

Taxonomic studies on the genus *Grandidierella* Coutière (Crustacea, Amphipoda)

III. Fijian, Australian and Saudi Arabian species

by Alan A. MYERS *

Abstract. — Seven species of *Grandidierella* Coutière are recorded from Fiji, Australia (including Lord Howe Island) and Saudi Arabia. These represent the first published records for the genus from Australia and Saudi Arabia. Six species are figured, including three species which are new to science. A review of the literature published since the appearance of RUFFO's (1958) bibliography on the genus is provided.

Résumé. — Étude de sept espèces de *Grandidierella* Coutière des îles Fidji, d'Australie (y compris l'île Lord Howe) et d'Arabie Saoudite : trois sont nouvelles pour la Science et trois sont signalées d'Australie et d'Arabie Saoudite pour la première fois. La figuration de six espèces, dont les trois nouvelles, est donnée. Les travaux sur le genre *Grandidierella* publiés depuis la parution de la bibliographie de RUFFO (1958) sont cités en référence.

INTRODUCTION

This paper reports on collections of *Grandidierella* Coutière made by the writer in Fiji, together with material collected by Dr. D. A. JONES in Saudi Arabia, and on collections in the Australian Museum, made available to me for study by Dr. J. K. LOWRY. Three species, *G. teres* sp. nov. from Fiji, *G. insulae* sp. nov. from Lord Howe Island, and *G. exilis* sp. nov. from Saudi Arabia are new to science. One species, *G. bispinosa* Schellenberg, was formerly known only from the Bismarck Archipelago and Amboina, two species, *G. japonica* Stephensen and *G. gilesi* Chilton, are quite widely distributed whilst one species, *G. bonnieroides* Stephensen, is circumtropical. Figures of all species except the well documented *G. bonnieroides* are given.

RUFFO (1958) published a useful bibliography of published works on the genus. Since then, several important publications have appeared including the description of six new species. With the three new species described herein, the known species of *Grandidierella* now number twenty-six. The following list includes papers published since 1958 :

- G. bispinosa* Schellenberg, 1938. BOUSFIELD, 1971 (Bismarck Archipelago) ; LEDOYER, 1979 (Amboina, Indonesia) ; Herein (Fiji).
G. bonnieroides Stephensen, 1948. NAYAR, 1959, 1965 (as *G. bonnieri*) (India) ; LEDOYER, 1967, 1968, (as *G. bonnieri*) and 1973 (Madagascar) ; MYERS, 1970 (South America ; Caribbean ; Gulf of Mexico ; East Africa), 1972 (Madagascar) ; GRIFFITHS, 1973, 1974b (as *G. bonnieri*) and 1974c (South Africa) ; herein (Queensland, Australia ; Saudi Arabia).

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- G. chelata* K. H. Barnard, 1951. GRIFFITHS, 1974a, 1974c (South Africa).
G. dentimera Myers, 1970. MYERS, 1970 (Hawaii).
G. exilis sp. nov., herein (Saudi Arabia).
G. gilesi Chilton, 1921. IMBACH, 1967 (South China Sea); SIVAPRAKASAM, 1970 (India); LEDOYER, 1979 (Java and ? Madagascar); herein (New South Wales, Australia).
G. grossimana Ledoyer, 1968. LEDOYER, 1968 (Madagascar).
G. indentata Ledoyer, 1979. LEDOYER, 1979 (Java).
G. insulae sp. nov., herein (Lord Howe Island).
G. japonica Stephensen, 1938. NAGATA, 1960 (Seto Sea, Japan); KUDRJASCHOV & TZVETKOVA, 1975 (Sea of Okhotsk); CHAPMAN & DORMAN, 1975 (California); herein (New South Wales, Australia).
G. lignorum K. H. Barnard, 1935. GRIFFITHS, 1974b, 1974c, 1975 (South Africa).
G. lutosa K. H. Barnard, 1952. GRIFFITHS, 1975 (South Africa).
G. makena (J. L. Barnard) comb. nov. BARNARD, 1970 (as *Neomicrodeutopus makena*) (Hawaii).
G. mahafalensis Coutière, 1904. MYERS, 1972 (Madagascar).
G. nyala (Griffiths) comb. nov. GRIFFITHS, 1974c (as *Neomicrodeutopus nyala* (South Africa)).
G. perlata Schellenberg, 1938. MYERS, 1970 (Marianas).
G. spinicoxa Myers, 1972. LEDOYER, 1969 (as *G. bonnieri*) (Madagascar); MYERS, 1972 (Madagascar).
G. teres sp. nov., herein (Fiji).

Eight species have not been reported on since 1958. These are : *G. africana* Schellenberg, *G. bonnieri* Stebbing, *G. cabindae* (Schellenberg), *G. elongata* Chevreux, *G. gravipes* K. H. Barnard, *G. macronyx* K. H. Barnard, *G. megnae* Giles, and *G. nottoni* Shoemaker.

The genus *Neomicrodeutopus* Schellenberg is said to differ from *Grandidierella* mainly in the presence of a very short article 1 to the mandibular palp. The writer has not had the opportunity of studying the type species of the genus *Neomicrodeutopus* (*N. cabindae* Schellenberg) and so cannot ascertain whether it merits generic distinction from *Grandidierella*. What does seem clear, is that the genus as at present constituted is merely a polyphyletic grouping of *Grandidierella* species with short mandibular-palp article 1. For the moment, the genera are best synonymised, all *Neomicrodeutopus* species being attributed to *Grandidierella* in the above table.

***Grandidierella bispinosa* Schellenberg**

(Figs 1-2)

Grandidierella bispinosa Schellenberg, 1938 : 92, fig. 47.

MATERIAL STUDIED : Fiji : 3 ♂, 2 ♀, Mburelevu, 25.viii.1979, among *Syringodium* sp. on reef flat; 4 ♂, 3 ♀, Suva Point, 29.viii.1979, among *Halophila ovata*, seaward fringe of *Rhizophora* thicket; 1 ♀, Momi Bay, 7.ix.1979, among *Syringodium* sp. on reef flat; 1 ♂, 1 ♀, Suva point, 10.x.1979, in mangrove litter; 8 ♂, 13 ♀, 2 immature, Laucala Island, 16.x.1979 in mangrove litter.

DISCUSSION : Present material agrees well with the original description and figures of SCHELLENBERG (1938). Minor differences are the somewhat more oval carpus of the male gnathopod 1, with a single medio-distal tooth on the inner face, rather than the two medio-proximal teeth on the inner face exhibited by SCHELLENBERG's material, and the more distinctly crenulate anterior margin of the male gnathopod 2 basis. Material described recently from Amboina, Indonesia (LEDOYER, 1979) lacks lateral teeth on the inner face

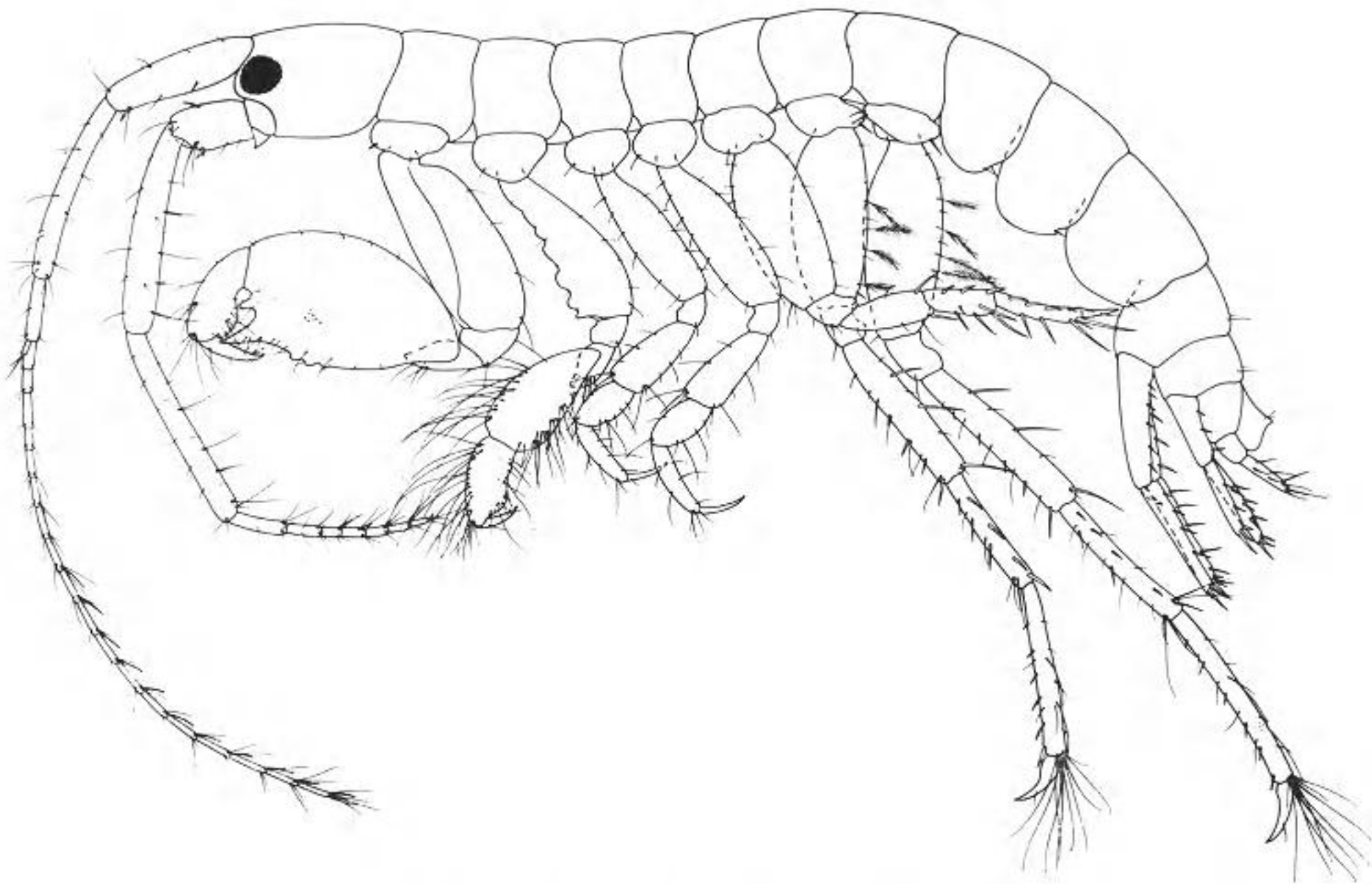


FIG. 1. — *Grandidierella bispinosa* Schellenberg. ♂ 4.0 mm, Suva Point, Fiji.

of the male gnathopod 1 carpus and also any indication of crenulation on the male gnathopod 2 basis. This does not appear to be due to immaturity since these characters are apparent in Fijian males from 3.0 mm. The maximum size of Fijian material is 4.3 mm.

DISTRIBUTION : Indonesia and Melanesia.

***Grandidierella teres* sp. nov.**

(Fig. 3)

MATERIAL STUDIED : 2 ♂, 1 ♀, Taunovo Bay, Fiji, 21.viii.1979, among *Syringodium* sp. on reef flat.

DESCRIPTION

♂ length 2.8 mm. Pereon lacking sternal processes. Antenna 1 peduncular articles in the ratios, 4 : 5 : 2, primary flagellum shorter than peduncle with about 9 articles, accessory flagellum rudimentary, composed of a single slender article, little more than half length of first flagellar article. Antenna 2 slender, peduncular articles 4 and 5 sub-equal, flagellum shorter than fifth peduncular article with only three articles. Mandibular palp article ratios 5 : 4 : 5, article 3 not markedly expanded distally. Gnathopod 1 coxa rounded, basis elongate, flask-shaped, merus short, sub-triangular, carpus sub-ovoid,

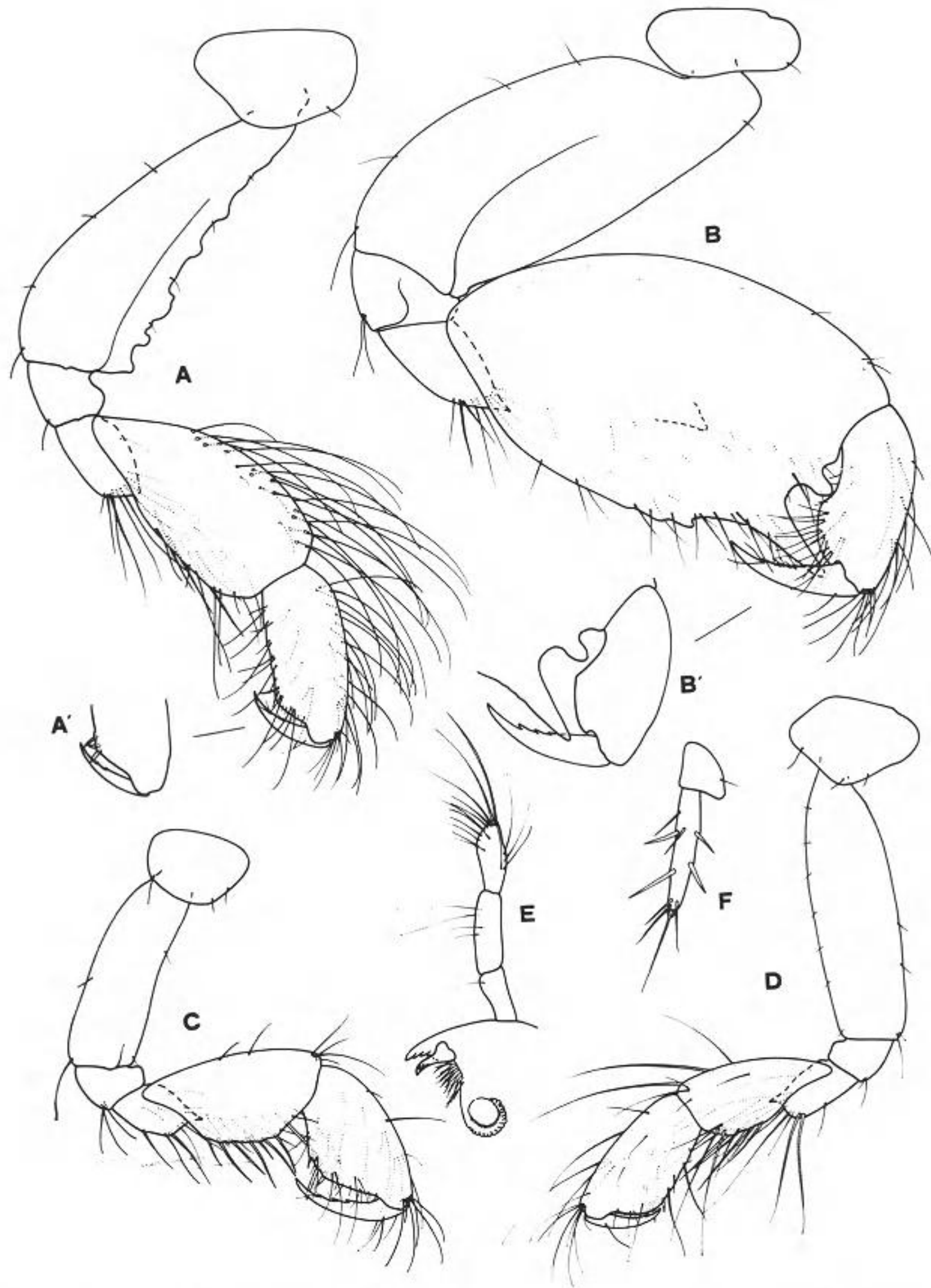


FIG. 2. — *Grandidierella bispinosa* Schellenberg. ♂ 4.0 mm, Suva Point, Fiji : A, gnathopod 2 with A' detail of palm ; B, gnathopod 2 with B' detail of distal end of carpus and propodus ; E, mandibular palp ; F, uropod 3, ♀ 4.0 mm, Suva Point ; C, gnathopod 1 ; D, gnathopod 2.

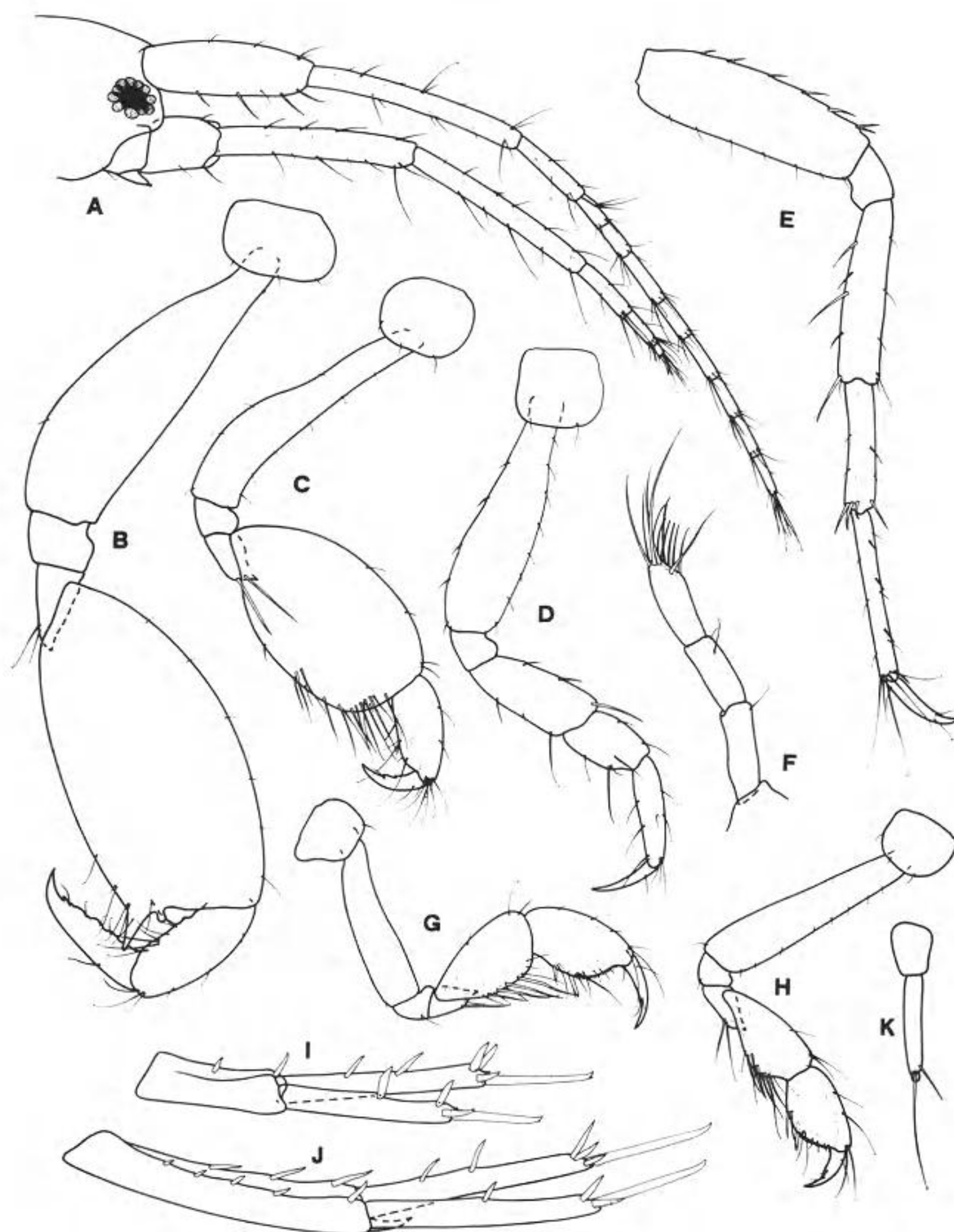


FIG. 3. — *Grandidierella teres* sp. nov. ♂ paratype, 2.8 mm Taunovo Bay, Fiji : A, head ; B, gnathopod 1 ; C, gnathopod 2 ; D, pereopod 3 ; E, pereopod 6 ; F, mandibular palp ; I, uropod 2 ; J, uropod 1 ; K, uropod. 3. — ♀ paratype 2.5 mm, Taunova Bay, Fiji : G, gnathopod 1 ; H, gnathopod 2.

produced at the postero-distal corner into a strong acute, and outwardly deflected tooth, at the base of which, on the distal margin, is a small rounded tooth, and on the inner face of the distal margin, a rounded, slightly indented flange, propodus almost parallel-sided dactylus stout, strongly hooked at the tip and with an irregular posterior margin. Gnathopod 2 coxa rounded, basis extremely slender, especially proximally, carpus enlarged, sub-ovoid, the distal margin very broad, propodus about one third the breadth of the

carpus. Pereopod 3 basis flask-shaped, dactylus about two thirds length of propodus. Uropod 1 slender, distal end of peduncle with a short inter-ramal tooth, rami sub-equal, shorter than peduncle. Uropod 2 peduncle without inter-ramal process, inner ramus longer than outer and about one and a half times length of peduncle. Uropod 3 slender, ramus twice length of peduncle, lacking marginal spines, and bearing a small second article.

♀ length 2.5 mm. Gnathopod 1 basis slender, carpus and propodus sub-equal, propodus with evenly rounded palm and a medial and medio-proximal spine. Gnathopod 2 similar to gnathopod 1 but slightly weaker, with carpus a little longer than propodus. Eggs (in live specimens) vivid emerald green.

DISCUSSION : This species resembles *G. grossimana* Ledoyer in the expanded carpus of the male gnathopod 2, however *G. teres* is very sparsely setiferous, whereas *G. grossimana* has the anterior margin of the gnathopod 2 carpus and the posterior margins of the gnathopod 1 merus and carpus strongly setose. In addition, the gnathopod 2 carpus of male *G. grossimana* is produced into a dentiform process or is angular, at the postero-distal corner, whereas in *G. teres*, the postero-distal corner is smoothly rounded. Lastly the uropod 3 ramus of *G. grossimana* is spatulate, but slender and rod-shaped in *G. teres*.

TYPES : ♂ holotype (AM 1337), 1 ♀ paratype (AM 1338) deposited in Muséum national d'Histoire naturelle, Paris.

***Grandidierella japonica* Stephensen**

(Fig. 4)

Grandidierella japonica Stephensen, 1938 : 179, figs. 1-2.

MATERIAL EXAMINED : Australia : 1♂, 2 ♀, 150 m off Green Point, Hawksbury river, New South Wales 12.i.1977, 1 ♂ Courangra, Hawksbury River 30 m off shore 3.v.1977, 3 ♂, 9 ♀, 2nd bend upstream from Sentry box reach 80 m off creek mouth, 7.v.1979.

DISCUSSION : This species is quite widely distributed in the Pacific probably due to anthropochore dispersal. Present material differs from that described and figured by STEPHENSEN (1938) and by CHAPMAN & DORMAN (1975) in lacking an accessory tooth on the inner posterior margin of the ♂ gnathopod 1 carpus, but in other respects agrees well with those descriptions. STEPHENSEN (1938) records a male length of 11 mm and a female length of 9 mm. CHAPMAN & DORMAN (1975) give 22 mm and 13 mm respectively. In present material the largest male measures 4.0 mm and the largest female 4.5 mm.

***Grandidierella bonnieroides* Stephensen**

Grandidierella bonnieroides Stephensen, 1948 : 12, fig. 3.

MATERIAL EXAMINED : Australia : 71 ♂, 50 ♀, 57 immature, eastern end of mangrove beach, Lizard Island, Queensland, 10.x.1978, sediment samples of sand and detritus from near mangroves, 1.5 m, C. Short ; 1 ♀ ditto locality and date, core sample positioned near Goby burrow in sand bottom, 1.5 m, A. R. JONES ; 31 ♂, 58 ♀, 7 immature, ditto locality, 11.x.1978, sediment sample

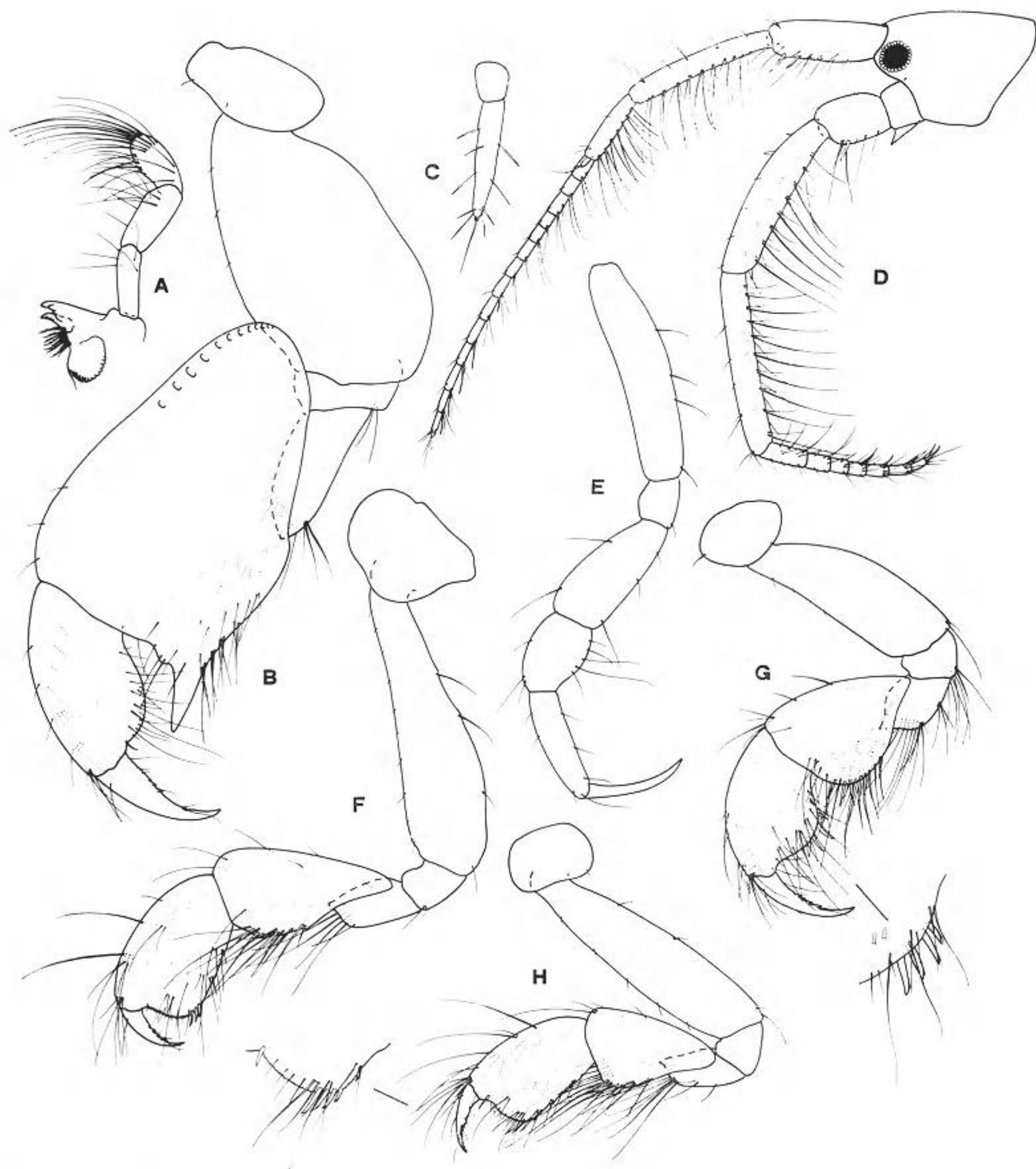


FIG. 4. — *Grandidierella japonica* Stephensen. ♂ 4.0 mm, Hawksbury river, New South Wales : A, mandibular palp ; B, gnathopod 1 ; C, uropod 3 ; D, head ; E, pereopod 3 ; F, gnathopod 2. — ♀ 4.5 mm, Hawksbury river : G, gnathopod 1 ; H, gnathopod 2.

from high detritus area among mangrove roots, 1.2 m, J. K. LOWRY. Saudi Arabia : 33 ♂, 51 ♀, 42 immature, Dawhat as Sayh lagoons, August 1974, salinity 58 ‰, D. A. JONES.

DISTRIBUTION : Circumtropical.

***Grandidierella insulae* sp. nov.**

(Fig. 5)

MATERIAL EXAMINED : 1 ♂, 1 ♀ Lord Howe Island, 11.v.1977, under inter-tidal rocks at north end of Old Settlement Beach, J. K. LOWRY and G. D. FENWICK.

DESCRIPTION

♂ length 4.8 mm. Pereon lacking sternal processes. Antenna 1 peduncular articles in the ratios 10 : 12 : 5, peduncular article 1 with antero-distal tooth-like process, flagellum shorter than peduncle with 5 articles, accessory flagellum rudimentary composed of a single article about half length of first flagellar article. Antenna 2 peduncular article 5 a little longer than 4, flagellum shorter than peduncular article 5 with 5 articles. Mandibular palp article ratios 13 : 14 : 16 article 3 scarcely expanded distally. Gnathopod 1 coxa unproduced, basis very stout, less than twice as long as broad, carpus massive, broad, about one and one half times as long as broad, the posterior distal corner produced into two strong teeth, the outer the longer and separated by a round-bottomed sinus from the inner, propodus posterior margin strongly concave proximally, palm somewhat produced and evenly rounded, anterior distal corner produced into a small tooth-like process, dactylus stout. Gnathopod 2 basis slender, flask-shaped, carpus very elongate, over three quarters length of basis and nearly three times as long as broad, propodus a little over half length of carpus, palm defined by a close group of three spines, dactylus fitting palm. Pereopod 3 dactylus about three quarters length of propodus. Uropod 1 basis elongate, much longer than rami and terminating in a short, stout, inter-ramal acute process, rami spinous, outer ramus slightly the longer. Uropod 2 peduncle without inter-ramal process, rami spinous, inner ramus markedly longer than outer and about equal in length to peduncle. Uropod 3 peduncle inner margin strongly expanded into a rounded flange, ramus about one and one half times as long as broad with a small second article.

♀ length 5.0 mm. Gnathopod 1 basis stout about twice as long as broad, carpus and propodus sub-equal, propodus posterior margin with three strong medial spines, postero-distal portion of palm excavated, dactylus relatively long, reaching central spine when in closed position. Gnathopod 2 basis slender, carpus a little longer than propodus.

DISCUSSION : *G. insulae* sp. nov. is undoubtedly very close *G. makena* (J. L. Barnard). It differs from the latter species in the shape of the propodus of the male gnathopod 1, in the very elongate carpus of the male gnathopod 2 and in the more elongate, unexpanded article 3 of the mandibular palp. The shape of the male gnathopod 1 basis is not described or figured by BARNARD (1970) for *G. makena* (as *Neomicrodeutopus* (?) *makena*), however, the relatively narrow point of attachment of the basis and ischium indicated by BARNARD

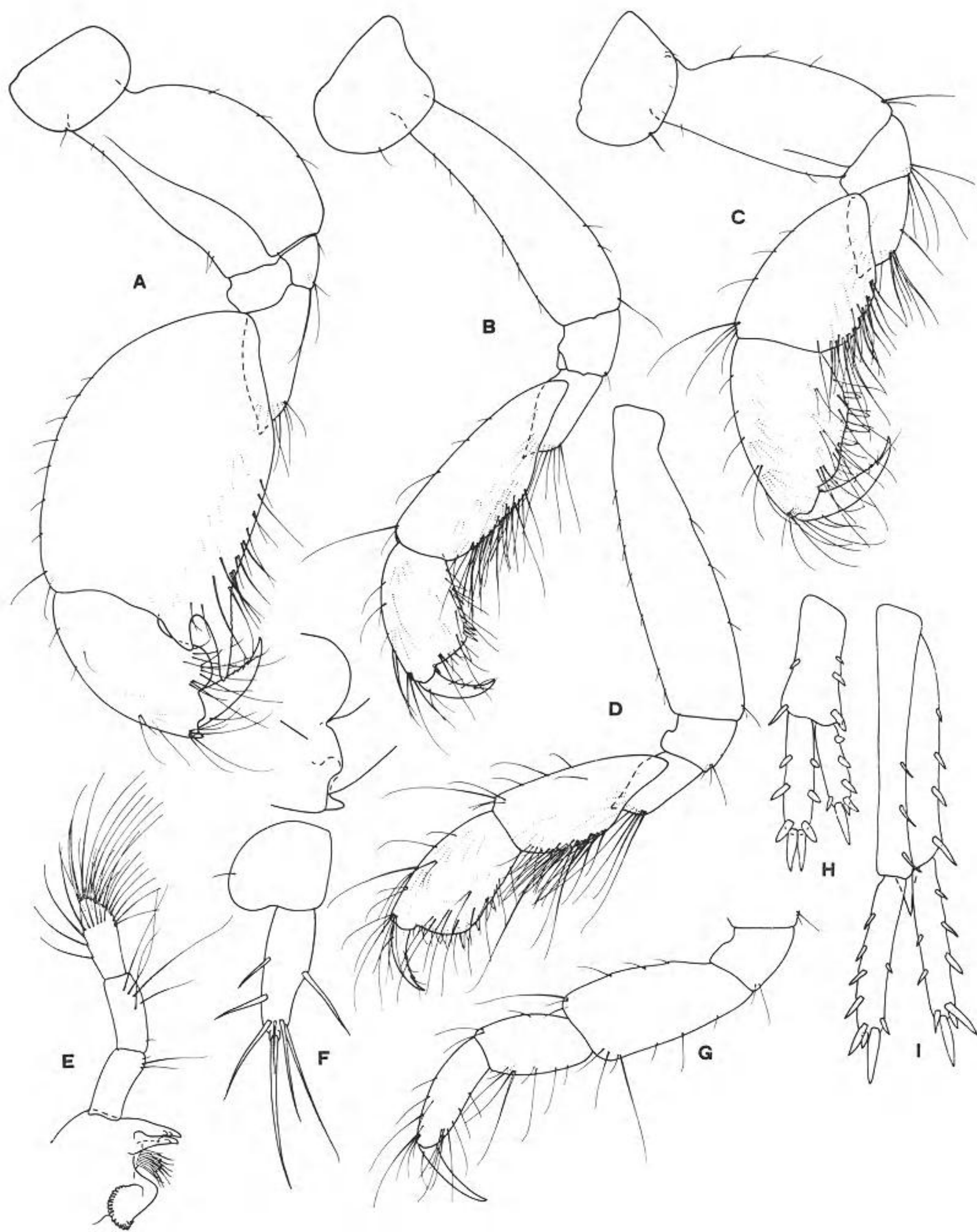


FIG. 5. — *Grandidierella insulae* sp. nov. ♂ holotype, 4.8 mm, Lord Howe Island : A, gnathopod 1 ; B, gnathopod 2 ; E, mandibular palp ; F, uropod 3 ; G, pereopod 3, arts 3-7 ; H, uropod 2 ; I, uropod 1. — ♀ paratype 5.0 mm, Lord Howe Island : C, gnathopod 1 ; D, gnathopod 2.

(fig. 47e) suggest that the basis of *G. makena* may be less stout than in the present species. *G. insulae* may prove to be only a form or sub-species of *G. makena* but for the present they are considered as sibling species. As yet, neither species is known from the intervening islands between Hawaii and Lord Howe.

Types : ♂ holotype, 1 ♀ paratype deposited in Australian Museum, Sydney.

***Grandidierella gilesi* Chilton**

(Fig. 6)

Grandidierella gilesi Chilton, 1921 : 552, fig. 11.

MATERIAL EXAMINED : 4 ♂, 8 ♀, 1 immature, Port beacon, offshore from large brick building, Brooklyn Gut, Hawksbury river, New South Wales, Australia, 22.II.1978.

DISCUSSION : This species was incompletely described and figured by CHILTON (1921) but has more recently been figured by IMBACH (1967) and LEDOYER (1979). It is figured here for comparison with the following species. In the light of the close similarity between this and the following species, the record of *G. gilesi* from Madagascar (LEDOYER, 1979) requires confirmation.

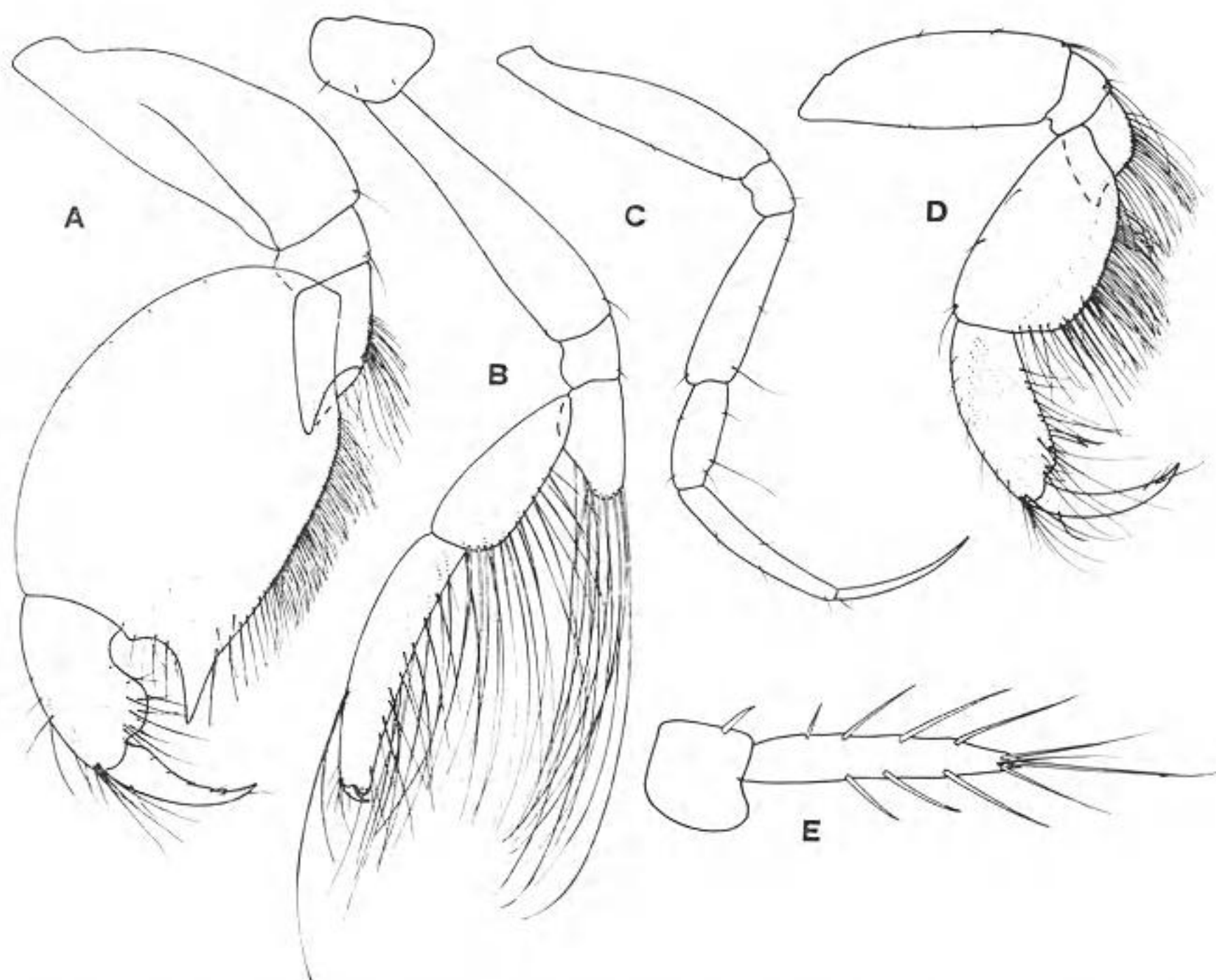


FIG. 6. — *Grandidierella gilesi* Chilton. ♂ 7.0 mm, Hawksbury river, New South Wales : A, gnathopod 1 ; B, gnathopod 2 ; C, pereopod 3 ; E, uropod 3. — ♀ 7.0 mm, Hawksbury river : D, gnathopod 1.

***Grandidierella exilis* sp. nov.**

(Fig. 7-8)

MATERIAL EXAMINED : 3 ♂, 6 ♀, Lagoons Dawhat as Sayh, Arabian Gulf, Saudi Arabia, salinity 58 ‰, August 1974, D. A. JONES.

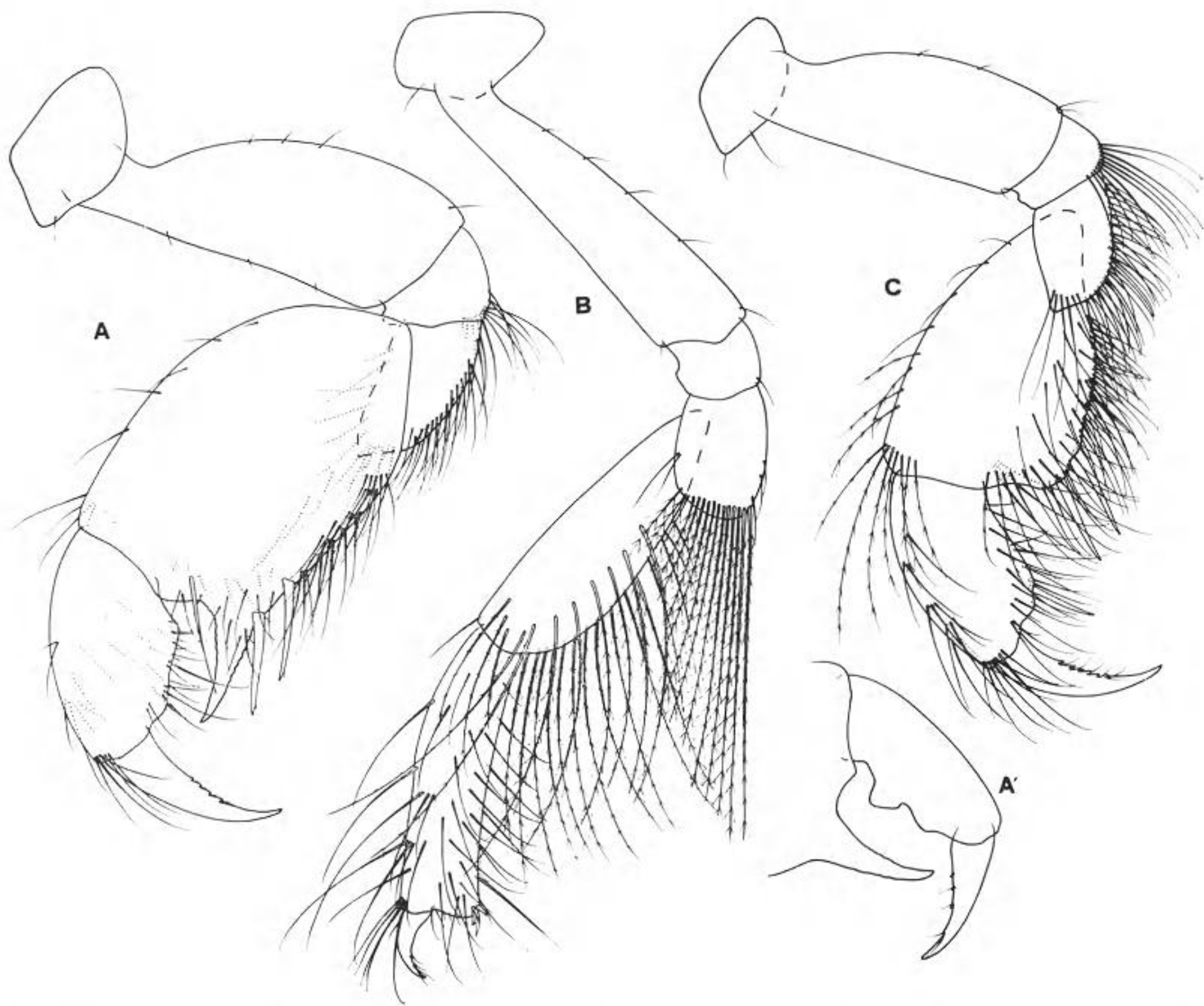


FIG. 7. — *Grandidierella exilis* sp. nov. ♂ 7.5 mm, lagoons Dawhat as Sayh, Saudi Arabia : A, gnathopod 1, A' gnathopod 1 propodus hyperadult ; B, gnathopod 2. — ♀ 8.0 mm, lagoons Dawhat as Say : C, gnathopod 1.

DESCRIPTION

♂ length 7.5 mm. Pereon segment 1 with a strong, forward curved, spinous mid-ventral process. Antenna 1 peduncular articles in the ratios 3 : 3 : 1, primary flagellum shorter than peduncle with about 17 articles, accessory flagellum wanting. Antenna 2 stout, peduncular articles 4 and 5 sub-equal, flagellum shorter than fifth peduncular article with 3 articles. Mandibular palp article ratios 3 : 5 : 5, article 3 not markedly expanded

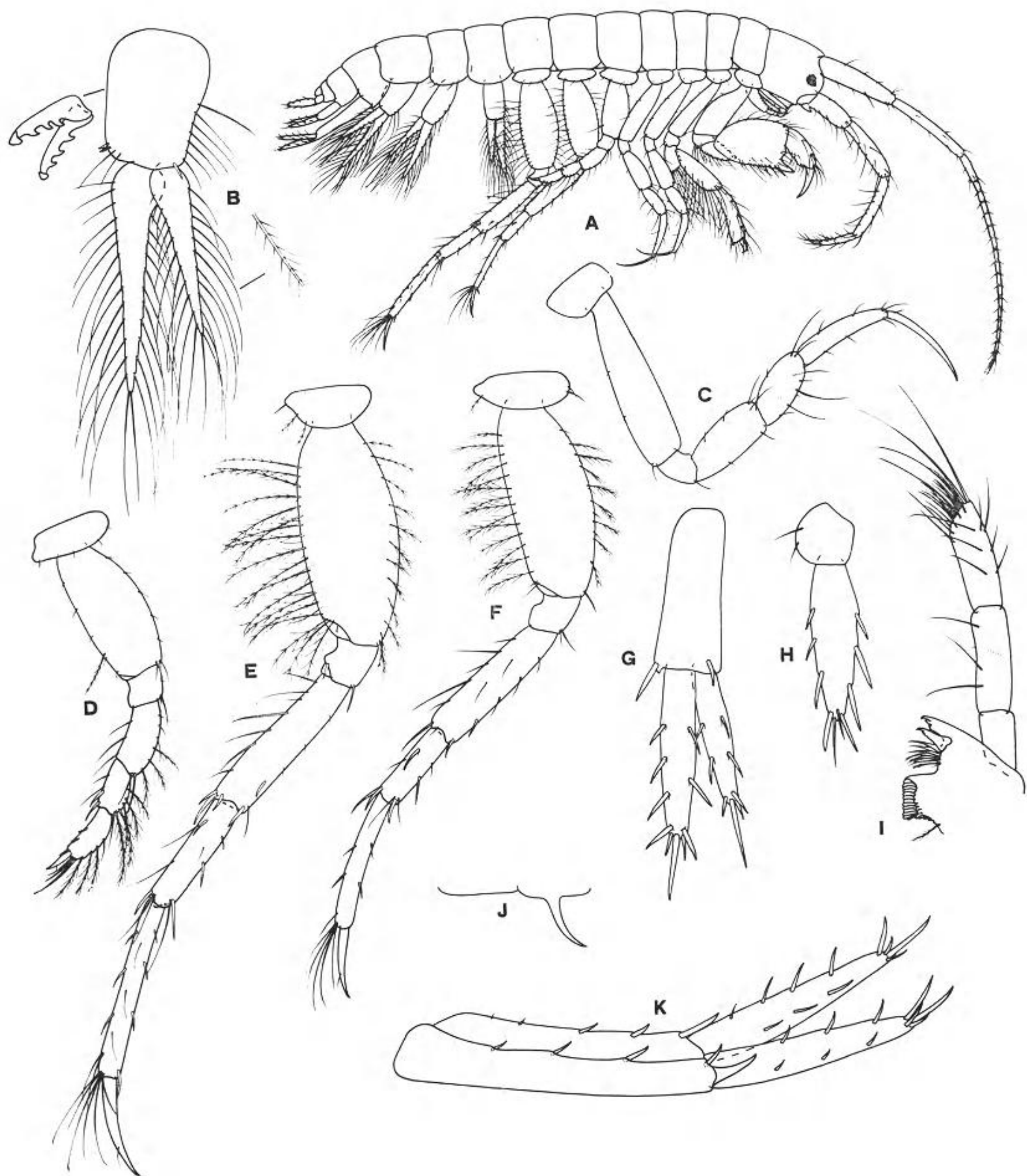


FIG. 8. — *Grandidierella exilis* sp. nov. ♂ 7.5 mm, lagoons Dawhat as Sayh, Saudi Arabia : A, entire specimen ; B, pleopod ; C, pereopod 3 ; D, pereopod 5 ; E, pereopod 7 ; F, pereopod 6 ; G, uropod 2 ; H, uropod 3 ; I, mandibular palp ; J, pereon process ; K, uropod 1.

distally. Gnathopod 1 coxa sub-quadrangular, basis stout, anterior margin straight, carpus about one and one half times as long as broad, the posterior-distal margin produced into a long slender, acute tooth at the base of which, on the posterior margin are inserted two very stout, long spines, propodus posterior margin sinuous, becoming characteristically bilobed in hyperadults, dactylus long and stout. Gnathopod 2 basis markedly broadening distally, merus spatulate, bearing a row of long pectinate setae, carpus and propodus slender, carpus very slightly the longer, propodus distal end expanded, palm transverse, dactylus fitting palm. Pereopod 3 basis slender, propodus and dactylus slender, sub-equal. Uropod 1 peduncle with short inter-ramal tooth, rami sub-equal, shorter than peduncle. Uropod 2 peduncle without inter-ramal process, inner ramus longer than outer and scarcely longer than peduncle. Uropod 3 ramus medially expanded, about three times length of peduncle.

♀ length 8.0 mm. Gnathopod 1 basis stout, carpus broadest distally, posterior distal margin angular, bearing two strong, long spines, propodus less than twice as long as broad, and about two thirds length of carpus, dactylus stout, greatly overlapping palm.

DISCUSSION : This species although clearly closely related to *G. gilesi* Chilton, differs from that species in a number of significant ways. The male gnathopod 1 carpus is less ovoid, the postero-distal tooth longer than in *G. gilesi*, and the two stout marginal spines are wanting in the latter species ; the posterior margin of the propodus is sinuous, becoming bilobed in *G. teres* but concave proximally convex distally in *G. gilesi*. The female gnathopod 1 carpus has the posterior margin more expanded and angular in *G. exilis*, and like the male has two stout spines (lacking in *G. gilesi*). In addition the propodus is broader than in *G. gilesi*. In the male and female gnathopod 2, the carpus and propodus are sub-equal in *G. exilis* but the propodus is markedly longer than the carpus in *G. gilesi*, whilst the palm is transverse in *G. exilis* but expanded into a rounded, forward projecting process in *G. gilesi*. Finally, uropod 3 is medially expanded in *G. exilis* but elongate and slender in *G. gilesi*.

TYPES : ♂ holotype (AM 1339), 1 ♀ paratype (AM 1340) deposited in Muséum national d'Histoire naturelle, Paris.

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