Garthambrus, a new genus of deep water parthenopid crabs (Crustacea: Decapoda: Brachyura) from the Indo-Pacific, with description of a new species from the Seychelles

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Key words: Crustacea, Decapoda, Parthenopidae, *Garthambrus* gen. nov., *Garthambrus posidon* spec. nov., deep water, Indo-Pacific, Seychelles.
A new genus of parthenopid crab, *Garthambrus* gen. nov., characterised by a broad carapace with strongly raised branchial and gastric regions, distinctive rostrum, sub-cylindrical ambulatory meri and a long distal segment of the second male pleopod, is established for six deep water species from various parts of the Pacific. A new species, *Garthambrus posidon* spec. nov., is also described from depths of between 480 to 600 m off the Seychelles in the Indian Ocean. It differs from its closest congener, *G. poupini* (Garth, 1993), in having a proportionately broader carapace, less granulated carapace and chelipedal surfaces, and in the form of the carapace regions.

Introduction

In 1993, during a visit to the Nationaal Natuurhistorisch Museum in Leiden, its curator of Crustacea, Charles Fransen, showed me a collection of parthenopids which had been made by staff from the museum from shallow and deep waters around the Seychelles in the Indian Ocean. Among the specimens was a large and striking undescribed species which resembled the recently described *Parthenope* (*Platylambrus*) *poupini* Garth, 1993, from French Polynesia, but which differed in many important respects. Studies of this specimen led me to reappraise the taxonomy of the various species now included in the subgenus *Platylambrus* Stimpson, 1871, especially the deep water Pacific species reviewed by Garth (1993). My studies show that species from the Seychelles, as well as the deep water species reported by Garth (1993) from the Pacific should be referred to a new genus, differing from *Parthenope* and *Platylambrus* in several key aspects.

The present paper serves to diagnose the new genus, *Garthambrus* gen. nov. as well as to describe the new species, *Garthambrus posidon* spec. nov. Specimens examined are deposited in the Nationaal Natuurhistorisch Museum [former Rijksmuseum van Natuurlijke Historie (RMNH)], Leiden; and Muséum national d'Histoire naturelle (MNHN), Paris. Measurements provided are of the carapace width and length respectively. The abbreviations G1 and G2 are for the male first and second pleopods respectively.

Descriptive part

Family Parthenopidae MacLeay, 1838

Garthambrus gen. nov.

Type species.— *Parthenope* (*Platylambrus*) *poupini* Garth, 1993, by present designation.

Diagnosis.— Carapace subtriangular in shape, broader than long; angle between antero- and posterolateral margins strongly produced; dorsal surfaces very rough (granulose, spinose or rugose); progastric, mesogastric, metagastric, mesobranchial, metabranchial, cardiac and intestinal regions very high, strongly inflated; gastric and branchial regions separated by deep grooves. Median lobe of rostrum prominent, sub-spatulate, deflexed downwards. Hepatic region and margin separated from anterolateral margin by cleft, notch or large tubercle. Posterolateral margin and metabranchial regions without long or prominent teeth or spines (although surface may be uneven or lined with numerous small spines). Chelipeds at least 2.5 times carapace length. Meri of ambulatory legs non-cristate. G1 relatively stout, tip rounded, not armed with long spines or stiff hairs. Distal segment of G2 elongate, at subequal to or distinctly longer than basal segment.

Etymology.— The genus name honours the late John Garth, a good friend, and the dean of parthenopid systematics. The name is an arbitrary combination with *Lambrus*, a common suffix for many parthenopid genera. Gender masculine.

Remarks.— The generic system within the subfamily Parthenopinae is in urgent need of a revision. The system generally used at present has not changed significantly since Alcock (1895) (see also Rathbun, 1925; Flipse, 1930), with the genus *Parthenope* containing several subgenera, most of which have not been well defined. *Parthenope* Weber, 1795, is a senior objective synonym of *Lambrus* Leach, 1815, with both genera having the same type species, *Cancer longimanus* Linnaeus, 1758 (see Manning & Holthuis, 1981: 327). Most of the subgenera in *Parthenope* however, are relatively easy to recognise, possessing distinct carapace and pereiopodal features. For this reason, some authors, e.g. Ng & Rodriguez (1986) and Chia & Ng (1993), used Flipse's (1930) subgenera as full genera, a system which is followed here. With regards to *Platylambrus*, the genus was established by Stimpson (1871), the type species being the Atlantic *Lambrus crenulatus* De Saussure, 1858 (a subjective junior synonym of *Lambrus serratus* H. Milne Edwards, 1834). At present, *Platylambrus* contains some 20 Atlantic and Indo-Pacific species (see Alcock, 1895; Flipse, 1930; Garth, 1958, 1993; Serène, 1968; Sakai, 1976; Gore & Scotto, 1979).

Garth's (1993) study of the deep water *Platylambrus* species from the Pacific is very important in that it clarifies the identities of several poorly known species. Garth showed that two of Rathbun's (1906) "varieties" of *Parthenope* (*Platylambrus*) *stellata* Rathbun, 1906, *P.* (*P.*) *stellata lacunosa* Rathbun, 1906, and *P.* (*P.*) *stellata complanata* Rathbun, 1906, were good species and distinct from *P.* (*P.*) *stellata* s. str. He also figured the G1 and G2 of *P.* (*P.*) *stellata* s. str. for the first time. Garth also transferred *Asterolambrus mironovi* Zarenkov, 1990, to *Parthenope* (*Platylambrus*), redescribing the species in detail. Garth (1993) also described two new species, *Parthenope*

(*Platylambrus*) *allisoni* and *Parthenope* (*Platylambrus*) *poupini*. These six species, as well as *Garthambrus posidon* spec. nov. described below, differ from all other *Platylambrus* species in several important aspects, viz. (1) a proportionately broader carapace, with the anterolateral margin forming a pronounced and strong angle with the posterolateral margin, the branchial regions being swollen and also produced laterally, (2) having the gastric, cardiac and branchial regions strongly inflated, giving the carapace a vaulted and very swollen appearance, (3) the metabranchial regions and posterolateral margins lack long sub-cylindrical or sub-lamelliform spines, (4) having a trifid rostrum with the base of the median lobe deflexed downwards, the median lobe being swollen, sub-spatuliform, and distinctly below the lateral lobes when viewed frontally, (5) a very broad posterior margin of the epistome which has a broadly triangular median lobe (against a proportionately narrower posterior epistomal margin which has a triangular median lobe in *Platylambrus*), and (7) a G2 which has an elongate distal segment as long as or longer than half the length of the elongate basal segment (cf. Alcock, 1895; Rathbun, 1906, 1925; De Man, 1907; Flipse, 1930; Stephensen, 1946; Garth, 1958; Gore & Scotto, 1979; Manning & Holthuis, 1981; Dai & Yang, 1991).

The structure of the G2 of *Garthambrus* is of particular significance, those of all other *Platylambrus* species (for which this structure is known) have a short distal segment which is much shorter than half the length of the basal segment (see Gore & Scotto (1979) for the American *Platylambrus*; Stephensen (1946: fig. 23C, D) for *P. carinatus*; Tirmizi & Kazmi (1986: fig. 64) for *P. pransor*). I have examined the G2s of several *Platylambrus* species, including *P. echinata* (Herbst, 1790) and *P. tumida* (Lanchetser, 1900) in our museum (Zoological Reference Collection) and all have short G2 distal segments. *Platylambrus tumida* was assigned to the genus *Parthenope* s. str. by Flipse (1930) (see also Serène, 1968: 59-60), but this is surely in error - it is clearly a *Platylambrus* (as defined by Flipse, 1930) in all respects.

It is prudent to note here that the genus *Platylambrus* as currently recognised, even with the transfer of six of its species into *Garthambrus*, is still heterogeneous in composition. At least two groups can be discerned. One group contains just two Atlantic species - *P. serrata* (Stimpson, 1871) (type species of *Platylambrus*) and *P. granulata* (Kingsley, 1879), both of which have relatively flat carapaces in which the regions are not inflated, the grooves separting the branchial and gastric/cardiac regions shallow, a more rounded carapace outline in which the hepatic region forms an almost continuous margin with the anterolateral margin, and the G1 is proportionately more slender, with the median part narrow, neck-like and the tip dilated and lined with several long spine-like setae. The second group includes several American species, *P. pourtalesii* (Stimpson, 1871), *P. exilipes* (Rathbun, 1893), *P. depressiuscula* (Stimpson, 1871), *P. guerini* (De Brito Capello, 1871) and perhaps *P. fraterculus* (Stimpson, 1871), as well as the other Indo-Pacific species now assigned to *Platylambrus* (see Flipse, 1930). This group has the carapace branchial, gastric and cardiac regions swollen, the grooves being deep; the hepatic region not forming a continuous margin with the anterolateral margin, with the anterior part of the carapace appearing slightly constricted; and the G1 is stout and simple.

As the differences observed between the two groups of *Platylambrus* species are less pronounced than those for *Garthambrus*, and because a good number of Indo-

Pacific *Platylambrus* species are not sufficiently well defined - it is possible that the Atlantic and Indo-Pacific species in the second group are not congeneric - any attempt to separate the Indo-Pacific and Atlantic *Platylambrus* species at the generic level would be premature. In any case, if more genera need to be recognised to suitably contain the various species, there are two available generic names, both of which are now regarded as subjective junior synonyms of *Platylambrus*, viz. *Enoplolambrus* A. Milne Edwards, 1878 (type species *Lambrus carenatus* H. Milne Edwards, 1834) and *Oncodolambrus* De Man, 1906 (type species *Oncodolambrus praedator* De Man, 1906). Both of the type species are Indo-West Pacific taxa.

It is also useful to note that Sakai (1938) had transferred the Japanese species, *Parthenope* (*Platylambrus*) *pteromerus* (Ortmann, 1893) into the genus *Tutankhamen* Rathbun, 1925. This genus was originally established for an Atlantic species, *Mesorhoea cristatipes* A. Milne Edwards, 1880, mainly because of the smooth carapace, long basal antennal segment which occupies the orbital hiatus and a lamellar ridge lining the afferent channels. *Tutankhamen pteromerus* however, differs very markedly from *Tutankhamen cristatipes* in carapace and pereiopod structures and proportions (see Rathbun, 1925: 530, pl. 277 figs. 3-5; Sakai, 1976: 281, text fig. 156; Miyake, 1983: 53, pl. 18 fig. 3), and it is very unlikely that the two species are congeneric, especially considering their distributions. *Tutankhamen cristatipes* is clearly allied to genera like *Mesorhoea* whereas *"Tutankhamen" pteromerus* seems to be closer to *Garthambrus*. The carapace shape and physiognomy of *"Tutankhamen" pteromerus* closely resembles those of *Garthambrus* species. *Garthambrus* species however, have very rough, granular or spiny carapaces, a short basal antennal segment which does not occupy the orbital hiatus and no lamellar ridge lining the afferent channels (only a few large granules present). *"Tutankhamen" pteromerus* should be referred to a new genus close to *Garthambrus*, but in lieu of specimens examined, I defer from taking any action at present.

The carapace shape of *Garthambrus* is especially different from the second group of *Platylambrus* species (Indo-Pacific species as well as the Atlantic *P. pourtalesii*, *P. exilipes*, *P. depressiuscula*, *P. guerini* and *P. fraterculus*), being broadly triangular rather than more rounded, with the lateral angles very strongly produced (against rounded). While the carapace regions on these *Platylambrus* species are also inflated, they do not reach the height or magnitude as those on *Garthambrus* species. Only in *Platylambrus praedator* are the branchial regions also very swollen, but in all other respects, *P. praedator* is a typical Indo-Pacific *Platylambrus* species (cf. De Man, 1907: 389, pl. 31 figs. 1-3). The carapace shape of *Garthambrus* species is closer to that of the Atlantic *Platylambrus serrata* and *P. granulata* but in these two species, the carapace is flatter, the regions low and the hepatic and anterolateral margins are evenly convex. The ambulatory meri of *Garthambrus* are also sub-cylindrical without a cristate margin, the dactylus being relatively short. In the Indo-Pacific and Atlantic *Platylambrus* species for which the ambulatory legs are known, the meri are cristate and the dactylus is proportionately longer and appears styliform.

Eight species of *Garthambrus* are here recognised, viz. *G. stellata* (Rathbun, 1906) (Hawaii), *G. lacunosa* (Rathbun, 1906) (Hawaii), *G. complanata* (Rathbun, 1906) (Hawaii), *G. mironovi* (Zarenkov, 1990) (Shoal Guyot and Nazca/Sala-y-Gomes Ridges), *G. allisoni* (Garth, 1993) (Easter Island), *G. poupini* (Garth, 1993) (French Polynesia

and Society Islands), *G. cidaris* (Garth & Davie, 1995) (Queensland, Australia) and *G. posidon* spec. nov. (Seychelles). With the exception of *G. posidon* which is from the Indian Ocean, all the other species are from the Pacific.

Garthambrus is almost certainly a deep water genus. The shallowest depth reliably reported for any *Garthambrus* species is 228 m, for *G. mironovi*, from Shoal Guyot (Garth, 1993: 792). Rathbun (1906: 883) reported *G. stellata* from Oahu, Hawaii, from depths of between 95 to 435 m, but as she also recorded it from depths of 269 to 362 m, and Garth (1993: 786) reported it from a depth of 319 m, it seems that the shallower end of the depth range for the species (95 m) is unlikely. Edmondson (1951: 213) reported two small specimens of *G. stellata* from Oahu, Hawaii, from relatively shallow water (150 feet), but his specimens are probably misidentified. The carapace of the specimen he figured (Edmondson, 1951: fig. 18) is proportionately narrower, the rostrum not trifid and the ambulatory dactylus is distinctly styliform. Edmondson (1951: 213) had noted that his specimens lacked the stellate granules on the chelipeds present in *G. stellata* and the ambulatory legs are not setose. Edmondson's specimens seem to be closer to *Platylambrus* s. str. as here redefined. The deepest *Garthambrus* has been reported from is 720 m, for *G. poupini* (see Garth, 1993: 782).

Garthambrus poupini (Garth, 1993)

Material.— Holotype, ♂, 35.5 by 28.0 mm (MNHN MP-B 22424), station 84, Fangataufa, Tuamotu, French Polynesia, 22°11'1"S 138°45'1"W, 520-570 m depth, coll. SMCB (Service Mixte de Controle Biologique des Armées), J. Poupin, 22.vi.1988. — Paratype, ♂, 35.3 by 27.0 mm (MNHN MP-B 21364), station 135, Fangataufa, Tuamotu, French Polynesia, 22°15'2"S 138°46'3"W, 720 m depth, coll. SMCB (Service Mixte de Controle Biologique des Armées), J. Poupin, 25.ii.1989.— Paratype, ♂, 38.0 by 29.0 mm (MNHN MP-B 22425), station 242, Maria, Tuamotu/Actéons, French Polynesia, 22°00'00"S 136°12.00'00"W, 670 m depth, coll. SMCB (Service Mixte de Controle Biologique des Armées), J. Poupin, 30.v.1990. Paratype, ♀, 25.6 by 19.1 mm (MNHN MP-B 21363), station 125, Mururoa, Tuamotu, French Polynesia, 21°51'S 138°47'W, 530-630 m depth, coll. SMCB, J. Poupin, 29.xi.1988. — Paratype, ♂, 40.1 by 30.0 mm (MNHN MP-B 22420), station 395, Fangataufa, Tuamotu, French Polynesia, 22°15'5"S 138°42'9"W, 660 m depth, coll. SMCB (Service Mixte de Controle Biologique des Armées), J. Poupin, 15.iii.1991. — ♀, 14.1 by 11.0 mm (MNHN MP-B 22421), station D-32, Bora-Bora, Society Islands, 16°28'37"S 151°47'52"W, 562 m depth, coll. SMCB, J. Poupin, 23.vi.1990.

Remarks.— There is no need to redescribe *G. poupini* as the descriptions and figures by Garth (1993) are excellent. The series of specimens in the MNHN agree well with each other, the variation in the specimens being minimal. The largest specimen is a male 40.1 by 30.0 mm (MNHN MP-B 22420) from French Polynesia, and it agrees well with the smaller holotype male (35.5 by 28.0 mm, MNHN MP-B 22424) figured by Garth (1993).

Garthambrus posidon spec. nov.
(figs 1-5)

Material.— Holotype, ♂, 66.1 by 41.6 mm, (RMNH D 42686), station 794, NIOP-E, south of Alphonse Atoll, Seychelles, 7°03'S 52°43'E, on coral rubble with poor epifauna, 480-600 m depth, coll. rectangular dredge, TYRO Seychelles Expedition 1992/93, 5-6.i.1993.

Description.— Carapace subtriangular in shape, angle between antero- and pos-

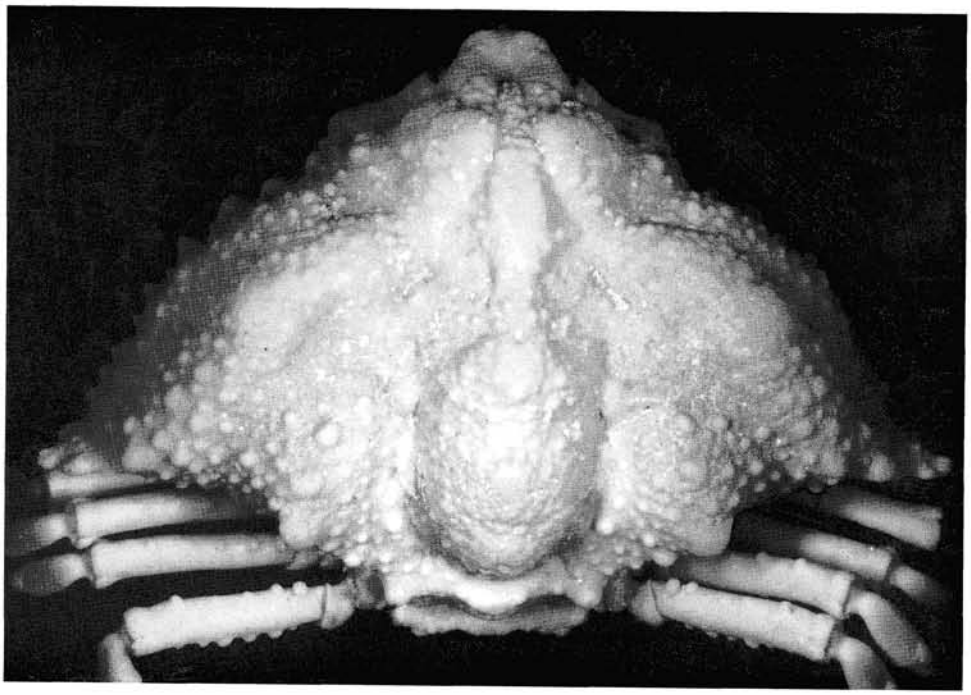

Fig. 1. *Garthambrus posidon* spec. nov. Holotype ♂, 66.1 by 41.6 mm (RMNH D 42686). Carapace (dorsal view)

terolateral margins strongly produced into pronounced lateral tooth; carapace width 1.6 times length; dorsal surfaces covered with numerous small rounded granules, most of which are discrete and not fused or coalesced, more densely placed along ridges; progastric, mesogastric, metagastric, mesobranchial, metabranchial, cardiac and intestinal regions very prominent, raised; highest part of ridges with rounded granules, especially prominent on mesobranchial regions; mesogastric region separated from metagastric region by shallow grooves; metagastric region separated from cardiac region by shallow groove; cardiac region separated from intestinal region by deep groove; mesobranchial region separated from mesogastric region by broad, deep groove; mesobranchial region separated from metabranchial region by broad, shallow groove; intestinal region with one broad median, rounded tooth, each edge with one longer but blunter tooth. Front appears trilobate, with median lobe most prominent, longitudinally sub-spatulate, deflexed downwards, base positioned below main frontal margin; lateral lobes rounded, thickened, gently confluent with supraorbital margins. Supraorbital margin with deep, narrow cleft. Hepatic region swollen, broadly triangular, anterior margin longer than posterior margin; separated from anterolateral margin by small but distinct narrow cleft. Deep depression present between hepatic and anterolateral regions. Anterolateral margin distinctly arcuate, appears dentate, with about 12-13 teeth (excluding largest lateral tooth at junction of antero- and posterolateral margins), anterior teeth rounded, posterior teeth sharper, teeth progressively smaller from anterior to posterior. Posterolateral

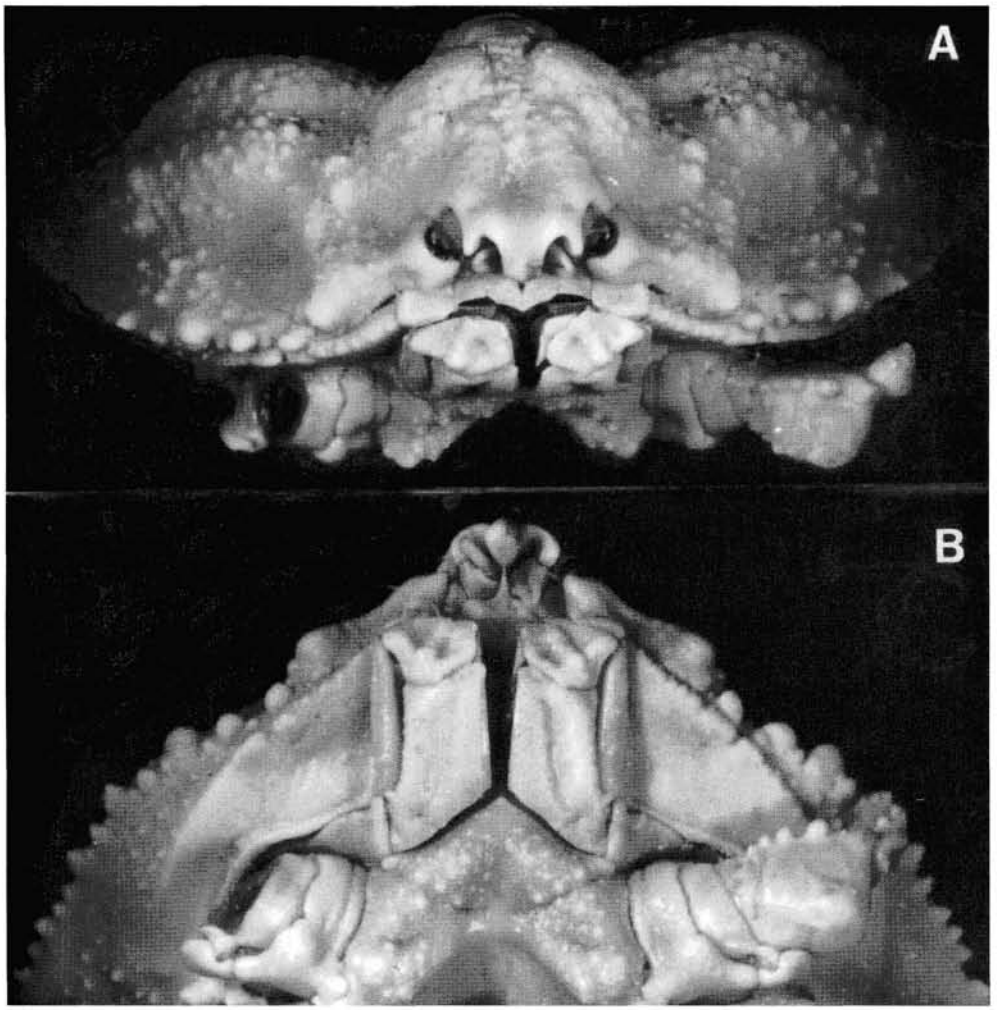

Fig. 2. *Garthambrus posidon* spec. nov. Holotype ♂, 66.1 by 41.6 mm (RMNH D 42686). A, carapace (frontal view); B, anterior part of carapace (ventral view).

margins strongly concave; median part raised, projecting obliquely backwards as a low, tooth-like protruberance.

Outer surfaces of third maxillipeds granular. Ischium subrectangular, with deep, broad oblique median sulcus, separated from basis by distinct suture. Merus with two shallow, submedian depressions, and one shallow depression near the base of the palp; antero-external angle strongly auriculiform. Exopod broad, well developed, reaching auriculiform meral antero-external angle. Palp (carpus, propodus, dactylus) short, concealed when appressed tightly against inner margin of merus.

Total length of left cheliped (tip of dactylus to coxa) ca. three times carapace length. Right cheliped missing. Basis-ischium fused, anterior margin with several

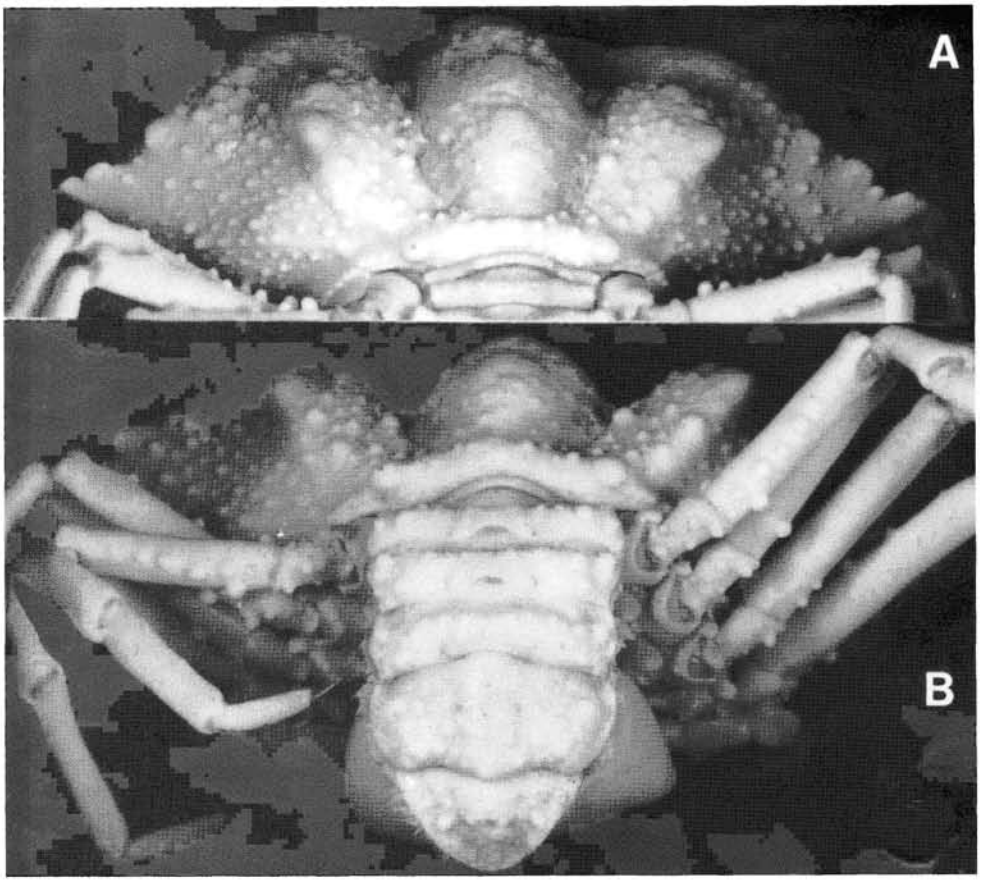

Fig. 3. *Garthambrus posidon* spec. nov. Holotype ♂, 66.1 by 41.6 mm (RMNH D 42686). A, carapace (posterior view); B, male abdomen and posterior margin of carapace

granules. Merus trigonal in cross-section; inner margin (between dorsal and anterior facets) arching forwards, with large, blunt submedian granule on outer margin (between posterior and dorsal facets); margins distinctly granular but surfaces of facets rough but not distinctly granulated. Carpus elongate, broader distally; surfaces gently granular. Left chela elongate; faintly trigonal in cross-section, with distal part distinctly broader than proximal part; margins (between dorsal and anterior facets; and posterior and dorsal facets) granular, but surfaces of facets not distinctly granular, appearing only rugose and uneven; anterior facet with distinct longitudinal ridge formed by flattened granules; closed fingers with basal gape; cutting edges of fingers pigmented brown; dactylar finger strongly curved; propodal finger with large and broad basal molariform tooth.

Ambulatory legs slender; first leg longest. Dorsal margins of meri 3 and 4 with 7-8 small to large rounded tubercles, meri 1 and 2 with 1-2 small subproximal tubercles or only weakly tuberculated; ventral margins of merus 4 line with 6-7 tubercles,

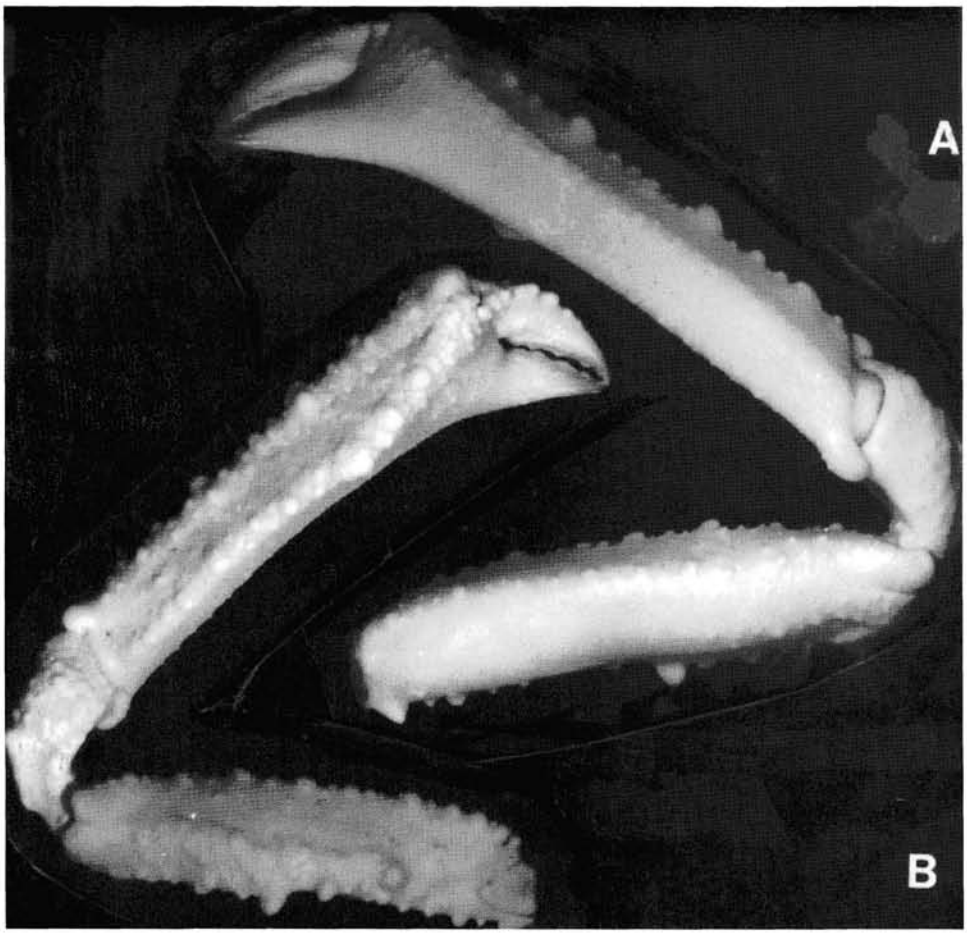

Fig. 4. *Garthambrus posidon* spec. nov. Holotype ♂, 66.1 by 41.6 mm (RMNH D 42686). A, left chela (frontal view); B, left chela (dorsal view).

merus 3 with tubercles only on proximal one-third, merus 2 with only 1-2 subproximal tubercles, merus 1 with a small subproximal tubercle or unarmed. Dorsal and ventral margins of carpus and propodus smooth, unarmed but margins may be uneven. Dactyli gently curved, smooth, unarmed; proximal one-quarter glabrous; median part densely covered with very short, stiff setae; distal one-quarter glabrous, horn-coloured.

Anterior thoracic sternites granulated; sternites 1-3 completely fused; suture between sternites 3 and 4 present but interrupted medially. Male abdomen relatively ovate (due to sacculinid parasitisation); 5-segmented, segments 3-5 immovable, completely fused, sutures not clearly visible; outer surfaces rugose, with lateral parts covered with small rounded granules.

G1 relatively stout, gently sinuous, tip rounded, turned obliquely inwards;

Table 1. Differences between *Garthambrus posidon* spec. nov. and *G. poupini*

	G. posidon	*G. poupini*
Carapace shape	Angle between anterolateral and posterolateral margins strongly produced laterally, carapace more transverse, width to length ratio ca. 1.6	Angle between anterolateral and posterolateral margins not strongly produced laterally, carapace width to length ratio ca. 1.3
Carapace surface	Covered with scattered, rounded granules	Densely covered with numerous small granules, surface appears distinctly granular
Rostrum	Median protuberance pronounced but small	Median protuberance large, bulbous
Branchial regions	Strongly inflated	Raised but not strongly inflated
Metabranchial and cardiac regions	Strongly inflated, highest point of metabranchial protuberance with large rounded granules	Raised, but not strongly inflated, highest point of metabranchial protuberance with smaller, more flattened granules
Chelipeds	Dorsal facets of palm and merus only granulated along margins; outer surface of palm (excluding median longitudinal ridge) not distinctly granular	Dorsal facets of palm and merus distinctly granulated throughout surface, being stronger along margins; outer surface of palm strongly granular
Ambulatory legs	Dorsal and ventral margins of carpus and propodus smooth, unarmed	Dorsal and ventral margins of carpus and propodus, especially of last leg, distinctly granulated

groove for G2 broad, distinct, ventral in position. G2 elongate, ca. 1.5 times length of G1; distal segment well produced, ca. 0.6 times length of basal segment; inner margin lined with long setae (due to sacculinid parasitisation).

Remarks.— Although known only from one holotype male, *Garthambrus posidon* spec. nov. differs markedly from its closest congener, *G. poupini* in carapace, cheliped, leg and gonopod features. I have examined the holotype male and paratypes of *G. poupini* from French Polynesia in the MNHN (see earlier) and compared them directly with the holotype of *G. posidon*, and the differences observed are valid for both sexes.

In addition to the differences between *G. posidon* and *G. poupini* listed in Table 1, their G1s also appear to differ. The G1 of *G. poupini* is proportionately stouter and straighter (Garth, 1993: fig. 2d), that of *G. posidon* being more slender and slightly

Fig. 5. *Garthambrus posidon* spec. nov. Holotype ♂, 66.1 by 41.6 mm (RMNH D 42686). A, left third maxilliped; B, left fourth ambulatory leg; C, D, left G1; E, left G2. C, ventral view; D, dorsal view. Scales = 1.0 mm.

bent subdistally (fig. 4A, B). Because of the holotype male of *G. posidon* is parasitised by a sacculinid, the structure of its G1 may not be representative of the species under normal conditions. The G2s of both *G. posidon* and *G. poupini* agree in shape, although that of *G. posidon* has a proportionately shorter distal segment (relative to the basal segment) (cf. Garth, 1993: fig. 2e; present fig. 5E). The G2 of *G. posidon* also has numerous long setae lining its margins (fig. 5E), but this is almost certainly a consequence of the emasculating effect of the sacculinid parasite. The abdomen of *G. posidon* is quite broad because of the parasite, but otherwise has a similar shape to that of *G. poupini* figured by Garth (1993: fig. 2c).

Etymology.— The species is named after the Greek god of the sea. The name is used as a noun in apposition.

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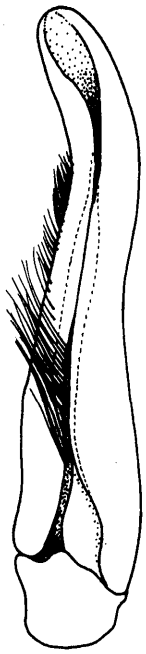

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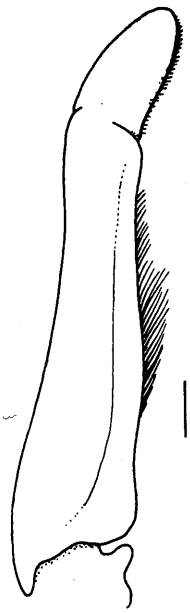

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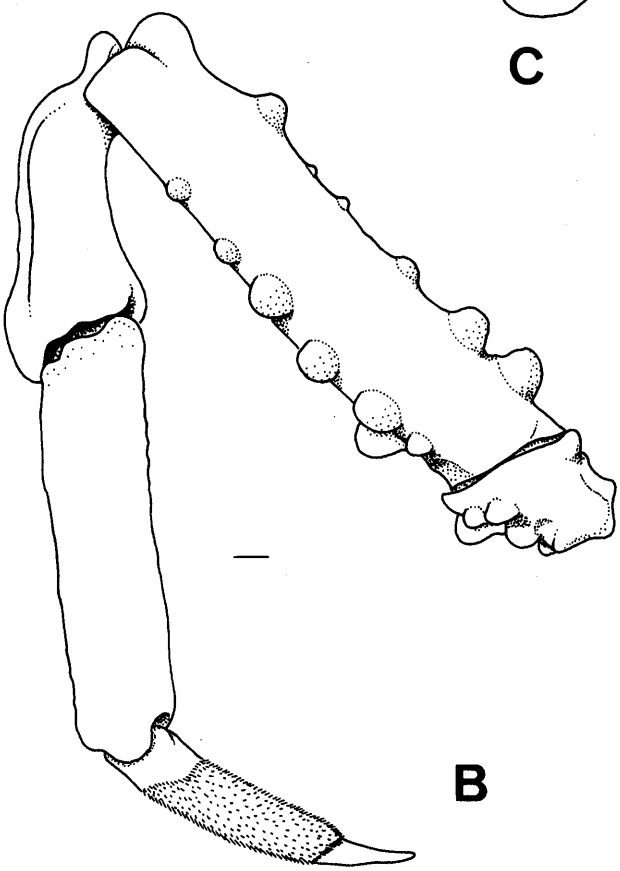

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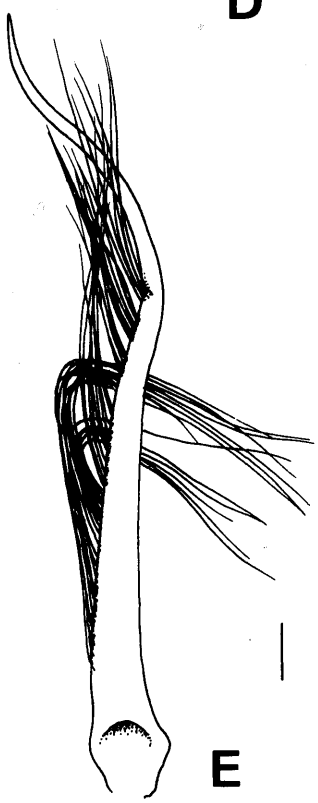

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