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ZOOLOGICAL RESULTS OF THE BRITISH SPELEOLOGICAL EXPEDITION TO PAPUA NEW GUINEA 1975. 7. CAVERNICOLOUS SHRIMPS (CRUSTACEA DECAPODA, NATANTIA) FROM NEW IRELAND AND THE PHILIPPINES

by

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With 6 text-figures

Through the kindness of Dr. P. Beron, National Natural History Museum, Sofia, Bulgaria, I was allowed to study some cavernicolous shrimps collected by him in New Ireland, while he was a member of the 1975 British Speleological Expedition to Papua New Guinea. The material proved to consist of two species, one a *Macrobrachium*, the other a *Caridina*, both new to science and both adapted to subterranean life.

Added to this report on the New Ireland cave shrimps is the description of a new genus and species of cave Atyid from Luzon, Philippines, material of which was kindly donated to the Leiden Museum by Mrs. C. L. Deeleman-Reinhold, who had obtained it from the Rev. F. Bandsma, missionary in the area where the specimens were found.

The material of both species of Atyidae is far from perfect, but shows enough details to permit a satisfactory description.

Dr. Beron provided the following data concerning Danmin Cave near Konogusgus, New Ireland, where *Macrobrachium microps* and *Caridina troglodytes* were collected by him. The cave consists of (1) a large entrance hall, which goes steeply down, and (2) a more or less horizontal gallery which reaches a swift underground river. This river lies in total darkness, it is exposed to view for about 100 meters, coming out of the rock and disappearing in the same way. The water is very clear and the current very strong; the bottom consists of pure rock, with at most some sand, but without mud. *Macrobrachium* was found in this river. *Caridina*, however, was taken in a stagnant pool near the river. The pool was 1 to 2 feet deep and filled

with clear water, probably "splashed in" from the stream. Both the river and the pool are in total darkness. The cave lies at an altitude of 600 to 700 m. The temperature of both air and water was 22.3° C.

Of the Philippine cave no details are known, the shrimps were obtained by natives and given to father Bandsma.

Description of the species

PALAEMONIDAE

Macrobrachium microps new species

Danmin Cave, near Konogusgus, New Ireland; in fast flowing subterranean river; 29 November 1975; leg. P. Beron. — 1 adult male holotype.

The rostrum is short, narrow and rather straight, only the distal part is slightly curved upward. In the holotype it reaches exactly to the end of the antennular peduncle. The upper margin bears 11 teeth, 5 of which are placed on the carapace behind the orbit; the first four are more widely spaced and are more erect than the others. The first tooth stands at 1/3 of the length of the carapace (rostrum excluded) behind the orbit. The last dorsal rostral tooth is very small and subdistal. The lower margin of the rostrum is convex and has three teeth, the distal of which is the smallest. The proximal ventral tooth stands slightly behind the level of the antepenultimate dorsal tooth. The lower orbital angle is wide and broadly rounded, in its lower part there is a strong antennal spine, which is placed slightly behind the anterior margin of the carapace, and posteriorly ends in a short carina. The hepatic spine stands slightly below the posterior end of this carina and is connected with the anterior margin of the carapace by a short and straight branchiostegal line. The surface of the carapace is smooth and slightly pitted.

The abdomen has the pleura of the first three somites broadly rounded; those of the fourth and fifth somites each end in a posterior tooth, which, especially in the fifth somite, is distinct. The pleura of the sixth somite are short, triangular with an acute tip; the posterolateral angle of the somite ends in a sharp point and bears a blunt tooth on the lower margin. The sixth somite is slightly (1.2 times) longer than the fifth, and 2/3 as long as the telson. The telson has two pairs of strong dorsal spines; the anterior of these is placed in about the middle of the length of the telson, the posterior pair is somewhat closer to the anterior pair than to the posterior margin of the telson. The posterior margin of the telson ends in a triangular point, which is overreached by the inner posterior spines by about half the length of the latter. The outer spines of the posterior margin are very short. Between the inner spines numerous hairs are present.

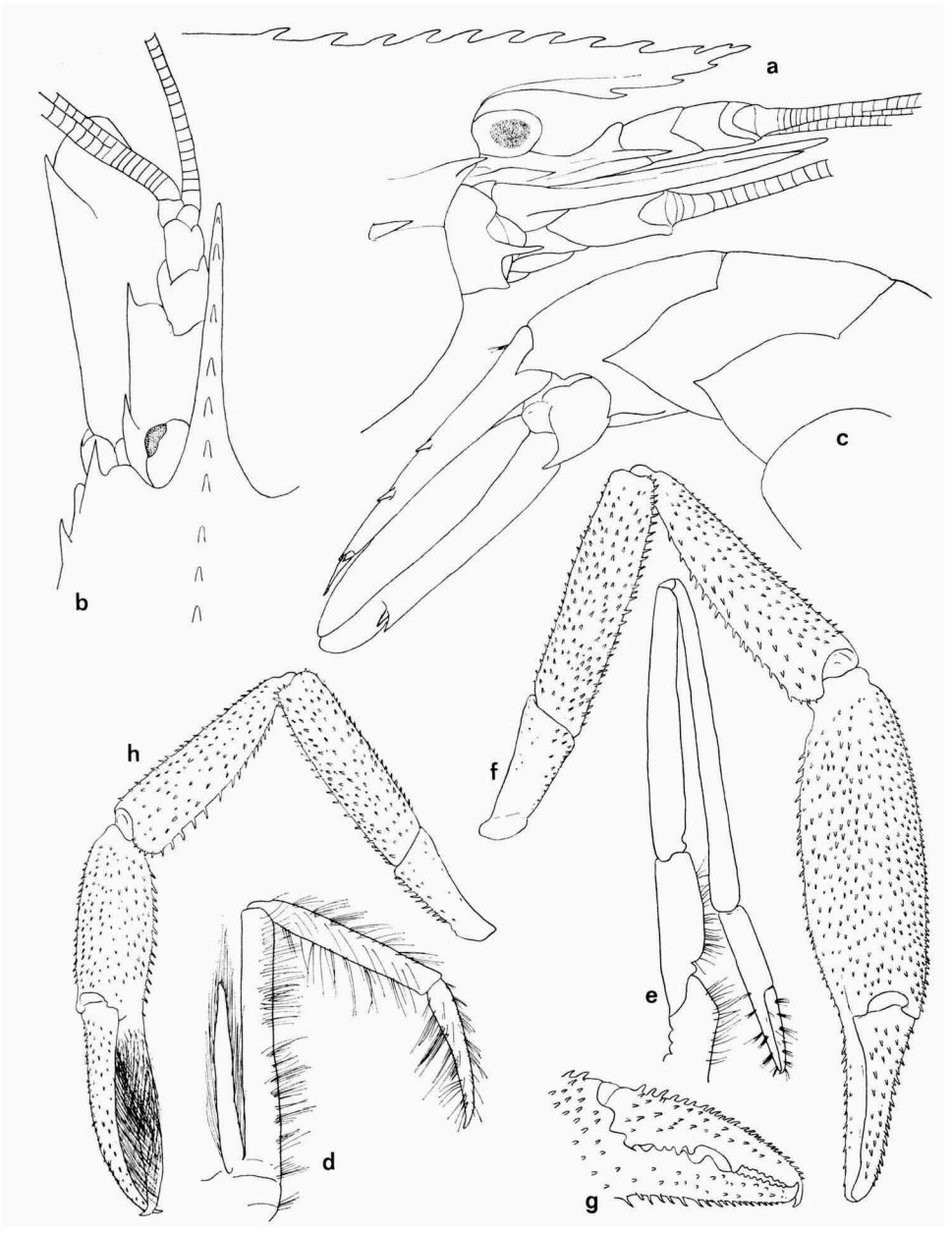

Fig. 1. *Macrobrachium microps* new species, holotype male. a, anterior part of body, in lateral view; b, rostrum, eye, antennula and antenna, in dorsal view; c, posterior part of abdomen, in lateral view; d, third maxilliped; e, first pereiopod; f, larger second pereiopod; g, fingers of larger second pereiopod, inside view; h, smaller second pereiopod. a-e, × 6; f-h, × 3.

The eyes are distinct, but have the cornea strongly reduced; the width of the cornea is only slightly more than half that of the stalk. Although the cornea is reduced, it is well pigmented. The eye reaches about to the middle of the length of the basal antennular segment.

The antennular peduncle has the usual shape found in the genus. The stylocerite is sharp and reaches slightly beyond the middle of the basal segment; the anterolateral angle of the segment ends in a slender sharp spine, which almost reaches the end of the second segment. The fused part of the upper flagellum is short and consists of about 9 articles.

The scaphocerite reaches distinctly (with about 1/3 of its length) beyond the rostrum. It is somewhat less than three times as long as broad. The outer margin ends in a strong tooth which is somewhat overreached by the lamella. The antero-internal angle of the lamella is hardly at all produced. The basicerite shows a dorsal rounded lobe and a strong external spine, while in the lower part of its anterior margin a blunt rectangular tooth is visible.

The third maxilliped reaches with half the distal segment beyond the rostrum. The distal segment ends in a corneous tip, but has no spines; it is somewhat more than 2/3 as long as the penultimate segment. The antepenultimate segment is longer than the penultimate. The exopod is well developed and reaches beyond the middle of the antepenultimate segment.

The first pereiopods are very slender and reach with the entire carpus

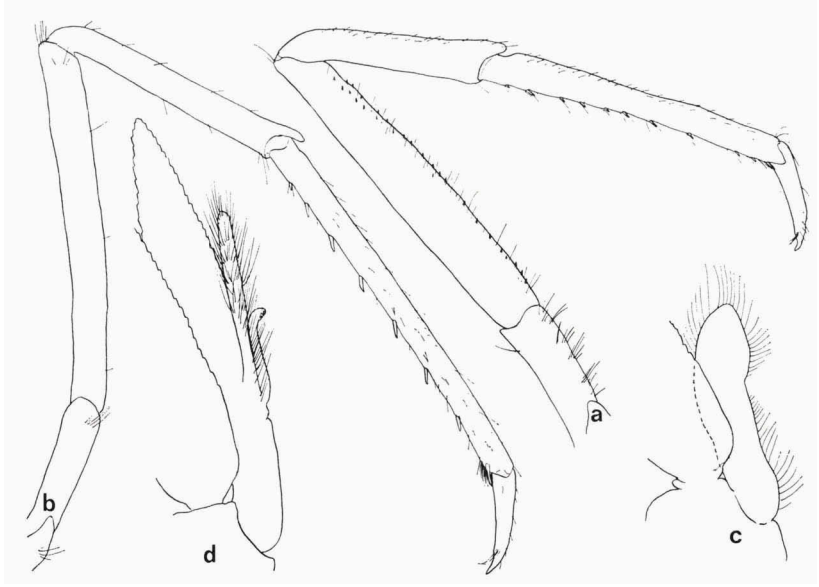

Fig. 2. *Macrobrachium microps* new species, holotype male. a, third pereiopod; b, fifth pereiopod; c, endopod of first pleopod; d, endopod of second pleopod. a, b, × 6; c, d, × 12.

beyond the rostrum. The chela is narrow and the slender fingers are about as long as the palm. The carpus is twice as long as the chela and distinctly longer than the merus.

The second pereiopods in the present specimen, an adult male, are strongly unequal. The larger leg is very robust and covered with numerous small spinules. It reaches with part of the merus beyond the rostrum. The fingers are slightly more than half as long as the palm. The cutting edge of the dactylus bears two large teeth between which there is a distinct gap. The basal of these teeth is very wide and ends in four narrow lobes. The second tooth stands somewhat before the middle of the cutting edge and is bluntly triangular. Before this second tooth the cutting edge is crenulated by the presence of some 8 small blunt denticles. The cutting edge of the fixed finger is very similar to that of the dactylus, only the second tooth is placed closer to the basal tooth, so that the gap between the two is smaller and consequently the crenulated distal part of the edge is longer. The palm is somewhat swollen and about twice as long as high, it shows no conspicuous pubescence. The carpus is slightly shorter than the palm and gradually narrows proximally. The merus is a little shorter than the carpus. The smaller second leg is, like the larger, covered with small spinules. It reaches with the merus to the end of the rostrum. It differs conspicuously from the larger leg in that the fingers are distinctly longer than the palm, narrow, curved and gaping; numerous long stiff hairs on the cutting edges of the fingers fill the gap between the fingers. The palm is less than half as high as long and slightly swollen. The carpus is slightly longer than the fingers and narrows proximally; it is more than three times as long as wide. The merus is somewhat shorter than the carpus.

The third leg reaches with half the propodus beyond the rostrum. The dactylus has slightly more than 1/3 of the length of the propodus. The propodus bears about 10 very small spinules on the posterior margin. The carpus is about 3/4 as long as the propodus. The merus is 1.5 times as long as the carpus; it bears minute spinules on the posterior surface. The fourth leg is similar to the third. The fifth leg is more slender and longer than the third. It reaches with half the propodus beyond the rostrum. Its dactylus is distinctly less than 1/3 of the length of the propodus. The propodus bears about 7 small spines on the posterior margin; these spines are larger than those in the third leg; a transverse row of setae is present in the extreme distal part of the posterior margin of the propodus. The carpus has 2/3 of the length of the propodus. The merus is slightly shorter than the propodus; it shows no posterior spinules.

The endopod of the first pleopod of this male is about oval with the outer margin evenly convex, the inner margin is convex at both ends, almost straight

in the middle. The appendix masculina of the second pleopod is slender, much longer than the appendix interna and provided with many stiff setae.

The protopodite of the uropods ends in a sharp tooth over the base of the exopod, in a broad lobe over the base of the endopod. The exopod has the outer margin about straight, ending in a strong tooth, which at its inner side bears a movable spine.

Size. — The carapace length of the holotype (including the rostrum) is 22 mm, the total length is about 50 mm.

Remarks. — The present new species shows much resemblance to *Macrobrachium placidulum* (De Man, 1892), and belongs to the group containing that species, *M. placidum* (De Man, 1892), *M. lepidactylus* (Hilgendorf, 1879), *M. lepidactyloides* (De Man, 1892), etc. It can immediately be distinguished from the other species of the group by the reduction of the cornea. In the shape of the slender first pereiopods the present species resembles *M. placidulum* and differs from the other species; also the short fingers of the larger second legs are similar to those of *M. placidulum*.

Only few species of *Macrobrachium* are known that have the eyes reduced, viz., *Macrobrachium cavernicola* (Kemp, 1925) from a cave in Assam, *M. acherontium* Holthuis, 1978, from a Mexican cave, and *M. villalobosi* Hobbs, 1973, also from subterranean waters in Mexico. The first two of these, like *M. microps* have the cornea reduced, but present; *M. villalobosi*, however, shows no corneal pigment at all.

ATYIDAE

Caridina troglodytes new species

Danmin Cave near Konogusgus, New Ireland; in subterranean stagnant pool, 0.3 to 0.6 m deep; 29 November 1975; leg. P. Beron. — 4 specimens (including 2 ovigerous females).

Description. — The rostrum is rather high, straight and short; it reaches to or slightly beyond the base of the third segment of the antennular peduncle (in one specimen, the largest, it attains almost the middle of that segment). The upper margin of the rostrum is almost straight, or slightly sinuous, and has 24 to 27 teeth, all of which are movable, and 9 or 10 of which are placed on the carapace behind the orbit. These 9 or 10 teeth occupy the anterior third of the dorsal margin of the carapace (rostrum excluded). The first tooth is very small, much smaller than the rest, which are evenly spaced in the posterior half of the toothed dorsal margin, and placed more closely together in the distal part, except for a very small subdistal stretch before the tip of the rostrum, which is unarmed. The lower margin of the rostrum is convex and bears 2 to 10 teeth in the distal 2/3; in my four specimens this

number is 2, 6, 7, and 10 respectively. The rostrum is highest in the basal part and thereby lance-shaped in lateral view. The ventral teeth are immovable.

The lower orbital angle is bluntly rectangular. A strong antennal spine is placed on the anterior margin of the carapace below this angle. The pterygostomian angle is rounded. No other spines are present on the carapace.

The abdomen is smooth. The pleura of the first three somites are broadly rounded, those of the fourth and fifth are somewhat posteriorly produced, but have the apex also rounded. The sixth somite is about 1.5 times as long as the fifth, slightly shorter than the telson and about half as long as the carapace without the rostrum. The pleuron of the sixth somite is small and rounded; the posterolateral angle of the somite ends in an acute tip and shows an indistinct angular projection on its lower margin.

The telson bears in its posterior half two longitudinal rows of four spinules. The posterior margin of the telson is rounded with a minute sharp triangular median tooth. On either side of this tooth the margin bears two spines: a very short outer spine and a long and strong inner spine. In between the long spines the margin shows 7 hairs, which, as far as can be judged from the imperfect material, are about as long as the longer spines; all hairs have a chitin plug in the basal part.

The eyes are oval, with the cornea visible as a small black spot at the top. The diameter of the cornea is about half that of the stalk. The eyes fail to reach the middle of the basal segment of the antennular peduncle.

The stylocerite is long and slender; it reaches somewhat beyond the end of the basal antennular segment without reaching the middle of the second segment. The second segment is about 1.5 times longer than the third.

The scaphocerite is less than three times as long as wide. It reaches somewhat beyond the antennular peduncle. The outer margin is slightly concave and ends in a strong tooth, which is overreached by the lamella. The lamella is slightly produced antero-internally. The antennal peduncle reaches about to the middle of the scaphocerite. The basicerite shows a distinct sharp tooth, which is placed just below the base of the scaphocerite; the upper margin of the basicerite is broadly rounded.

The mandible has the incisor process ending in two teeth and a row of hairs is present on its inner margin. The molar process is bluntly truncated. The maxillula has the lower lacinia very broad and rounded, the upper is high and narrow. The palp is rounded distally. The maxilla has the separation between the two laciniae rather obscure; the upper lacinia shows a distinct rounded distal lobe; no palp was observed; the scaphognathite is rather narrow, and ends posteriorly in a triangular lobe with a narrow top. All maxillipeds have exopods. The first maxilliped shows a rudimentary epipod; the caridean

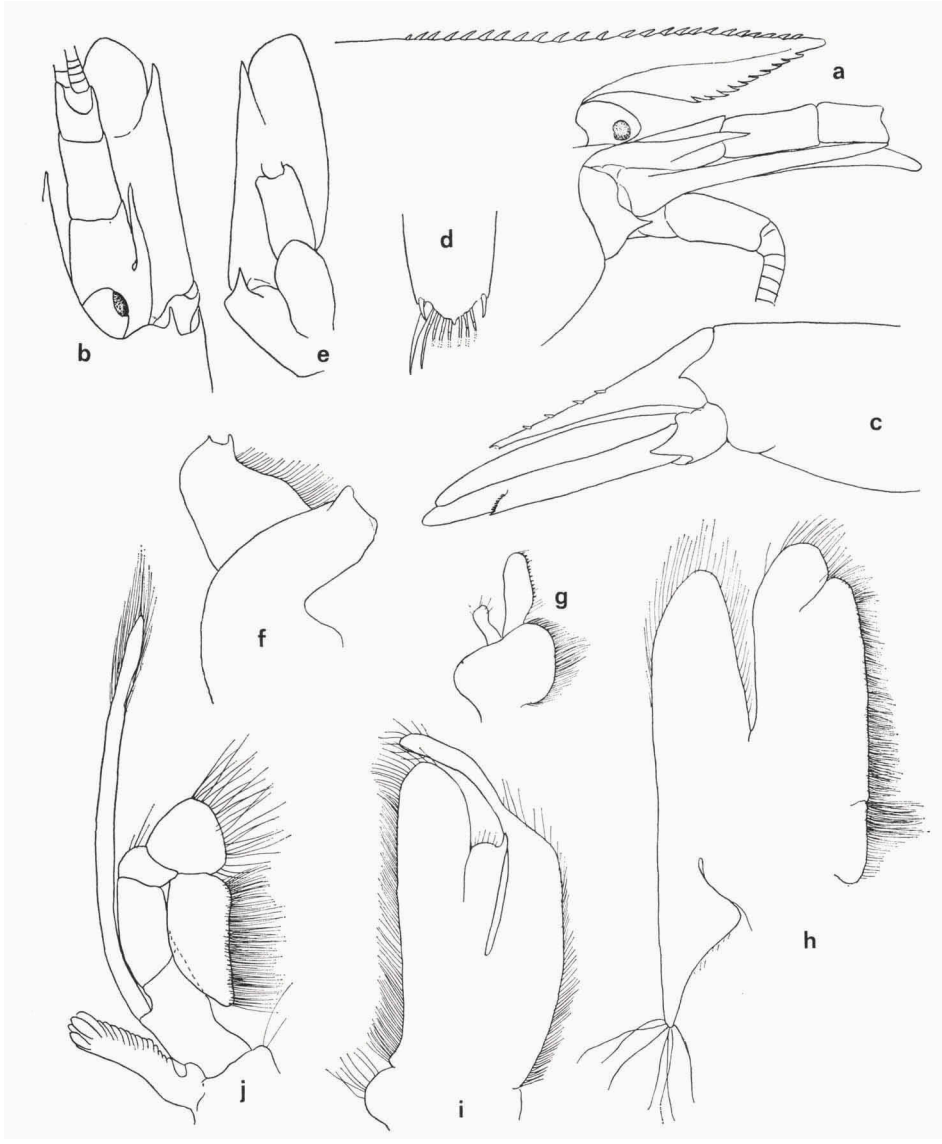

Fig. 3. *Caridina troglodytes* new species. a, anterior part of body, in lateral view; b, eye, antennula and antenna, in dorsal view; c, posterior part of abdomen, in lateral view; d, tip of telson, in dorsal view; e, scaphocerite, in ventral view; f, mandible; g, maxillula; h, maxilla; i, first maxilliped; j, second maxilliped. a-c, e, g, j, × 12.5; d, f, h, i, × 25.

lobe is narrow; the flagellum of the exopod ends in a blunt top; the palp is wide and ends in a narrow lobe; the endites are elongate and separated from each other by a small notch; the upper endite is several times higher than the lower, which is rounded. The second maxilliped has an epipod and a podobranch, the exopod is well developed. The third maxilliped is broken in all specimens. It has an exopod and two arthrobranchs.

The branchial formula is as follows:

	maxillipeds			pereiopods				
	1	2	3	1	2	3	4	5
pleurobranchs	—	—	—	1	1	1	1	1
arthrobranchs	—	—	2	1	—	—	—	—
podobranchs	—	1	—	—	—	—	—	—
epipods	—	1	1	1	1	1	1	—
exopods	1	1	1	—	—	—	—	—

All pereiopods are broken in the specimens examined. A number of loose, but complete chelipeds are present and could be studied, but all other pereiopods are so badly damaged that of a few only propodus and dactylus are available for description. Pleurobranchs are present on all pereiopods, a small arthrobranch on the first and epipods on the first four.

The chelipeds are of three types: (1) The first type, which evidently is a cheliped of the first pair, has the fingers large and blunt, the palm measures about 3/4 of the length of the fingers and is slightly longer than high. The carpus is narrower than the chela and only slightly longer. The merus is about as long as the chela (see fig. 4a). (2) The second type clearly is that of the second pereiopod. Here the fingers are very elongate and rather thin, they are more than three times, almost four times, as long as the palm. The entire chela is about 4 times as long as high. The palm is higher than long. The carpus also is very slender and is almost 1.5 times as long as the chela. The merus, although shorter than the carpus, is distinctly longer than the chela (see fig. 4c). (3) A third type of cheliped is about intermediate in form between the two other types. The chela resembles that of the first type in that the fingers are about 1.5 times as long as the palm and the chela is slightly more than twice as long as high. The carpus, however, is long and slender, being about 1.5 times as long as the chela and about 7 times as long as wide. The merus is shorter than the carpus, but distinctly longer than the chela. It is difficult to decide whether this leg is of the first or second pair, and what its relation with the other chelipeds is. It is hoped that undamaged material will be forthcoming so that this question can be solved. Among the remnants of the third to fifth legs there are several pieces consisting of propodus and dactylus. Among these there are two types: (1) the first type

clearly belongs to either the third or fourth leg, and (2) the second must be that of the fifth leg. The fragments of type 1 (pereiopod 3 or 4) have the dactylus about 1/4 of the length of the propodus. It ends in a sharp strong apex and has 2 or 3 spines on the posterior margin; the distal of these spines is strongest, but it is less strong than the apex. The next spine is much smaller, while proximally of it a third very small spinule may be present. The propodus

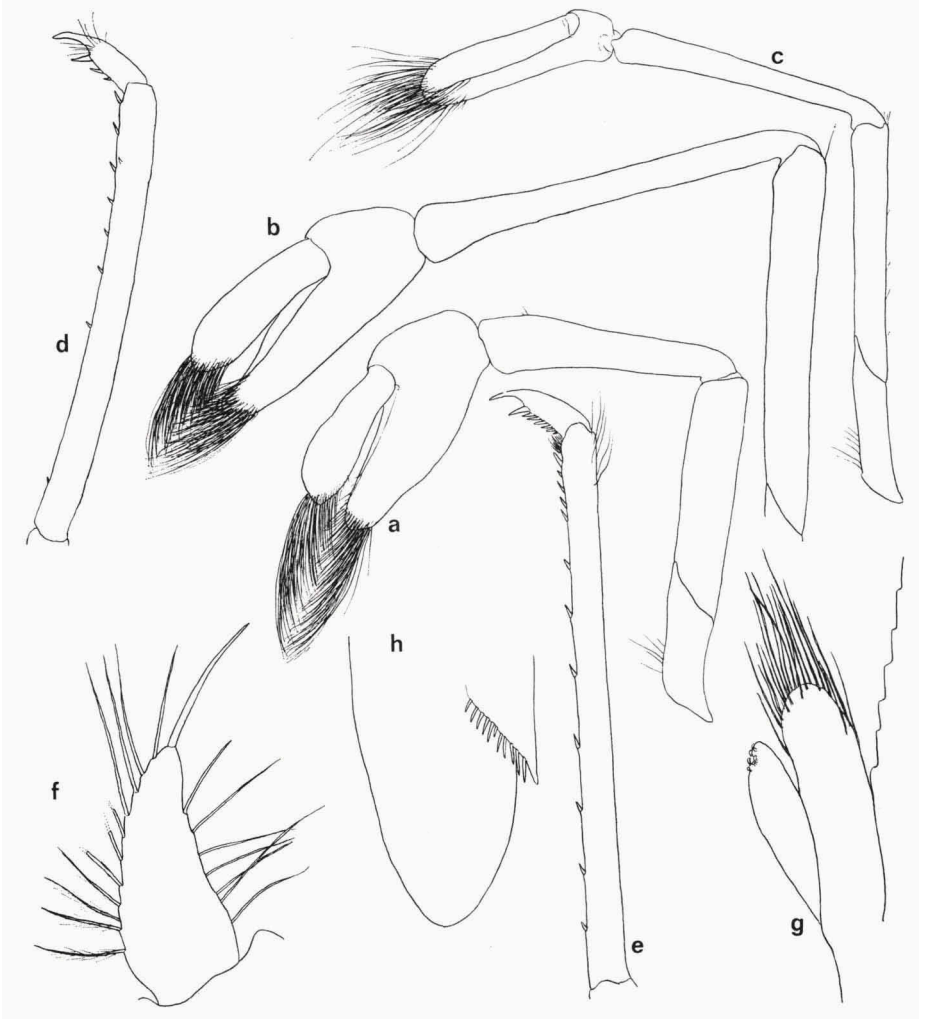

Fig. 4. *Caridina troglodytes* new species. a, first pereiopod; b, first (?) pereiopod; c, second pereiopod; d, distal part of third or fourth pereiopod; e, distal part of fifth pereiopod; f, endopod of first male pleopod; g, appendix interna and appendix masculina of second male pleopod; h, distal part of uropodal exopod. a-e, h, × 25; f, g, × 125.

is elongate with about 10 minute spinules on the posterior margin, the distal of these being the largest. The dactylus of type 2 (pereiopod 5) is about 1/5 as long as the propodus. It ends in a sharp tooth and on the posterior margin it has a large distal tooth, which is almost as large as the apex, and behind this there is a row of about 6 small spinules. The posterior margin of the propodus has a distinct transverse row of hairs, about 15 small spinules are placed over the entire length of this margin, the spinules are closest together distally.

The first pleopod of the male has the endopod elongate triangular, without appendix interna. The second pleopod of the male has the appendix masculina slightly longer than the appendix interna and provided with many long setae.

The exopod of the uropod has about 10 to 12 spinules on the diaeresis.

Size. — The carapace length of the animals varies from 8 to 10 mm, their total length from 21 to 26 mm. The largest specimen (carapace length 10 mm, total length 26 mm) is an ovigerous female. The diameter of the eggs is 0.3 to 0.5 mm; the number of eggs is rather great.

Remarks. — The new species seems to be close to *Caridina serratirostris* De Man, 1892. The shape of the rostrum, though slightly longer in De Man's species, is very similar; especially the great number of dorsal rostral teeth placed behind the orbit is the same in the two species; also in the shape of the chelipeds there is a strong resemblance. *C. troglodytes* can immediately be distinguished from *C. serratirostris* by the strong reduction of the cornea, by the far less slender dactyli of the third to fifth pereiopods, and the fewer spinules on the diaeresis.

One of the most striking features of the present species is the reduction of the cornea of the eye. As far as I know this character has been found in only two other species of the genus *Caridina*: *C. lovoensis* Roth-Woltereck, 1955, from Zaire and *C. rubella* Fujino & Shokita, 1975, from the Ryukyu Islands. It is especially with the latter species that *C. troglodytes* shows a remarkable resemblance. *C. rubella* also has the *C. serratirostris* type of rostrum and the long stylocerite. However, it differs from *C. troglodytes* in the greater number (11 to 23) of ventral rostral teeth, in the armament of the posterior margin of the telson, which has short spines between the longer outer spines, in the more slender chelipeds, and in the greater number of spines on the dactylus of the fifth pereiopods.

Edoneus new genus

Diagnosis. — The rostrum is short and unarmed. The carapace shows no spines or teeth. The abdominal pleura are rounded. The telson bears several pairs of dorsal spines and has a broad posterior margin with spines, of which

the outer are longest. The eyes are degenerate. Exopods are present only on the maxillipeds. Epipods are only absent from the fifth pereiopods. No podobranchs or arthrobranchs are present, but the five pereiopods each have a single pleurobranch. The males have the endopod of the first pleopod without any appendix; the endopod of the second male pleopod is provided with a strong appendix masculina. The diaeresis of the uropodal exopod carries many spinules.

Type species. — *Edoneus atheatus* new species.

Remarks. — The new genus belongs to Bouvier's (1925: 41, 89) "série caridellienne" and in its branchial arrangement is closest to *Limnocaridella.* That genus, however, has one less epipod (on the fourth leg), and possesses an arthrobranch (be it rudimental) at the base of the third maxilliped. Furthermore, *Limnocaridella* has a long rostrum with teeth, well developed eyes, the third legs with only two teeth on the posterior margin of the dactylus, a spine on the carpus and merus, but not on the ischium.

Edoneus atheatus new species

Cave near Santiago, Maddela area, Isabela Province, Luzon, Philippines; 1977; Rev. F. Bandsma. — 3 specimens.

Description. — The rostrum is very short, it is triangular in lateral view and does not reach, or hardly reaches, beyond the eyes. There are no spines at all on the carapace. The lower angle of the orbit is bluntly and widely angular, the pterygostomian angle is broadly rounded.

The abdomen is smooth, the pleura of the first four somites are broadly rounded, those of the fifth somite are produced posteriorly, but also are rounded. The sixth somite is less than twice as long as the fifth. The pleuron is short and rounded, the posterolateral angle forms a blunt lobe over the base of the telson. The telson is slightly longer than the sixth abdominal somite. In its posterior part the upper surface of the telson bears two longitudinal rows of about 6 spines. The first pair of these spines is placed slightly before the middle of the telson, the last pair lies over the base of the outer spines of the posterior margin of the telson. The posterior margin of the telson bears 5 pairs of spines; the outer spines are the longest and the strongest, medially the spines become gradually shorter. None of the spines is setose. Short hairs are implanted on the posterior margin of the telson above the spines; the margin itself shows no median tooth.

The eyes are small and bullet-shaped; in the rather poorly preserved material they show no pigment at all.

The stylocerite reaches beyond the middle of the basal antennular segment

and is narrowly triangular. The second antennular segment is distinctly longer than the third.

The scaphocerite is more than twice as long as wide. The outer margin is about straight and ends in a tooth, which fails to reach the end of the antennular peduncle. The lamella is produced forwards far beyond this tooth and overreaches the antennular peduncle considerably. The antennal peduncle reaches somewhat beyond the middle of the scaphocerite. A small tooth is present on the basicerite near and somewhat below the base of the scaphocerite.

The mandible has the incisor process with several small teeth; the molar process shows many concentric ribs. In between the two processes the inner margin of the mandible bears several spaced hairs and a dense tuft. The maxillula has the upper lacinia narrow and high, the lower rounded; the palp is short and blunt, and bears several hairs and a spinule. The maxilla has the scaphognathite slender and ending in a narrow posterior point; the palp is small and rather hidden; the upper endite is short and rounded, the lower is long. The first maxilliped has the endites fused; the palp is wide and suddenly ends in a narrow and short finger-like prolongation. The exopod has the caridean lobe distinct, the flagellum is rather short and thin. The presence of an epipod could not be ascertained. The second maxilliped has a well developed exopod and epipod, but there is no podobranch. The third maxilliped reaches with the last segment beyond the antennular peduncle. The exopod is well developed and an epipod is present, but no gills were noticed. The ultimate segment of the maxilliped is slightly longer than the penultimate, it ends in a sharp point, which on the posterior margin is followed by about 6 spines, all of which are placed in the distal half of the margin. The proximal half of the margin bears setae. The penultimate segment shows some transverse rows of short spinules in the proximal part of the outer surface.

The branchial formula, as far as it could be ascertained, is the following:

	maxillipeds			pereiopods				
	1	2	2	1	2	3	4	5
pleurobranchs	—	—	—	1	1	1	1	1
arthrobranchs	—	—	—	—	—	—	—	—
podobranchs	—	—	—	—	—	—	—	—
epipods	?	1	1	1	1	1	1	—
exopods	1	1	1	—	—	—	—	—

In all, five pleurobranchs are present at the bases of the pereiopods; no other pleurobranchs were observed, neither were any arthrobranchs or podobranchs. No epipod was seen on the first maxilliped, but it may have

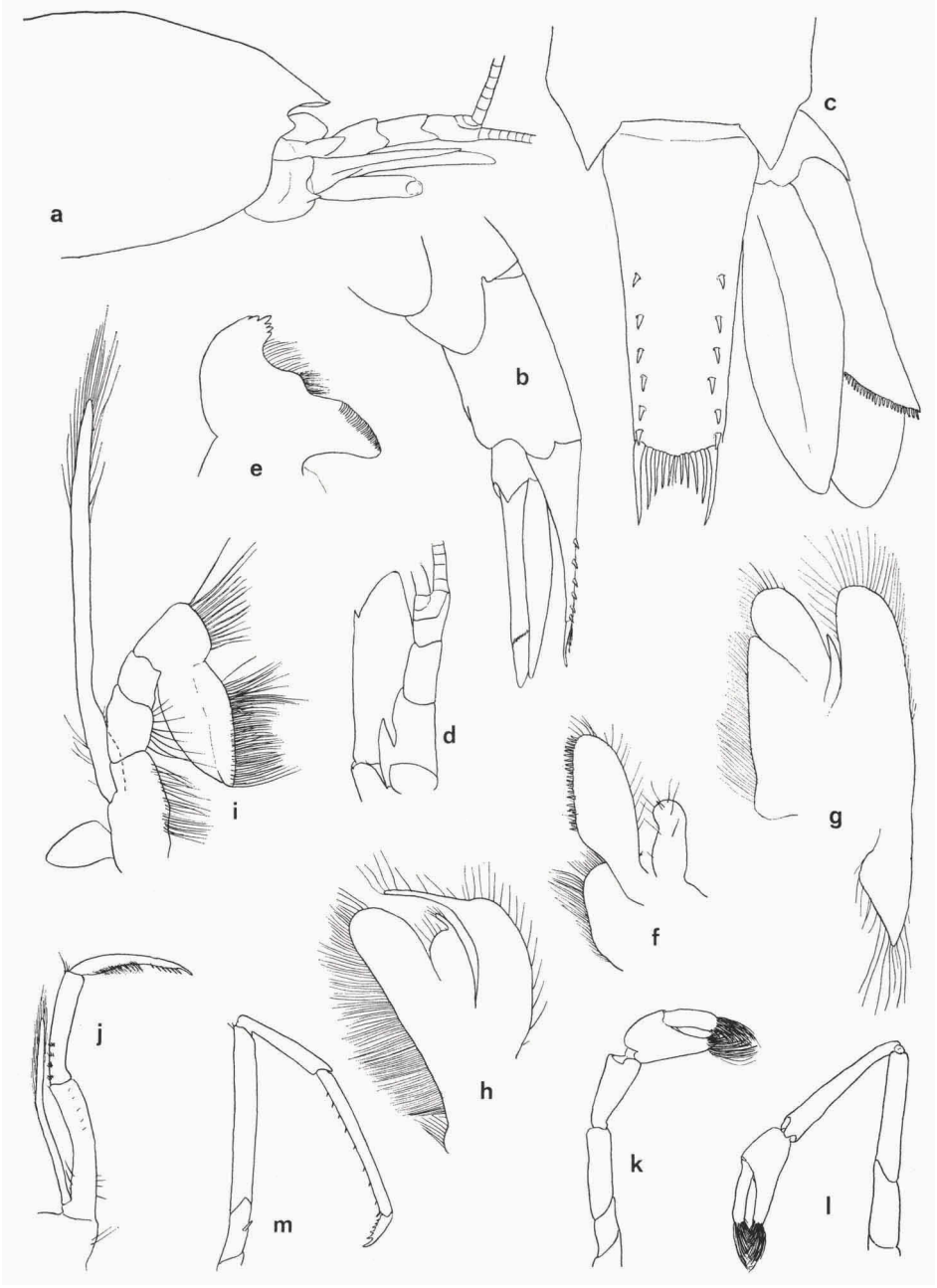

Fig. 5. *Edoneus atheatus* new genus, new species. a, anterior part of body, in lateral view; b, posterior part of abdomen, in lateral view; c, telson and right uropod, in dorsal view; d, antennula and antenna, in dorsal view; e, mandible; f, maxillula; g, maxilla; h, first maxilliped; i, second maxilliped; j, third maxilliped; k, first pereiopod; l, second pereiopod; m, third pereiopod. a, b, d, j-m, × 12.5; c, e-i, × 25.

broken off during dissection, the other two maxillipeds and the first four pereiopods showed distinct epipods. Exopods are present on the maxillipeds only, they fail on all pereiopods.

The first pereiopod is short, it reaches about to the end of the basal segment of the antennular peduncle. The fingers are rather stubby and are about as long as or slightly longer than the palm. The carpus is a little shorter than the chela, and is slightly excavated anteriorly. The second leg is more slender and reaches the end of the antennular peduncle. The fingers are distinctly longer than the palm. The carpus is longer and more slender than that of the first leg, it is much longer than the chela, and also is longer than the merus. The third leg reaches with half the propodus beyond the antennular peduncle. The dactylus ends in a sharp, slightly curved point, and on the

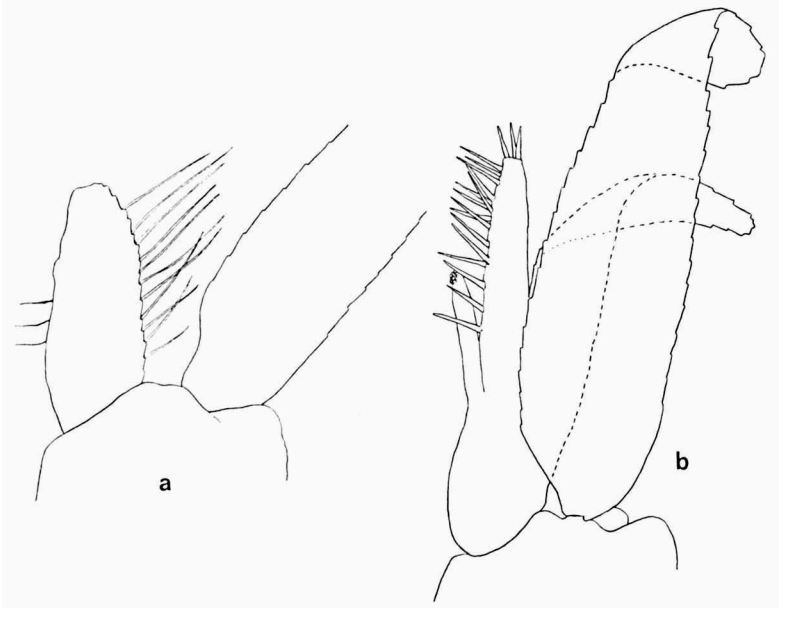

Fig. 6. *Edoneus atheatus* new genus, new species. a, endopod of first male pleopod; b, second pleopod of male. a, b, × 60.

posterior margin bears 4 or 5 spines; the distal of these spines is the strongest and forms a more or less distinct bident with the apex. The propodus is more than three times as long as the dactylus, it is slender and bears about 10 very small spinules on the posterior margin. These spinules are rather regularly spaced. The carpus is about 2/3 as long as the propodus. The merus is slightly longer and broader than the propodus. A spine is present on the ischium. The fourth leg is similar to the third. The fifth leg is missing in all specimens.

The endopod of the first pleopod of the male is ovate, without any appendix; the outer margin bears rather strong hairs which are regularly placed. The second male pleopod has the appendix masculina longer and broader than the appendix interna and its inner margin bears a number of strong spines.

The endopod of the uropod is elongate ovate. The exopod has the outer margin ending in a small tooth at the end of the diaeresis. On the diaeresis a row of about 12 very small spinules is present. The lamella of the exopod reaches distinctly beyond the outer margin and, like the endopod, it reaches to or slightly beyond the end of the telson.

Size. — The male holotype has a carapace length of 5 mm. The two paratypes have the carapace length 4.5 and 5.5 mm.

Types. — All the types are preserved in the Rijksmuseum van Natuurlijke Historie, Leiden, the male holotype under no. Crust. D.31898, the paratypes under no. Crust. D.31899.

No details are known about colour or habitat of the specimens.

Literature cited

Bouvier, E. L., 1925. Recherches sur la morphologie, les variations, la distribution géographique des crevettes de la famille des Atyidés. — Encycl. entomol., (A) 4: 1-370, figs. 1-716.