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## *PODOCERUS CHELONOPHILUS*, A TESTUDINOUS AMPHIPOD NEWLY RECORDED FROM THE WESTERN ATLANTIC OCEAN

*James Darwin Thomas and J. L. Barnard*

### ABSTRACT

*Podocerus chelonophilus* (= *P. cheloniae*), an amphipod inhabiting the carapace of the loggerhead turtle, *Caretta caretta*, is reported for the first time from the western Atlantic Ocean.

Previously, this amphipod had been reported only from the eastern Atlantic Ocean in the Azores Islands and in the Mediterranean Sea along the shores of Algeria. The record by Stebbing (1888) stated simply "Atlantic" and may have been from the western Atlantic because the CHALLENGER Expedition traversed those waters.

This species was described twice in 1888, with the name *P. chelonophilus* Chevreux and de Guerne, 1888 (February 1888) taking priority over the name *P. cheloniae* Stebbing, 1888 (December 1888) according to a footnote on page 115 in Chevreux (1900). Stebbing (1906) retained both species as distinct in his world monograph. In the opinion of the few subsequent students who have reported on the species, the specimen described as *C. cheloniae* by Stebbing (1888) is believed to exhibit juvenile features on article 2 of pereopods 3-4. It should be, therefore, a synonym of *C. chelonophilus* Chevreux and de Guerne (1888), the description of which was based on adult males and females. Article 2 of pereopods 3-4 in juveniles is relatively more swollen and has fewer and longer setae than do adults. This is quite typical of many species of amphipods and we agree with this conclusion.

We present a review of *Podocerus* with a new diagnosis, list of species, principal references to those species, and a redescription of *P. chelonophilus*. Numbers in brackets are geographic codes to be found in Barnard and Barnard (1983).

In our figures capital letters refer to parts; lower case letters to left of capital letters refer to specimens (if no letter present, then figure is unattributed) and to the right refer to adjectives as described below: A, antenna; B, body; D, dactyl; E, epimera; G, gnathopod; J, epistome marked by arrow; M, mandible; P, pereopod; R, uropod; S, maxilliped; T, telson; U, upper lip; V, palp; X, maxilla; r, right; t, left.

### Podoceridae Podocerinae

#### *Podocerus* Leach

*Podocerus* Leach, 1814: 433 (*Podocerus variegatus* Leach, 1814, monotypy).—Stebbing, 1906: 700.—

J. L. Barnard, 1970: 237.—Lincoln, 1979: 570.

*Platophium* Dana, 1852: 309; 1853: 837 (*Platophium brasiliense* Dana, 1853, monotypy).

*Dexiocerella* Haswell, 1885: 107 (*Cyrtophium dentatum* Haswell, 1879, = *Cyrtophium cristatum* Thomson, 1879).

**Diagnosis.**—Body often dorsally corrugated or provided with elevations, teeth, humps, or carinate or smooth, depressed, last 2-3 pereonal segments often fused, urosomite 1 elongate. Rostrum short, ocular lobes short, blunt, antennal sinus deep. Eyes large to weak, often bulging laterally.

Antennae of medium to great length, 1 shorter than 2, 1 slender, antenna 2 stout; peduncular article 3 of antenna 1 longer than 1, article 2 longest, accessory flagellum 1–2-articulate, main flagellar articles very few. Antenna 2 peduncular article 3 scarcely elongate, peduncle moderately stout, flagellum short, poorly articulate.

Epistome produced anteriorly. Labrum incised, bilobed. Mandible normal, palp strong, article 3 clavate, shorter than 2. Labium with entire outer lobes, with well developed inner lobes, mandibular lobes long, pointed or blunt. Inner plate of maxilla 1 short to vestigial, with 0–1 seta, outer plate with 9 (?11) spines, palp 2-articulate. Outer plate of maxilla 2 rather broad, inner plate with only sparse mediomarginal setae. Inner plate of maxilliped with distal spines, outer plate normal, reaching halfway to apex of palp article 2, with spines on medial margin, palp with 4 articles, article 2 long, article 3 unlobed, article 4 short, with long nail and setae.

Coxae very small, short, weakly discontinuous, of various sizes and shapes, not progressively elongate from 1 to 4, often spiniform, coxa 1 dilated, produced forward, coxa 2 shorter or longer than 1, often produced, coxa 4 not longer than coxa 1, not lobed, coxa 5 as long as 4, coxa 6–7 not much smaller than anterior coxae.

Gnathopods 1–2 diverse, gnathopod 2 greatly larger than 1, gnathopod 1 in male poorly subchelate, article 5 shorter than or as long as 6, weakly lobed. Gnathopod 2 enlarged, weakly subchelate or essentially simple, often very setose, with article 2 barely dilated, with article 4 enlarged, incipiently merochelate, extended and fused distally along posterior margin of article 5, article 5 much shorter than 6, mostly fused to 4 or cryptic, article 6 dilated, dactyl long.

Pereopods 3–4 longer than gnathopods, similar, with slender article 2, article 4 dilated, dactyls medium. Pereopods 5–7 similar to each other, progressively slightly longer or pereopod 6 longer, pereopods 5–7 with narrow to broad unlobed or barely lobed article 2, dactyl of pereopods 5–7 medium, curved.

Sternal processes of thorax absent. Coxal gills [undescribed on type species, present in other species on thoracic segments ?2–6 or 2–7 as in *P. chelonophilus* reported herein]. Pleopods normal. Epimeron 3 smoothly quadrate, bisinuate.

Uropods 1–2 biramous, rami grossly unequal, inner much longer than (2) or as long as (1) peduncle, peduncle of uropods 1–2 with or without ventrodistal process, that of uropod 2 smaller. Uropod 3 forming small leaf lacking rami, very short, obtuse distally, with few armaments. Telson entire, short, broader than long, ovate or semicircular, spinose.

*Female.*—Sexual dimorphism strong. Gnathopod 2 smaller, merus lobate, carpus distinct but subcryptic, propodus short and inflated. Oostegites broad, present on segments 2–5 or 2–4.

*Variables.*—Lateral ocular lobes often bulging laterally; shape and setosity of male and female gnathopods 1–2 variable; article 5 of gnathopod 1 longer than 6 (e.g., *P. chelonophilus*); article 2 of pereopods 3–4 inflated (e.g., *P. chelonophilus*); pereopods weakly prehensile (*P. chelonophilus*); posterodorsal teeth, humps, carinae variable; telson longer than broad (*P. manawatu*).

*Relationship.*—Forming the basic member of the subfamily because of the presence of 3 pairs of uropods, accessory flagellum and 9 apical spines on the outer plate of maxilla 1.

See the other genera of the subfamily, all more derivative or advanced: *Cyrtophium*, *Laetmatophilus*, *Leipsuropus*, and *Podobothrus*.

- Species*.—*africanus* K. H. Barnard, 1916, 1937 (Griffiths, 1975), western Indian Ocean [690];  
*andamanensis* (Giles, 1890) (Stebbing, 1906), Andaman Islands [662];  
*brasiliensis* (Dana, 1853) (Nayar, 1959) (J. L. Barnard, 1970) (Rabindranath, 1972) (?=*synaptochir*  
Walker, 1904) Brazil, and ?worldwide, ?transferred by ships [751 + ?423 + ?T];  
*capillimanus* Nicholls, 1938 (Thurston, 1974), Antarctic islands [890];  
*chelonophilus* (Chevreux and de Guerne, 1888) (= *cheloniae* Stebbing, 1888; 1906) (Chevreux, 1900)  
(Chevreux and Fage, 1925) (Mateus and Afonso, 1974), amphi-Atlantic, inquilinous [3541];  
*crenulatus* Myers, 1985, Fiji [576];  
*cristatus* (Thomson, 1879) (?J. L. Barnard, 1962) (= *dentatum* Haswell, 1879), *c. rotundatus* Schel-  
lenberg, 1931, southeastern Australia and ?Indo-Pacific [781 + ?600];  
*danae* (Stebbing, 1888; 1906), bathyal Kerguelen Island [851B], *d. armatus* Bellan-Santini and  
Ledoyer, 1987, Marion-Prince Edward Islands [799];  
*fulanus* J. L. Barnard, 1962, 1979, northeastern Pacific warm-temperate [370];  
*gloriosae* Ledoyer, 1986, bathyal southeastern Africa [618B];  
*hanapepe* J. L. Barnard, 1970 (Ledoyer, 1972; 1986) (Myers, 1985), Indo-Pacific [600];  
*hystrix* Stebbing, 1910 (Griffiths, 1974), southeastern Australia and southern Africa [781 + 743];  
*inconspicuus* (Stebbing, 1888) (Nagata, 1965) (Griffiths, 1975), Indo-Pacific [600];  
*karu* J. L. Barnard, 1972, New Zealand [775];  
*laevis* (Haswell, 1885) (Sivaprakasam, 1969) (= *haswelli* Chevreux and de Guerne, 1888), south-  
eastern Australia and ?Indian subcontinent [781 + ?670];  
*lobatus* (Haswell, 1885) (?Pirlot, 1938), southeastern Australia and ?New Guinea [781 + ?597];  
*madagascarensis* Ledoyer, 1986, Madagascar [698];  
*manawatu* J. L. Barnard, 1972, New Zealand [775];  
*mangarevae* Chevreux, 1908 (= *zeylanicus* fide Ruffo, 1969) (?Ledoyer, 1979a), Tuamotu-Gambier  
and ?Madagascar [556 + ?698];  
*multispinis* K. H. Barnard, 1925 (Griffiths, 1975), *m. levis* K. H. Barnard, 1925, southern Africa  
[743];  
*palinuri* K. H. Barnard, 1916 (Ledoyer, 1986), southern Africa to Madagascar [745];  
*palinuroides* Ledoyer, 1986 (= species of Ledoyer, 1978; 1979a), Mauritius, Madagascar [697–698];  
*pyrae* Griffiths, 1975, southern Africa inquilinous [7431];  
*schieckei* Ruffo, 1986, northwestern Mediterranean [348];  
*senegalensis* Chevreux, 1926 (Pirlot, 1939), Senegal [441];  
*septemcarinatus* Schellenberg, 1926, 1931 (K. H. Barnard, 1932) (Stephensen, 1947) (= *hystricoides*  
Monod, 1926), sublittoral-bathyal Antarctica [870 + B];  
*spongicolus* Alderman, 1936 (Hewatt, 1946), warm-temperate northeastern Pacific [370];  
*talegus* J. L. Barnard, 1965, *t. lawai* J. L. Barnard, 1970, *t. levuensis* Myers, 1985, mid-tropical  
Pacific and ?Cuba [550 + ?483];  
*tulearensis* Ledoyer, 1986, Madagascar [698];  
*variegatus* Leach, 1814 (Chevreux and Fage, 1925) (Lincoln, 1979) (= *darwinii* Bate, 1857), warm  
eastern Atlantic, Mediterranean, salty Black Sea [352];  
*walkeri* Rabindranath, 1972 (Ledoyer, 1979b) Indian Ocean [660]; *w. pedunculata* [sic] Ledoyer,  
1979a, 1986, Madagascar [698];  
*wanganui* J. L. Barnard, 1972, New Zealand [775];  
*zeylanicus* (Walker, 1904) (Nayar, 1967) (Ruffo, 1969) (?Ledoyer, 1986), tropical Indian Ocean,  
Red Sea [685];  
“species” (*cristatus* ID of Chilton, 1926, Ledoyer, 1972), Cook Strait region of New Zealand [774];  
“species” K. H. Barnard, 1932, South Georgia [833];  
“species” Nagata, 1960, warm-temperate Japan [395];  
“species” Ledoyer, 1978, 1979a, Mauritius, Madagascar [697–698];  
“species” Goddard, 1984, Oregon [268, mimic to nudibranch].

*Distribution of Genus*.—Marine, cosmopolitan, 0–750 m, 32 species.

*Podocerus chelonophilus* Chevreux and de Guerne  
 Figures 1–2

*Cyrtrophium chelonophilum* Chevreux and de Guerne, 1888: 1–4.

*Platophium chelonophilum*. Chevreux, 1900: 115–118, pl. 13, fig. 2, pl. 14, fig. 7.

*Podocerus chelonophilus*. Stebbing, 1906: 703, 741.—Chevreux, 1911: 272.—Chevreux and Fage,  
 1925: 375–376, fig. 383.—Chevreux, 1935: 130–131.—Mateus and Afonso, 1974: 36–38, figs.  
 27–28.

*Platophium cheloniae* Stebbing, 1888: 1190–1194, pl. 130.

*Podocerus cheloniae*. Stebbing, 1906: 701–702.

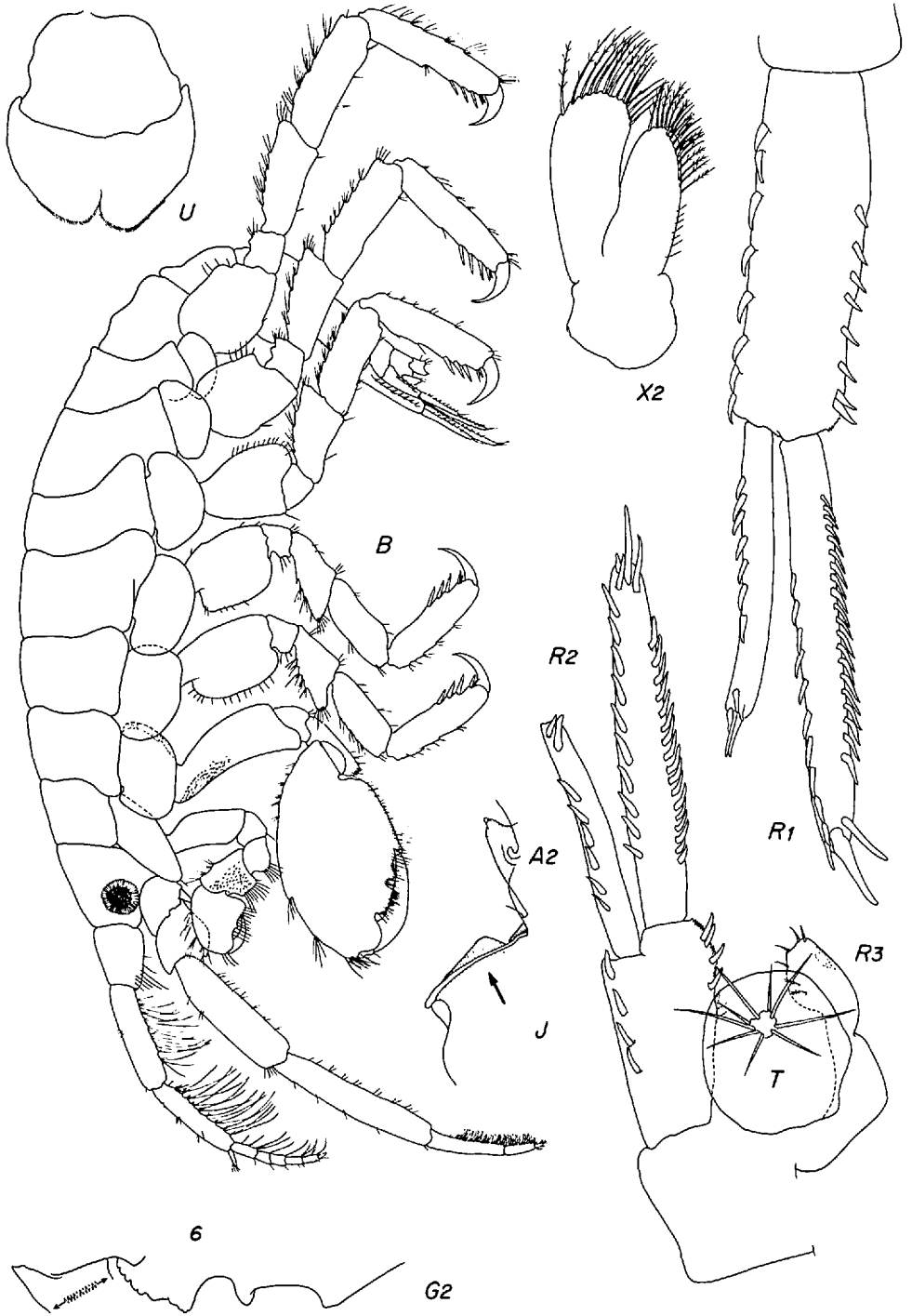


Figure 1. *Podocerus chelonophilus*, unattributed figures = male "a" 7.37 mm; v = male "v" 8.83 mm.

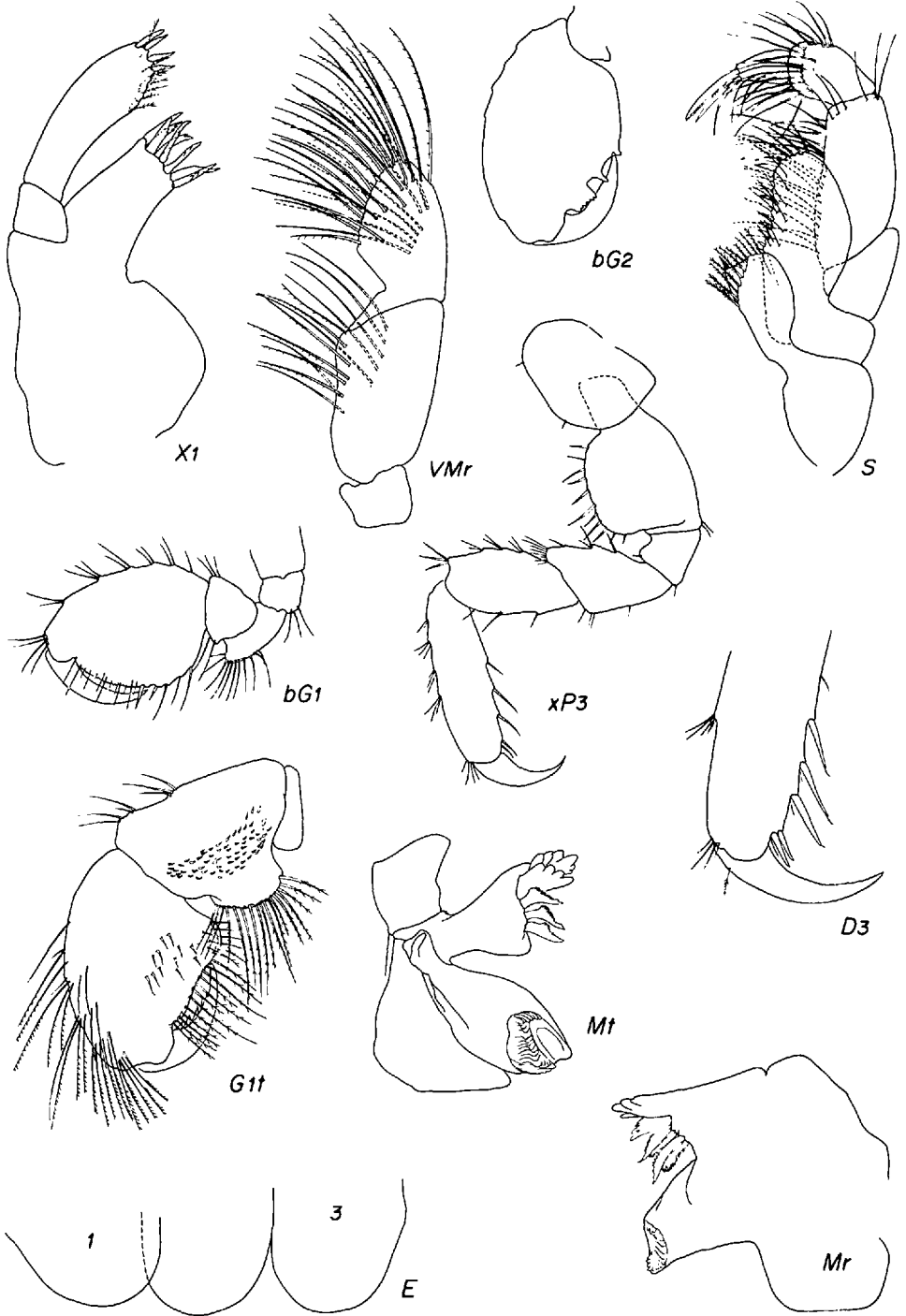


Figure 2. *Podocerus chelonophilus*, unattributed figures = male "a" 7.37 mm; b = female "b" 4.62 mm; x = juvenile "x" 4.21 mm.

*Diagnosis of Male.*—Lateral cephalic lobe weakly protruding in mammilliform shape, eyes with dark pigment core, situated behind anterior margin of head and on lower margin; accessory flagellum 1-articulate, not elongate; antenna 2 short, about as long as thorax, antenna 1 reaching almost to end of peduncle on antenna 2 flagella of antennae very short and with few articles, 6 on antenna 1, 3 on antenna 2, flagellum of antenna 2 only setose, no major spines present; epistome unproduced, anterior margin of upper lip with weakly produced anterior keel; coxa 1 extended forward, coxa 2 with medial stridulation flange situated postero-ventrally, covered with "grit"; article 5 of gnathopod 1 scarcely shorter than article 6, article 5 laterally furnished with scaliform pattern, bearing quadrate posterior lobe, article 6 trapezoidal, with lateral group of 7 sets of comb-like short setae numbering from 1 to 3, palm very oblique, with weak knob, defining end of palm extended and swollen, dactyl shorter than palm, posterior margin of article 6 shorter than palm, dactyl with 5 inner teeth; anteroproximal outer face of article 2 on gnathopod 2 with tiny stridulation humps, anterodistal corner with mammilliform lobe, article 4 blunt distally, article 6 large, elongate, palm oblique, less than half as long as article 6, carved into one broad castellate hump, one narrow blunt tooth in middle and weak defining tooth, palm and posterior margin densely furnished with short setae; article 2 of pereopods 3–7 well expanded in context of genus, anterior margins on pereopods 3–4 and posterior margins on pereopods 5–6 moderately setose (in context of genus), article 2 of pereopod 7 poorly setose; article 2 of pereopod 5 with nasiform lobe, of pereopod 6 with sharp, almost lobate posteroventral corner, of pereopod 7 with blunt, almost lobate posteroventral corner; anterior margins of articles 4–6 on pereopods 3–4 and similar posterior margins on pereopods 5–7 with (in context) relatively numerous small clusters of setae set in notches, for example, setal groups on article 4 of pereopods 3–7 = 4-4-4-4-5; posterior margins on article 6 of pereopods 3–4 and similar anterior margins on pereopods 5–7 with thick distal spines in tandem in the formula for the 5 legs of 3-3-3-3-3, each of pereopods 5–7 with extra proximal notches each usually bearing one seta, each of pereopods 3–7 with apical spine-set (= "unlocking pair") composed of 2 spines; pereopods 3–7 therefore considered to be prehensile; uropods 1–2 lacking interramal tooth on peduncles, outer rami of uropods 1–2 about 70 percent as long as inner rami, inner rami excessively spinose (in context of genus), for example, lateral margins of uropods 1–2 with 10 and 10 spines, medial with 17 and 20 spines; peduncles of uropods 1–2 also more strongly spinose than in other species of *Podocerus*, medial apices serrate; uropod 3 small and leaflike, with 4 short apical setal-spines and 2 facial penicillate setules; telson with small dorsal circle of 9 spines and 1–2 tiny setules; dorsal body humps absent or obsolescent; all pereonites articulate; pleonal epimera evenly rounded below.

*Description.*—Gills present on coxae 2–7.

*Female.*—Coxae relatively shorter than on male; article 2 of gnathopod 2 lacking anterodistal process, protrusions on articles 4 and 5 weak, article 6 short, stout, palm about half as long as article 6, evenly convex, defined by spine on notch and one farther spine beyond apex of dactyl; densely setose oostegites present on coxae 3–5, those on 3–4 large, suboval, subequal, that on 5 half as large.

*Juvenile "x" 4.21 mm.*—Article 2 of pereopods 3–4 (see illustration) slightly more swollen and setae slightly longer than in adult. The figures in the literature show the spines on article 6 of pereopods 5–7 to be thinner than in our adults; our juveniles also have thin spines as we show in the illustrations.

*Material.*—Pritchard's Island, South Carolina, 14 July 1982, coll. Dr. Edsel Caine, from nesting *Caretta caretta*, male "a" 7.37 mm, female "b" 4.62 mm, male "v" 8.83 mm, juvenile "x" 4.21 mm and 100's of other specimens. Hutchinson Island, Florida, 14 June 1983, coll. S. E. Le Croy, from carapace of *Caretta caretta*, 2 males, 2 females. Key West, Florida, 30 September 1982, coll. Hester-Dendy (presumably from turtle), 2 males, 6 females.

*Distribution.*—Algeria; Azores; South Carolina; Florida; on carapace of *Caretta caretta*, the loggerhead turtle.

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