercles, especially for adult males. Spines on the chelipeds of adult males much reduced compared with those of females and young males. Only pereopod 1 with an epipod; pereopods 2-4 similar in shape and size; pereopod 5 very thin, terminating as small densely setose chela, usually folded.

Uropod margins rounded posteriorly, with long setae and rows of large and small spines; surface also with small groups of spines and stiff setae, all directed backwards.

Length: The smallest *Galathea* species in the Study Area; adults usually measure from 12 to 20 mm total length (Selbie, 1914).

Colour: Yellowish, pink or reddish brown, sometimes with blue spots (Holthuis, 1950).

Remarks: The small size and the number of spines (2) on the antennule basal segment distinguish *G. intermedia* from all other species within the Area.

Two forms of *G. intermedia* are provisionally recognised by d'Udekem d'Acoz (1999) viz. *G. intermedia intermedia* Liljeborg, 1851, distributed in the NE Atlantic, and *G. intermedia parroceli* Gourret, 1887, occurring in the Mediterranean. D'Udekem d'Acoz remarked, however, that the taxonomy of the latter form needs further study to assess its true status. For this reason we have not used the subspecific designation for *G. intermedia* in this *Synopsis*.

Bionomics: Throughout its range, Holthuis (1950) noted that this species most commonly occurs in depths between 8 m and 100 m.

Within the Study Area; reported occurring on various substrates from hard mud, sand, gravel, maerl, stones and also among algae, from intertidal region down to 90 m (Selbie, 1914; Bourdon, 1965; Christiansen, 1972). Noted ovigerous from March to July and with a single spring to summer brood, also from middle March to beginning of October; larvae recorded in plankton from February to December, most abundant from June to September (Selbie, 1914; Holthuis, 1950; O'Ceidigh, 1962; Allen, 1967; Samuelsen, 1970; Lindley, 1987; Martin, 2001).

Beyond the Study Area; reported in depths down to 179 m (Diez *et al.*, 1994).

Distribution: *Within the Study Area;* south and west Norway; Faroe Islands; Shetland Islands; southwards in western and eastern regions of the British Isles and in western and eastern English Channel to Brittany; also southern North Sea (Brattegard & Christiansen, 1997; d'Udekem d'Acoz, 1999).

Beyond the Study Area; northwards – Norway to mid part of Troms county, [south of 70°N]; eastwards – west coast of Sweden; Danish waters: southwards – Bay of Biscay; north west Spain; Portugal; south west Spain; north of Moroccan Atlantic. (Stephensen, 1910; Jägerskiöld, 1971; Enckell, 1980; Brattegard & Christiansen, 1997; d'Udekem d'Acoz, 1999). Records of *G. intermedia intermedia* south of the Moroccan Atlantic are questioned by d'Udekem d'Acoz (1999).

Galathea strigosa (Linnaeus, 1761)

(Figs 124, 130)

Cancer strigosus Linnaeus, 1761: 495

Astacus strigosus: Pennant, 1777: 18, pl. 14, fig. 6

Galathea spinigera Leach, 1815b: pl. 28B, figs 1-2

Galathea strigosa: Bell, 1846: 200, fig.

Galathea strigosa: Bonnier, 1888: 160, pl. 13, figs 4-6

Galathea strigosa: Lagerberg, 1908: 69, pl. 3, fig. 15

Galathea strigosa: Bull, 1937: 49, pl. 3, fig. 4

Galathea strigosa: Bouvier, 1940: 170, fig. 129

Galathea strigosa: Allen, 1967: 20, 34, 59, 94 (fig.)

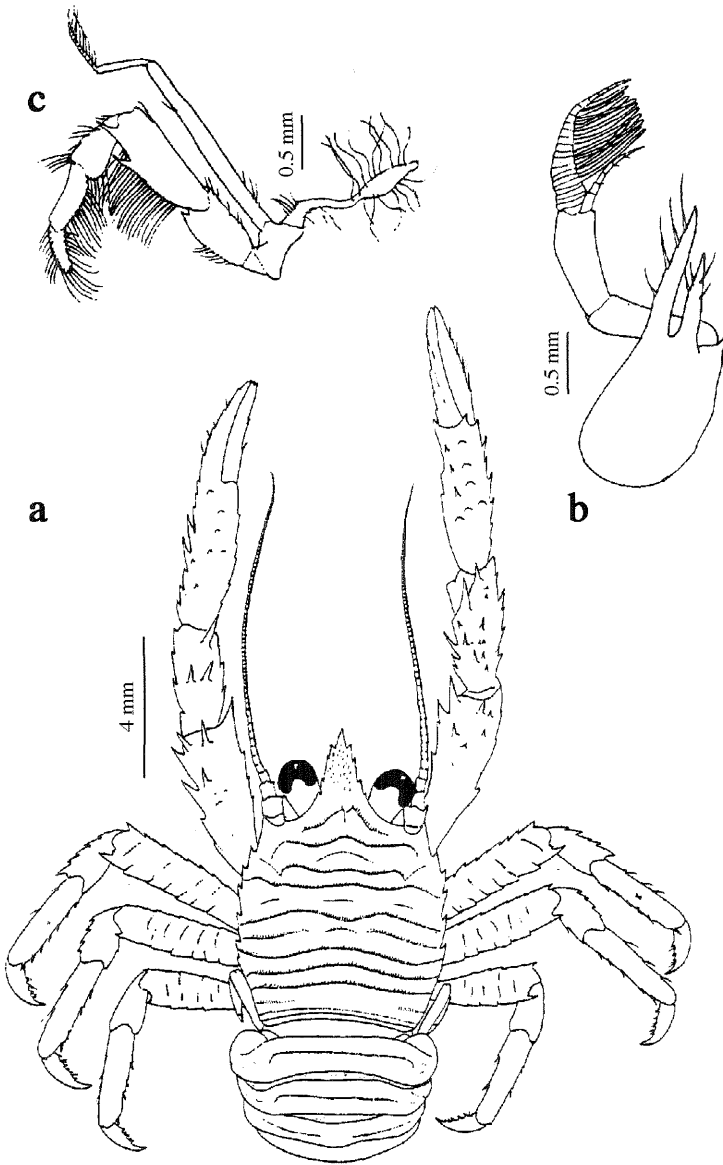


Fig. 129.

Galathea intermedia Liljeborg, female 8.5 mm carapace length:

(a) dorsal aspect; (b) right antennule, ventral aspect; (c) left maxilliped 3, ventral aspect.

Galathea strigosa: Zariquiey Alvarez, 1968: 274, figs 96, 97 a, b

Galathea strigosa: Christiansen, 1972: 43, fig. 51

Galathea strigosa: Moyses & Smaldon, 1990: 526, fig. 10.16

Galathea strigosa: Hayward *et al.*, 1995: 442, fig. 8.55

Diagnosis: Carapace with ciliated transverse striae; lateral margins with several spines; 2 to 6 small spines on the rostro-gastral stria at base of rostrum; 1 or more spines on hepatic region and 1 spine on the epibranchial region; rostrum triangular, terminating as a sharp spine, lateral margins with 3 pairs of conspicuous spines and a very small posterior pair.

Dorsal surface of abdominal somites 2-4 each with 3 transverse ciliated striae, somite 5 sometimes with 4 striae, somite 6 with an elaborate pattern of striae.

Telson not much different from that of *G. intermedia*.

Antennule short, basal segment with 3 strong spines, otherwise very similar to that of *G. intermedia*.

Maxilliped 3 with 2 strong spines on inner margin of merus, one placed at distal extremity and the other situated medially, merus almost same length as ischium or shorter.

Chelipeds with many strong spines. Chelae shorter than palm; spines on dorsal surface of propodus may be reduced and be much smaller than the marginal spines. Pereiopods without epipods.

Uropods similar to those of *G. intermedia*.

Length: Specimens commonly measuring 80-90 mm total length and one 102 mm were recorded by Selbie (1914).

Colour: Reddish with some brown colour and distinct blue stripes (Lagerberg, 1908).

Remarks: This is the largest *Galathea* species in the Area. It is also distinguished from *G. intermedia* by the number of spines on the basal segment of the antennule, and from the other three *Galathea* species by the difference in spinulation on the inner margin of the merus of maxilliped 3.

Vernacular names: Thorny bastard lobster, spinous lobster, spinous galathea, spiny squat lobster, strigose squat lobster (United Kingdom); krinakrabbe (Norway).

Bionomics: *Within the Study Area*; reported occurring beneath stones at MLWS and a little below and down to depth of 71 m (Selbie, 1914; Bruce *et al.*, 1963; Allen, 1967). Noted ovigerous from January to July and as having two broods, one spawned from mid-winter to April and the other in May, hatching in May and late summer; larvae recorded in plankton from January to October (MBA, 1957; O'Ceidigh, 1962; Allen, 1967; Lindley, 1987; Martin, 2001).

Beyond the Study Area; reported as infrequently intertidal and also in caves, and down to depths of 180 m, as deep as 600 m (Zariquiey Alvarez, 1968; Ledoyer, 1968; Štević, 1990; d'Udekem d'Acoz, 1999). Noted ovigerous from December to following April and August (Zariquiey Alvarez, 1968).

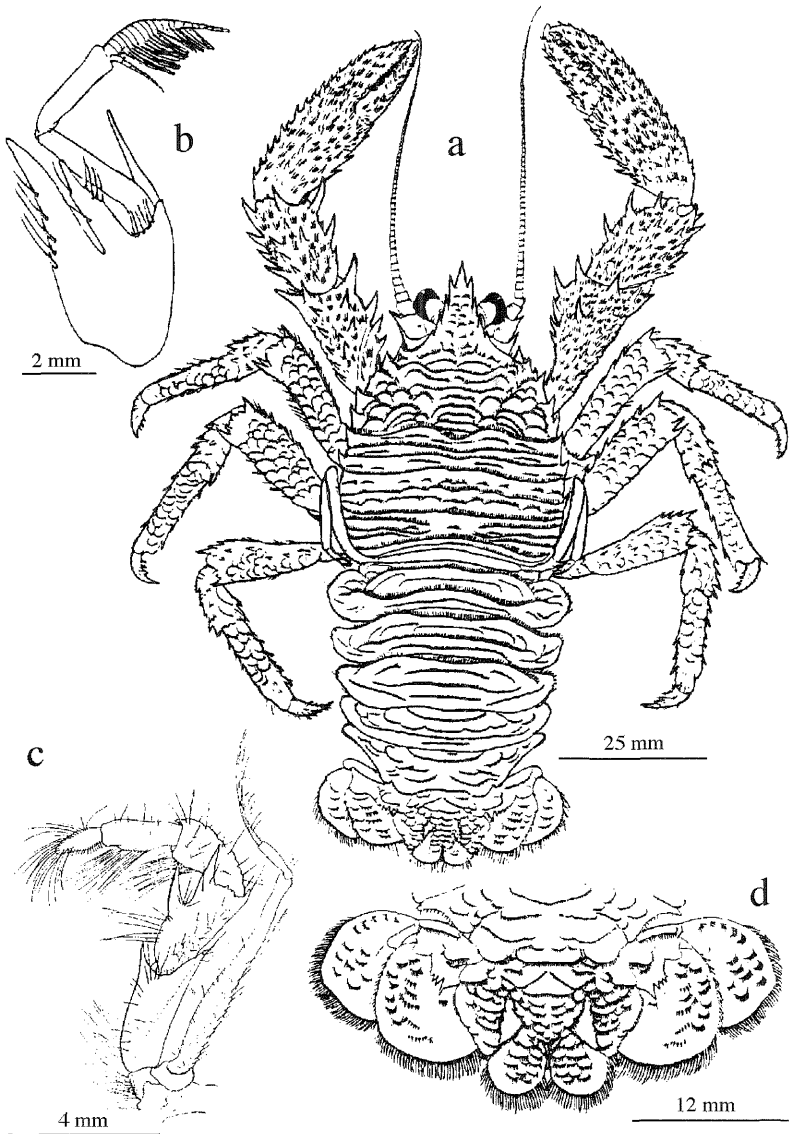


FIG. 130.

Galathea strigosa (Linnaeus), female 49 mm carapace length:

- (a) dorsal aspect; (b) right antennule, ventral aspect; (c) left maxilliped 3, ventral aspect; (d) telson and uropods from dorsal aspect. [(c) after Bull, 1937, pl. 3, fig. 4].

Distribution: Within the Study Area; south and west Norway; Shetland and Orkney Islands; southwards in western and eastern regions of the British Isles and western and eastern English Channel to Brittany (Norman, 1869; Davis, 1967; Brattegard & Christiansen, 1997; d'Udekem d'Acoz, 1999; Natural History Museum, London).

Beyond the Study Area; northwards – Norway to mid-part of Troms county [south of 70°N]; eastwards – west coast of Sweden; Danish waters: southwards – Bay of Biscay; north west Spain; Portugal; Moroccan Atlantic; western Sahara; Azores: *Mediterranean* – western region; Adriatic, Ionian and Aegean Seas; Sea of Marmara (Lagerberg, 1908; Stephensen, 1910; Jägerskiöld, 1971; Brattegard & Christiansen, 1997; d'Udekem d'Acoz, 1999).

***Galathea squamifera* Leach, 1814**

(Figs 125, 131)

Galathea squamifera Leach, 1814: 393, pl. 1

Galathea squamifera: Bell, 1846: 197, fig.

Galathea digitadistans Bate, 1868: 113

Galathea squamifera: Bonnier, 1888: 143, pl. 12, figs 1-5

Galathea squamifera: Lagerberg, 1908: 68, pl. 3, fig. 2.

Galathea squamifera: Bull, 1937: 49, pl. 3, fig. 2, pl. 4, fig. 3

Galathea squamifera: Bouvier, 1940: 168, fig. 128

Galathea squamifera: Holthuis, 1950: 118, figs 41, 42

Galathea squamifera: Allen, 1967: 19, 34, 59, 94 (fig.)

Galathea squamifera: Zariquiey Alvarez, 1968: 274, figs 97c, d, 98a

Galathea squamifera: Christiansen, 1972: 43, fig. 52

Galathea squamifera: Moyse & Smaldon, 1990: 526, fig. 10.16

Galathea squamifera: Hayward *et al.*, 1995: 440, fig. 8.55

Galathea squamifera: González Pérez, 1995: 157, photos 93, 94

Diagnosis: Carapace with ciliated transverse striae; lateral margins with several spines; 2 small spines on the rostro-gastral stria at base of rostrum; rostrum broadly triangular, terminating as a spine, lateral margins with 4 pairs of spines, posterior pair smallest.

Dorsal surface of abdominal somites 2-5 each with 3 transverse ciliated striae of which the proximal and distal striae may be discontinuous, somite 6 with an elaborate pattern of striae.

Telson not much different from that of *G. intermedia*.

Antennule short, basal segment with 3 strong spines, otherwise similar to that of *G. intermedia*.

Inner margin of merus of maxillipeds with one large distal spine and 3 to 5 anteriorly placed graded spines of which the most proximal is the largest, merus longer than ischium.

Chelipeds with spines; chelae shorter than palm; upper and lower surfaces of segments densely covered with scaly tubercles of which many on the dorsal

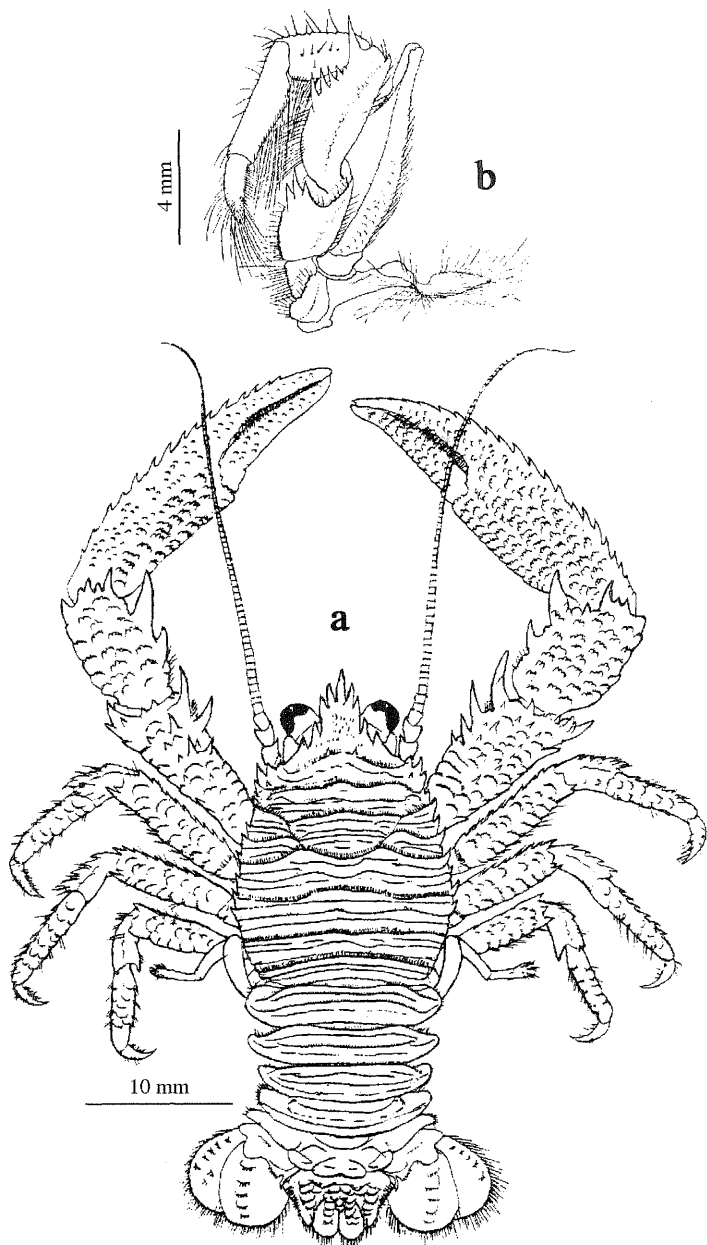


FIG. 131.

Galathea squamifera Leach, male 22 mm carapace length:

(a) dorsal aspect; (b) left maxilliped 3, ventral aspect. [after Bull, 1937, pl. 3, fig. 2].

surface have minute spines anteriorly; spines longest on inner margin of merus and carpus; propodus with spines only on outer margin. Epipods present on pereopods 1-3. Pereopods 2-5 and uropods similar to those of *G. intermedia*.

Length: Common size for adults up to 60 mm total length (Selbie, 1914; Holthuis, 1950).

Colour: Red, reddish brown or greenish brown with violet or red spots (Holthuis, 1950).

Remarks: *G. squamifera* is distinguished from the other four species of British *Galathea* by having 3 spines on the antennule basal segment and a longer merus than ischium of maxilliped 3.

Vernacular names: Scaly galatheid (United Kingdom); ecrevisse (Channel Islands).

Bionomics: Throughout its range, Holthuis (1950) noted that the species occurred generally between depths of 5 m to 180 m.

Within the Study Area; reported occurring on gravel, maerl, mud-filled shells, beneath stones, on rock substrates and among algae, from MLWS and LWST regions down to 78 m (Crawshay, 1912; MacDonald, 1951; Bourdon, 1965; Christiansen, 1972). According to Selbie (1914), migrates shoreward in spring and found in large numbers under stones between tide-marks. Noted spawning from December to following February, ovigerous in April and July and eggs hatching between April and August; larvae recorded in plankton from January to November (Henderson, 1886; O'Ceidigh, 1962; Allen, 1967; Lindley, 1987; Martin, 2001).

Beyond the Study Area; noted ovigerous from November to May (Zariquiey Alvarez, 1968).

Distribution: *Within the Study Area*; Norway [north to approx. 64°N]; Shetland and Orkney Islands; southwards in western and eastern regions of the British Isles and western and eastern English Channel to Brittany; also southern North Sea (Merrifield, 1860; Brattegard & Christiansen, 1997; d'Udekem d'Acoz, 1999; Natural History Museum, London).

Beyond the Study Area; eastwards – west coast of Sweden; Danish waters: southwards – Bay of Biscay; north west Spain; Portugal; Moroccan Atlantic; north of Mauritania; Azores, Canary and Cape Verde Islands: *Mediterranean* – western and south central regions; Adriatic, Ionian and Aegean Seas; Sea of Marmara; eastern region (Lagerberg, 1908; Stephensen, 1910; Jägerskiöld, 1971; d'Udekem d'Acoz, 1999).

***Galathea nexa* Embleton, 1834**

(Figs 127, 132)

Galathea nexa Embleton, 1834: 71*Galathea nexa*: Bell, 1846: 204, fig.*Galathea nexa*: Bonnier, 1888: 149, pl. 12, figs 6-8*Galathea nexa*: Selbie, 1914: 70 (part)*Galathea nexa*: Bull, 1937: 42, pl. 1, figs 1-3, pl. 2, figs 1-6, pl. 3, fig. 1, pl. 4, figs 2, 5, pl. 5, figs 1-4, pl. 6, figs 1, 4, 5*Galathea nexa*: Bouvier, 1940: 166, fig. 127*Galathea nexa*: Allen, 1967: 19, 34, 59, 94 (fig.)*Galathea nexa*: Christiansen, 1972: 44, fig. 53A*Galathea nexa*: Moyses & Smaldon, 1990: 526, fig. 10.16*Galathea nexa*: Hayward *et al.*, 1995: 440, fig. 8.55

Diagnosis: Carapace with ciliated transverse striae (the fine setae fringing the striae do not generally exceed in length one fourth of the distance to the next major anterior stria), lateral margins with several spines; rostro-gastric stria with variable number of spines (from 0 to 6); rostrum triangular, lateral margins with 4 pairs of spines, posterior pair smallest, surface of rostrum with only scattered setae at most.

Dorsal surface of abdominal somites 2-5 medially with a single transverse ciliated stria that is more or less continuous on somites 4 and 5, somite 6 with a more elaborate pattern of striae.

Telson not much different from that of *G. intermedia*.

Antennule short, basal segment with 3 strong spines, otherwise similar in shape to *G. intermedia*.

Maxilliped 3 with a large medial spine on inner margin of merus, it is not followed by any pronounced spines distally, but considerable variation occurs of the spine development and arrangement along this margin, merus about as long as ischium.

Chelae slightly shorter to slightly longer than palm according to age and size. Chelipeds with conspicuous spines, absent on propodal dorsal and ventral surface; propodus to merus and ischium usually covered with dense long plumose setae (less densely arranged for young specimens). Pereiopods 1-3 with an epipod; pereiopods 2-5 and uropods differ little from those of *G. intermedia*, except that the uropod endopod has a few extra long spines on the posterior margin.

Length: The largest male reported by Bull (1937) measured 40 mm total length.

According to Bull, usual size for adult males is 30-38 mm total length, and for ovigerous females 16-20 mm.

Colour: Greenish red, with no well defined patches or marks of any other colour, with the exception of a small amount of brilliant blue or bluish white pigment of limited distribution (Bull, 1937).

Remarks: In some published accounts (see Bull, 1937) *G. nexa* and *G. dispersa* are considered synonymous, but Bull clearly showed that both are valid species and

that they also can be distinguished on their larval features. Although the dense setation of the chelipeds is very characteristic for *G. nexa*, it is less developed for small specimens that, on this feature alone, could be confused with *G. dispersa*. Long preservation in alcohol tends to result in the loss of the characteristic 'furry' appearance of the chelipeds (Bull, 1937).

Vernacular names: Embleton's galatheid (United Kingdom).

Bionomics: Within the Study Area; reported occurring in shore rock pools, on muddy sand, gravel and rock substrates, sometimes intertidal and in various depths down to 503 m, exceptionally at 860 m (Henderson, 1886; Holt, 1892; Grieg, 1927; Bourdon, 1965; Allen, 1967; Moore, 1987). Noted as spawning between December and following April and between May and September with first brood hatching about July; larvae recorded in plankton from February to September, most abundant in June (Allen, 1967; Lindley, 1987).

Beyond the Study Area; reported inhabiting gravel, corals and deep water *Posidonia* (Nunes-Ruivo, 1961; Ledoyer, 1968). Noted ovigerous in May (Zariquiey Alvarez, 1968).

Distribution: Within the Study Area; south and west Norway; Faroe Islands, Shetland and Orkney Islands; southwards to western and eastern regions of the British Isles, western and eastern regions of English Channel to Brittany; also south western North Sea (Norman, 1869; Bull, 1937; Forrest & Crichton, 1938; Stephensen, 1939; Brattegard & Christiansen, 1997; d'Udekem d'Acoz, 1999; Natural History Museum, London).

Beyond the Study Area; northwards – Iceland; Norway [to approx. 71°N]; eastwards – west coast of Sweden; Denmark: southwards – west and south of Portugal; Canary Islands: *Mediterranean* – western region and Adriatic, Ionian and Aegean Seas (Stephensen, 1939; Jägerskiöld, 1971; Brattegard & Christiansen, 1997; d'Udekem d'Acoz, 1999).

Galathea dispersa Bate, 1859

(Figs 128, 133)

Galathea dispersa Bate, 1859: 3

Galathea dispersa: Bonnier, 1888: 154, pl. 13, figs 1-3

Galathea nexa: Selbie, 1914: 70 (part)

Galathea dispersa: Bull, 1937: 46, pl. 1, figs 4-6, pl. 3, fig. 3, pl. 4, figs 1, 4, pl. 5, figs 5-8, pl. 6, figs 2, 3, 6

Galathea dispersa: Allen, 1967: 18, 34, 59, 94 (fig.)

Galathea dispersa: Zariquiey Alvarez, 1968: 278, fig. 98d, e

Galathea dispersa: Christiansen: 1972: 44, fig. 53B

Galathea dispersa: Moyses & Smaldon, 1990: 526, fig. 10.16

Galathea dispersa: Hayward *et al.*, 1995: 440, fig. 8.55

Diagnosis: Carapace with approximately twice as many ciliated transverse striae as

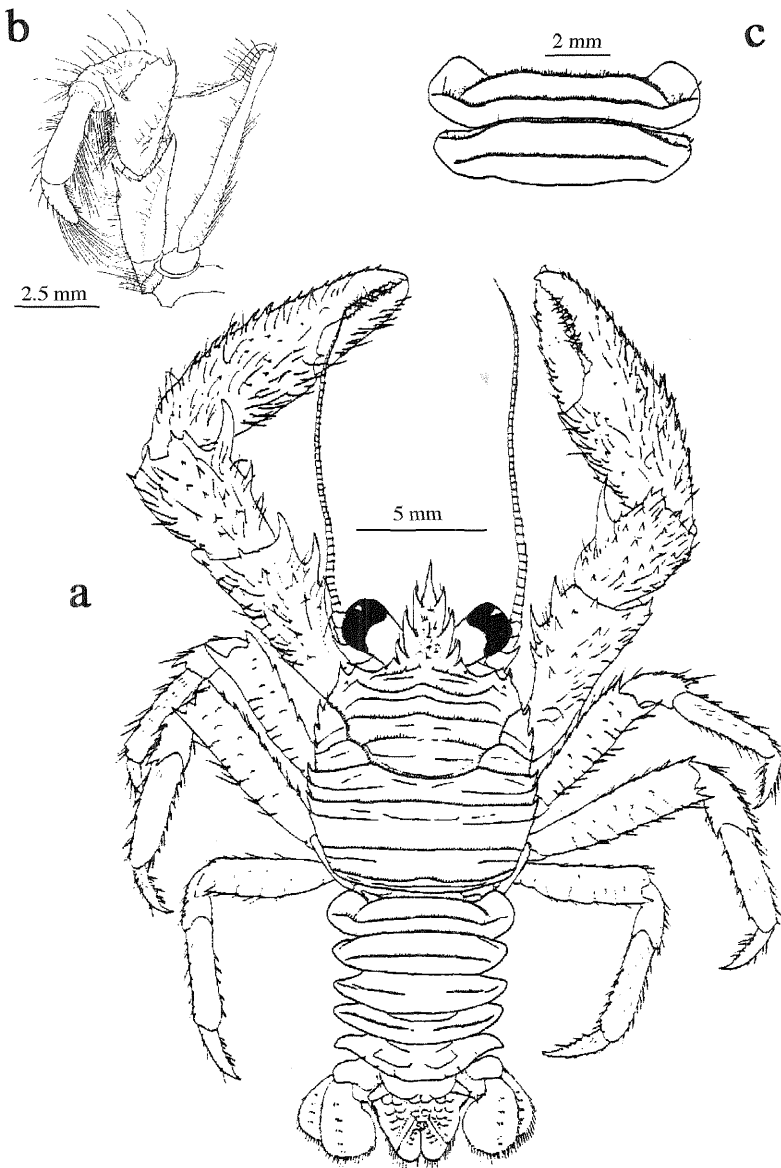


FIG. 132.

Galathea nexa Embleton, male 12 mm carapace length:

- (a) dorsal aspect; (b) left maxilliped 3, ventral aspect [after Bull, 1937, pl. 3, fig. 1];
 (c) abdominal somites 2 and 3, dorsal aspect.

G. nexa, (the fine setae fringing the anterior margins of the striae are very dense and many are about twice as long as those of *G. nexa*), lateral margins of carapace with several spines; rostro-gastric striae with spines varying in number similar to those of *G. nexa*; rostrum triangular terminating as a sharp spine, lateral margins with 4 pairs of spines, posterior pair smallest, surface covered with scales and often numerous short setae.

Dorsal surface of abdominal somites 2-3 each with 3 transverse ciliated striae, those on somites 4-5 slightly different in shape to those on preceding somites, somite 6 with a more elaborated pattern of striae.

Telson similar in shape to that of the other *Galathea* species.

Antennule similar to that of *G. nexa*, with 3 strong spines on basal segment.

Maxilliped 3 with a large medial spine on inner margin of merus and a few smaller spines present distally varying in number, merus about as long as ischium.

Chelae usually shorter than palm. Chelipeds with conspicuous spines, surfaces covered with scaly tubercles fringed anteriorly with fine setae, some also with minute spinules. According to Bull (1937), old males and ovigerous females frequently develop a large number of plumose setae on the chelipeds, but these never merge to make the typical *G. nexa* fur-like appearance. Pereiopods 1-3 with an epipod; pereiopods 2-5 and uropods not much different from those of the other *Galathea* species.

Length: According to Bull (1937), the usual size of both males and females is slightly less than for *G. nexa*. The largest male seen by Bull measured 35 mm total length.

Colour: Very variable in shades of red, yellow, orange, blotched with white, or uniform colouring; it is extremely rare to find a specimen even approaching the distinctive greenish red colour of *G. nexa* (Bull, 1937).

Remarks: The most obvious characters that distinguish *G. dispersa* from *G. nexa* are the more numerous ciliated striae and their setal pattern on carapace and abdominal tergites 2-3, and the scales and setae covering the rostrum (setae may be lost in alcohol preserved specimens) whereas *G. nexa* has only scattered setae at most on the rostral surface.

Bionomics: *Within the Study Area*; reported occurring on muddy sand, sand, gravel, calcareous gravel, stones and rocks and in depths from 5 m to 10 m, down to 366 m, most abundant between 46 m and 91 m (Bull, 1937; Jones, 1951; Bourdon, 1965; Allen, 1967; Natural History Museum, London). Noted ovigerous in March and July; larvae recorded in plankton from February to September, most abundant in April and June (Henderson, 1886; Allen, 1967; Lindley, 1987; Martin, 2001).

Beyond the Study Area; reported on mud and maerl and commonly between 10 m and 170 m (Zariquiey Alvarez, 1968; Koukouras & Kattoulas, 1975). Noted ovigerous in January and June (Zariquiey Alvarez, 1968).

Distribution: *Within the Study Area*; south and west Norway; Shetland and Orkney Islands; southwards in western and eastern regions of the British Isles and

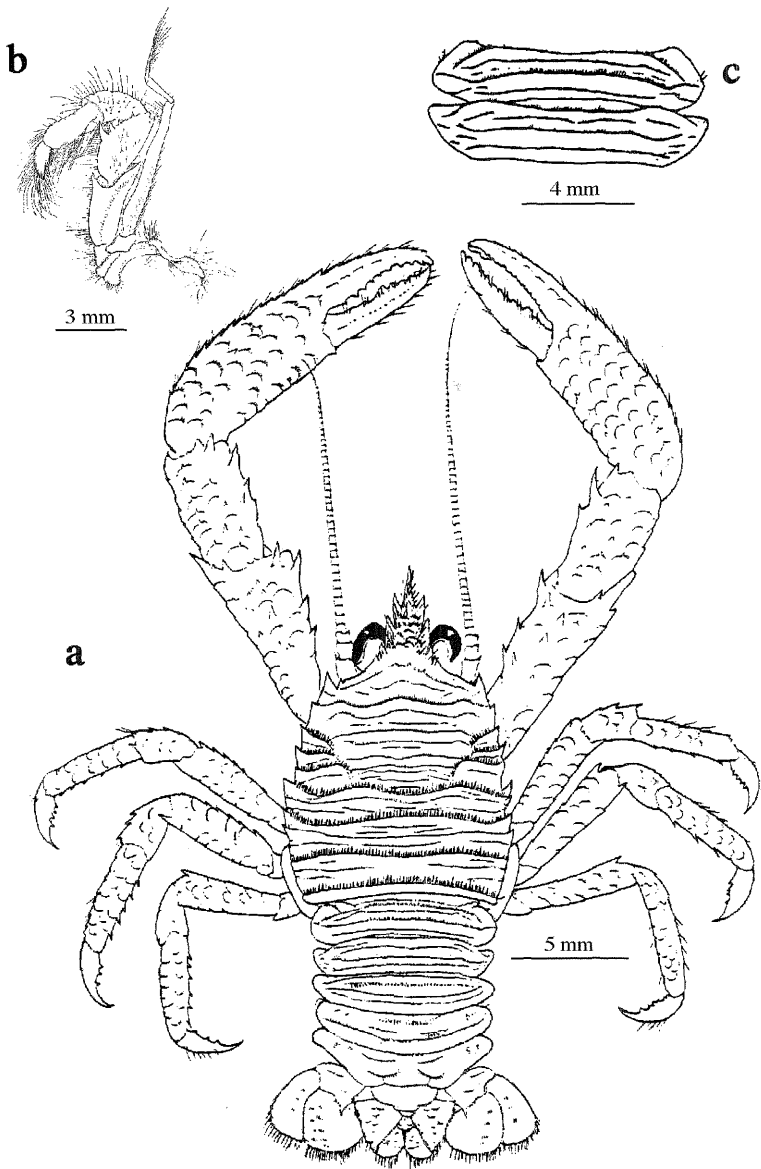


FIG. 133.

Galathea dispersa Bate, female, 14 mm carapace length:

- (a) dorsal aspect; (b) left maxilliped 3, ventral aspect [after Bull, 1937, pl. 3, fig. 3]; (c) abdominal somites 2 and 3 from dorsal aspect.

western and eastern regions of English Channel to Brittany; also southern North Sea (Norman, 1869; Brattegard & Christiansen, 1997; d'Udekem d'Acoz, 1999; Natural History Museum, London).

Beyond the Study Area; northwards – Norway [to Nordland county-between 66°N and 67°40'N]; *eastwards* – west coast of Sweden; *southwards* – Bay of Biscay; Portugal; Moroccan Atlantic; Madeira and Canary Islands; ?South Africa; *Mediterranean* – western and south central regions; Adriatic, Ionian and Aegean Seas; ?Sea of Marmara; eastern region (Jägerskiöld, 1971; Noël, 1992; Brattegard & Christiansen, 1997; d'Udekem d'Acoz, 1999).

Family Porcellanidae Haworth, 1825

Porcellanidae Haworth, 1825: 183

Porcellanidae: Haig, 1960: 10

Porcellanidae: Zariquiey Alvarez, 1968: 289

Crab-like anomurans. Frontal region of carapace often prominent but without a true rostrum. Basal segments of antennules broad. Antennae inserted external to the eyes. Maxillipeds 3 too large to be contained in buccal cavity. Chelipeds strong, with a short merus, carpus usually longer. Pereiopods 2-4 well developed, pereiopods 5 feeble and reduced in size. Telson of abdomen composed of 5 or 7 well calcified plates.

Key to the British genera and species of Porcellanidae

- Carapace and pereiopods partly covered with long plumose setae. Front divided into 3 lobes of about the same size (Fig. 134).
..... Genus *Porcellana*
[one species: *Porcellana platycheles*, p. 168].

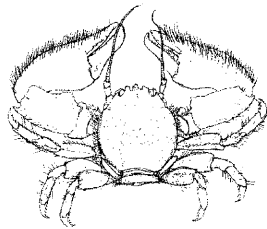


FIG. 134

- Carapace and pereiopods nearly smooth, only with few scattered setae. Front divided into 3 lobes of which the central is the broadest (Fig. 135).
..... Genus *Pisidia*
[one species: *Pisidia longicornis*, p. 170].

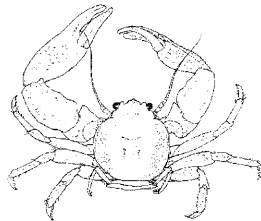


FIG. 135

GENUS *PORCELLANA* LAMARCK, 1801

Porcellana Lamarck, 1801: 153

Porcellana: Holthuis, 1950:124-125 (part)

Body crab-shaped. Carapace and pereiopods partly covered with long plumose setae; lateral margin of carapace slightly constricted behind the orbit, front divided into 3 lobes. Eyes well developed, partly visible from above. Abdomen bent against sternum, somites short and broad. Antennule with 2 short flagellae. Antennal flagellum long. Chelipeds strong, usually depressed with large and flattened chelae. Pereiopods 2-4 much more slender than the chelipeds, without chelae. Pereiopods 5 short and narrow with a small chela. Uropods oval.