ZOOLOGISCHE MEDEDELINGEN

UITGEGEVEN DOOR HET

RIJKSMUSEUM VAN NATUURLIJKE HISTORIE TE LEIDEN

(MINISTERIE VAN CULTUUR, RECREATIE EN MAATSCHAPPELIJK WERK)

Deel 53 no. 19 25 oktober 1978

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

L. B. HOLTHUIS

Rijksmuseum van Natuurlijke Historie, Leiden

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

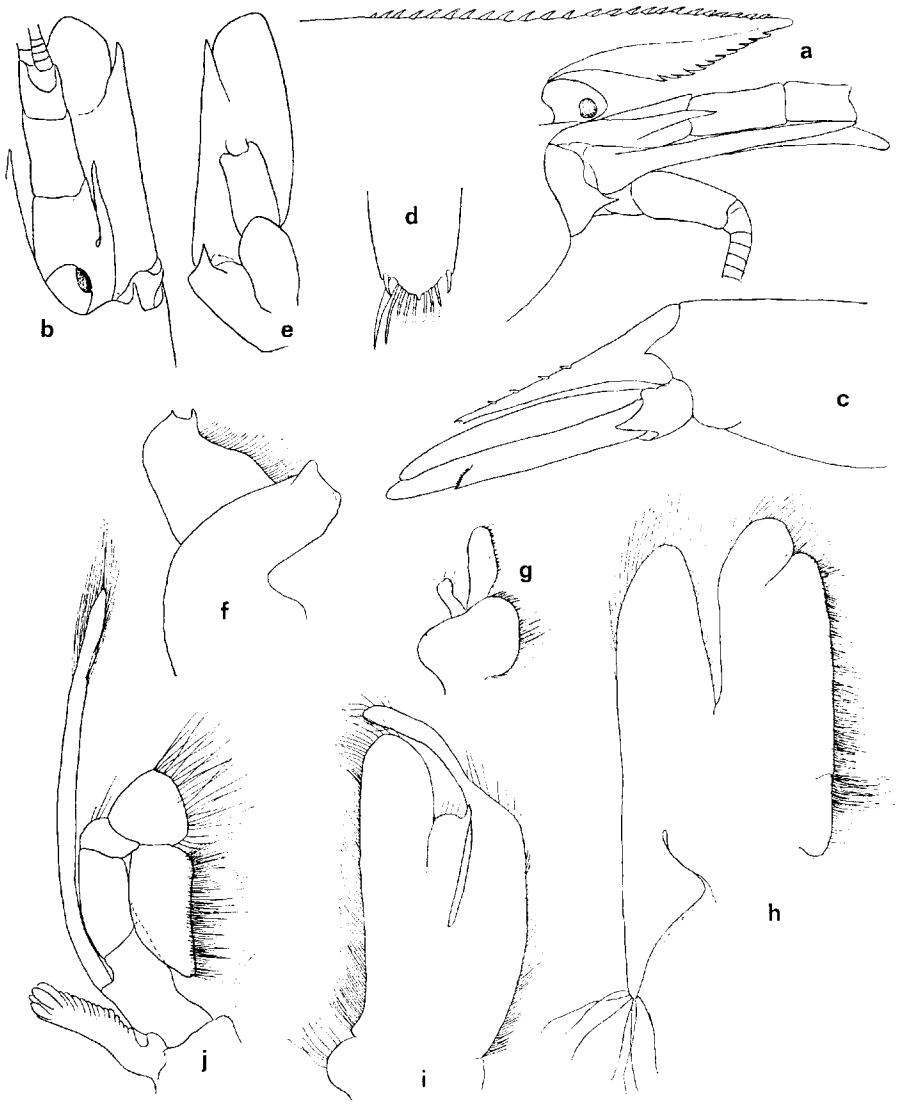

Fig. 3. *Caridina troglodytes* new species. a, anterior part of body, in lateral view; b, eye, antennula and antenna, in dorsal view; c, posterior part of abdomen, in lateral view; d, tip of telson, in dorsal view; e, scaphocerite, in ventral view; f, mandible; g, maxillula; h, maxilla; i, first maxilliped;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

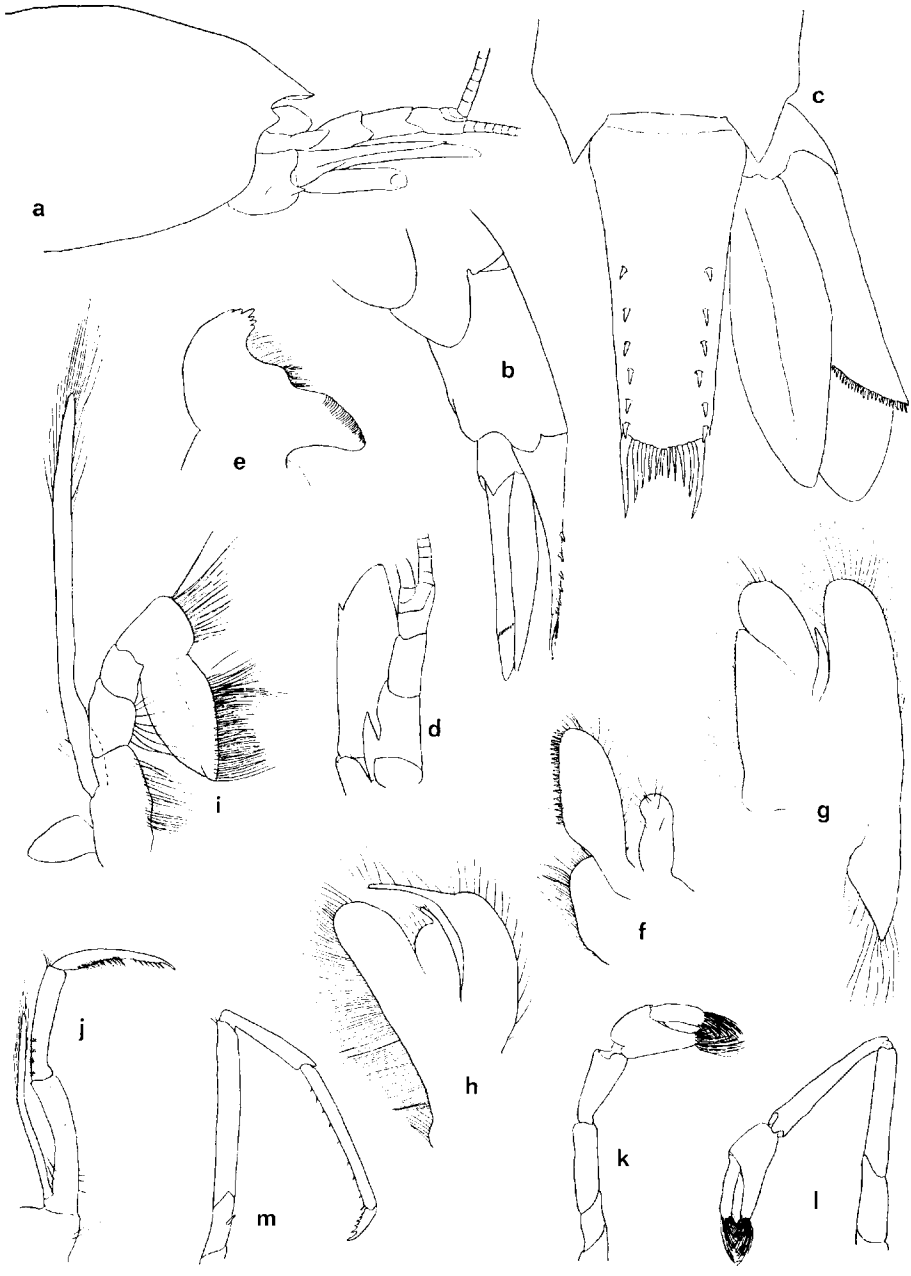

Fig. 5. *Edoneus atheatus* new genus, new species. a, anterior part of body, in lateral view; b, posterior part of abdomen, in lateral view; c, telson and right uropod, in dorsal view; d, antennula and antenna, in dorsal view; e, mandible; f, maxillula; g, maxilla; h, first maxilliped; i, second maxilliped;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

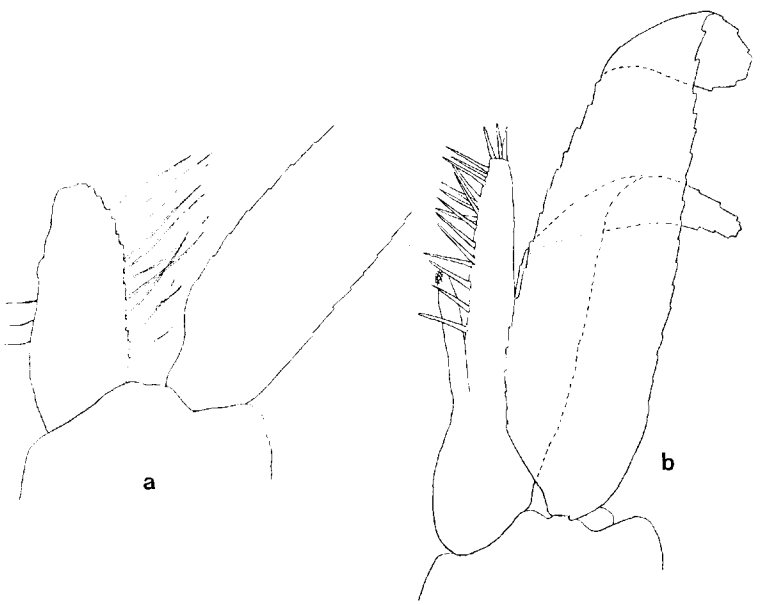

Fig. 6. *Edoneus atheatus* new genus, new species. a, endopod of first male pleopod; b, second pleopod of male. a, b, × 60.

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.