

TWO NEW GENERA AND NINE NEW SPECIES OF
GERYONID CRABS
(CRUSTACEA, DECAPODA, GERYONIDAE)

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Abstract.—The family Geryonidae Colosi, 1923 is restricted to three genera: *Geryon* Krøyer, 1837, containing two species, *G. trispinosus* (Herbst, 1803), and *G. longipes* A. Milne Edwards, 1882; *Chaceon*, new genus, containing 21 species, eight of which are newly described; and *Zariquieyon*, new genus, containing one new Mediterranean species, *Z. inflatus*. The new species of *Chaceon* and their ranges are: *C. atopus*, Saint Helena Island; *C. bicolor*, central Pacific Ocean; *C. crosnieri*, Madagascar; *C. eldorado*, northern South America; *C. inglei*, northeastern Atlantic; *C. mediterraneus*, western Mediterranean Sea; *C. notialis*, Uruguay and Argentina; and *C. sanctaehelenae*, Saint Helena Island.

In addition to results published elsewhere (see Manning & Holthuis 1984, 1986, 1987, 1988), our studies on deep-sea crabs of the family Geryonidae have revealed the existence of nine other undescribed species from various localities that can be assigned to two new genera. These taxa are named herein.

Specimens have been deposited in the British Museum (Natural History), London (BMNH), the Muséum National d'Histoire Naturelle, Paris (MNHN), the Rijksmuseum van Natuurlijke Historie, Leiden (RMNH), the National Museum of Natural History, Smithsonian Institution, Washington (USNM), and the Zoological Museum, Copenhagen (ZMC).

We use the following abbreviations: cb, carapace breadth, measured between the tips of the posterior pair of anterolateral teeth; cl, carapace length, measured on the midline; fm, fathoms; leg, collector; m, meter(s); mm, millimeter(s); P5, fifth leg (fourth walking leg); sta, station.

Family Geryonidae Colosi, 1923

Geryonidae Colosi, 1923:249.

Diagnosis.—Carapace hexagonal, with three or five anterolateral teeth on each side.

Suborbital margin with inner tooth only. Chelipeds unequal, merus with subdistal dorsal spine, carpus with strong inner spine. Chelae portunid-like. Walking legs with naked dactyli, lacking segments expanded for swimming. Abdomens of male and female with seven free segments.

Remarks.—The status of the family Geryonidae and of the genera assigned to it have long posed problems for students of the group, as we already have pointed out (Manning & Holthuis 1981:109). That the family Geryonidae deserves recognition as a family distinct from the Xanthidae s.l. and the Goneplacidae s.l. and that its affinities are with the Portunidae no longer seem to be in question.

Several genera of uncertain affinities have been placed in the family Geryonidae (see Guinot 1971:1077-1078), e.g., *Paragalene* Kossmann, 1878, *Bathyplax* A. Milne Edwards, 1880, *Platypilumnus* Alcock, 1894, *Progeryon* Bouvier, 1922, and *Platychelonia* Crosnier & Guinot, 1969.

In spite of Guinot's (1969:692) observation, "Les deux genres monospécifiques *Progeryon* and *Platypilumnus* nous paraissent étroitement apparentés à *Geryon*, inséparables de celui-ci," we do not believe

that these or any of the genera other than *Geryon* and the two new genera established here belong in the Geryonidae. We believe that for the moment all other Recent genera formerly assigned to the Geryonidae should be placed in the Xanthidae s.l. Several of them, including *Paragalene* and *Progeryon*, may well belong in a new family.

Members of all of the genera here excluded from the Geryonidae lack the portunid-like chelipeds and the characteristic subdistal dorsal spine on the merus of the chelipeds found in the geryonids proper as well as in some portunids, and they all can be distinguished from geryonids as restricted here by these features alone. Further, all of the geryonids as restricted here have naked dactyli on the walking legs and lack black fingers on the chelae, other features that will distinguish them from members of *Paragalene* and *Progeryon*.

As restricted here, the Geryonidae comprise three genera and 24 species: *Geryon* Krøyer, with 2 species; *Chaceon*, new genus, with 21 species; and *Zariquieyon*, new genus, with 1 species.

Geryon Krøyer, 1837

Geryon Krøyer, 1837:10, 20, 21 [type species, by original designation and monotypy, *Geryon tridens* Krøyer, 1837, a subjective junior synonym of *Cancer trispinosus* Herbst, 1803].

Chalaepus Gerstaecker, 1856:118 [type species, by monotypy, *Cancer trispinosus* Herbst, 1803].

Definition.—Geryonid crabs with three anterolateral teeth on each side of the carapace. Carapace length half to two-thirds width. Branchial regions not markedly inflated. Frontal teeth poorly developed, small. Orbits shallow, rounded.

Included species.—Two, both from the northeastern Atlantic Ocean:

Geryon longipes A. Milne Edwards (1882: 16, 39).

Geryon trispinosus (Herbst) (1803:43)

(=*Geryon tridens* Krøyer, 1837, see Manning & Holthuis 1987).

Remarks.—*Geryon* differs from both *Chaceon* and *Zariquieyon* in having three rather than five anterolateral teeth on each side of the carapace, and the two submedian frontal teeth are smaller than in the representatives of either of the other two genera. *Geryon* agrees with *Chaceon* and differs from *Zariquieyon* in having the orbits shallow and rounded rather than rectangular, and *Geryon* and *Chaceon* lack the swollen branchial regions that are characteristic of the only known species of *Zariquieyon*.

Chaceon, new genus

Type species.—*Geryon fenneri* Manning & Holthuis, 1984.

Name.—The name is given in honor of our colleague Fenner A. Chace, Jr. The suffix -on is used to make the name similar to *Geryon*. This suffix should not be considered to be the Greek neuter ending -on. The gender of the name *Chaceon* is masculine, like that of *Geryon*.

Definition.—Geryonid crabs with five anterolateral teeth on each side of the carapace. Carapace length half to two-thirds width. Branchial regions not markedly inflated. Frontal teeth well-developed, large. Orbits shallow, rounded.

Included species.—Twenty-one, of which eight are described herein. Nominal species include the following:

Chaceon affinis (A. Milne Edwards & Bouvier, 1894:41), northeastern Atlantic.

Chaceon chuni (Macpherson, 1983:23), Namibia and South Africa.

Chaceon erytheiae (Macpherson, 1984:86), Valdivia Bank, southeastern Atlantic.

Chaceon fenneri (Manning & Holthuis, 1984:666), northwestern Atlantic.

Chaceon gordonae (Ingle, 1985:90), West Africa.

Chaceon granulatus (Sakai, 1978:11), Japan.



Fig. 1. *Chaceon atopus*, male holotype, cb 124 mm, Saint Helena, dorsal view.

Chaceon inghami (Manning & Holthuis, 1986:367), Bermuda.

Chaceon macphersoni (Manning & Holthuis, 1988:83), southwestern Indian Ocean and South Africa.

Chaceon maritae (Manning & Holthuis, 1981:112), West Africa.

Chaceon paulensis (Chun, 1903:531), central Indian Ocean.

Chaceon quinquedens (Smith, 1879:35), northwestern Atlantic.

Two other species originally described in *Geryon*, *Geryon incertus* Miers, 1886, and

Geryon ischurodous Stebbing, 1923, were incorrectly assigned to the genus. Manning & Holthuis (1986:369) showed that *G. incertus* is a synonym of the portunid *Bathynectes longispina* Stimpson, 1871, and Manning & Holthuis (1988:78) showed that *G. ischurodous* is a species of the goneplacid genus *Carcinoplax*.

Remarks.—Accounts of two other species, one from Chile, and one from Brazil are in preparation. These 2 species, the 11 known species, and the 8 new species described below raise the known number of species to 21.

Members of *Chaceon* agree with *Zariquieyon* and differ from *Geryon* in having five anterolateral teeth on each side of the carapace.

Chaceon atopus, new species

Figs. 1–2

Material.—Off Rupert's Bay, Saint Helena Island [15°58'S, 5°43'W], 130 fm (238 m), 5 Aug 1983, leg A. J. Edwards: one male (holotype, RMNH).

Diagnosis.—A large *Chaceon*, cl 90 mm, cb more than 120 mm in only known specimen, with well-developed anterolateral teeth on the carapace in adults and with laterally compressed dactyli on the walking legs. Carapace 1.4 times broader than long, very inflated, strongly convex from front to back, appearing smooth. Median pair of frontal teeth long and sharp, separated by a narrow, V-shaped emargination, medians extending further forward than laterals; outer margin of lateral frontal tooth with slight convex projection, indicating position of inner orbital angle. Anterolateral teeth well-developed, all sharp, fourth smallest but sharp and distinct. Distance from first to second tooth about the same as from third to fourth, distance from first to third tooth less than distance between third to fifth. Carapace surface finely granular posterolaterally. Suborbital tooth strong and sharply pointed, visible in dorsal view, extending about to level of lateral frontal tooth; suborbital margin evenly curved, tuberculate.

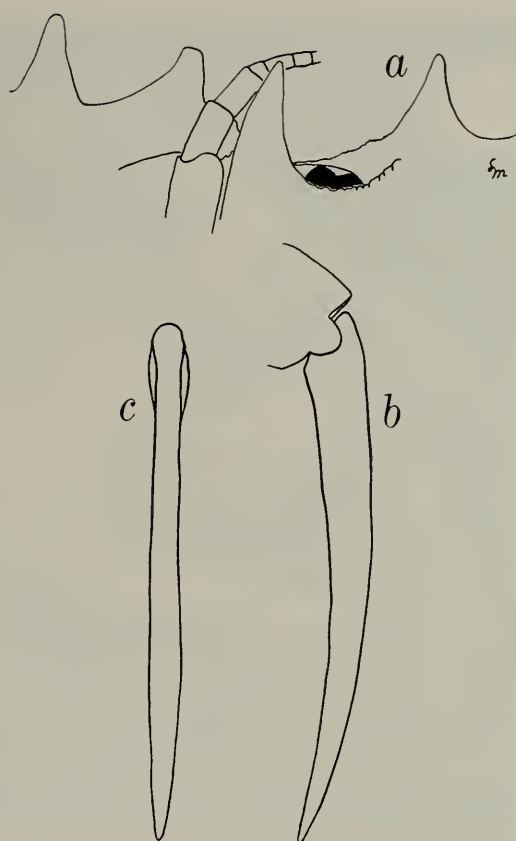


Fig. 2. *Chaceon atopus*, male holotype, cb 124 mm, Saint Helena: a, Ventral view of orbit; b, P5 dactylus, posterior view; c, P5 dactylus, dorsal view.

Cheliped merus with sharp spine subdistally and with distal dorsal spine; carpus roughened dorsally, with distal outer spine, denticulate anterior margin, and strong and slender distal spine; propodus with distal dorsal spine broken in left chela, right chela with distal angled projection. Meri of walking legs with distinct distal dorsal spine. Dactyli of walking legs laterally compressed, height at midlength greater than width. P5: merus 6.5 times longer than high, length 0.58 cb; carpus with line of erect spinules dorsally; propodus longer than dactylus, length 5.8 times height.

Size.—Unique male holotype, cl 90 mm, cb 124 mm.

Remarks.—This species resembles *C. gordonae*, from the Cape Verde Islands and Sierra Leone, in many features, including the large size, the well-developed frontal and anterolateral teeth on the carapace, and the compressed dactyli of the walking legs. It differs from *C. gordonae* in having much

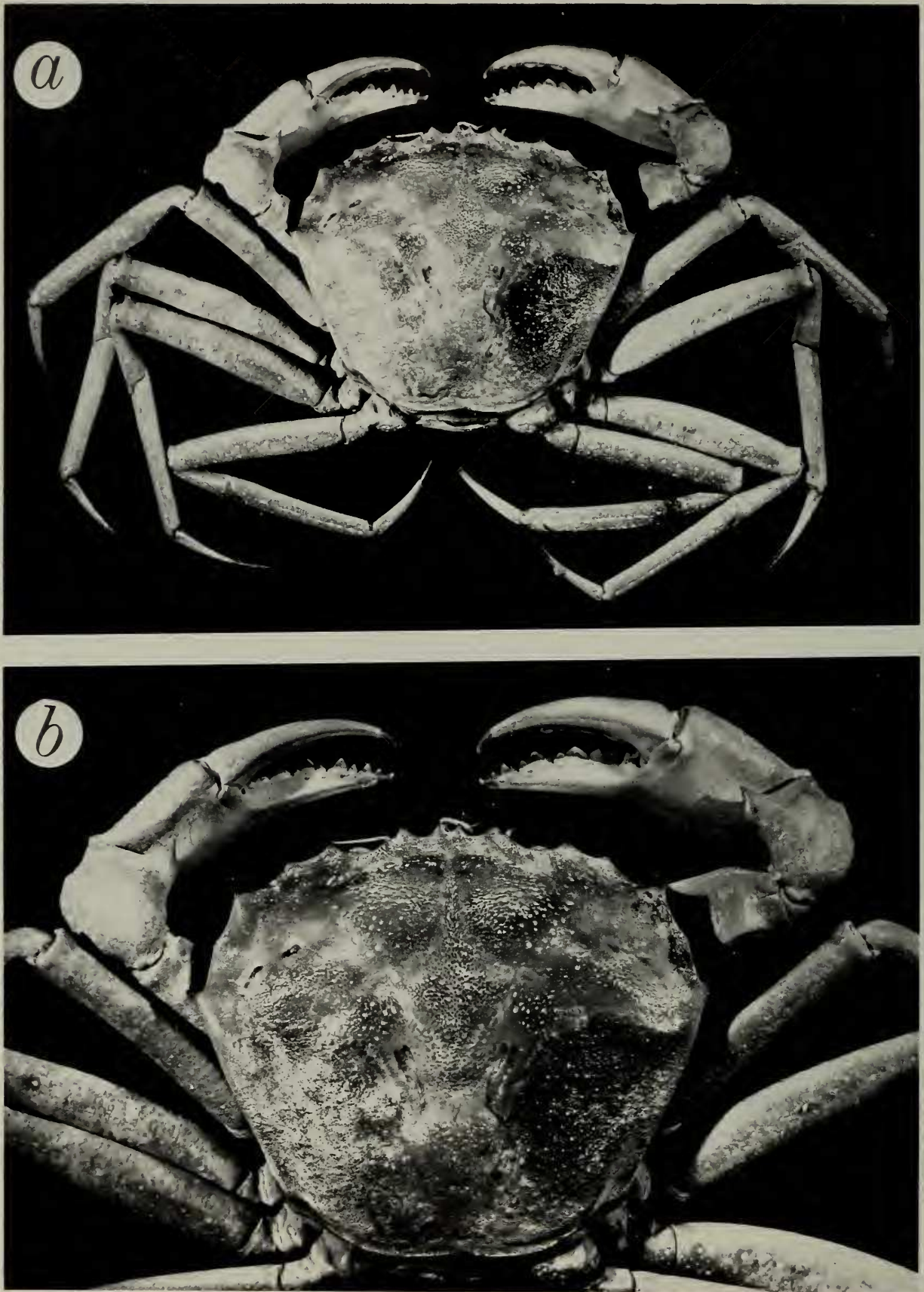


Fig. 3. *Chaceon bicolor*, male paratype, cb 158 mm, Passe de Saint Vincent: *a*, Dorsal view; *b*, Carapace.

longer walking legs, with the merus more than 6 times longer than high, and in its habitat. *Chaceon gordonae*, in which the P5 merus is less than 6 times longer than high, generally occurs in depths in excess of 2000 m, whereas the present new species occurs in less than 250 m.

This species can be distinguished on sight from *C. sanctaehelenae*, described below, by the long, slender walking legs, the distal meral spine on the walking legs, and the well-developed anterolateral spines of the carapace.

Name.—The specific name is from the Greek, *atopos*, out of place, strange, our reaction when we learned this specimen was specifically distinct from the holotype of *C. sanctaehelenae*, described below.

Distribution.—Known only from Saint Helena Island, in 238 m.

Chaceon bicolor, new species

Figs. 3–4

Geryon affinis.—Griffin & Brown, 1976:256, figs. 7–9.—Sakai, 1978:9, figs. 18–19, pl. 2, fig. D (color). [Not *Geryon affinis* A. Milne Edwards & Bouvier, 1894.]

Geryon quinquedens.—Intès, 1978:7, figs. 5B, 8.—Guinot & Richer de Forges, 1981:249.—King, 1984:186. [Not *Geryon quinquedens* Smith, 1879.]

Geryon.—Intès, 1978: fig. 10.—Guinot & Richer de Forges, 1981:249.

Previous records.—Emperor Seamount Chain: North of Nintoku Seamount, 42°20'N, 170°50'E, 800 m; Jingu Seamount [38°50'N, 171°15'E], 890–930 m; Kinmei Seamount, 35°34'N, 171°41'E, 600–640 m, and 500–700 m; south of Kinmei Seamount, 34°42'N, 171°48'E, 980–1100 m (Sakai 1978).

Southwestern Pacific: in depths greater than 600 m (King 1984).

Loyalty Islands [21°00'S, 167°00'E]: (Intès 1978).

New Caledonia [21°30'S, 165°30'E]: 600–

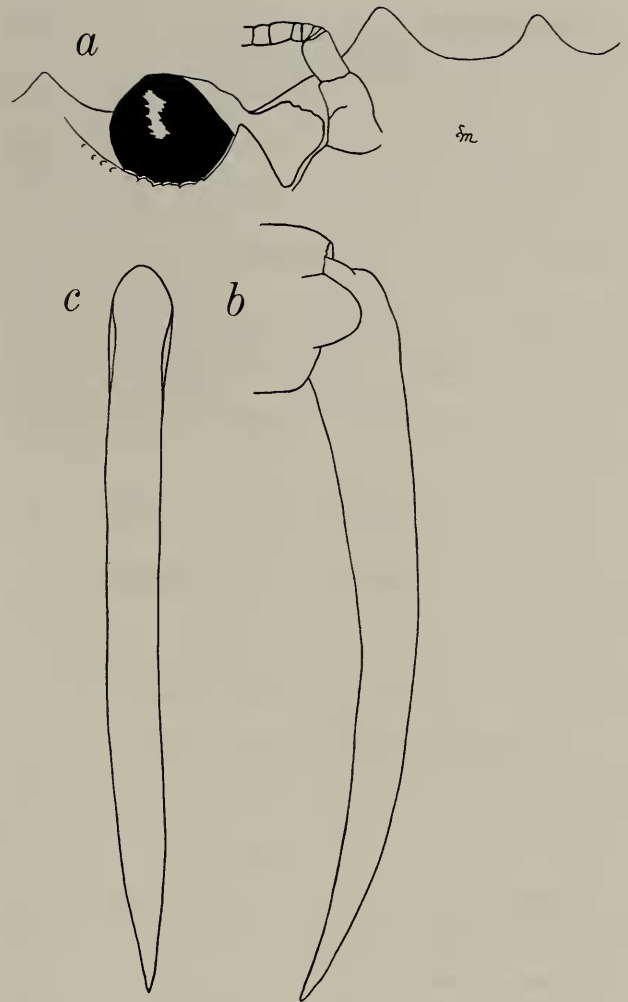


Fig. 4. *Chaceon bicolor*, male paratype, cb 148 mm, Passe de Saint Vincent: a, Ventral view of orbit; b, P5 dactylus, posterior view; c, P5 dactylus, dorsal view.

1000 m (Intès 1978; Guinot & Richter de Forges 1981).

New South Wales, Australia: Southeast of Grafton, 29°49'S, 153°42'E to 29°59'S, 153°38'E, 369 m; east of Broken Bay, 33°40'S, 151°53'E to 33°22'S, 152°09'E, 450 m, 33°40'S, 151°53'E to 33°35'S, 151°58'E, 450–810 m, and 33°38'S, 151°57'E to 33°34'S, 152°01'E, 774–792 m; north of Sydney, 33°43'S, 151°55'E to 33°37'S, 152°02'E, 675 m; off Sydney, 33°52'S, 152°50'E to 33°48'S, 152°54'E, 765 m (Griffin & Brown 1976).

Material.—Emperor Seamount Chain: Kinmei Seamount, 35°17.50'N, 171°25.98'E, 150 fm (275 m), *Townsend Cromwell* cruise

Cromwell cruise 82-05, sta 57, 11 Nov 1982: three females (USNM 205974).

New Caledonia: 23°44'S, 166°58'E, 1490–1620 m, BIOCAL, *Jean Charcot* sta CP 57, 1 Sep 1985: one juvenile male, one female (MNHN), one female (USNM 205975).—23°07'S, 166°51'E, BIOCAL, *Jean Charcot* sta CP 32, 825 m, 29 Aug 1985: one male (MNHN).—Passe de Saint Vincent [22°02'S, 165°57'E], 800 m, traps, leg B. Richer de Forges: four males (3 MNHN, 1 USNM 205976).

Australia: Southeast of Newcastle, New South Wales, 33°11–09'S, 152°24–25'E, 732 m, leg D. E. Brown on FRV *Kapala*, sta K77-23-10, 7 Dec 1977: one male (USNM 205978).—East of Broken Bay, New South Wales, 33°35–33'S, 152°00–02'E, 823 m, leg D. E. Brown on FRV *Kapala*, sta K77-23-12, 8 Dec 1977: one male, one female (USNM 205977).

The holotype is the male, cl 144 mm, cb 165 mm, from New Caledonia, *Jean Charcot* sta CP 32 (MNHN). All of the other specimens are paratypes.

Diagnosis.—A very large *Chaceon*, cl to more than 140 mm, cb to 180 mm in adults, with small, blunt anterolateral teeth on the carapace in adults and with laterally-compressed dactyli on the walking legs. Carapace 1.1–1.2 times broader than long in adults, 1.4 times broader than long in juveniles. Median pair of frontal teeth narrower than laterals, separated by U-shaped emargination, medians extending further forward than laterals. Second and fourth anterolateral teeth reduced, fourth often obsolete. Distance from first to second anterolateral tooth less than that from third to fourth, distance from first to third subequal to that from third to fifth. Carapace with distinct granulation mesial to fifth tooth and on protogastric, cardiac, and branchial regions; hepatic region smooth; protogastric region inflated in large specimens, especially in females. Suborbital tooth short and blunt in males, longer and sharper in females and juveniles, scarcely or not at all visible in

dorsal view, suborbital margin evenly curved, tuberculate. Cheliped lightly tuberculate dorsally; upper margin of merus with sharp subdistal spine; carpus lacking outer spine in adult, blunt projection present in some specimens, with distinct spine in juvenile; propodus unarmed distally. Meri of posterior walking legs with distinct distal dorsal angled projection, spined in juveniles. Dactyli of walking legs laterally compressed, height at midlength greater than width. P5: merus 4.3–5.1 (mean 4.6) times longer than high in females, 5.2–5.6 (mean 5.4) times longer than high in males, and 7.0–7.5 times longer than high in juveniles, usually with blunt distal dorsal projection in adults, distinct distal spine in juveniles; merus length 0.49–0.56 cb in females, 0.61–0.64 cb in males; carpus smoothly tuberculate dorsally; propodus distinctly longer than dactylus, 3.6–4.6 (mean 4.1) times longer than high in adults, 5.6–6.0 times longer than high in juveniles.

Size.—Males, cl 116–147 mm, cb 134–165 mm; females, cl 21–110 mm, cb 30–122.5 mm; juvenile, cl 7 mm, cb 10 mm. The largest specimens recorded in the literature are: male, cl 141 mm, cb 155 mm (Sakai 1978); a specimen with cb 176 mm (Griffin & Brown 1976); a specimen with cb 180 mm (Intès 1978).

Color.—Anterior part of carapace predominantly purple, branchial regions tan, legs yellowish. Sakai (1978: pl. 2, fig. D) gave a figure in color.

Remarks.—*Chaceon bicolor* differs from all other species of the genus in color pattern, with the anterior part of the body purplish rather than reddish or tan, set off from the tan branchial regions. Remnants of this distinctive color pattern are visible in one of the juveniles from deep water off New Caledonia. In addition to color pattern, *C. bicolor* also differs from the only other species known to occur in the central Pacific, *C. granulatus*, in having compressed rather than depressed dactyli on the walking legs; also, the hepatic region of the carapace

in *C. granulatus* is coarsely granular, whereas it is smooth in *C. bicolor*.

The juvenile specimens taken in 1490–1620 m off New Caledonia differ from the adults in many features: the teeth of the carapace are much larger and sharper, there is a sharp outer spine on the carpus of the cheliped and a sharp distal spine on the merus of each walking leg, and the legs are much longer and slenderer. As mentioned above, one specimen shows traces of the typical color pattern of the adults, suggesting that these small specimens are juveniles that occur in much deeper water than do the adults.

Adult females differ from males in having much sharper anterolateral teeth on the carapace, sharper suborbital spines, and much shorter legs, with less trace of a distal dorsal projection on the merus. Also, the carapace of females is more strongly arched from front to back and the protogastric regions are noticeably more inflated.

Our specimens were taken in depths of 275, 732, 800, 823, 825, and 1490–1620 m; the juveniles were collected at the latter depth. Depth records in the literature include: 369 to 774–792 m (Griffin & Brown 1976); 500–700 to 980–1100 m (Sakai 1978); 600–1000 m (Intès 1978, Guinot & Richer de Forges 1981); and in depths greater than 600 m (King 1984).

Name.—The specific name is from the Latin, the prefix *bi-* and *color*, referring to the purple and tan color pattern of this species in life.

Distribution.—Widely distributed in the central Pacific, from the Emperor Seamount Chain (42°20'N) to eastern Australia, off Sydney (33°52'S), in depths between 275 and about 1600 (1490–1620) m.

Chaceon crosnieri, new species

Figs. 5–6

Material.—Madagascar: 22°21'S, 43°05.5'E, 450–420 m, sta 27, 15 Jan 1986: two males, three females (MNHN).—22°13.5'S,

43°05'E, 530 m, mud, chalutage 62, leg Rudo von Cosel, 19 Oct 1986: one female (MNHN).—22°26.1'S, 43°04.6'E, 520 m, mud, chalutage 65, leg Rudo von Cosel, 1986: one male, four females (MNHN).—22°12.5'S, 43°02.5'E, 560 m, mud, chalutage 75, leg Rudo von Cosel, 23 Oct 1986: two females (MNHN).—22°24.7'S, 43°04.2'E, 535 m, mud, chalutage 91, leg Rudo von Cosel, 4 Nov 1986: one male, two females (USNM 205979).—22°24.6'S, 43°03.7'E, 590 m, mud, chalutage 93, leg Rudo von Cosel, 7 Nov 1986: one male, one female (MNHN).—22°S, 43°E, 790 m, mud, chalutage 102, leg Rudo von Cosel, 24 Nov 1986: one male, one female (MNHN).—22°24.7'S, 43°03.7'E, 630 m, mud, chalutage 115, leg Rudo von Cosel, 28 Nov 1986: one female (MNHN).

The holotype is the male, cl 116 mm, cb 140 mm, from chalutage 93; all other specimens are paratypes.

Diagnosis.—A very large *Chaceon*, cl to 127 mm, cb to 155 mm in adults, with low, blunt anterolateral teeth on the carapace in adults and with laterally compressed dactyli on the walking legs. Carapace 1.2 times broader than long, very inflated dorsally, especially at protogastric regions. Median pair of frontal teeth narrower than laterals, not set ahead of laterals, both pairs extending about to same level. All five anterolateral teeth reduced, distance from first to second equal to distance from third to fourth, distance from first to third equal to distance from third to fifth. Carapace relatively smooth, with small granules and pits on branchial, cardiac, and gastric regions, hepatic regions smooth. Suborbital tooth sharp in females, very short and blunt in males, scarcely visible in dorsal view, suborbital margin concave, tuberculate. Cheliped lightly granular, not conspicuously roughened, merus with sharp subdistal spine; carpus irregular dorsally, with sharp inner tooth, lacking any trace of outer tooth; propodus with some small tubercles dorsally, lacking distal spine. Meri of walking legs,

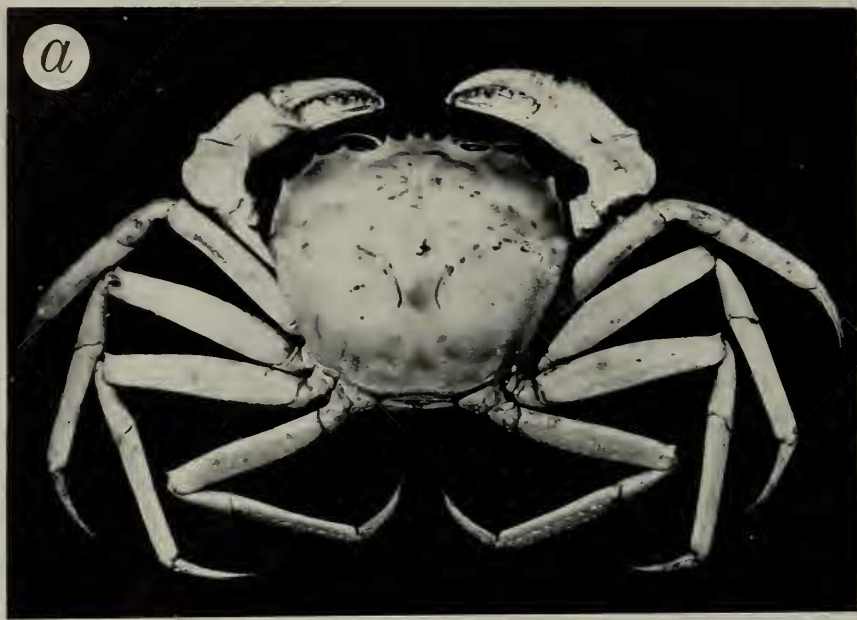


Fig. 5. *Chaceon crosnieri*, male holotype, cb 140 mm, Madagascar: *a*, Dorsal view; *b*, Carapace. Female paratype, cb 127 mm, Madagascar: *c*, Carapace, lateral view.

especially posterior ones, with distal, dorsal spine. Dactyli of walking legs laterally compressed, height at midlength greater than width. P5: merus 4.1–5.0 (mean 4.7 in males, 4.5 in females) times longer than high, with distal dorsal spine, length 0.47–0.55 cb (mean 0.51) in females, 0.57–0.63 cb (mean 0.59) in males; carpus lacking erect spinules dorsally; propodus length 3.6–4.4 times height (mean 3.9 in males, 4.0 in females), usually longer than dactylus, subequal to dactylus in large females.

Size. — Males, cl 83–127 mm, cb 101–155 mm; females, cl 82–127 mm, cb 97–148 mm.

Color. — In preservative, some males show tips of fingers of chela with red band proximally, apices whitish. Color in life unknown.

Remarks. — *Chaceon crosnieri* differs from *C. affinis* in that the carapace is much more inflated, the outer orbital and the suborbital teeth are stronger, the subdistal tooth on the merus of the cheliped is stronger and the cheliped is smoother dorsally, the carpus of the walking legs lacks dorsal spinules, and the merus of the walking legs, especially the posterior ones, has a strong distal dorsal spine. This new species differs from *C. chuni* in being much larger, cb to 155 mm, the carapace is much more inflated, especially at the protogastric region, the gap between the first and second anterolateral tooth of the carapace is larger (equal to distance from third to fourth in *C. crosnieri*, less in *C. chuni*), the frontal teeth of the carapace are stronger, the suborbital spine is smaller, and the carpus of the cheliped lacks an outer spine.

Chaceon crosnieri is a much smoother species than *C. bicolor*, with much shorter, stouter legs, the suborbital spine is much lower and blunter, and the distal projection on the merus of the walking legs is much less developed in larger specimens.

A male of *C. paulensis* in the USNM, cl 82 mm, cb 113 mm, from 38°24.92'S, 77°25.15'E, in 1050–1110 m off Amsterdam Island in the southern Indian Ocean,



Fig. 6. *Chaceon crosnieri*, male paratype, cb 155 mm, Madagascar: a, Ventral view of orbit; b, P5 dactylus, posterior view; c, P5 dactylus, dorsal view.

is available for comparison. It shares the compressed dactyli of the walking legs with *C. crosnieri*, and little else. It differs in many features, especially in having strongly developed, sharp anterolateral teeth on the carapace and on the meri of the walking legs, and in having a large, sharp outer spine on the carpus of the cheliped.

Chaceon crosnieri was taken together with *C. macphersoni* at sta 27 and at chaluages 62, 65, 91, and 93. The two species can be distinguished immediately, as *C. macphersoni* is much rougher dorsally and has the dactyli of the walking legs depressed, not laterally compressed.

Our specimens were taken in depths of 420–450 to 790 m, with five samples being taken in depths between 520 and 590 m.

Name. — We are pleased to dedicate this

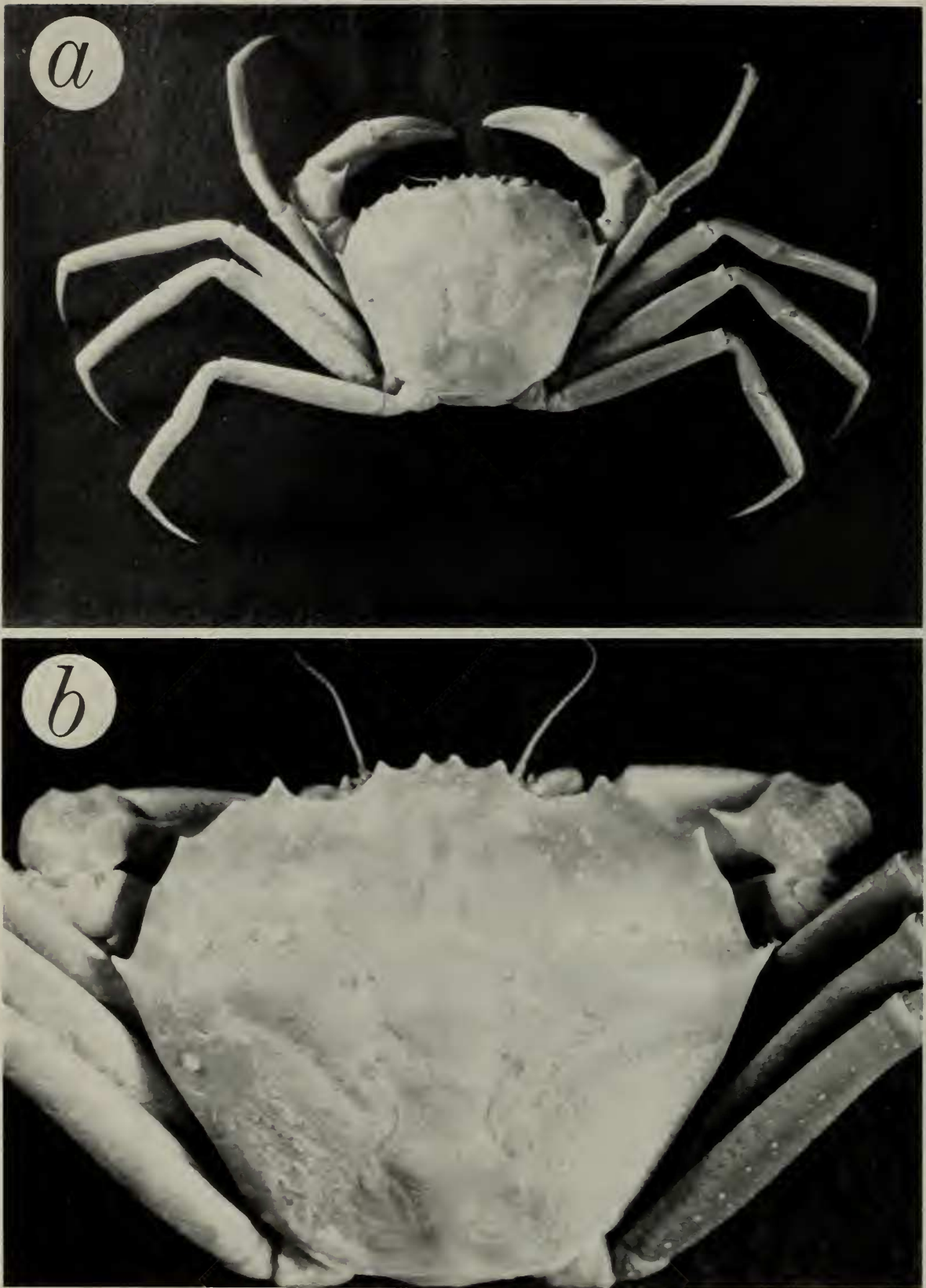


Fig. 7. *Chaceon eldorado*, male holotype, cb 109 mm, Venezuela: *a*, Dorsal view; *b*, Carapace.

species to our colleague Alain Crosnier, Muséum National d'Histoire Naturelle, Paris, who made special efforts to save specimens of geryonids whenever they were encountered in the field.

Distribution.—Known only from localities around Madagascar, in depths between 420–450 and 790 m.

Chaceon eldorado, new species

Figs. 7–8

Geryon quinquedens.—Takeda, 1983:15, 18, 31, 164, color fig. on p. 164. [Not *Geryon quinquedens* Smith, 1879.]

Previous records.—Off Suriname and French Guiana, 310–790 m (Takeda 1983).

Material.—Colombia: 12°06'N, 72°55'W, 350–500 fm (641–915 m), *Oregon* sta 4912, 31 May 1964: one male (USNM 205980).

Venezuela: 12°55'N, 70°16'W, 340 fm (622 m), *Oregon II* sta 11307, 26 Nov 1970: one female (USNM 205981).—11°53'N, 69°25'W, 350 fm (641 m), *Oregon* sta 4413, 3 Oct 1963: one male (USNM 205982).—11°36'N, 62°46'W, 290 fm (531 m), *Oregon* sta 2777, 19 Apr 1960: two males (USNM 205983).

French Guiana: 7°37'N, 53°32'W, 395 fm (723 m), *Oregon II* sta 10616, 13 May 1969: one male (USNM 205984).

The male, cl 89.5 mm, cb 109 mm, from *Oregon* sta 4413, is the holotype (USNM 205982); the other specimens are paratypes.

Diagnosis.—A moderately large *Chaceon*, cl to 89.5 mm, cb to 109 mm in material examined, with low, blunt anterolateral teeth on the carapace in adults and with dorsoventrally depressed dactyli on the walking legs. Carapace 1.2–1.3 times broader than long, inflated dorsally, especially at protogastric regions. Median pair of frontal teeth about as wide as and extending farther forward than laterals. Second and fourth anterolateral teeth usually reduced, much smaller and lower than remainder. Distance from first to second tooth equal to or less

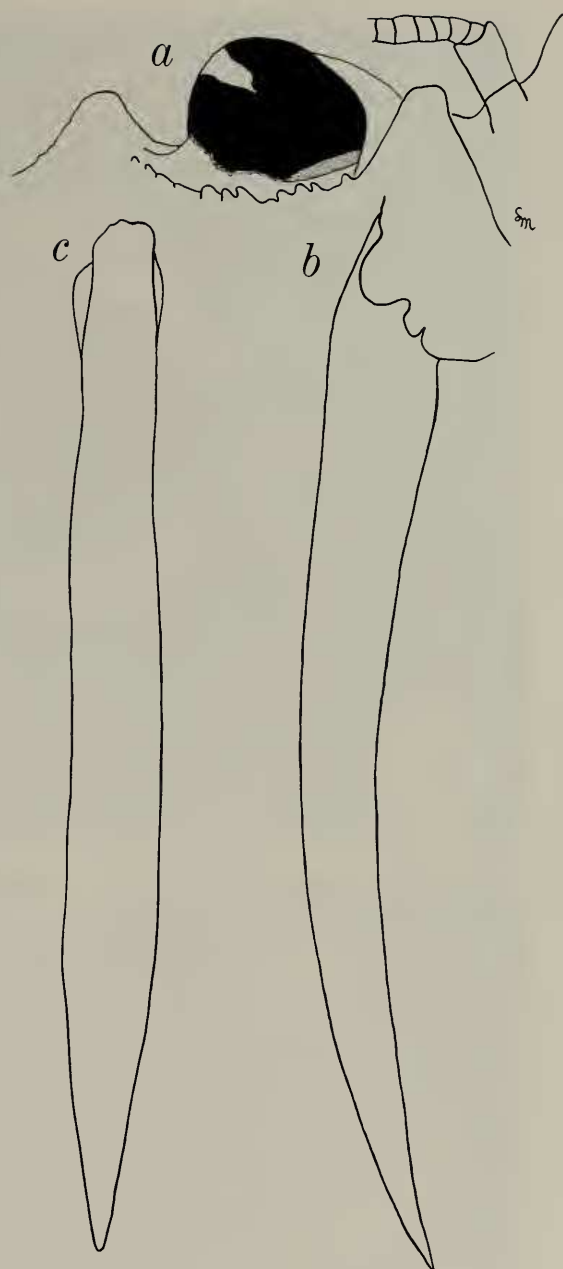


Fig. 8. *Chaceon eldorado*, male holotype, cb 109 mm: a, Ventral view of orbit; b, P5 dactylus, posterior view; c, P5 dactylus, dorsal view.

than that from third to fourth tooth, distance from first to third tooth less than that from third to fifth. Carapace granular posterolaterally and on cardiac and protogastric regions, hepatic region smooth. Suborbital tooth short, broad, visible in dorsal view, lower margin of orbit evenly curved, tuberculate. Cheliped lightly granular; merus with sharp subdistal spine; carpus with sharp inner tooth and distinct angled projection or

low tooth on outer margin; propodus unarmed distally. Meri of walking legs, especially posterior ones, with distal dorsal tubercle, lacking distinct distal spine. Dactyli of walking legs dorsoventrally depressed, height at midlength less than width. P5: merus 5.3–5.9 (mean 5.5) times longer than high, length 0.56 cb in female, 0.61–0.67 (mean 0.63) cb in males; carpus with line of erect spinules dorsally; propodus length 4.5–5.1 (mean 4.8) times height, longer than dactylus.

Size.—Males, cl 46–89.5 mm, cb 56–109 mm; only female examined, cl 48 mm, cb 64 mm.

Color.—Takeda's (1983:164) colored figure shows a dark red crab.

Remarks.—This species resembles *C. quinquedens* in having depressed dactyli on the walking legs, but differs in that the legs are shorter (P5 propodus 5–7 times longer than high) and lack a strong distal spine on the merus, the propodus of the chela lacks a distal dorsal spine, and the carapace is more granular.

The specimens from stations 4912 (male, cl 47 m), 11,307 (female, cl 48 mm), and 10,616 (male, cl 46 mm) have much stronger anterolateral spines on the carapace than those from stations 2777 (males, cl 53.5 and 55 mm) and 4413 (female, cl 89.5 mm).

Takeda (1983) reported this species from depths between 310 and 790 m. Our specimens were taken in depths of 531, 622, 641, 641–915, and 723 m.

Name.—The name refers to the mythical land of gold, El Dorado, thought by sixteenth century Spanish explorers to be in northern South America.

Distribution.—Northern coast of South America, from Colombia to French Guiana, in depths between 531 and 641–915 m.

Chaceoninglei, new species

Figs. 9–11

Geryon affinis.—Hansen, 1908:19, pl. 1, fig. 1a, b. [Not *Geryon affinis* A. Milne Edwards & Bouvier, 1894.]

Geryon gordonae Ingle, 1985:90, figs. 3, 4 [part, not material from Sierra Leone and Cape Verde Islands].

Previous records.—Northeastern Atlantic: 61°33'N, 19°0'W, 1089 fm (1993 m) and 61°30'N, 22°30'W, 975 fm (1784 m) (Hansen 1908).—56°49'–56°48'N, 09°51'–09°57'W, 2000 m; 51°6.8'–51°6.9'N, 13°16.7'–13°24.4'W, 1817–1930 m; 51°05.3'–51°06.5'N, 13°04.5'–12°59.5'W, 1925–1960 m; 49°39.5'N, 12°36.9'W, 1857–1910 m; 49°38.6'N, 12°40.9'W, 1860–1875 m; 49°32.6'–49°33.5'N, 13°7.1'–13°5.9'W, 1630–1640 m; 49°30.1'–49°27.7'N, 13°19.9'–13°17.2'W, 1794–1785 m; and 49°27.3'–49°30.1'N, 13°21.1'–13°26.8'W, 2045–2110 m (Ingle 1985).

Material.—North Atlantic: 61°33'N, 19°00'W, 1089 fm (1993 m), *Ingolf* sta 65: one male (ZMC).—61°30'N, 22°30'W, 975 fm (1784 m), *Ingolf* sta 67: one ovigerous female (ZMC).—56°49'–56°48'N, 09°51'–09°57'W, 2000 m, *Challenger* sta 12, leg R. W. Ingle: one female (BM 1978.102).—55°07.7'N, 15°11.2'W to 55°10.3'N, 15°09.3'W, 2215–2233 m, COB NORATLANTIQUE, PR 0006, sta CH04, Blake trawl, 10 Aug 1969: two males (USNM 205986).—49°27.3'–49°30.1'N, 13°21.1'–13°26.8'W, 2045–2110 m, *Challenger* sta 50518, 7 Jun 1979: one male (BMNH).—48°45'N, 11°19.8'W to 48°46.6'N, 11°21.8'W, 1830–1870 m, *Thalassa* sta 2448, 1973: one female (MNHN B.15835).—48°34'N, 10°51.6'W to 48°32.9'N, 10°49'W, 1975–2070 m, *Thalassa* sta 2453, 1973: one female, two juveniles (MNHN B.15834).—47°34.6'N, 08°38.8'W, 2245 m, BIOGAS IV, *Jean Charcot* sta CP 01, 25 Feb 1974: one male, one female (MNHN B.7215).—47°34.5'N, 08°34.2'W, 2180 m, CENTOB BIOGAS, sta 011, CV 08: one female (MNHN B.17207).—47°34.1'N, 08°40.5'W, 2175 m, CENTOB BIOGAS XI, sta 1, CP 37: one female (MNHN B.17583).—47°34'N, 8°41'W, 2100 m, CENTOB, EPI IV, sta 1, CP 40, 3 Sep 1985: one juvenile female (MNHN B.17585).—47°33.2'N, 08°38.5'W, 2177 m, CENTOB BIOGAS, PR 08, CP:

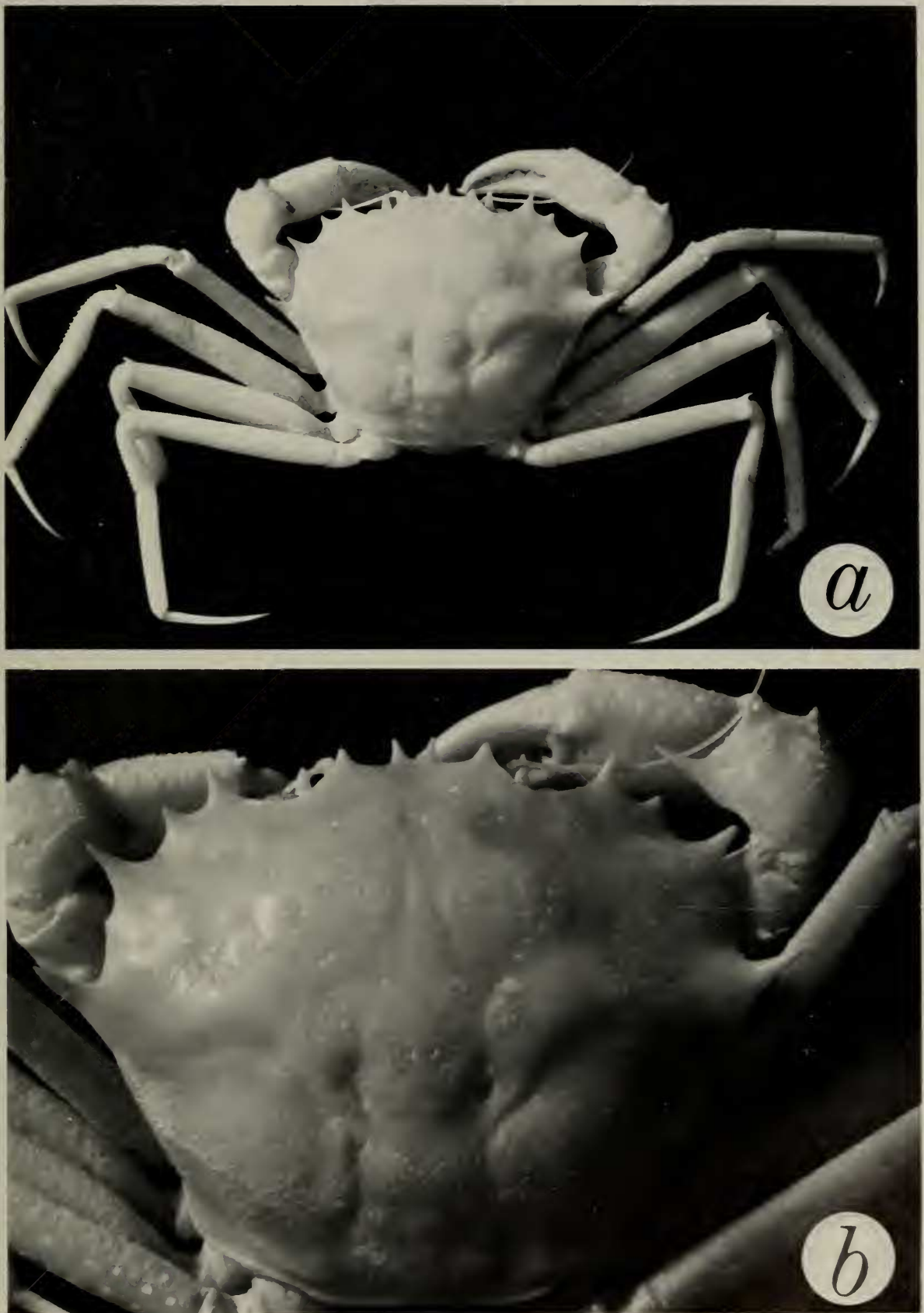


Fig. 9. *Chaceon inglei*, male paratype, cb 61 mm, North Atlantic: a, Dorsal view; b, Carapace, enlarged.

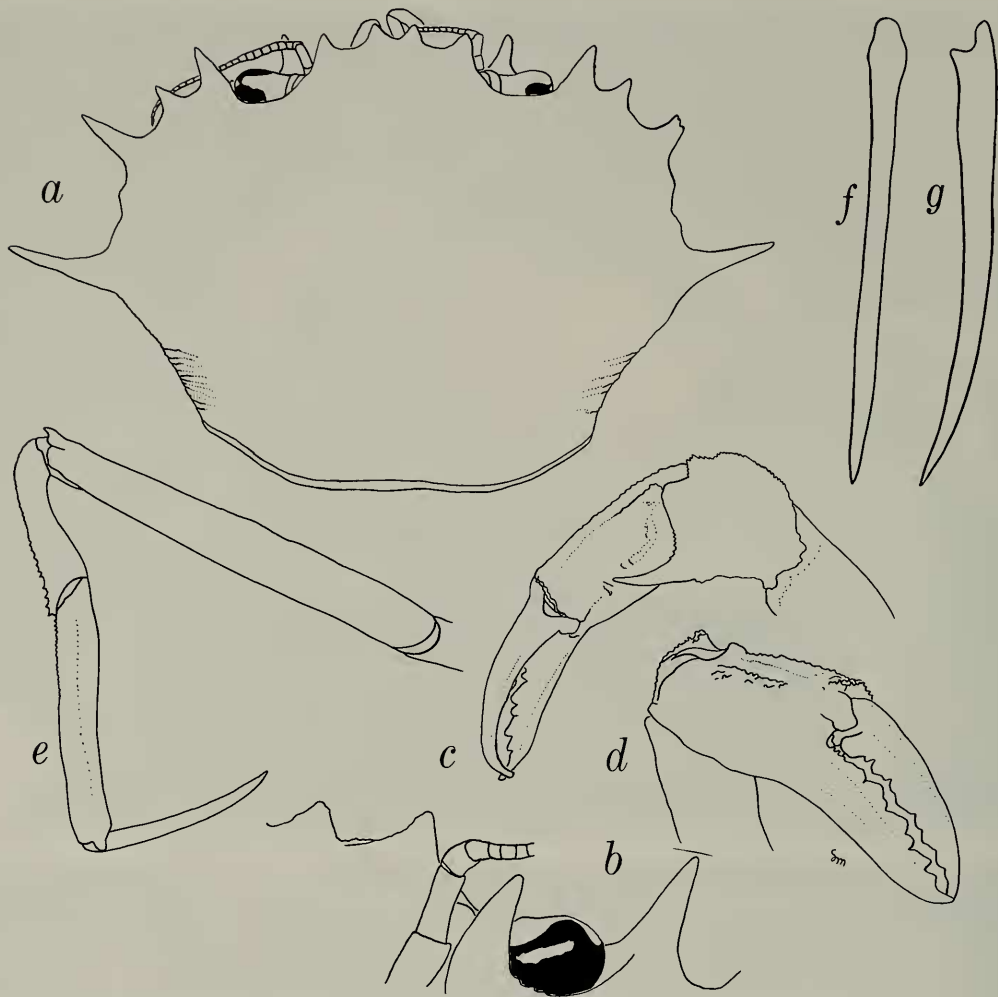


Fig. 10. *Chaceon inglei*, male paratype, cb 34 mm, North Atlantic: a, Carapace; b, Ventral view of orbit; c, Cheliped, dorsal view; d, Chela, outer view; e, P5; f, P5 dactylus, dorsal view; g, P5 dactylus, posterior view.

one female (MNHN B.15821).—47°32.8'N, 08°33.5'W, 2115 m, BIOGAS VI, CP 26: two males, one female (USNM 205987).—47°32.7'N, 08°34.2'W, 2034 m, BIOGAS III, CV 23: one ovigerous female (MNHN B.17208).—47°31.4'N, 8°42.7'W, 2100 m, CENTOB, EPI IV, sta 1, CP 41, 4 Sep 1985: one male (MNHN B.17586).—47°31'N, 08°16'W, 2200 m, BIOGAS I, CV 06: 2 females (MNHN B.15820).—47°28.1'N, 08°25.1'W to 47°29.6'N, 08°22.6'W, 2149–2047 m, COB NORATLANTIQUE, CHOO4, PR 124, B019, sta 48, Blake Trawl, 31 Oct 1969: one male, one female (MNHN B.15822).—42°32'N, 08°39.4'W, 2100 m, CENTOB, EPI I, sta 1, CP 39, 30 Mar 1984: one female (MNHN B.17584).—39°04.5'N, 32°43.5'W, 2120 m, Blake trawl, BIA-

CORES 1971, sta 131, 24 Oct 1971: one male, one female (MNHN B.15836).

The female from *Challenger* sta 12, cl 43 mm, cb 62 mm, is the holotype (BM 1978.102). The other specimens are paratypes.

Diagnosis.—A small *Chaceon*, cl to 54 mm, cb to 72 mm in adults, with sharp, well-developed anterolateral spines on the carapace in adults and with laterally compressed dactyli on the walking legs. Carapace 1.3–1.5 times broader than long. Median pair of frontal teeth strong, sharp, separated by U-shaped sinus, medians narrower and extending farther forward than laterals. Second lateral tooth small, fourth usually obsolete or even totally absent, fifth usually largest. Distance from first to second

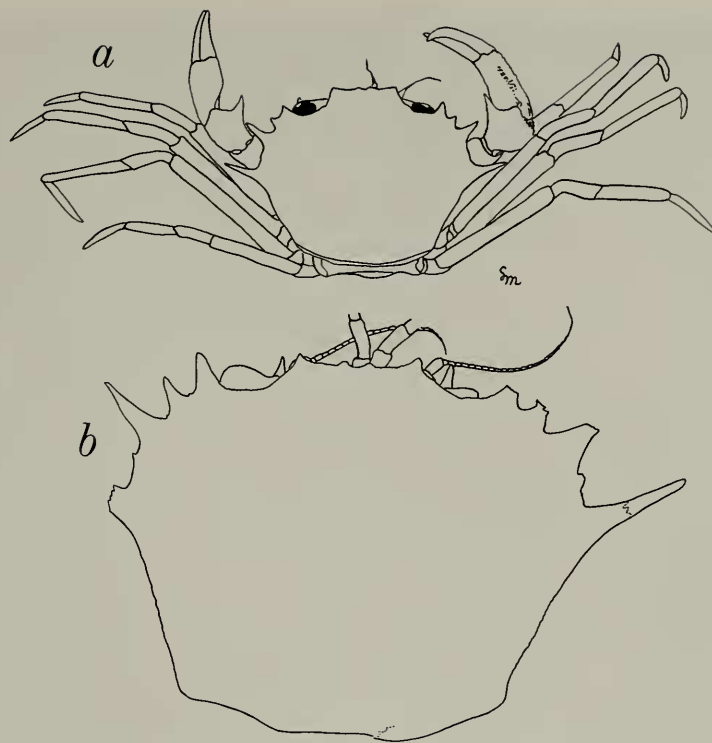


Fig. 11. *Chaceon inglei*, North Atlantic: *a*, Male paratype, cb 18 mm, dorsal view; *b*, Male paratype, cb ca. 28 mm, dorsal view.

tooth subequal to or less than distance from third to fourth tooth, distance from first to third tooth subequal to or less than distance from third to fifth tooth. Suborbital tooth large, extending at least to level of outer frontal tooth, visible in dorsal view, suborbital margin evenly concave. Cheliped roughened dorsally; merus with sharp subdistal and smaller distal spine; carpus with long inner spine and shorter outer spine; propodus with distal dorsal spine or angled projection. Meri of walking legs, especially fourth and fifth, with distal, dorsal spine. Dactyli of walking legs laterally compressed, height at midlength greater than width. P5: merus more than 6 times longer than high, 6.5–7.2 (mean 6.8) times in males, 6.3–7.5 (mean 6.7) times in females. 8.0–9.0 times in juveniles, with distal dorsal spine, length 0.52–0.61 cb (mean 0.56 cb) in females, 0.53–0.66 cb (mean 0.60 cb) in males; carpus with line of erect spinules dorsally; propodus 5.1–6.7 (mean 5.7 in both sexes) times longer than high, longer than dactylus.

Size.—Males, cl 22–54 mm, cb 34–72 mm; females, cl 15–45 mm, cb 24–62 mm; ovigerous females, cl 43 and 44 mm, cb 61 mm; juveniles cl 9 mm. Hansen (1908) reported a male with cl 40 mm, an ovigerous female with cl 42 mm. Ingle (1985) studied males with cl 11.5–49.5 mm, females with cl 7–43 mm.

Remarks.—The long anterolateral teeth of the carapace, the long, slender legs, with the merus of the fifth leg more than 6 times longer than high, the sharp outer spine on the carpus of the claw and the merus of the walking legs, all will serve to differentiate this species from *C. affinis*, the only other species of *Chaceon* known to occur in the northeastern Atlantic off the coast of Europe.

Chaceon affinis, which, like this species, has compressed dactyli on the walking legs, differs from *C. inglei* of the same size in the features mentioned above and in having smaller and blunter frontal teeth on the carapace and a much smaller suborbital spine. A small male, cl 30 mm, cb 42 mm, of *C.*



Fig. 12. *Chaceon mediterraneus*, male holotype, cb 65 mm, Mediterranean, dorsal view.

affinis available for comparison (USNM) has a much shorter fifth leg, with the merus less than 6 times as long as high and the propodus less than 5 times as long as high. The merus shows no trace of the distal, dorsal spine that is so prominent in members of *C.inglei*.

Chaceon gordonae, a species that occurs off West Africa, is a much larger species, cb to at least 161 mm (male from the Cape Verde Islands, MNHN B.6432) rather than less than 75 mm, that has much shorter legs, with the merus less than 6 times longer than high. In *C. gordonae* the fourth anterolateral tooth of the carapace is present, whereas it usually is obsolete in *C.inglei*.

This species differs from *Chaceon mediterraneus*, described below, in having compressed rather than depressed dactyli on the walking legs. That species also inhabits relatively deep water.

Small specimens that lack the second and fourth anterolateral teeth of the carapace could be mistaken for *Geryon longipes*; both species occur together in the northeastern Atlantic. The frontal teeth of *G. longipes* are

much smaller than those of *C.inglei* at the same carapace length.

This species occurs in relatively deep water, with all records coming from depths in excess of 1600 m. The specimens reported by Hansen (1908) were taken in 1784 and 1993 m, and Ingle (1985) saw material from depths ranging from 1630–1640 to 2045–2110 m. Our specimens were taken in depths between 1784 and 2245 m, with most lots coming from depths in excess of 2000 m.

Name.—We are pleased to dedicate this species to our colleague R. W. Ingle, British Museum (Natural History).

Distribution.—Northeastern Atlantic, from about 61°N, south of Iceland, to 39°N, off the Azores, in depths between 1630–1640 m to 2245 m.

Chaceon mediterraneus, new species
Figs. 12–13

Geryon gordonae.—Della Croce, Drago, & Flocchini, 1988:6, 7, 8 [not *Geryon gordonae* Ingle, 1985].

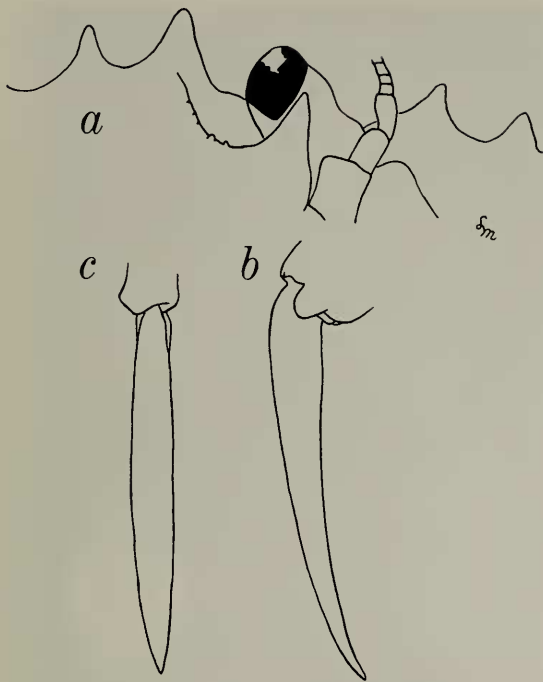


Fig. 13. *Chaceon mediterraneus*, male holotype, cb 65 mm, Mediterranean: *a*, Ventral view of orbit; *b*, P5 dactylus, posterior view; *c*, P5 dactylus, dorsal view.

Previous records.—Mediterranean Sea, north of Sardinia, 1990–2008 m (Della Croce, Drago, & Flocchini, 1988).

Material.—Mediterranean Sea, 37°56.7'N, 07°31.6'E, 2830 m, POLYMED sta CV 04, 18 May 1970: one male (holotype, MNHN B.15824). Off Sardinia, 1990–2016 m; N. Drago: one male (USNM); one male, one female (BMNH).

Diagnosis.—A moderately large *Chaceon*, cl to 78 mm, cb to 103 mm, with well-developed anterolateral teeth on the carapace and with dorsoventrally depressed dactyli on the walking legs. Carapace 1.3 times broader than long. Median pair of frontal teeth broad and short, separated by V-shaped emargination, medians extending further forward than laterals. Orbit broadly concave, with low swelling on margin of inner orbital tooth. First, third, and fifth anterolateral spines stronger than remainder, fifth strongest, slender; gap between first and second tooth very small. Distance from first to second tooth subequal to distance from third to fourth tooth, distance from first to third tooth less than distance from

third to fifth tooth. Raised areas of carapace pitted and eroded, but not tuberculate. Suborbital tooth strong, sharp, extending about to level of lateral frontal tooth, suborbital margin tuberculate, evenly rounded. Cheliped sparsely tuberculate dorsally; upper margin of merus with sharp subdistal spine and distal angled lobe; carpus with strong inner spine and distinct but smaller outer spine; propodus with distinct distal spine. Meri of walking legs broad, upper margin distinctly convex, with distal, dorsal spine. Dactyli of walking legs dorsoventrally depressed, width near midlength slightly larger than height. P5: merus 4.5–5.4 times longer than high, with distal dorsal spine, length about half cb; carpus with line of sharp spinules dorsally; propodus 4.1–4.3 times longer than high, slightly longer than dactylus.

Size.—Males. cl 50–78 mm, cb 65–103 mm; female, cl 59 mm, cb 82 mm.

Remarks.—This species resembles *C. maritae* and differs from both *C. affinis* and *C. inglei* in having relatively broad, depressed dactyli on the walking legs. It differs from *C. maritae* in having much stronger anterolateral spines on the carapace (even when specimens of the same size are compared), in having distal dorsal spines on the meri of the walking legs, and in having slenderer walking legs. The merus of the fifth leg is more than 5 times longer than high in *C. mediterraneus*, about 4 times longer than high in *C. maritae*.

Although the dactyli of the walking legs of *C. mediterraneus* are not as conspicuously flattened as in *C. maritae*, they are distinctly broader than the dactyli in *C. gordonae* or *C. inglei*.

It is more than a little surprising to find an undescribed *Chaceon* from the Mediterranean. Even more surprising is that this species was collected together with the new genus and species described below.

The only eastern and central Atlantic species with strong anterolateral spines on the carapace in adults are *C. atopus*, *C. gordonae*, and *C. inglei*, and all of them have

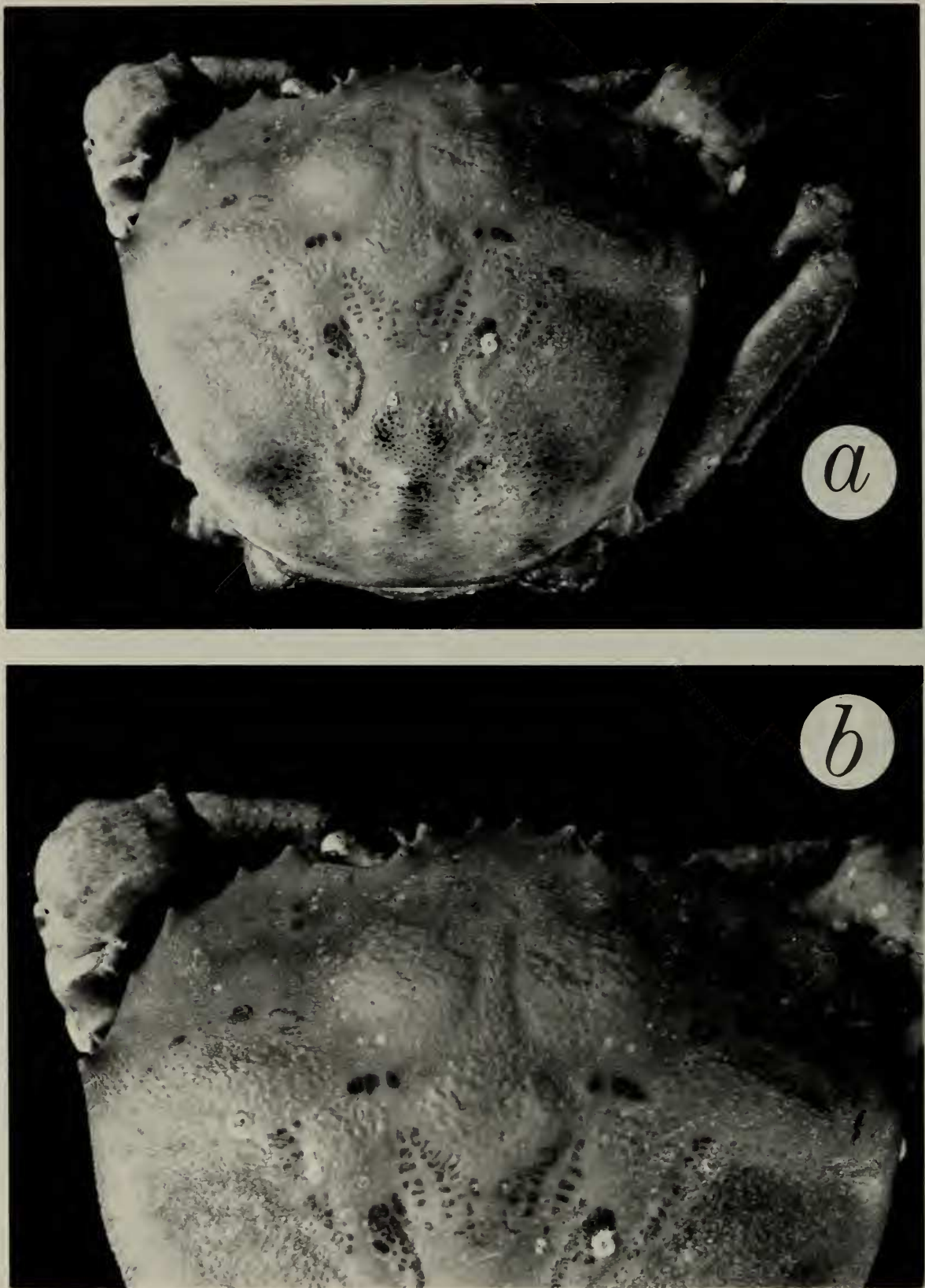


Fig. 14. *Chaceon notialis*, ovigerous female paratype, cb 110 mm, Argentina: a, Dorsal view; b, Carapace.

distinctly compressed dactyli on the walking legs.

Name.—Derived from the type locality in the Mediterranean Sea.

Distribution.—Known only from the western Mediterranean Sea, in 1990–2830 m.

Chaceon notialis, new species

Figs. 14–15

Geryon quinquedens.—Juanicó, 1973:145, fig. on p. 147.—Scelzo & Valentini, 1974: 561, figs. 1–2 [part, not specimens from Brazil].—Boschi, 1976:66, 67; 1979: 140.—Boschi et al., 1981:247.—Barea & Defeo, 1985:189, fig. 1; 1986:38, fig. 1. [Not *Geryon quinquedens* Smith, 1879.]

Previous records.—Uruguay and Argentina: 34°40'–36°45'S, 250–800 m (Barea & Defeo 1985).—34°40'–39°04'S, 250–800 m (Barea & Defeo 1986).—33°56'–36°25'S, 52°35'–54°51'W (Juanicó 1973).—Uruguay: 33°38'S, 50°38'W, 790 m; 34°48'S, 52°02'W, 400 m; 35°04'S, 52°06'W, 800 m; 35°04'S, 52°15'W, 600 m (Scelzo & Valentini 1974).—Argentina: 36°24'S, 53°58'W, 120 m; 37°45'S, 54°55'W, 300 m; and 38°55'S, 55°35'W, 170 m (Scelzo & Valentini 1974).—Buenos Aires Province, 36°–41°S (Boschi, 1976, 1979).—35°40'S, 52°47'W, 260 m (Boschi et al. 1981).

Material.—Argentina: 37°45'S, 54°55'W, 280–320 m, R/V *Cruz del Sur*, 17–18 May 1973: one ovigerous female, paratype (USNM 205702).—38°55'S, 55°35'W, 170 m, R/V *Cruz del Sur*, 16 Apr 1973: one male, holotype (USNM 205701).

Diagnosis.—A large *Chaceon*, cl to about 120 mm, cb to 135 mm in adults, with low, blunt anterolateral spines on the carapace and with dorsoventrally depressed dactyli on the walking legs. Carapace 1.1–1.2 times broader than long. Median pair of frontal teeth sharp, projecting forward, separated by U-shaped sinus, extending farther forward than laterals. Anterolateral teeth low,



Fig. 15. *Chaceon notialis*, male holotype, cb 104 mm, Argentina: a, Ventral view of orbit; b, P5 dactylus, posterior view; c, P5 dactylus, dorsal view.

blunt, fourth tooth very small, almost obsolete. Distance from first to second anterolateral tooth less than distance from third to fourth, distance from first to third anterolateral tooth less than distance from third to fifth. Carapace surface strongly granular posterolaterally. Suborbital tooth low, blunt, falling short of level of lateral frontal tooth, suborbital margin evenly curved. Cheliped with blunt tooth subdistally and with distal angled lobe on merus; carpus roughened dorsally, lacking distal outer spine, anterior margin denticulate; propodus lacking distal spine or angled projection. Meri of walking legs with at most a distal dorsal tubercle, lacking a distinct distal dorsal spine. Dactyli of walking legs depressed, width at mid-length much greater than height. P5: merus less than 5 times longer than high, length 0.60 cb; carpus with line of low but sharp spinules dorsally; propodus length less than 4 times height, slightly longer than dactylus.

Size.—Male, cl 94 mm, cb 104 mm; ovigerous female, cl 99 mm, cb 110 mm. Juanicó (1973) reported a male with cl 61 mm, cb 73 mm; Boschi et al. (1981) studied a male cl 30 mm. Scelzo & Valentini (1974) studied 18 specimens, measuring as follows: males, cl 88–116 mm, cb 97–124 mm; females, cl 72–99 mm, cb 82–110 mm. Barea & Defeo (1985) reported catching males with cb 32–135 mm, females with cb 48–124 mm.

Color.—Scelzo & Valentini (1974) reported that this species is reddish in color.

Remarks.—*Chaceon notialis* resembles both *C. quinquedens*, from the northeastern Atlantic, and *C. maritae*, from West Africa, in having depressed dactyli on the walking legs, but it differs from both in numerous features. It is a much shorter-legged species than *C. quinquedens*: the merus of the fifth leg is about three-fifths the width of the carapace as opposed to three-fourths the carapace width in *C. quinquedens*, and the propodus of the fifth leg is less than 4 times as long as high instead of 5–7 times as long as high. In *C. quinquedens* there is a sharp outer spine on the carpus and a distal dorsal spine on the propodus of the cheliped, and each walking leg has a distinct distal dorsal spine. These spines are not present on the cheliped of *G. notialis*, and in this latter species the meri of the walking legs are armed with at most a distal dorsal tubercle. The surface of the carapace also is much coarser in *C. notialis*, especially posterolaterally.

Chaceon notialis differs from *C. maritae* as follows: the frontal teeth are sharper and are not as close together; the anterolateral teeth of the carapace all are sharper, and the fourth tooth is much more distinct; the suborbital teeth are sharper and longer; and the walking legs are slightly longer. The merus of the fifth leg is about 5 rather than 4 times as long as high, and is about three-fifths rather than two-thirds of the carapace width.

Barea & Defeo (1985, 1986) provided details of the occurrence and biology of this species on joint fishing grounds off Uruguay and Argentina. Boschi (1976, 1979) char-

acterized it as a cold-temperate species of the Buenos Aires Province (36–41° South latitude).

The specimen from off Brazil identified with *Geryon quinquedens* by Rathbun (1937: 270) and material from Brazil identified by Scelzo & Valentini (1974:560) with the same species is referable to a new species, the description of which is in preparation. Scelzo & Valentini reported that their Brazilian specimens were cream-colored, whereas their material from Uruguay and Argentina was reddish. Further, the length/height ratio of the propodus of the walking legs of their specimens from Brazil was 4.3–4.5, longer than that of *C. notialis*. The range in the length/height ratio observed by Scelzo & Valentini for their specimens from Uruguay and Argentina, with one exception, is as we found in our material of *C. notialis*.

Our specimens were taken in depths of 170 and 280–320 m. Boschi et al. (1981) recorded a specimen from 260 m. Scelzo & Valentini (1974) reported specimens from depths of 120, 170, 300, 400, 600, 790, and 800 m, and Barea & Defeo (1985, 1986) reported this species from fishing grounds in depths between 250 and 800 m.

Name.—The specific name is from the Latin, *notialis*, southern.

Distribution.—Known from the coasts of Uruguay and Argentina, from about 33°S to about 41°S, in depths between 120 and 800 m.

Chaceon sanctaehelenae, new species

Figs. 16–17

Material.—Sandy Bay, St. Helena Island [15°58'S, 5°43'W], trap, 8 Oct 1968, leg F. N. Martin: one male (holotype, USNM 125510).

Diagnosis.—A large *Chaceon*, cl 113 mm, cb 134 mm in adult, with low, blunt anterolateral teeth on the carapace in adults and with laterally compressed dactyli on the walking legs. Carapace about 1.2 times broader than long. Median pair of frontal

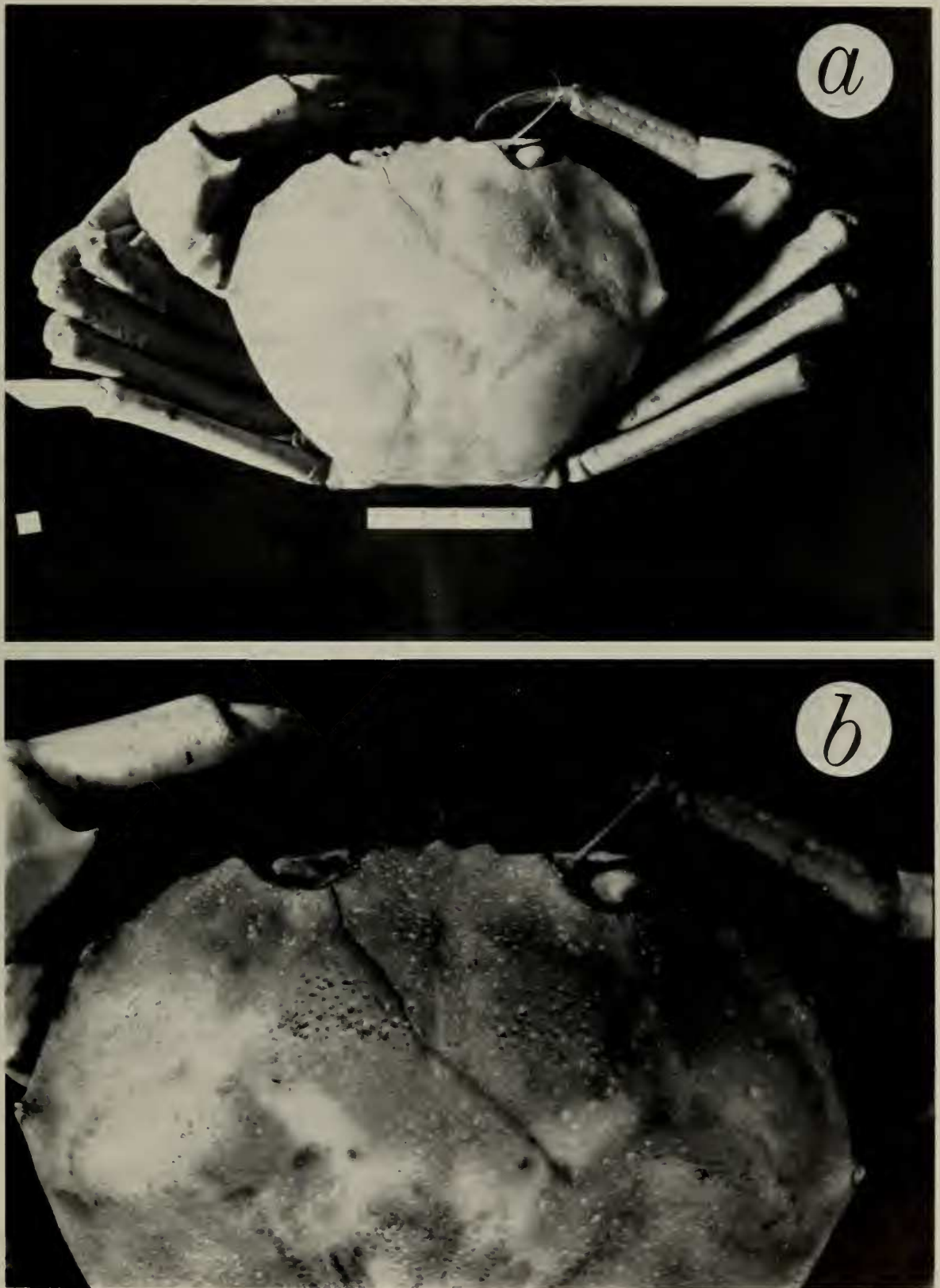


Fig. 16. *Chaceon sanctaehelena*, male holotype, cb 134 mm, Saint Helena: *a*, Dorsal view; *b*, Carapace.

teeth broad, obtuse, separated by shallow U-shaped emargination, medians extending farther forward than laterals. Second and fourth anterolateral teeth obsolete, present

as low lobes in adults. Distance from first to second anterolateral tooth subequal to distance from third to fourth tooth, distance from first to third tooth subequal to distance



Fig. 17. *Chaceon sanctaehelenae*, male holotype, cb 134 mm, Saint Helena: a, Ventral view of orbit; b, P5 dactylus, posterior view; c, P5 dactylus, dorsal view.

from third to fifth. Carapace surface finely granular, hepatic regions largely smooth. Suborbital tooth short, blunt, scarcely visible in dorsal view, falling short of level of lateral frontal tooth, suborbital margin evenly rounded. Cheliped with blunt tooth subdistally on merus; carpus roughened dorsally, lacking outer spine, anterior margin smooth; propodus lacking distal angled projection. Meri of walking legs lacking distal, dorsal spine. Dactyli of walking legs compressed, height at midlength greater than width. P5: merus 4.5 times longer than high, length 0.6 cb; propodus slightly longer than dactylus, length 3.3 times height.

Size.—Male, cl 113 mm, cb 134 mm.

Remarks.—This new species differs from both *C. affinis* and *C. atopus* in having much lower and blunter frontal and anterolateral teeth on the carapace; in *C. affinis* the second and fourth teeth are well-developed in

large specimens, but in *C. sanctaehelenae* the second and fourth teeth are almost completely obsolete. In addition, in *C. sanctaehelenae* the orbit appears to be shallower, the suborbital tooth is shorter and more obtuse, and the carpus of the walking legs is much smoother dorsally than in *C. affinis*. This new species further differs from *C. atopus* in having much shorter walking legs (P5 merus 4.5 times rather than 6.5 times longer than high), and in having the distance from the first to third anterolateral teeth on the carapace subequal to the distance from the third to the fifth tooth; in *C. atopus* the distance from the first to third tooth is shorter.

Chaceon sanctaehelenae differs from *C. fenneri* in some of these same features. All marginal teeth of the carapace are lower than in *C. fenneri*; in that species the frontal teeth are much sharper and more prominent, and the first, third, and fifth anterolateral teeth are much more prominent. The carapace is smoother than in *C. fenneri*, with lower and fewer granules, and the dorsal ridge on the carpus of the walking legs is much smoother.

Chaceon chuni, from the southeastern Atlantic, differs in having a larger suborbital spine and in having a distinct distal dorsal spine on the merus of each walking leg.

Name.—The specific name is derived from the type locality.

Distribution.—Known only from the type locality.

Zariquieyon, new genus

Type species.—*Zariquieyon inflatus*, new species.

Name.—The name is dedicated to the late Spanish carcinologist, Ricardo Zariquiey Alvarez, whose studies of Mediterranean decapods added so much to our knowledge of the group. As in *Chaceon*, the ending *-on* is added to make the name similar to *Geryon*. The gender is masculine.

Definition.—Geryonid crabs with five anterolateral spines on each side of the cara-

pace. Carapace length about seven-tenths width. Branchial regions markedly inflated. Frontal teeth well-developed, large. Orbits deep, rectangular.

Included species.—One, *Zariquieyon inflatus*, n. sp.

Remarks.—*Zariquieyon* shares with *Chaceon* and *Geryon* the portunid-like chelipeds, with the subdistal dorsal spine on the merus, the strong inner spine on the carpus, the portunid-like chela, the single inner suborbital tooth, the slender walking legs with their naked dactyli, and the seven-segmented abdomen in both sexes. *Zariquieyon* differs from those genera in having a comparatively broader carapace, with the posterolateral margins convex, strongly inflated branchial regions, and rectangular rather than rounded orbits. It also shows far more pebbling dorsally, visible only under magnification, than any species of *Chaceon* or *Geryon*.

Zariquieyon inflatus, new species

Figs. 18–19

Material.—Mediterranean Sea, 37°56.7'N, 07°31.6'E, 2830 m, POLYMED sta CV 04, 18 May 1970: one male, two females (MNHN; one female USNM 205985).

The holotype is the female, cl 22 mm, cb 35 mm, in the collection of the Muséum National d'Histoire Naturelle, Paris; the other specimens are paratypes.

Diagnosis.—A very small geryonid, cl 19–22 mm, cb 27–35 mm, with strongly developed anterolateral teeth on the carapace in adults and with laterally compressed dactyli on the walking legs. Body, except abdomen, covered with fine granules, coarser and larger on posterior branchial regions. Regions of carapace well-marked, proto-gastric region, area adjacent to fifth anterolateral spine, and branchial regions very inflated. Intestinal region with two prominences. Posterolateral margins strongly convex. Carapace 1.4–1.6 (mean 1.5) times broader than long. Median pair



Fig. 18. *Zariquieyon inflatus*, female holotype, cb 35 mm, Mediterranean, dorsal view.

of frontal teeth slender, separated by V-shaped emargination. Second and fourth anterolateral teeth reduced, fourth smallest; other teeth progressively increasing in size posteriorly, fifth much the largest. Distance from first to second tooth short, about the same as from third to fourth tooth, distance from first to third tooth much less than distance from third to fifth. Orbits rectangular. Suborbital tooth strong, extending to level of outer frontal tooth, suborbital margin denticulate. Cheliped finely granular dorsally; merus with sharp subdistal spine, distal angled projection spinulose; carpus pebbled dorsally, with long, sharp inner spine and distinct outer spine or crest of spinules; propodus pebbled dorsally, with distal dorsal projection. Meri of walking legs with distinct distal dorsal spine. Dactyli of walking legs laterally compressed, height near mid-length greater than width. P5: merus 6.3–6.6 times longer than high, pebbled dorsally, with distal dorsal spine, length 0.45 times cb; carpus with line of spinules dorsally;

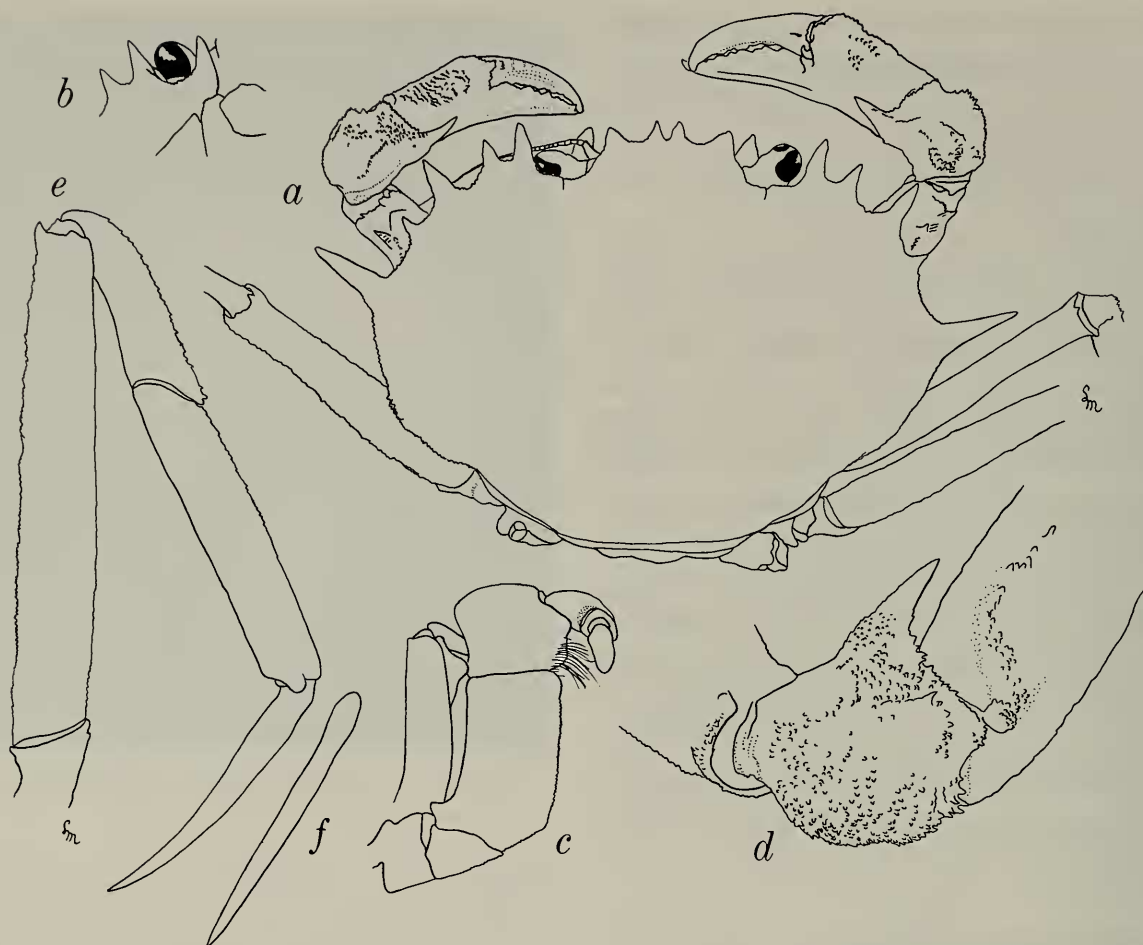


Fig. 19. *Zariquieyon inflatus*, female holotype, cb 35 mm, Mediterranean: a, Dorsal view; b, Ventral view of orbit; c, Third maxilliped; d, Carpus of cheliped; e, P5; f, P5 dactylus, dorsal view.

propodus length about 5 times height, much longer than dactylus.

Size.—Male, cl 19 mm, cb 28 mm; females, cl 20–22 mm, cb 27–35 mm.

Color.—Not recorded.

Remarks.—This species was taken together with *Chaceon mediterraneus* at a depth of 2830 m in the western Mediterranean basin. We know of no deeper record for a brachyuran crab from the Mediterranean.

Name.—The specific name is from the Latin, *inflatus*, swollen.

Distribution.—Known only from the type locality, in 2830 m.

Remarks

The genus *Chaceon* has proven to be much more speciose than even we imagined when we began studying its members, and much

additional work remains to be done on the genus. The geographic ranges of most species remain to be determined; in general, ranges of each species are restricted latitudinally, although some species, like *C. bicolor*, have relatively wide ranges. *Chaceon paulensis* from the southern Indian Ocean should be redescribed, and the status of the species reported from off Travancore, India, in 224–284 fm (410–520 m) by Alcock (1899:85) needs to be determined. A particularly interesting problem that remains to be solved is whether the types of *Chaceon quinquedens*, one of which is an ovigerous female only 22 mm long (Smith, 1879:36), are conspecific with the large, commercially important species now identified as *C. quinquedens*.

For most species there is no information available on growth changes, especially as it pertains to proportions of the walking legs

Table 1.—Characteristics of known species of *Chaceon*. Abbreviations are as follows: ? (not known); Color: B (bicolor, tan and purple), R (red), T (tan), W (whitish); Size (maximum cb in mm); P5 dactylus: C (laterally compressed), D (dorsoventrally depressed); Distal spine on P5 merus: + (large, well developed), - (small, reduced or absent); Anterolateral teeth of carapace: + (large, well-developed in adults), - (small, reduced or absent).

	Color	Size	Dactylus P5	Merus P5	Carapace spines
Northwestern Atlantic					
<i>C. eldorado</i>	R	109	D	-	-
<i>C. fenneri</i>	T	190	C	-	-
<i>C. inghami</i>	R	110	C	+	+
<i>C. quinquedens</i>	R	178	D	+	-
Southwestern Atlantic					
<i>C. notialis</i>	R	135	D	-	-
n. sp. Brazil	T	158	D	-	-
Northeastern Atlantic					
<i>C. affinis</i>	T	210	C	-	-
<i>C. inglei</i>	R	72	C	+	+
<i>C. mediterraneus</i>	?	103	D	+	+
Central South Atlantic					
<i>C. atopus</i>	?	124	C	+	+
<i>C. sanctaehelenae</i>	?	134	C	-	-
Southeastern Atlantic					
<i>C. chuni</i>	T	114	C	+	-
<i>C. erythraiae</i>	RT	125	C	+	-
<i>C. gordonae</i>	?	161	C	+	+
<i>C. maritae</i>	T	172	D	-	-
Western Indian Ocean					
<i>C. crosnieri</i>	?	155	C	+	+
<i>C. macphersoni</i>	?	126	D	+	-
<i>C. paulensis</i>	R	113	C	+	+
Western and Central Pacific					
<i>C. bicolor</i>	B	180	C	-	-
<i>C. granulatus</i>	T	146	D	-	-
Eastern Pacific					
n. sp. Chile	W	175	C	-	-

and spination of the carapace and walking legs. In the case of *C. bicolor*, for example, we have identified a small, spiny, long-legged specimen from deep water with the much larger adult found in the same area, but the possibility remains that more than one species is involved.

Certainly additional species remain to be recognized, and we believe that a key to the species now known would be premature and perhaps even confusing. As the species of

Chaceon may be difficult to distinguish in the absence of comparative material, we provide here, by broad geographic region, a summary of the species found in each region and their major characteristics (Table 1).

Acknowledgments

Many people contributed to this study. We thank all of those who provided us with material or access to their collections: E. E. Boschi, Instituto Nacional de Investigación

y Desarrollo Pesquero, Mar del Plata, Argentina; Diane E. Brown, Australian Museum, Sydney; Alain Crosnier and D. Guinot, Muséum National d'Histoire Naturelle, Paris; Reginald M. Gooding, then of the NOAA/NMFS Southwest Fisheries Center, Honolulu Laboratory; R. W. Ingle, British Museum (Natural History), London; Enrique Macpherson, Instituto de Ciencias del Mar, Barcelona; Torben Wolff, Zoological Museum, Copenhagen; and Nicolino Drago, Università di Genova, Italy, who allowed us to add reference to his material from the Mediterranean in galley.

Our studies on geryonid crabs have been supported in part by the Food and Agriculture Organization of the United Nations (FAO); that support is gratefully acknowledged. This paper also was supported in part by the Smithsonian Institution, through its Research Opportunities Fund.

We thank Roy K. Kropp for taking the photographs used in Figs. 14 and 16. Fig. 1 was taken by the staff photographer of the Rijksmuseum van Natuurlijke Historie, Leiden, and Figs. 3 and 5 were taken by the staff photographer of the Muséum National d'Histoire Naturelle, Paris. Lilly King Manning drew the line drawings and prepared all of the figures for publication.

We thank Fenner A. Chace, Jr., Enrique Macpherson, and Marilyn Schotte for reading a draft of the manuscript.

Literature Cited

- Alcock, A. 1899. An account of the deep-sea Brachyura collected by the Royal Indian Marine Survey Ship Investigator, pp. 1-85, 1-2, pls. 1-4. Calcutta: Indian Museum.
- Barea, L., & O. Defeo. 1985. Primeros ensayos de captura del crustáceo batial *Geryon quinquedens* Smith en el area común de pesca Argentino-Uruguay. —Contribución, Departamento de Oceanografía (F.H.C.), Montevideo 2(3):189-203.
- , & ———. 1986. Aspectos de la pesquería del cangrejo rojo (*Geryon quinquedens*) en la zona común de pesca Argentino-Uruguay. —Publicaciones de la Comisión Técnica Mixta del Frente Marítimo 1(1):38-46.
- Boschi, E. E. 1976. Nuevos aportes al conocimiento de la distribución geográfica de los crustáceos decápodos del Mar Argentino. —Physis (A)35(90):59-68.
- . 1979. Geographic distribution of Argentinian marine decapod crustaceans. —Bulletin of the Biological Society of Washington 3:134-143.
- , M. I. Iorio, & K. Fischbach. 1981. Distribución e abundancia de los crustáceos decápodos capturados en las campañas de los B/I "Walther Herwig" y "Shinkai Maru" en el Mar Argentino, 1978-1979. In Campañas de investigación pesquera realizadas en el Mar Argentino por los B/I "Shinkai Maru" y "Walther Herwig" y el B/P "Marburg," Años 1978 y 1979. —Contribuciones del Instituto Nacional de Investigación y Desarrollo Pesquero 383:233-253.
- Chun, C. 1903. Aus den Tiefen der Weltmeeres, 2nd edition. Gustav Fischer, 592 pp.
- Colosi, G. 1923. Una specie fossile de Gerionide (Decapodi brachiuri). —Bolettino della Società dei Naturalisti in Napoli, 35 (series 2, volume 15), 37:248-255.
- Della Croce, N., N. Drago, & G. Flocchini. 1988. Ricerche biologiche e geofisiche. Campagna oceanografica N/R "Minerva" (14-31.8.1987). —Istituto di Scienze Ambientali Marine, Università di Genova, Rapporto Tecnico 24:1-10.
- Gerstaecker, A. 1856. Carcinologische Beiträge. —Archiv für Naturgeschichte 22(1):101-162, pls. 4-6.
- Griffin, D. J. G., & D. E. Brown. 1976. Deepwater decapod Crustacea from eastern Australia: Brachyuran crabs. —Records of the Australian Museum 30(11):248-271.
- Guinot, D. 1969. Les Goneplacidae (suite et fin). Recherches préliminaires sur les groupements naturels chez les Crustacés Décapodes Brachyours, VII. —Bulletin du Muséum National d'Histoire Naturelle (2)41(3):688-724. pls. 3-5.
- . 1971. Synthèse et bibliographie. Recherches préliminaires sur les groupements naturels chez les Crustacés Décapodes Brachyours, VIII. —Bulletin du Muséum National d'Histoire Naturelle (2)42(5):1063-1090.
- , & B. Richer de Forges. 1981. Crabes de profondeur, nouveaux ou rares, de l'Indo-Pacifique (Crustacea, Decapoda, Brachyura) (*Deuxième partie*). —Bulletin du Muséum National d'Histoire Naturelle, Paris (4)3(A1):227-260, pls. 3-7.
- Hansen, H. J. 1908. Crustacea Malacostraca, I. —The Danish Ingolf-Expedition 3(2):1-120, pls. 1-5.
- Herbst, J. F. W. 1799-1804. Versuch einer Naturgeschichte des Krabben und Krebse, nebst einer systematischen Beschreibung ihrer verschiedenen Arten, 3:215 pp. Berlin and Stralsund.
- Ingle, R. W. 1985. *Geryon gordonae* sp. nov. (Decap-

- oda *Brachyura*, Geryonidae) from the north-eastern Atlantic Ocean.—*Crustaceana* 48(1):88–98.
- Intès, A. 1978. Pêche profonde aux casiers en Nouvelle Calédonie et îles adjacentes. Essais préliminaires. ORSTOM, Centre de Nouméa, Rapports Scientifiques et Techniques 2:1–10, figs. 1–10.
- Juanicó, M. 1973. Hallazgo de *Geryon quinquedens* Smith, 1879 (Crustacea Decapoda), en aguas Uruguayas.—*Revista de Biología del Uruguay* 1(2):145–149.
- King, M. G. 1984. The species and depth distribution of deepwater caridean shrimps (Decapoda, Caridea) near some southwest Pacific islands.—*Crustaceana* 47(2):174–191.
- Krøyer, H. 1837. *Geryon tridens*, en ny Krabbe.—*Naturhistorisk Tidsskrift* 1:10–21, pl. 1.
- Macpherson, E. 1983. Crustáceos decápodos capturados en las costas de Namibia.—*Resultados Expediciones Científicas* (supplement to *Investigación Pesquera*, Barcelona) 11:3–80.
- . 1984. Crustáceos decápodos del Banco Valdivia (Atlántico sudoriental).—*Resultados Expediciones Científicas* (supplement to *Investigación Pesquera*, Barcelona) 12:39–105.
- Manning, R. B., & L. B. Holthuis. 1981. West African brachyuran crabs.—*Smithsonian Contributions to Zoology* 306:379 pp.
- , & ———. 1984. *Geryon fenneri*, a new deep-water crab from Florida (Crustacea: Decapoda: Geryonidae).—*Proceedings of the Biological Society of Washington* 97(3):666–673.
- , & ———. 1986. Notes on *Geryon* from Bermuda, with the description of *Geryon inghami*, new species (Crustacea: Decapoda: Geryonidae).—*Proceedings of the Biological Society of Washington* 99(2):366–373.
- , & ———. 1987. The status of *Geryon trispinosus* (Herbst) (Geryonidae).—*Investigación Pesquera*, Barcelona 51 (supplement 1):57–62.
- , & ———. 1988. South African species of the genus *Geryon* (Crustacea, Decapoda, Geryonidae).—*Annals of the South African Museum* 98(3):77–92.
- Milne Edwards, A. 1882. Rapport sur les travaux de la Commission chargée par M. le Ministre de l'Instruction Publique d'étudier la faune sous-marine dans les grandes profondeurs de la Méditerranée et de l'Océan Atlantique.—*Archives des Missions Scientifiques et Littéraires*, Paris (3)9: 1–59.
- , & E.-L. Bouvier. 1894. Brachyours et anomoures. Crustacés décapodes provenant des campagnes du yacht l'*Hirondelle* (1886, 1887, 1888). Première partie.—*Résultats des campagnes scientifiques accomplies sur son yacht par Albert I^{er}, Prince Souverain de Monaco* 7: 1–112.
- Rathbun, M. J. 1937. The oxystomatous and allied crabs of America.—*United States National Museum Bulletin* 166, vi + 278 pp.
- Sakai, T. 1978. Decapod Crustacea from the Emperor Seamount Chain.—*Researches on Crustacea* 8 (supplement):1–39, pls. 1–4.
- Scelzo, M. A., & A. Valentini. 1974. Presencia de *Geryon quinquedens* Smith en aguas del Océano Atlántico sudoccidental (Decapoda, Brachyura, Geryonidae).—*Physis*, Buenos Aires (A)33(87): 557–567.
- Smith, S. I. 1879. The stalk-eyed crustaceans of the Atlantic coast of North America north of Cape Cod.—*Transactions of the Connecticut Academy of Arts and Sciences* 5(1):27–136.
- Takeda, M. 1983. Crustaceans. Pp. 19–185 in *Crustaceans and mollusks trawled off Suriname and French Guiana*. Japan Marine Fishery Research Center, Tokyo.

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