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A NEW SPECIES OF *CALLIAPAGUROPS* DE SAINT LAURENT FROM THE PHILIPPINES WITH A DISCUSSION OF THE TAXONOMIC POSITION OF THE GENUS (THALASSINIDEA, CALLIANASSIDAE)

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ABSTRACT

The genus *Calliapagurops* De Saint Laurent was established in 1973 for a new species, *Calliapagurops charcoti*, of which the holotype and only known specimen, collected at the Azores, was a badly damaged female without abdomen and pereiopods 4, 5.

Four specimens belonging to a new species of *Calliapagurops* from the Philippines are described in this work. They confirm the validity of the genus and reveal its close relationship with certain genera of the subfamily Callichirinae Manning & Felder, 1991. The genus seems better placed in the latter subfamily than in the Calliapaguropinae, as proposed by Sakai (1999). This is discussed.

RÉSUMÉ

Le genre *Calliapagurops* De Saint Laurent a été établi en 1973 pour une espèce nouvelle, *Calliapagurops charcoti*, dont le holotype et le seul spécimen connu, récolté dans les Açores, était une femelle en mauvais état, dépourvue d'abdomen et des péréiopodes 4, 5.

Quatre spécimens d'une nouvelle espèce de *Calliapagurops* font l'objet de cette note. Ils confirment la validité du genre qui se révèle proche de certains genres de la sous-famille des Callichirinae Manning & Felder, 1991. L'inclusion de *Calliapagurops* dans cette dernière sous-famille semble mieux justifiée que dans celle des Calliapaguropinae proposée par Sakai (1999). Ceci est discuté.

INTRODUCTION

The genus *Calliapagurops* De Saint Laurent was established in 1973 for a new species, *Calliapagurops charcoti*, which was briefly diagnosed. The holotype and only known specimen was a damaged (probable) female, with a carapace length of 9.5 mm and missing abdomen and pereiopods 4, 5, from the Azores. Its long cylindrical eyestalks nevertheless justified its placement in a new genus. The

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species was redescribed and partly figured by Sakai (1999: 8, fig. 1) who erected a new subfamily, Calliapaguropinae, for it.

Four specimens of another species of *Calliapagurops* (three of them complete and in good condition), obtained from the Philippines in 1980 and 1985, were earlier identified as a new species by M. De Saint Laurent, but remained undescribed in the collections of the Muséum national d'Histoire naturelle, Paris. Their description and figures are given herein.

The present work uses the generic and subfamilial subdivisions proposed by Tudge et al. (2000), in the latest phylogenetic analysis of the Callianassidae. It considers the position of *Calliapagurops* in the subfamilies recognized by them and in the scheme by Sakai (1999), which (independently) synonymized most of these subfamilies and introduced the monotypic Calliapaguropinae for this genus. *Calliapagurops* was previously placed in the subfamily Callianassinae by Manning & Felder (1991) and was not included in the phylogenetic analysis of the Callianassidae by Tudge et al. (2000). Description of the new material from the Philippines confims the validity of the genus and also reveals its close relationship with certain genera of the Callichirinae Manning & Felder, 1991. *Calliapagurops*, therefore, seems better placed in the latter subfamily rather than in the Calliapaguropinae, as proposed by Sakai (1999).

Measurements (in mm) given in the description are: carapace length (cl.), measured from the tip of the rostrum (rostral spine not included) to the posterior border of the carapace, and total length (tl.), measured from the tip of the rostrum to the posterior border of the telson.

The material studied belongs in the collections of the Muséum national d'Histoire naturelle, Paris (MNHN), the Natural History Museum, London (BMNH) and the Swedish Museum of Natural History (SMNH).

SYSTEMATIC ACCOUNT

Family CALLIANASSIDAE Dana, 1852

Subfamily CALLICHIRINAE Manning & Felder, 1991

Genus **Calliapagurops** De Saint Laurent, 1973

Calliapagurops De Saint Laurent, 1973: 515. — Poore, 1994: 101. — Sakai, 1999: 8.

Type species. — *Calliapagurops charcoti* De Saint Laurent, 1973 by monotypy and original designation.

Diagnosis (amended from De Saint Laurent, 1973). — Carapace with faint dorsal oval, long rostral and anterolateral spines; linea thalassinica complete.

Abdominal somite 2 longest, longer than somite 6; telson wider than long, with rounded outline and transverse dorsal crest bearing spiniform setae. Eyestalks cylindrical, length 3-4 times diameter of terminal corneas. Antenna 1 peduncle reaching approximately middle of much heavier antenna 2 peduncle; antennal scale small. Epipod of maxilliped 1 with elongated anterior lobe. Epipod of maxilliped 2 small. Maxilliped 3 ischium and merus operculiform (sensu Manning & Felder, 1991: ischium-merus length less than two times merus width), 3 or more meral spines on distal margin; propodus widened proximally, dactylus digitiform; exopod absent. Pereiopod 1 unequal in males, subequal in females with numerous spines on lower border of ischium and merus. Pereiopod 4 chelate, with fixed finger nearly as long as dactylus; pereiopod 5 chelate. Pleopod 1 uniramous, pleopod 2 biramous with small terminal appendix interna in both sexes, no appendix masculina in males. Pleopods 2-5 foliaceous and biramous with appendix interna partly embedded in margin of endopod in both sexes. Uropodal endopod elongated-ovate, longer than telson.

Calliapagurops foresti new species (figs. 1-3)

Material examined. — Holotype: Philippines, MUSORSTOM 2, st. 71, 14°00.1′N 120°17.8′E, 30.xi.1980, 189 m: ♂, cl. 14 mm, tl. 57 mm (MNHN-Th 720). Paratypes: Philippines, MUSORSTOM 2, st. 62, 14°00.4′N 120°17′E, 29.xi.1980, 186 m: 1 ♂ without abdomen, cl. 14.5 mm (MNHN-Th 1397); MUSORSTOM 3, st. 109, 14°00.2′-14°00.4′N 120°17.6′-120°19′E, 2.vi.1985, 190-198 m: 1 ♀, cl. 13 mm, tl. 55 mm (MNHN-Th 1398); MUSORSTOM 3, st. 102, 14°00.8′N 20°17.8′E, 1.vi.1985, 192 m: 1 ♀, cl. 8.5 mm, tl. 30.5 mm (MNHN-Th 1399).

Other material, examined for comparison *Calliapagurops charcoti* De Saint Laurent, 1973: 1 ♀, holotype, Azores Islands (MNHN-Th 345); *Corallianassa articulata* (Rathbun, 1906): 1 ♂, Gilbert Island, Apamama (SMNH 27304; old n° 16226); *Corallianassa borradailei* (De Man, 1928): 3 ♀♀, Sandwich Islands (BNHM 1859:79); *Corallianassa longiventris* (A. Milne-Edwards, 1870) types, 1 ♀, 1 ♂, Martinique (MNHN-Th 86 & 87), 1 ♀, Bahia (MNHN-Th 505).

Diagnosis. — As for the genus, with the following details added: eyestalks narrowing distally, not reaching base of last article of antenna; maxilliped 3 with 6-10 spines on distal margin of merus; pereiopod 1 ischium with 7-8 lower spines, merus with 6-7 lower spines, major appendage with both fixed finger and dactylus bearing low triangular tooth near midpoint of cutting edge.

Description. — Carapace with linea thalassinica well defined and faint dorsal oval; trispinous with long and acute rostral spine extending nearly to base of corneas, flanked by shorter anterolateral spines, all three spines bearing noncalcified area proximally. Eyestalks cylindrical, narrowing distally, length about 3.5-4 times diameter of corneas, latter rounded, terminal on eyestalks, brown in preserved material. Abdominal somite 2 longest, slightly longer than somite 6, latter

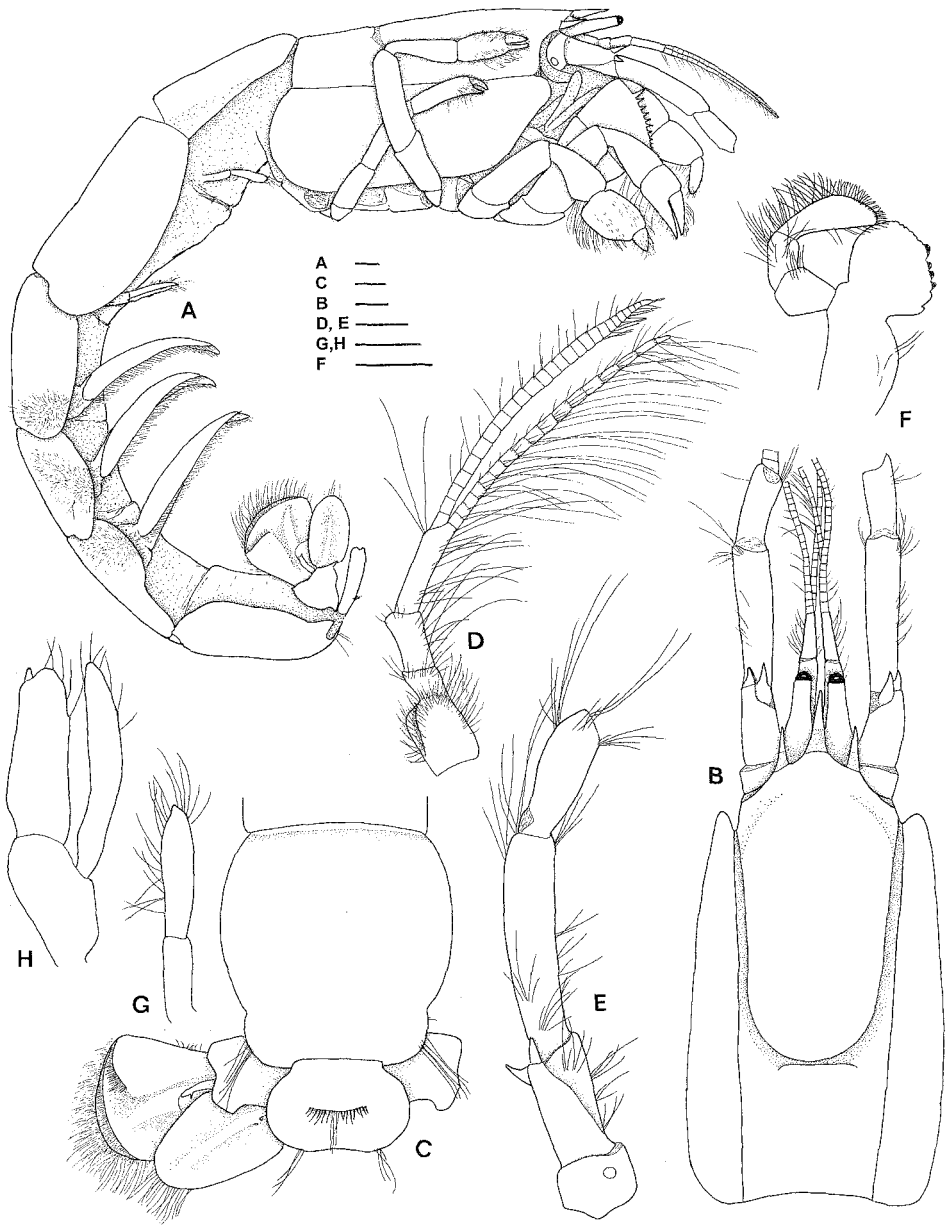

Fig. 1. *Calliapagurops foresti* new species. A-C, G, H, holotype male (MNHN-Th 720); D-F, male paratype (MNHN-Th 1397). A, lateral view, pereiopod 1 omitted; B, anterior part of body, dorsal view; C, 6th abdominal somite, telson, and left uropod, dorsal view; D, E, antennae 1 and 2, respectively, lateral view; F, mandible, outer view; G, H, male pleopods 1 and 2, respectively, anterior view. Scale lines: 1 mm.

with convex lateral borders; somites 3-5 of about same length, with dense tufts of lateral setae. Telson approximately 1.5 times as wide as long, lateral borders rounded, posterior border slightly concave medially, a transverse crest on mid-dorsal surface bearing spiniform setae.

Antenna 1 peduncle about half as long as that of antenna 2, with long setae on lower border; article 1 (bearing statocyst) and 3 of about same length, article 2 a little shorter; flagella slightly overreaching antenna 2 peduncle, lower ramus carrying denser and longer setae than dorsal ramus. Antenna 2 peduncle longer, much thicker but less setose than that of antenna 1, article 5 half as long as article 4; antennal scale small, pointed distally.

Mandible with 3-segmented palp; maxillae 1 and 2, as in fig. 2, with usual morphology for Callianassidae. Maxilliped 1 endopod small, rounded; exopod with weak transverse suture; large epipod with elongated anterior lobe. Maxilliped 2 exopod not overreaching merus; epipod small. Maxilliped 3 ischium and merus of approximately same length, ischium about 1.2 times and merus 1.3 times as wide as long; internal surface of ischium with row of teeth or spines, mesiolateral border of merus rounded, 6-10 spines on distal border (10 in holotype); carpus subtriangular, longer than wide; propodus subrhomboidal, expanded proximally with lower border rounded; dactylus narrow, twice as long as wide; exopod absent.

Paired arthrobranchs on maxilliped 3 and pereiopods 1-4, proximal one on maxilliped 3 rudimentary.

Pereiopods 1 (chelipeds) unequal in male, subequal and more slender in female, with major cheliped of female (fig. 3A) similar to minor cheliped of male (fig. 2B); similar spinulation in both sexes. Ischium with 7-8 lower spines. Upper border of merus rounded proximally, 5-7 spines on lower border, larger in female. Carpus unarmed, with laterally proximal round lobe and keeled lower border, about as long as wide in major cheliped of male, 1.2-1.3 times as long as wide in minor cheliped of male and in female. Propodus unarmed, with lower border keeled, about 1.5 times as long as distal width in major cheliped of male, 1.6-1.7 times in minor cheliped of male and in female; fixed finger with small triangular tooth near proximal 1/3rd of cutting edge of major cheliped, cutting edge of minor cheliped unarmed or finely denticulate in both sexes. Dactylus with curved tip and one or two triangular teeth on cutting edge of major cheliped, unarmed in minor cheliped in both sexes.

Pereiopod 2 chelate, with usual morphology of Callianassidae. Pereiopod 3 propodus oval, approximately 1.2 times as long as wide, lower border rounded with distal small conical expansion; dactylus with subacute tip. Pereiopod 4 propodus (fig. 2D, E) over twice as long as wide, unarmed; fixed finger cylindrical, about as long as dactylus with spiniform setae along inner border and at tip. Pereiopod 5 chelate.

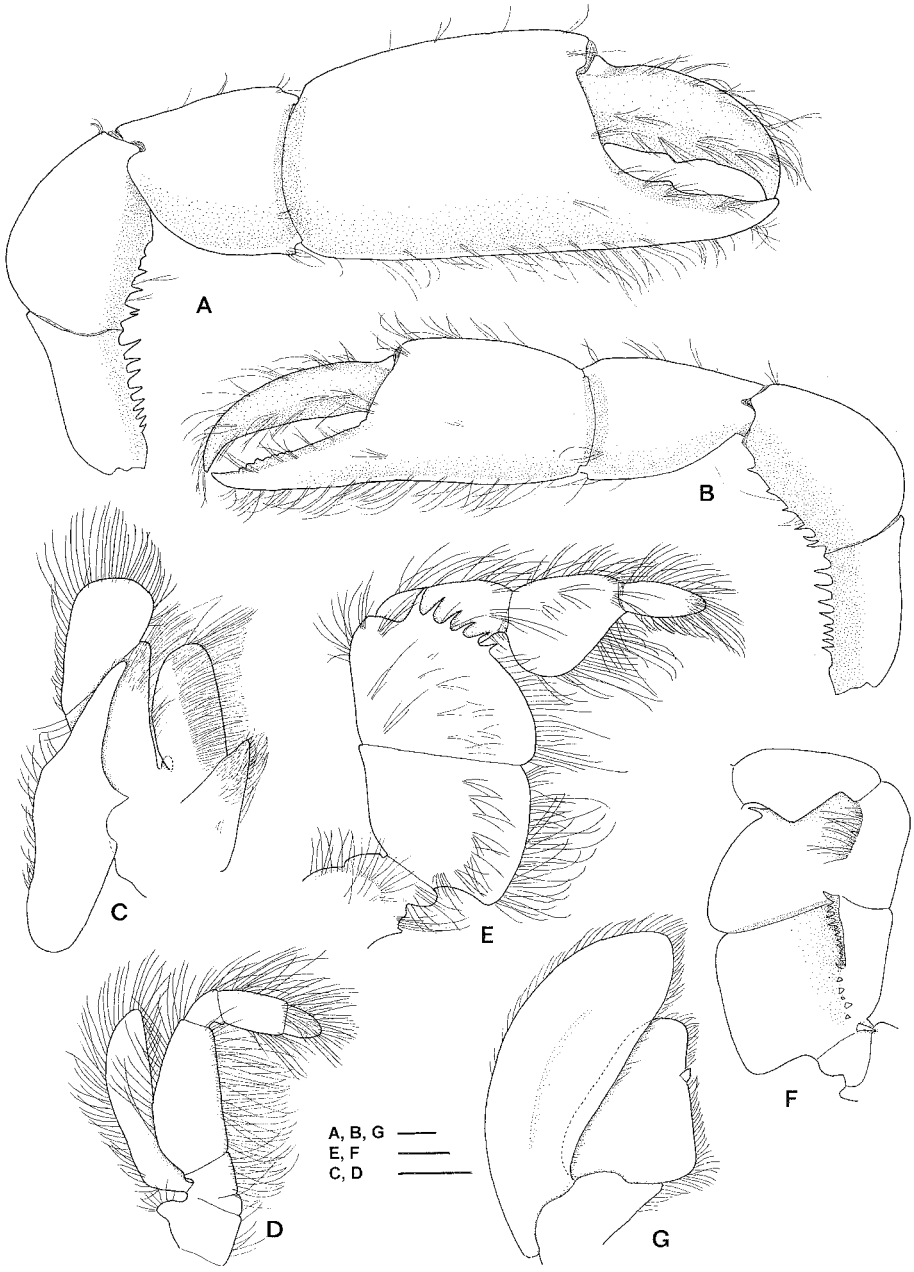

Fig. 2. *Calliapagurops foresti* new species. A, B, G, holotype male (MNHN-Th 720); C-F, male paratype (MNHN-Th 1397). A, B, major and minor cheliped, respectively, lateral view; C, D, maxilliped 1 and 2, respectively, outer view; E, maxilliped 3, outer view; F, maxilliped 3, inner view of ischium, merus, and carpus; G, pleopod 3, anterior view. Scale lines: 1 mm.

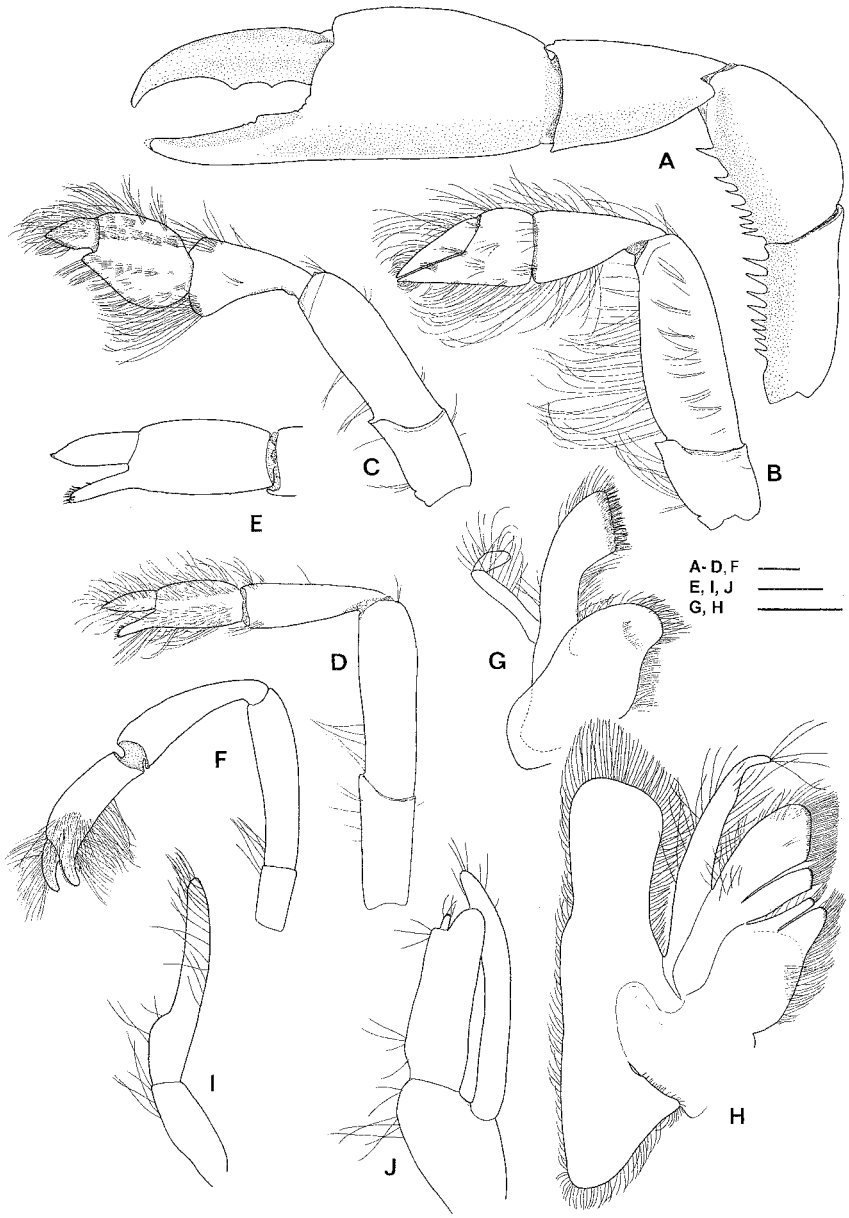

Fig. 3. *Calliapagurops foresti* new species. A-F, I, J, female paratype (MNHN-Th 1398); G, H, male paratype (MNHN-Th 1397). A-F, pereiopods in lateral view. A, major cheliped; B, C, pereiopods 2 and 3, respectively; D, pereiopod 4; E, propodus and dactylus of pereiopod 4, most setae omitted; F, pereiopod 5; G, H, maxilla 1 and 2, respectively, outer view; I, J, female pleopods 1 and 2, respectively, anterior view. Scale lines: 1 mm.

Male pleopod 1 (fig. 1G) and female pleopod 1 (fig. 3I) uniramous, 2-articulate, distal article longer in female. Male pleopod 2 (fig. 1H) and female pleopod 2 (fig. 3J) biramous, similar, with small appendix interna on distal inner border of endopod; exopod as long as endopod in male, exceeding endopod in female. Pleopods 3-5 with (approximately) cylindrical appendix interna partly embedded in mesial margin of endopod.

Uropod greatly exceeding telson; exopod broadly triangular, with proximal spinule and dorsal plate separated from curved posterior margin, latter bearing two thick rows of setae; endopod elongate-ovate, wider proximally, tapering distally to rounded apex; a proximal spine (broken in holotype).

Remarks. — Material of the new species was compared with the holotype of *Calliapagurops charcoti.* Although the latter was referred to by both De Saint Laurent (1973) and Sakai (1999) as a male, it probably is a female. Both pairs of pereiopods 4 and 5, including their coxae, are lost, but a detached pereiopod 3 and a detached coxa with female gonopore are present. Besides, its pereiopods 1 (see Sakai, 1999, fig. 1C, D) are similar in shape to those of the female paratype of *C. foresti* (MNHN-Th 1399), the only female with both pereiopods 1 present.

Calliapagurops foresti was collected in the Indo-Pacific and *C. charcoti* in the Atlantic. Due to the missing appendages and abdomen in the holotype of *C. charcoti,* only two differentiating characters can be detected: (1) eyestalks narrowing distally, corneas small, not as wide as proximal part of eyestalks in *C. foresti* (vs. eyestalks not narrowing distally, corneas as wide as proximal part of eyestalks in *C. charcoti*); (2) maxilliped 3 with 6-10 spines on distal border of merus in *C. foresti* (vs. 3-4 spines on same border in *C. charcoti*).

Etymology. — The species is named in honor of Professor Jacques Forest, for his lifelong dedication to the study of decapod crustaceans.

Type locality. — Philippines, 14°0.1′N 120°17.8′E.

DISCUSSION

The genus *Calliapagurops* De Saint Laurent, 1973 and its taxonomic position. — The holotype of *Calliapagurops charcoti* from the Azores was examined alongside the types of the new species, *Calliapagurops foresti.* None agrees with the diagnosis for *Calliapagurops* as given by Sakai (1999: 8) in that the antennal scale, considered by him as "bilobed distally", actually has a single lobe; maxilliped 3 and pereiopod 1 were stated as provided with "rudimentary exopod" while the exopod is absent on both appendages. Sakai (1999: 8) cited criteria

for *Calliapagurops* to be included in the Callianassidae, namely a complete linea thalassinica and a dorsal oval on the carapace, the suboperculiform maxilliped 3, and expanded pereiopod 3 propodus.

Calliapagurops charcoti has been considered very similar to *Corallianassa articulata* (Rathbun, 1906) (M. De Saint Laurent, pers. comm.). A specimen of the latter species from the Gilbert Islands (SMNH 27304) was examined. *Calliapagurops charcoti* and the new species, *Calliapagurops foresti,* share with *Corallianassa articulata* and all its congeners, *C. borradailei* (De Man, 1928), *C. collaroy* (Poore & Griffin, 1979), and *C. longiventris* (A. Milne-Edwards, 1870), the presence of long rostral and anterolateral spines on the carapace, cylindrical elongate eyestalks with terminal corneas, peduncle of antenna 2 longer than that of antenna 1, maxilliped 3 operculiform, pereiopods 1 with numerous spines on lower border of ischium and merus, abdominal somite 2 longer than somite 6, pleopod 1 uniramous, pleopod 2 biramous in both sexes, and telson wider than long. There is clearly a close relationship between the two genera, but they differ in:

(1) Eyestalks much longer in *Calliapagurops*, length 3-4 times diameter of corneas (vs. length hardly 1-1.5 times diameter of corneas in *Corallianassa*); (2) antenna 2 peduncle approximately twice as long as that of antenna 1 and twice as thick in the two distal articles in *Calliapagurops* (vs. antenna 2 peduncle not twice as long and not thicker than that of antenna 1 in *Corallianassa*); (3) numerous spines on distal border of maxilliped 3 merus in *Calliapagurops* (vs. same border unarmed in *Corallianassa*, except in *C. collaroy* with a single spine); (4) pereiopod 4 chelate, with fixed finger approximately as long as dactylus in *Calliapagurops* (vs. subchelate, fixed finger not longer than half length of dactylus in *Corallianassa*).

Calliapagurops is also similar to some species of *Corallichirus* Manning, 1992, e.g., *C. xuthus* (Manning, 1988) and also to *Glypturus martensi* (Miers, 1884) in having a trispinose carapace and elongate eyestalks bearing terminal corneas. Most of the differentiating characters mentioned above for *Corallianassa* can be used to separate them. *Calliapagurops* is here regarded as valid and distinct from *Corallianassa, Corallichirus*, and *Glypturus.*

The three last mentioned genera are members of the paraphyletic, basal callianassid subfamily Callichirinae Manning & Felder, 1991 (Tudge et al., 2000), synonymized with a much larger Callianassinae by Sakai (1999). The question arises whether *Calliapagurops* also belongs in the Callichirinae sensu Tudge et al., (2000) or in the Calliapaguropinae Sakai, 1999, the subfamily introduced for *Calliapagurops* alone.

The two species of *Calliapagurops* differ from other callianassids in: (1) Long cylindrical eyestalks with terminal corneas, longer than in any callianassids but approached by species of *Corallianassa*. (2) Antenna 2 peduncles approximately

twice as long as those of antenna 1 and much thicker. In a few species of *Biffarius*, e.g., *B. biformis* (Biffar, 1971), in species of *Corallianassa*, *Corallichirus*, and *Glypturus*, the antenna 2 peduncle is about 1.1-1.2 times longer than that of antenna 1, it is longest in *Callianassa intermedia* De Man, 1905 (about twice as long) but not thicker than the antenna 1 peduncle. (3) Maxilliped 3 with several spines on distal meral border. In other callianassids with distal meral spines on maxilliped 3, *Corallianassa collaroy* (Poore & Griffin, 1979), *Cheramus praedatrix* (De Man, 1905), *Cheramus propinqua* (De Man, 1905), or *Callianassa modesta* De Man, 1905, there is no more than one spine. (4) Pereiopod 4 chelate with fixed finger nearly as long as dactylus. There are intermediate forms in the morphology of this appendage: pereiopod 4 is simple in several species of *Callianassa*, it is weakly subchelate, with fixed finger not overreaching half the length of the dactylus in many other species, e.g., *Glypturus acanthochirus* Stimpson, 1866, *Glypturus armatus* (A. Milne-Edwards, 1870), *Lepidophthalmus siriboia* Felder & Rodrigues, 1993, *Neocallichirus cacahuate* Felder & Manning, 1995, and in *Corallianassa* species. This fixed finger is slightly longer than half the length of the dactylus in another callichirine species, *Grynaminna tamaki* Poore, 2000. It is as long as the dactylus in *Calliapagurops*, which probably is an apomorphic feature in the development of the appendage.

The above considerations show that *Calliapagurops* species are near members of *Corallianassa*, and to a lesser extent, to those of *Corallichirus* and *Glypturus*, all three genera belonging to the subfamily Callichirinae Manning & Felder, 1991. The characteristics listed mean that the genus could have arisen almost anywhere in the callianassid clade, but most probably somewhere in the Callichirinae, close to *Corallianassa*. Sakai (1999) suggests that there are two branches in the callianassid tree, *Calliapagurops* and the rest, which does not agree with the results presented here. Particular features cited by Sakai (1999: 4) for the subfamily Calliapaguropinae concern the possession of elongated eyestalks and the Mxp3 merus bearing 3 distal spines. Intermediate forms exist, however, mostly within the subfamily Callichirinae, and material of the new taxon, providing additional characteristics, confirms this view. Callichirinae sensu Tudge et al. (2000) is here regarded as a valid subfamily in which the genus *Calliapagurops* is best placed, as there are no characters that warrant a subfamily for it alone.

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