長崎大学教養部紀要（自然科学篇）終刊号　第38巻　第1号（1997年9月）

Stenalpheops anacanthus, new genus, new species (Crustacea, Decapoda, Alpheidae) from the Seto Inland Sea and the Sea of Ariake, South Japan

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ABSTRACT

Stenalpheops anacanthus, new genus, new species, is described and illustrated from specimens collected from the Seto Inland Sea and the Sea of Ariake, South Japan. Its affinities with the most closely related genus, *Potamalpheops* Powell, 1979, are discussed. The distinctions from *Potamalpheops* are: crenate lamella present along the full length of diaeresis of uropodal exopod; orbital teeth lacking; eyestalk with anteromedial protuberance; without ventral tooth on 1st antennular segment; sclerite at the base of antennule unarmed; anal tubercles present; two pairs of dorsal spines of telson situated laterally on proximal half; with 6 epipods and 4 setobranchs; and with rows of grooming setae on medial face of merus of 1st pereopod, which have not been reported in any other taxon.

In addition, the symmetrical development of segmented appendix, without musculature, at the distal margin of uropodal exopods is found in two larger male specimens, the holotype (CL 6.6 mm) and one paratype (CL 6.4 mm). This is certainly unusual and unique, but can present an evidence to show "the distal segment of exopod" of uropods also "sometimes being multiarticulate" (McLaughlin, 1982 : 202). CL: carapace length including rostrum.

I have hesitated for many years before establishing a new genus to include the following Japanese marine form, which is very closely related to *Potamalpheops* Powell, 1979, from fresh and brackish waters in west Africa, then from a fresh water cave in Mexico (Hobbs, 1983) and recently from

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mangrove swamps in Australia (Bruce, 1991) and southeast Asia (Yeo and Ng, 1997). It is also somewhat allied to *Pseudathanas* Bruce, 1983, from heavily silted habitat at Darwin, Australia.

The material of this undescribed aberrant species from Japan is as follows: A single specimen, from an uncertain locality, was accepted in 1967 from the late Prof. Dr. Itsuo Kubo, Tokyo University of Fisheries; additional material came to hand for identification through Mr. Kinji Yamashita, Miyajima Aquarium, who found it living in a burrow of *Upogebia* (*Upogebia*) *major* (De Haan, 1841), on a mud flat on Miyajima Island in the Seto Inland Sea; and the latest specimen was taken by myself from a soft sandy mud flat of Amakusa-Matsushima Island, in the Sea of Ariake. Closer examination of these specimens, as well as those of all the species of *Potamalpheops* from Niger Delta, Nigeria, which Dr. C. B. Powell of the University of Port Harcourt, Nigeria kindly sent to me, revealed that the Japanese marine form could not be placed in *Potamalpheops*, nor any other known genera of the Alpheidae. This conclusion is confirmed recently by the comparative studies of the specimens of the Japanese species and those of Australian and Southeast Asian *Potamalpheops* and of *Pseudathanas darwiniensis*. Further, the uncertain locality of the first specimen could be detected by the effort of Mr. Midori Yamamoto of the Prefectural Naikai Fisheries Experimental Station of Yamaguchi.

Most of the type specimens of *Stenalpheops anacanthus*, new genus, new species, are deposited in the National Science Museum, Tokyo (NSMT); an ovigerous female and two male paratypes are in our laboratory (BLNU).

Systematics

Stenalpheops, new genus

Diagnosis.--Body compressed, elongate, with slender appendages. Rostrum short, acute in lateral view. Orbital teeth absent. Pterygostomial margin rounded. Cardiac notch present. Cornea of eye largely exposed dorsally and laterally, with dull-pointed and naked (non-setose) anteromedial protuberance of eyestalk. Antennular peduncle slender; 1st segment lacking ventral tooth;

stylocerite strongly developed; sclerite at base of antennule unarmed. Scaphocerite narrow with strong lateral spine. Mandible with 2-segmented palp. Maxilla with unilobed distal endite and broad scaphognathite. Caridean lobe of 1st maxilliped rather broad. Endopod of 2nd maxilliped markedly elongate with long ischio-basis; epipod greatly enlarged. First pair of pereopods carried extended forward, slender, symmetrical, showing sexual dimorphism; chelae cylindrical, without any grooves and ridges; opposable margins of both fingers armed with 2 or 3 broad, subtriangular teeth; carpus and merus with 3-7 rows of short setae ventromedially. Carpus of 2nd pereopod 5-segmented. Dactyli of 3rd to 5th pereopods simple, meri unarmed. Abdomen of usual form; posterolateral angle of 6th segment with articulated plate. Endopod of 2nd pleopod with appendices interna and masculina in male, appendix interna only in female. Uropodal exopod with crenate lamella along full length of diaeresis. Telson slender, rounded posteriorly, armed dorsally with 2 pairs of movable spines near lateral margins on proximal half; anal tubercles distinct. Branchial formula: 5 pleurobranchs + 1 arthrobranch (on 3rd maxilliped) + 6 epipods +4 setobranchs.

Type-species.--*Stenalpheops anacanthus*, new species.

Etymology.--From the Greek, *stenos*, narrow, in combination with *alpheops*, analogue of *alpheopsis, Alpheus*-like. The gender is masculine.

Relationships.--The 6th abdominal segment with a movable plate articulated at the posterolateral angle of the pleuron, the short rostrum pointed in lateral view, and the 3rd maxilliped with an arthrobranch are characteristic features of *Stenalpheops*, they are shared with *Potamalpheops* Powell, *Alpheopsis* Coutière, 1897, *Neoalpheopsis* Banner, 1953,[1] *Nennalpheus* A. H. and D. M. Banner, 1981. This genus is easily separated from all these related genera by the presence of the following characters: 1) crenate lamella present along the full length of diaeresis of the uropodal exopod, compared with the lamella having sharp teeth along the lateral two-thirds or three-fourths of the diaeresis

1) *Neoalpheopsis* may prove to be a junior synonym of *Parabetaeus* Coutière, 1897 (Banner and Banner, 1985: 39).

as in *Potamalpheops* (Powell, 1979; Bruce, 1991; Yeo and Ng, 1997); 2) anal tubercles distinct; 3) two pairs of dorsal spines of the telson located on the proximal half, close to the lateral margins; 4) merus of 1st pereopod with rows of grooming brushes medially; 5) ventral tooth absent from the 1st antennular segment; and 6) sclerite at the base of antennular peduncle unarmed. The last two characters may be regarded as generically important. For the sake of convenience, the frontal part of the body in ventral view of *Stenalpheops anacanthus* new species, *Potamalpheops pylorus* Powell, 1979 and *Alpheopsis aequalis* Coutière, 1896 are compared (Fig. 1).

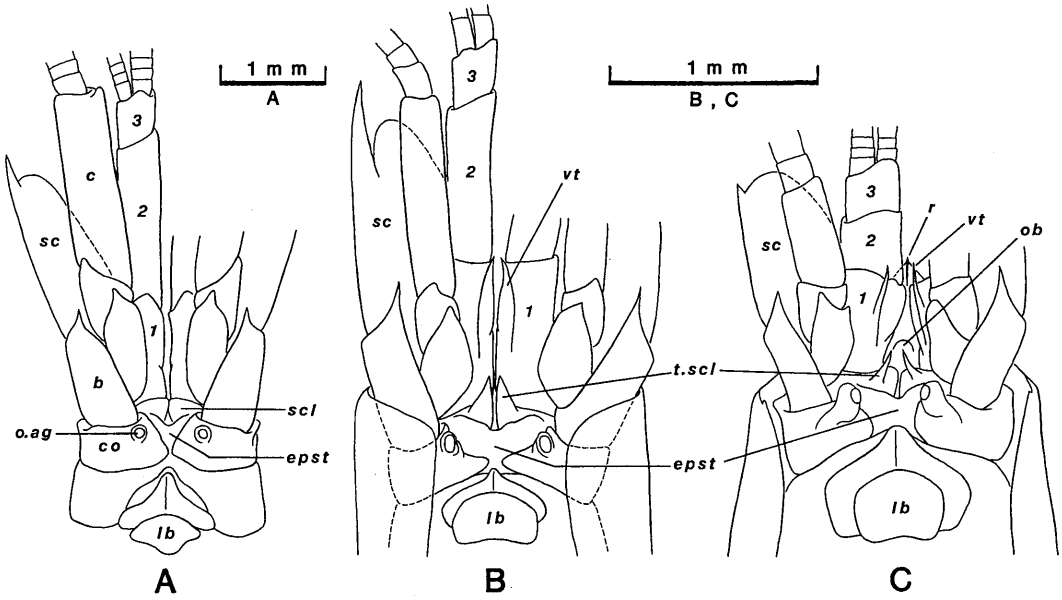

Fig. 1. Frontal part of body of *Stenalpheops anacanthus*, new genus, new species, *Potamalpheops pylorus* Powell, and *Alpheopsis aequalis* Coutère, ventral view. A, *S. anacanthus*, male paratype (CL 6.4 mm), from Miyajima, Seto Inland Sea, BLNU, carapace removed; B, *P. pylorus*, male (CL 3.7 mm) from Port Harcourt (type locality), Nigeria, Nov. 1978, coll. C.B. Powell; C, *A. aequalis*, female (CL 3.7 mm) from Sagami Bay. Abbreviations: *r*, = rostrum; *ob*, = ocular beak; *t. scl*, = tooth on sclerite (*scl*) at base of antennule; *epst*, = epistome; *lb*, = labrum; *1*, *2*, *3*, and *vt*, = 1st, 2nd, 3rd antennular segment and ventral tooth of 1st segment, respectively; *co*, *o. ag*, *b*, *c*, and *sc*, = antennal coxa, opening of antennal gland, basicerite, carpocerite, and scaphocerite, respectively.

In addition, the new genus differs from *Potamalpheops* in lacking orbital teeth, setae on the anteromedial margin of eyestalks, and movable spines on the meri of the last three pereopods; from *Alpheopsis* and *Neoalpheopsis* in having the body slender, antennular and antennal peduncles more elongate, and

the rostrum shorter than the eyestalk, which is largely exposed dorsally, and from the former by the unilobed distal endite of maxilla instead of bilobed (Miya, 1983), and also from the latter by the round posterior margin of the telson. From *Nennalpheus* it is also distinct in having an elongate cyathiform carpus of the 1st pereopod, instead of a round subrectangular shape in lateral view as noted by A. H. and D. M. Banner (1981).

On the other hand, the new genus can be distinguished from *Pseudathanas Bruce, 1983*, which it also resembles, by the above mentioned six characters used for separating *Stenalpheops* from the four related genera and several additional features (Bruce, 1983) : a) in *Pseudathanas* the diaeresis of uropodal exopod is armed with a row of strong spines, which is absent in *Stenalpheops* ; b) an arthrobranch is present on the 3rd maxilliped in *Stenalpheops*, whereas it is absent in *Pseudathanas*; c) a series of long simple inwardly directed setae is present along the ventral margin of palm of both chelae in *Pseudathanas*, whereas in *Stenalpheops* this is absent; d) *Stenalpheops* has a more developed caridean lobe on the 1st maxilliped, longer ischio-basis segment of the endopod and a larger epipod of the 2nd maxilliped.

Furthermore, some similarities between *Stenalpheops* and *Leptalpheus* Williams, 1965 are noticed in the same branchial formula; the presence of anal tubercles; the elongate antennular and antennal peduncles; and some characteristics of mouthparts; and three known species of *Leptalpheus* are found living in burrows of thalassinids (e.g., Williams, 1965; Banner and Banner, 1974; Rios and Carvacho, 1983), as also occurs with the present species. However, *Stenalpheops* may be distinguished from *Leptalpheus* by the following features: the uropodal exopod with the crenate lamella instead of with an overlapping pointed lamina; the eyes largely exposed dorsally; no ventral tooth of the 1st antennular segment; the unilobed distal endite of the maxilla; and the symmetrical 1st pereopods with the chelae extended anteriorly.

Stenalpheops anacanthus, new species

Figs. 1A, 2-5

Material.--Holotype: ♀, NSMT-Cr. 7792, Seto Inland Sea, Hiroshima Prefecture, Miyajima Island, intertidal zone, found in a burrow of *Upogebia* (*Upogebia*)

major, October 31, 1979, coll. K. Yamashita. Allotype: ♀ (Cl 6.0 mm), NSMT-Cr. 7793 (part), collected with holotype. Paratypes: 1 ♂, 2 ♀♀, NSMT-Cr. 7793 (part), and 1 ♂, BLNU, collected with holotype; 1 ovig. ♀, BLNU, Seto Inland Sea, Yamaguchi Pref., Aoe-wan (cove) at mouth of Ohmi-wan Bay, St. J, July 2, 1956, coll. Yamaguchi Pref. Naikai Fish. Exper. Stat., don. I. Kubo; 1 ♂, BLNU, Sea of Ariake, Kumamoto Pref., Amakusa Islands, Matsushima Island, Aitsu, at the back of Aitsu Mar. Biol. Lab., Kumamoto Univ., soft sandy mud flat, at low tide level, a stagnant water hole under rock attached with oyster shells partially imbedded in soft sandy mud, June 25, 1990, coll. Y. Miya.

Description.--Body compressed, elongate, smooth, and polished, with slender appendages (Fig. 2A). Rostrum sharply pointed in lateral view, broadly triangular in dorsal view, barely reaching ⅔ of eyestalks; carina distinct dorsally, extending posteriorly to base of eyestalk (Fig. 2B). No orbital teeth nor projections. Pterygostomial margin rounded and naked.

Eyestalk short, bluntly produced at anteromedial corner, and largely exposed from anterior margin of carapace; setae absent along anteromedial margin.

Antennular peduncle elongate, 2nd segment 2.7-3.6 times as long as broad; visible part of 1st segment ⅔ as long as 2nd, 3rd segment ⅓ as long as 2nd; no ventral tooth on 1st segment; sclerite unarmed (Fig. 1A). Stylocerite slender, surpassing proximal third of 2nd segment. Outer flagellum with 6-9 articles proximal to bifurcation.

Basicerite with sharp ventral tooth. Carpocerite 2.7-3.7 times as long as high, exceeding end of antennular peduncle. Lateral margin of scaphocerite weakly convex, sharp distal spine ending at level of proximal half of 3rd antennular segment; lamella narrow, 2.5-3.0 times as long as broad, barely reaching end of 2nd segment.

Mouthparts examined from ovigerous female (CL 5.6 mm) (Fig.4) and male (CL 6.4 mm) paratypes. Mandible composed of stout molar process, 5-toothed incisor process and 2-segmented palp; distal segment of palp oblong and fringed with plumose setae (Fig. 4A). Palp of maxillule bilobed, distal lobe with 3 plumose setae, proximal lobe with apical plumose seta; distal endite

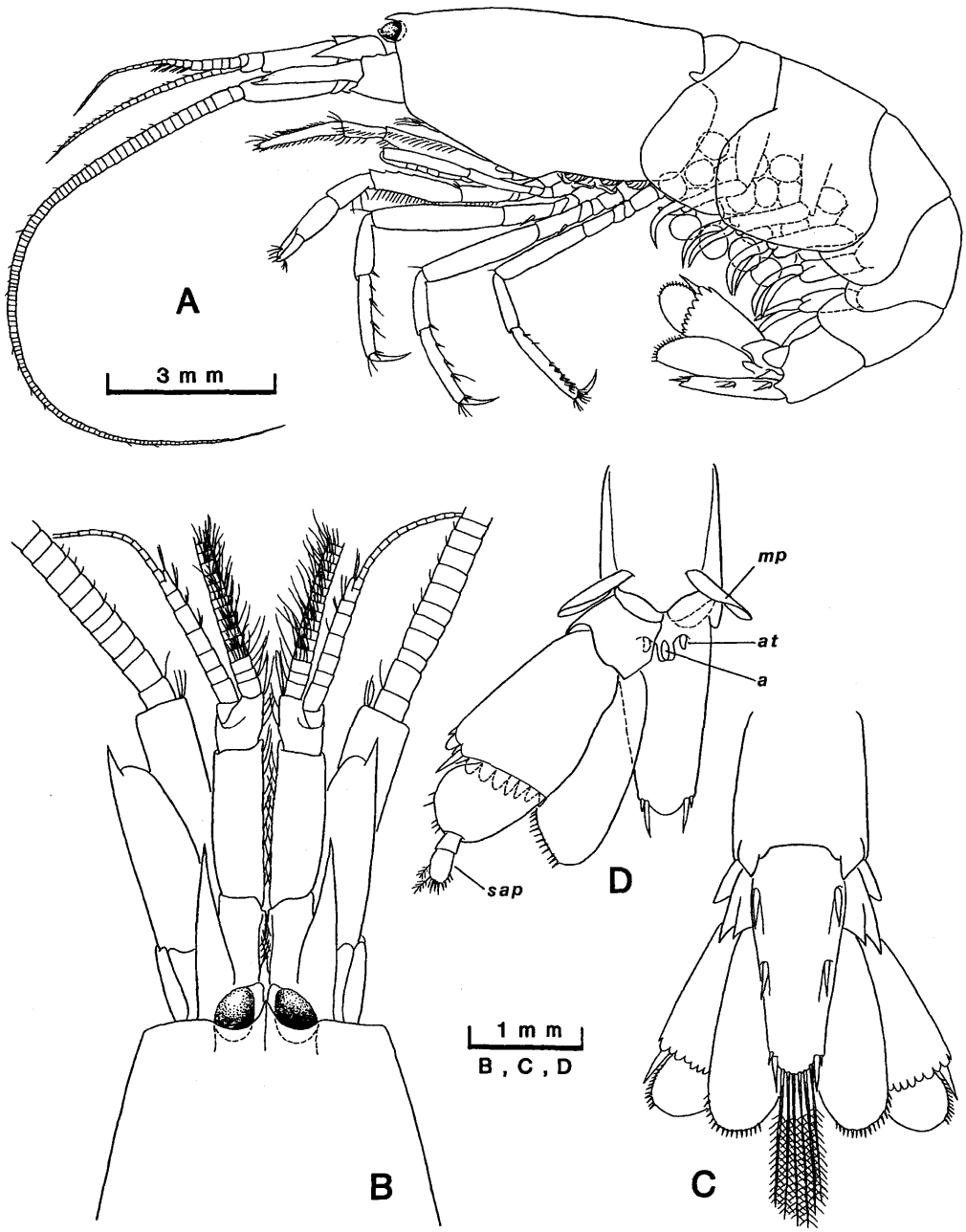

Fig. 2. *Stenalpheops anacanthus*, new genus, new species. A, ovigerous female paratype (CL 5.6 mm), from Aoe-wan (cove), Seto Inland Sea, BLNU, lateral view; B, frontal part of body and C, telson and uropods, same ovigerous female paratype, dorsal view; D, telson and right uropod, male paratype (CL 6.4 mm), BLNU, ventral view. Abbreviations: *a*, = anus; *at*, = anal tubercle; *mp*, = movable plate at posterolateral margin of 6th abdominal segment; *sap*, = segmented appendix at distal end of uropodal exopod.

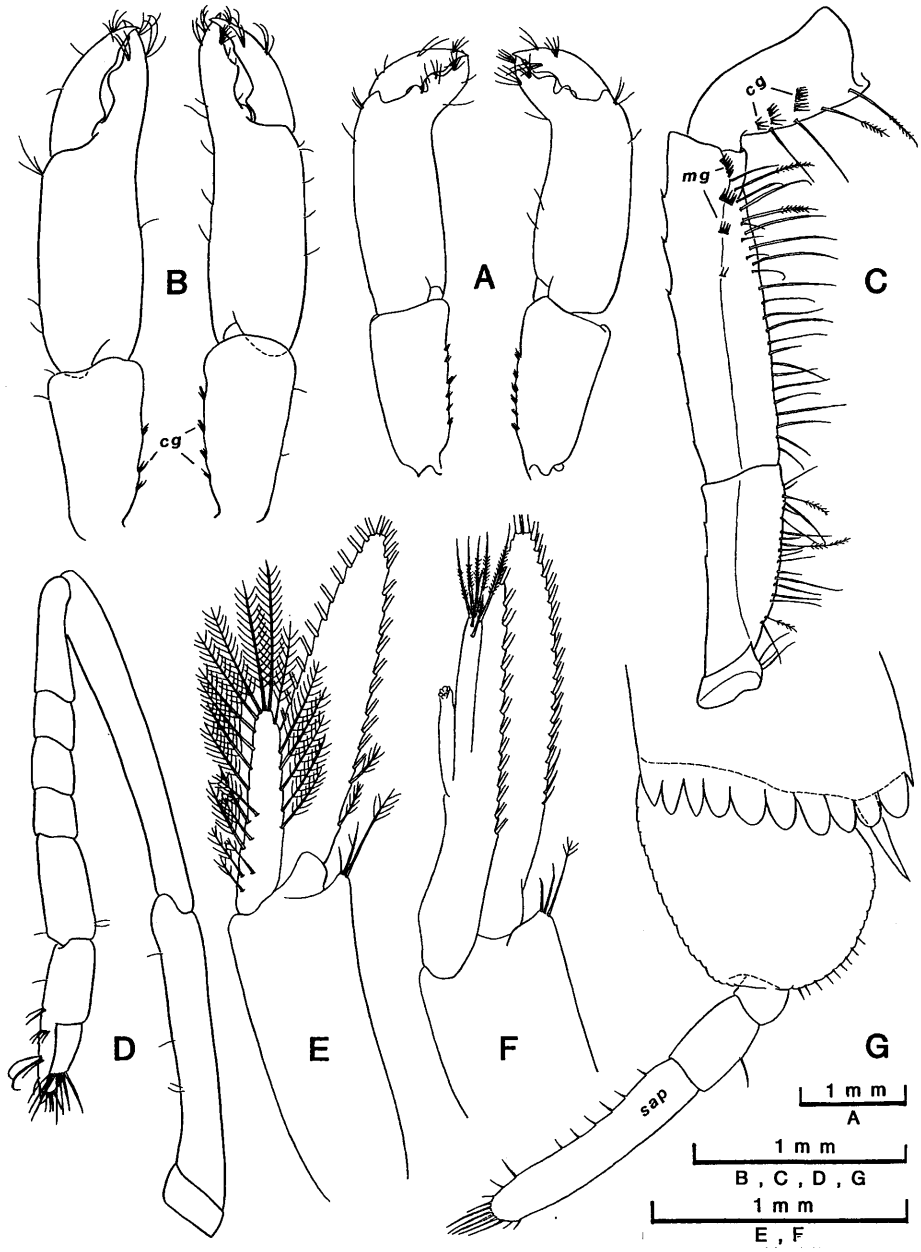

Fig. 3. *Stenalpheops anacanthus*, new genus, new species. A, chelae and carpi of 1st pair of pereopods, male holotype, from Miyajima, Seto Inland Sea, NSMT-Cr 7792, dorsal view; B, chelae and carpi of 1st pair of pereopods, ovigerous female paratype (CL 5.6 mm), BLNU, dorsal view; C, carpus, merus and ischium of left 1st pereopod shown in B, showing rows of carpal (*cg*) and meral (*mg*) serrate setae, believed to groom 3rd maxillipeds, medial view and D, left 2nd pereopod, same ovigerous female paratype; E, left 1st pleopod, male paratype (CL 6.4 mm), medial view; F, left 2nd pleopod, same male paratype, medial view; G, distal part of right uropodal exopod, holotype, with segmented appendix (*sap*), dorsal view.

subrectangular, with dense fringe of serrate setae along medial margin (Fig. 4B). Proximal endite of maxilla thumb-shaped, with short apical seta; distal endite not bipartite, subrectangular, densely fringed with simple and plumose setae along medial margin; palp slender and naked; scaphognathite broadly auriculate (Fig. 4C). Proximal endite of 1st maxilliped bluntly pointed at distomedial corner, with apical plumose setae; distal endite elliptical; 2-segmented palp slender, distal segment very small, with long plumose apical seta; caridean lobe a little broad and distinctly separated from exopod distally (Fig. 4D). Second maxilliped with greatly elongated 5-segmented endopod, 1st segment (ischio-basis) of endopod markedly produced at distomedial corner, 2nd segment about half as long as 1st, 4th also greatly elongate, epipod well developed (Fig. 4E). Third maxilliped slender, reaching end of carpocerite; coxa with elongate, auriculate lateral plate and hook-like epipod; single well-developed arthrobranch present (Fig, 4F).

First pereopods slender and symmetrical; chelae carried extended, cylindrical and smooth, and different in shape and size in sexes; fingers sharply pointed, crossing, bearing 2 or 3 well- or poorly-developed subtriangular teeth along both cutting edges. Chela in males 0.35-0.38 as long as carapace, with large subtriangular projection at medial shoulder of dactylar articulation; fixed finger strongly curving ventrally (Fig. 3A). Chela in females 0.26-0.34 times as long as carapace, rounded at medial shoulder; fixed finger weakly curving ventrally (Fig. 3B). Carpus cylindrical with 3-6 rows of grooming setae along ventromedial margin (Fig. 3C). Merus and ischium indistinctly notched on dorsal margins, and shallowly excavated ventromedially; 4-7 rows of grooming setae on medial surface of merus; merus 1.2-1.3 times as long as palm in males and 1.3-1.8 times as long as in females.

Second pereopods folded beneath body; 5 carpal articles with ratio of 10 : 3-5 : 3-5 : 3-5 : 8-10 (Fig. 3D). Dactylus of 3rd pereopod slender, simple; propodus with pair of spines at distoventral angle and 2-5 spines along ventral margin; carpus with only 1 spine at distal corner of ventral margin; merus unarmed, 4.4-5.8 times as long as high; ischium half as long as merus, with ventral spine. Propodus of 5th pereopod with 5-8 rows of short grooming setae along ventrolateral margin; carpus, merus and ischium unarmed.

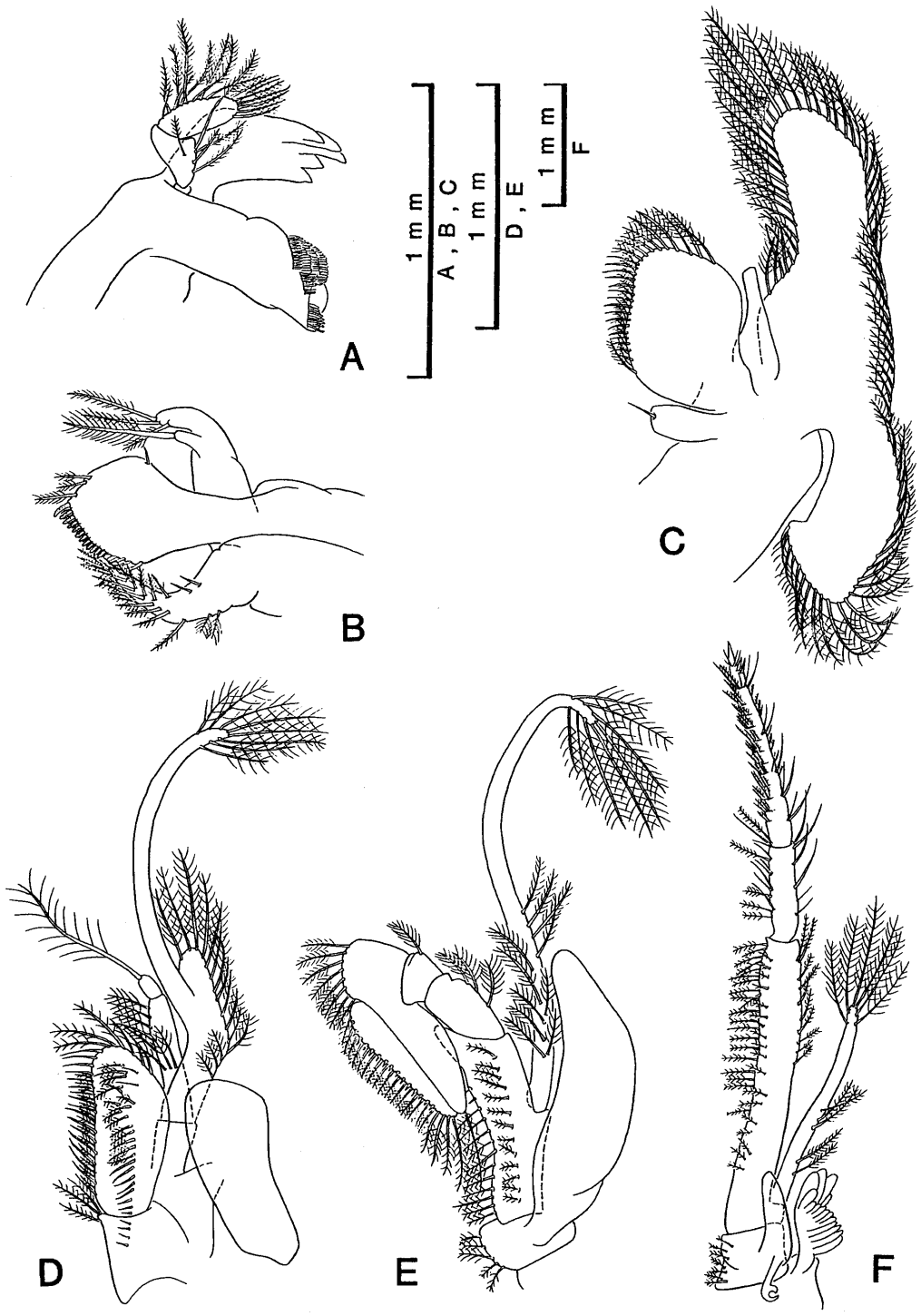

Fig. 4. Mouthparts of *Stenalpheops anacanthus*, new genus, new species, ovigerous female paratype (CL 5.6 mm), BLNU. A, left mandible; B, left maxillule; C, left maxilla; D, left 1st maxilliped; E, left 2nd maxilliped; F, left 3rd maxilliped.

Branchiae as follows:

	Maxillipeds			Pereopods				
	1	2	3	1	2	3	4	5
Pleurobranchs	-	-	-	1	1	1	1	1
Arthrobranchs	-	-	1	-	-	-	-	-
Podobranchs	-	-	-	-	-	-	-	-
Epipods	1	1	1*	1*	1*	1*	-	-
Setobranchs	-	-	-	1	1	1	1	-
Exopods	1	1	1	-	-	-	-	-

1* : hook-like epipod

Abdomen normal ; pleura of first 4 segments rounded at posterolateral margin, that of 5th segment subtriangular in both sexes, 6th segment with large subtriangular movable plate.

First 4 pleopods of ovigerous female showing no indication of "basal and endopodal mesial lamellar expansions" as seen in ovigerous females of *Potamalpheops monodi* (Sollaud, 1932; Gordon, 1956; Powell, 1979). Endopod of 2nd pleopod in male with appendix interna and very long appendix masculina bearing group of long serrulate apical setae (Fig. 3F).

Uropodal exopod and endopod bearing spinules along their distal margins; exopod with small, acute distolateral tooth and strong subterminal movable spines; and lamella of 9-11 convex teeth, which are variable in size, along full length of diaeresis (Fig. 2C, D, 3G).

Telson narrow, tapering, 3.5-4.3 times as long as broad when measures at posterior margin (Fig. 2C); dorsal surface with 2 pairs of long movable spines nearer lateral margins, anterior pair situated at proximal 0.2 of length, posterior pair at 0.5; posterior margin rounded, provided with 2 pairs of movable spines laterally, medial pair as long as dorsal spines; anal tubercles small but distinct (Fig. 2D).

Ovigerous female paratype carrying numerous eggs of 0.66 x 0.54 mm in size.

Measurements (in mm).-- As shown in Table 1:

Table 1. Measurements (in mm) of types of *Stenalpheops anacanthus*, new genus, new species.

	Holotype	Allotype	Paratypes					
	♂	♀	♂	♂	♂	♀	ovig. ♀	♀
Total length	20.2	17.2	15.1	14.6	17.8	17.4	13.6	18.0
Carapace length	6.6	6.0	4.9	5.0	6.4	5.6	4.4	5.3
Telson length	2.3	2.1	1.8	2.0	2.1	2.0	1.4	1.9
Left cheliped,								
Chela length	2.5	2.2	1.7	—	2.4	1.6	1.5	1.4
Merus length	2.3	2.0	1.4	—	2.0	1.6	1.3	1.4
Right cheliped,								
Chela length	2.5	1.9	1.7	1.9	2.4	1.6	1.5	1.4
Merus length	2.3	2.1	1.4	1.9	2.0	1.6	1.3	1.4
Third pereopod,								
Dactylus length	0.7	0.8	0.7	0.7	0.8	0.7	0.6	0.7
Propodus length	1.7	1.6	1.3	1.6	1.7	1.4	1.1	1.5
Merus length	2.8	2.4	1.9	2.4	2.5	2.2	1.7	2.1

Color in life.--The color pattern of live shrimp is recorded from a paratype male (CL 5.0 mm) collected from the Sea of Ariake (Fig. 5). It is transparent and pale blue, with evenly scattered red chromatophores, with a colorless mid-dorsal band running from the rostral apex to the posterior end of telson. Along this band there are yellowish white chromatophores: 8 on carapace, 1, 2, 3, 7, 3, and 2 on the respective abdominal segments. Eyes brown. Antennular peduncles with a narrow longitudinal band of red chromatophores. Third maxillipeds and all pereopods and pleopods transparent, without any chromatophores. The gastric mill is orange and the pancreas green.

The specimens from Miyajima island were translucent, tinged with pale blue in 5 % formalin.

Habitat.--This species is an estuarine form, inhabiting sandy mud or mud flats in shallow waters and may often live in burrows of *Upogebia (Upogebia) major*.

My field note for a male paratype (CL 5.0 mm) from the Sea of Ariake indicated its habitat as follows: It was blindly swept by small hand-net from a stagnant water hole after removing a rock debris covered with oyster shells and partially imbedded in soft sandy mud. During the same hand-net collection, many specimens of *Athanas japonicus* Kubo, 1936, *Alpheus lobidens* De Haan, 1849, A. *pacificus* Dana, 1852, *A. heeia* Banner and Banner, 1974,[2] *A. brevicristatus* De Haan, 1844, and *U.* (*U.*) *major* were collected from many small pools after digging up edible Japanese littlenecks, "Asari" in Japanese, *Ruditapes philippinarum* (A. Adams et Reeve) and from the holes as mentioned above. *A. brevicristatus* and *U.* (*U.*) *major* are common burrow-dwellers in muddy or sandy flats in Japan.

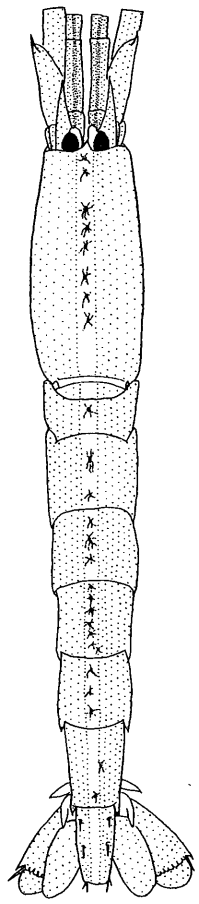

Fig. 5. Color pattern of live *Stenalpheops anacanthus*, new genus, new species, male paratype (CL 5.0 mm), BLNU, from Amakusa Matsushima, Sea of Ariake.

With regard to the locality of the ovigerous female paratype, Mr. M. Yamamoto, Prefectural Naikai Fisheries Experimental Station of Yamaguchi, kindly provided the following information: "The sampling station (St.J) in Aoe-wan (cove) at the mouth of Ohmi-wan Bay, where the alpheid shrimp was collected, was set up as one of the stations for a biological survey of *Metapenaeus moyebi* (Kishinouye, 1896) in 1956. At that time Aoe-wan was a small cove of less than 5 m deep with a mainly sandy mud flat bottom, and was estimated to be very little influenced by the inflow of fresh water from Saha-gawa River in the innermost part of Ohmi-wan. At present Aoe-wan has greatly changed its topography through the filling-up of the innermost part of the cove."

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2) *A. heeia*, previously known only from the type localities in Oahu, Hawaiis seems to be rather common in southern Japan (Miya, 1995 : 283). It has been erroneously identified with *A. lobidens* or *A. edwardsi* (Audouin, 1827) based on their morphological affinities or *A. leviusculus* Dana, 1852 on their similar coloration. So far as collected by myself, A. heeia lives under cover, in anything available, from open rocky shore to sandy mud flats of well-protected coves.

Remarks.--The symmetrical development of the segmented appendix at the distal margin of the uropodal exopods is seen only in the two larger male specimens: a pair of three-segmented appendices in the holotype (Fig. 3G) and a pair of two-segmented ones in the paratype of CL 6.4 mm (Fig. 2D). But the musculature does not develop in these appendices. These findings are reminiscent of the uropodal exopod also consisting of "two segments, the basal segment and the distal segment sometimes being multiarticulate," as shown in a generalized biramous appendage (McLaughlin, 1982 : 202, figs. 1, 2). In this interpretation, two usual flattened segments (articulated at the diaeresis) of uropodal exopod should be equal to the basal segment and the first of multiarticulated distal segment. Further, two- and three-segmented appendix in the above two specimens may be the excessive articles of the distal segment which has not been previously recorded in the exopod of uropods in any of the known taxa.

On the other hand, Coutière (1899 : 301-302, figs. 369) has previously proposed the hypothesis, "the inversion of two rami of uropods in Natantia", which means that the endopod and exopod of uropods in Natantia are not actually those of pleopods, but the position between endopod and exopod is reversed in uropods (e.g., figs. 382, 383, 387, 392). It may offer a completely different idea to interpret the excessive articles. Using his hypothesis, the uropodal exopods with three-segmented appendices in the holotype male may interpret as the five segments of typical endopod : the two usual segments are equal to ischium and merus, and three excessive articles are carpus, propodus and dactylus, respectively. However, McLaughlin's proposition seems to explain the present subject more justifiably.

Among the material examined of *S. anacanthus*, four species of *Potamalpheops*, *P. pylorus*, *P. haugi* (Coutière, 1906), and *P. monodi* (Sollaud, 1932) from Niger Delta, Nigeria and *P. hanleyi* Bruce, 1991 from Darwin, Australia, *Alpheopsis aequalis* from Sagami Bay, Japan and *Pseudathanas darwiniensis* from Darwin, Australia, only three species, *S. anacanthus*, *P. monodi* and *P. hanleyi* have rows of setal brushes on the 1st pereopods, the morphology of which suggests a grooming or cleaning function. *S. anacanthus* bears 3-6 rows of setal brushes on the carpus and 4-7 rows of them on the

merus (Fig. 3C). In *P. monodi* the the carpal setal brushes only are present, and the number of rows of brushes varies from five to seven among the specimens examined (5♂♂, 5 ovig. ♀♀, CL 2.6-4.2 mm, BLNU), as described previously as "comb-like rows of setae" and figured by Gordon (1956: 1113, fig. 12) and Powell (1979: 141). *P. hanleyi* has also four rows of carpal setal brushes only, as described and figured as "serrulate spines" by Bruce (1991: 634, fig. 4B).

When Bauer (1981; 1989) discussed and summarized the studies on the functional morphology and biological roles of grooming in the decapod crustaceans, he (1989: 54-55) states "Within the Caridea, two of 15 families surveyed (Bauer 1978) did not show the P1-CP brushes [the first pereopod having antennal grooming brushes on carpus and / or propodus]. In the Atyidae, grooming of the antennal flagella is done with the third maxillipeds .....; this is also true in the Alpheidae (Bauer, 1979)." This is the first observation for me, too, to find alpheids having these grooming brushes on the 1st pereopods, in addition to the usual grooming bushes on the ultimate segment of 3rd maxillipeds and on the propodus of 5th pereopods. On the basis of their morphological characteristics and their locations, these grooming brushes on the 1st pereopods may be classified as a short "serrate setae" (Watling , 1989: 25, fig. 5f), and suggest grooming the 3rd maxillipeds having antennal grooming brushes rather than direct grooming of the antennal flagella as their function. The P1-"MC" (meral-carpal) brushes in *S. anacanthus* which have not been reported in elsewhere, and P1-CP brushes in P. monodi and *P. hanleyi* appear to be an adaptive mechanism for grooming in silty environment.

The species name is derived from *an* (Gr., = without) + *akanthos* (Gr., = a thorn), in reference to the absence of orbital tooth.

Acknowledgements

I thank Mr. K. Yamashita of Miyajima Aquarium, Miyajima, for making the material of *Stenalpheops anacanthus* available for study, and Mr. M. Yamamoto of the Prefectural Naikai Fisheries Experimental Station of Yamaguchi, Aio, for information on the surveying station where the ovigerous female paratype was obtained in 1956. I am much indebted to Dr. C. B. Powell

of the University of Port Harcourt, Nigeria, who willingly sent me the excellent collections of all the species of Potamalpheops from Niger Delta, which are now deposited in the National Science Museum, Tokyo, excepting some specimens retained in our reference collection. Thanks are also due to Dr. T. Yamaguchi of Aitsu Marine Biological Laboratory, Kumamoto University, Amakusa Matsushima, for providing working facilities; Dr. K. Baba of Kumamoto University, Kumamoto for reading the first draft; Dr. A. J. Bruce of the Northern Territory Museum of Arts and Sciences, Darwin for reading the manuscript and much suggestive comment on the probably different function of grooming brushes of this species; and Dr. L. B. Holthuis of the Nationaal Natuurhistorisch Museum, Leiden for suggesting a more euphonious generic name and reading the manuscript. The comparable specimens of Australian *Potamalpheops* and *Pseudathanas darwiniensis* were collected during my visit to the Northern Territory Museum of Arts and Sciences, Darwin, which was supported by that museum.

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