

NOTES ON SOME INDO-PACIFIC PONTONIINAE, XXIII.

TECTOPONTONIA MAZIWIAE GEN. NOV., SP. NOV.,

A NEW CORAL ASSOCIATE FROM TANGANYIKA

(DECAPODA, PALAEMONIDAE)

BY

A. J. BRUCE

East African Marine Fisheries Research Organization, P.O. Box 81651, Mombasa, Kenya

Numerous genera of the sub-family Pontoniinae Kingsley, 1878, of the shrimp family Palaemonidae Samouelle, 1819, are known to live in association with scleractinian corals in the Indo-West-Pacific region. Many specimens are conspicuously coloured and easily visible amongst the branches of the host. During the 318th cruise of the F.R.V. "Manihine" in the coastal regions of northern Tanganyika a single specimen of a small shrimp was obtained, which on subsequent examination could not be referred to any known genus of the Pontoniinae. Due to its small size and inconspicuous colouration the specimen was not noticed in the field, where it resembled a juvenile of other species present. A new genus is now described to include this single specimen.

Tectopontonia gen. nov.

Definition. — A small-sized commensal pontoniinid shrimp associated with branching corals. Body normal in shape, slightly depressed, with short dorsally toothed rostrum. Carapace smooth, without supra-orbital, hepatic and antennal spines. Orbit deep; inferior orbital angle acute; large acute post-orbital spine present. Abdomen smooth, with rounded pleura. Telson elongated, narrow, with two pairs of dorsal spines and three pairs of terminal spines. Submedian and intermediate posterior telson spines robust and strongly ventrally hooked. Eye short, stout; cornea hemispherical. Basal segment of antennular peduncle with strongly produced, acute disto-lateral angle; stylocerite short and broad. Upper flagellum feebly biramous. Scaphocerite well developed, broad with strong disto-lateral spine; basicerite unarmed. Epistomial horns absent. Mandible without palp, processes feeble. Maxillula with simple palp, lower lacina unispinose. Maxilla with slender palp, and broad scaphognathite, endites absent. First maxilliped with slender palp, exopod normal with broad caridean lobe, epipod triquetral. Second maxilliped normal with exopod and simple epipod. Third maxilliped with rudimentary exopod only; epipod normal, without arthrobranch. First pereiopods slender. Second pereiopods small, similar, equal; chela short, stout, with globular dactylus and reduced pollex. Ambulatory pereiopods stout, non-spinulate, with

small slender strongly hooked dactylus, simple but with small basal protuberance. Thoracic sternites unarmed. Uropods normal, with small disto-lateral spine on exopod.

Type species. — *Tectopontonia maziwiae* sp. nov.

Systematic position of genus. — The features important in assessing the systematic position of the genus are: (i) the presence of a moderately developed dorsally dentate rostrum, (ii) the absence of the hepatic, antennal and supra orbital spines, (iii) the presence of a stout post-orbital spine, (iv) the absence of a median sternal spine on the fourth thoracic sternite, (v) the hamate submedian and intermediate posterior telson spines, (vi) the presence of a normally developed scaphocerite, (vii) the slender molar and incisor processes of the mandible and the absence of a mandibular palp, (viii) the slender lower lacinia and simple palp of the maxillula, (ix) the lack of endites of the maxilla, (x) the presence of normally developed exopods and epipods on the first and second maxillipedes, (xi) the presence of a small epipod and rudimentary exopod on the maxilliped, (xii) the small, equal, similar second pereiopods, with specialized chelae, and (xiii) the slender, simple, strongly hooked dactyls of ambulatory pereiopods.

Consideration of these features indicates that *Tectopontonia* is related to the coral inhabiting genera *Fennera* and *Metapontonia* (Holthuis, 1951; Bruce 1967). The differences between *Tectopontonia* and these two genera are summarized in the following tables:

TABLE I

<i>Tectopontonia</i> gen. nov.	<i>Fennera</i>
1. Orbit deeply developed.	Orbit shallow.
2. One large post-orbital spine present.	Several small post-antennal spines present.
3. Incisor process of mandible distally slender.	Incisor process of mandible distally expanded.
4. Molar process of mandible distally obliquely truncate, dentate with short setae marginally.	Molar process of mandible reduced, distally rounded with terminal tuft of long setae.
5. Lower lacinia of maxillula slender, terminally with single stout spine.	Lower lacinia of maxillula with numerous setae distally.
6. Third maxilliped with rudiment of exopod only.	Third maxilliped with normally developed exopod.
7. First pereiopods long and slender.	First pereiopods short and stout.
8. Second pereiopods with chela shorter than carpus; dactyls globular and pollex greatly reduced.	Second pereiopods with chela distinctly longer than carpus; finger small but normally developed.
9. Dactylus of ambulatory pereiopods with a narrow base.	Dactylus of ambulatory pereiopods with a broad base.
10. Submedian and intermediate posterior telson spines robust and strongly hooked.	Intermediate posterior telson spines only particularly robust, not strongly hooked.

Tectopontonia shows a closer resemblance to *Fennera*, another associate of branching corals, than to *Metapontonia*, a specialized associate of corals belonging to the genus *Fungia*. The most conspicuous difference from *Fennera* is the almost complete reduction of the exopod of the third maxilliped.

TABLE II

<i>Tectopontonia</i>	<i>Metapontonia</i>
1. Body slightly depressed.	Body feebly compressed.
2. Rostrum well developed with numerous dorsal teeth.	Rostrum feebly developed with single dorsal tooth only.
3. Incisor process of mandible distally expanded.	Incisor process of mandible distally broadened.
4. Molar process of mandible distally truncate.	Molar process of mandible distally acute.
5. Lower lacinia of maxillula slender with single distal spine.	Lower lacinia of maxillula truncate.
6. Epipods present on second and third maxillipeds.	Epipods absent from second and third maxillipeds.
7. Exopod rudimentary on third maxilliped.	Exopod reduced, scale-like, on third maxilliped.
8. Dactylus of ambulatory pereiopods with small basal process.	Dactylus of ambulatory pereiopods without basal process.
9. Submedian and intermediate posterior telson spines robust and strongly hooked.	Submedian and intermediate posterior telson spines normal.

Remarks. — The new genus *Tectopontonia* is closely related to the other coral inhabiting genera and forms a further link in the graduated series of forms ranging from the unspecialized genus *Vir* Holthuis to the highly modified gall-forming genus *Paratypton* Balss. The main sequence of these genera shows a progressive reduction in the development of the second pereiopods, with reduction generally also of the antennae and the exopods and epipods of the maxillipeds. This sequence is represented by the genera *Vir*, *Periclimenes* Costa (as represented by *P. amymone* de Man, *P. consobrinus* de Man and *P. lutescens* auct.), *Philarius* Holthuis, *Ischnopontonia* Bruce, *Anapontonia* Bruce, *Metapontonia* Bruce and *Paratypton*. The *Fennera-Tectopontonia* group of genera have probably diverged from this sequence at about the level of *Ischnopontonia*.

The mouthparts in general are similar to the related genera of coral associated pontoniinids. The most marked difference is the almost complete reduction of the exopod of the third maxilliped, which is represented by a small rudiment only. In all except one of the other corallicolous genera the exopod of the third maxilliped is normally or strongly developed. The only exception is in the highly specialized genus *Paratypton*, in which reduction in the mouthparts is even more marked, the second maxilliped also lacking an exopodite.

Several other genera of pontoniinid shrimp are known to lack exopods on the

third maxilliped. These are *Hamodactylus* Holthuis, *Pontonides* Borradaile, *Propontonia* Bruce and *Mesopontonia* Bruce in the Indo-West-Pacific region, and *Waldola* Holthuis, *Neopontonides* Holthuis, *Veleronia* Holthuis, *Lipkebe* Chace, *Contierea* Nobili and *Pseudocoutierea* Holthuis in American waters and *Balsia* Kemp in the eastern Atlantic and Mediterranean Sea. The host animals of several of these genera are still unknown. Of those whose hosts are known, (*Hamodactylus*, *Propontonia*, *Pontonides*, *Mesopontonia*, *Neopontonides*, *Veleronia* and *Balsia*), all are found in association with alcyonarian coelenterates and none with zoantharian hosts. Most of these are actually associated with gorgonians. All these genera, except for *Propontonia* and *Mesopontonia* also lack an exopod on the second maxilliped and, except for *Pontonides*, have a well developed, often bilobed, endite on the maxilla. These features are noticeably absent in *Tectopontonia*, which is consequently considered to be more closely related to the corallicolous genera than to those found in association with alcyonarian coelenterates.

Tectopontonia maziwiae sp. nov.

Material examined. — 1 ovigerous ♀, Maziwi Island, off Pangani, Tanganyika, 5°30.0'S 39°04.1'E, F.R.S. "Manihine", stn. 98 (# 1312), coll. A. J. Bruce, 13 December 1970.

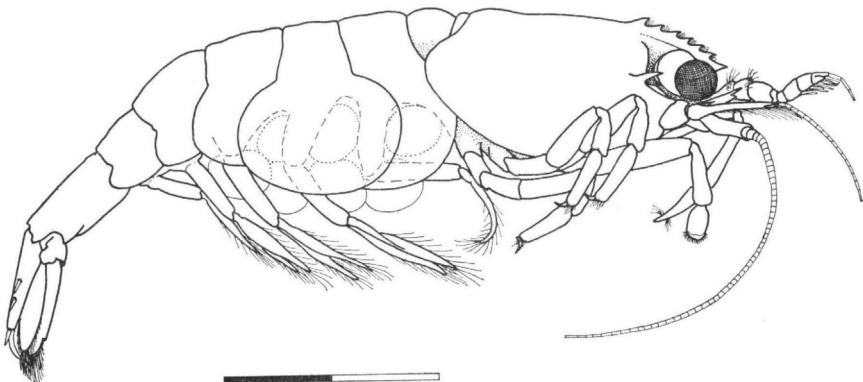


Fig. 1. *Tectopontonia maziwiae* gen. nov., sp. nov. Holotype, female, Maziwi Island, Tanganyika. Scale in mm.

Description. — A small-sized pontoniinid shrimp of normal, slightly depressed body form.

The carapace is smooth, with a well-developed short, slender, tapering, compressed rostrum, which is slightly depressed and extends anteriorly almost to the level of the anterior margin of the basal segment of the antennular peduncle. The lateral carina is feebly developed. The dorsal margin is feebly convex and bears six acute, evenly spaced, subequal teeth, the most posterior tooth being situated on the carapace. The interspaces between the teeth bear plumose setae. The tip of the rostrum is acute. The lower border is sinuous, without teeth, and non-setose. The

orbit is deeply developed with distinct posterior and lateral walls. The inferior orbital angle is produced and acute. Supra-orbital, hepatic and antennal spines are completely absent but a single large acute post-orbital spine is present at the postero-lateral angle of the orbit. The antero-lateral margin of the carapace is distinctly notched and the antero-lateral angle is bluntly produced. The posterior margin of the branchiostegite is broadly rounded.

The abdominal segments are smooth. The third segment is not produced in the dorsal midline. The fifth segment is about half the length of the sixth segment, which is twice as long as deep. The posterior angle and the postero-lateral angles are feebly produced. The pleura of all abdominal segments are broadly rounded. The telson is narrow, tapering feebly, 2.8 times longer than broad, with almost straight lateral margins. Two pairs of stout dorsal spines are present, situated laterally at 0.5 and 0.7 of the telson length. The posterior margin of the telson is broad and bears three pairs of spines. The lateral spines are situated a little in advance of the intermediate spines and are similar to the dorsal spines. The intermediate spines are large and robust, equal to almost one third of the length of the telson, slightly compressed and strongly curved ventrally to form a strong hook. The submedian spines are similar to the intermediate spines but are slightly more slender and shorter.

The eyes are well developed with a stout, slightly flattened stalk. The cornea is globular and without an accessory pigment spot. The stalk is 1.5 times as broad as long and tapers distally, and proximally is equal to 1.5 times the diameter of the cornea.

The antennular peduncle exceeds the rostrum by the distal and intermediate segments and one fifth of the proximal segment. The basal segment is 1.8 times longer than broad, with parallel sides. The stylocerite exceeds half the length of the basal segment and is broad and acute distally. The antero-lateral lobe is feebly produced but bears a large acute spine laterally that extends anteriorly beyond the level of the base of the distal peduncular segment. The middle of the ventral medial border is armed with a small tooth. The statocyst is normally developed and contains an oval non-granular statolith. The intermediate segment of the peduncle is twice as broad as long, with a small lateral lamina, and extends ventrally beneath the distal segment. The distal peduncular segment is twice the length of the intermediate segment and slightly longer than broad. The lower flagellum is short and slender, consisting of twelve segments, and subequal to the length of the peduncle. The upper flagellum is short, stout and biramous, with the two proximal segments fused, and slightly shorter than the peduncle. The shorter free ramus consists of only a single stout segment and the longer ramus consists of six slender segments. Seven groups of aesthetascs are present on the stout portion of the flagellum.

The antenna has a stout, laterally unarmed basicerite. The carpocerite is slender, subcylindrical, and extends anteriorly to the base of the distal segment of the antennular peduncle. The flagellum is short and equal only to about half the body

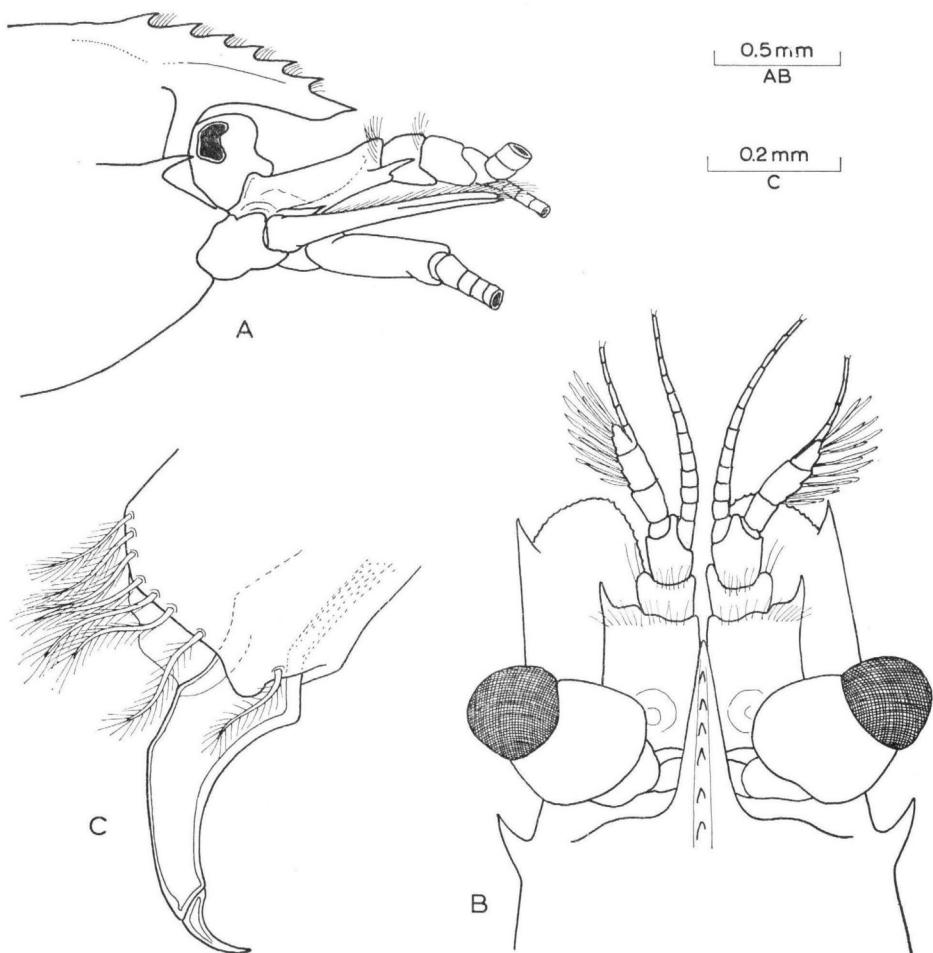


Fig. 2. *Tectopontonia maziwiae* gen. nov., sp. nov., holotype, female. A, anterior carapace and antennal peduncles, lateral view; B, anterior carapace and antennae, dorsal view; C, dactylus of third pereiopod.

length. The scaphocerite is broad and the lamella exceeds the antennular peduncle. The lateral border is straight and terminates distally in a strong spine. The lamella is 1.75 times longer than broad and slightly exceeds the tip of the disto-lateral spine. The median border is convex and the antero-lateral border is almost straight, the two meeting at a blunt anterior angle.

The epistome is normal and unarmed. The mandible is slender. The molar process is well developed, slender, with feeble teeth distally and a few stout setae and setal brushes distally. The incisor process is also well developed, slender, tapering, with five very small subequal teeth distally. There is no mandibular palp present. The maxillula has a narrow upper lacinia with five simple spines and one setose seta distally. The lower lacinia is slender, tapering and bears a

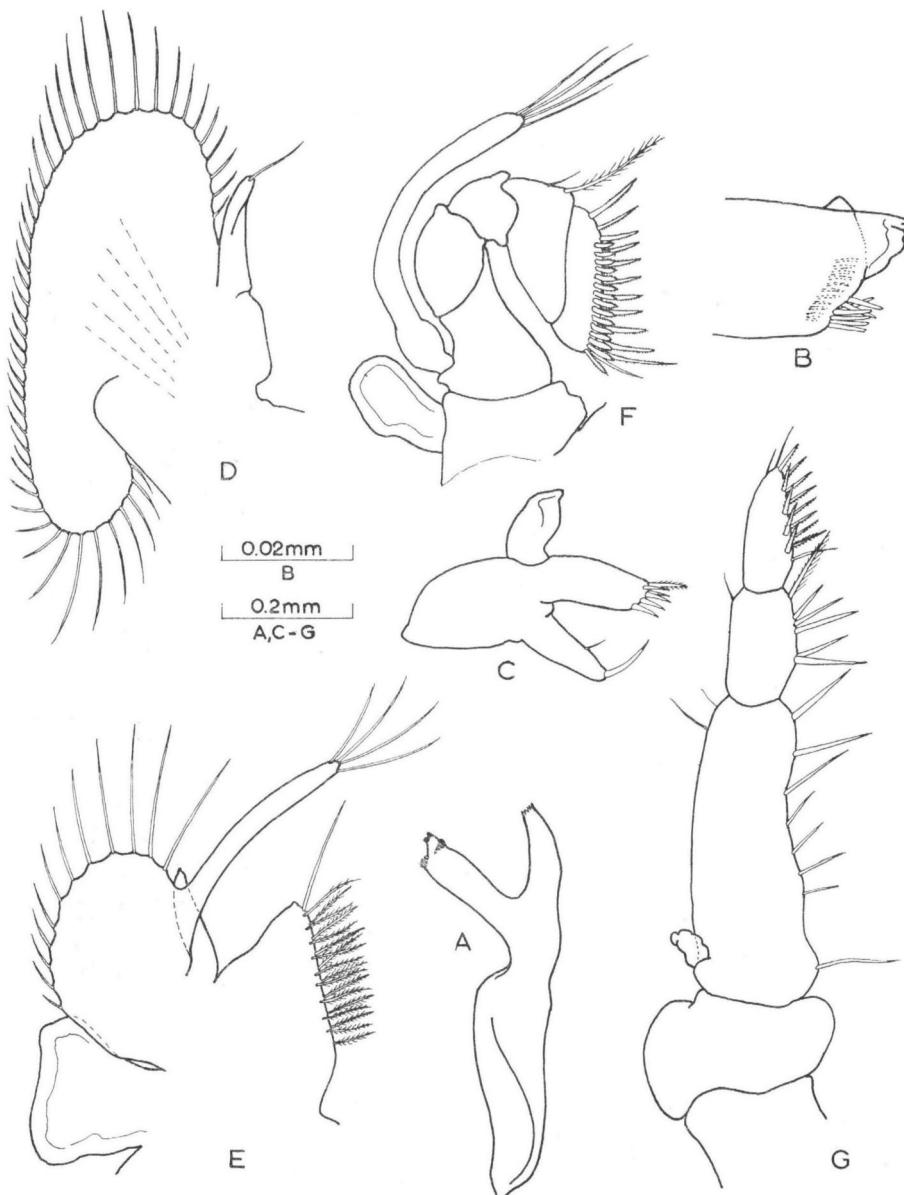


Fig. 3. *Tectopontonia maziwiae* gen. nov., sp. nov., holotype, female. A, mandible; B, molar process of mandible; C, maxillula; D, maxilla; E, first maxilliped; F, second maxilliped; G, third maxilliped.

single long curved spine distally. The palp is normally developed, simple and without a terminal seta. The maxilla bears a simple slender palp with a single non-setose terminal seta. The endites are completely absent, the medial border proximal to the palp showing a broad truncated lobe only. The scaphognathite is well developed and broad anteriorly. The first maxilliped bears an elongated slender,

non-setose palp. The endite is broad, somewhat acute distally, and shows no division into basal and coxal portions. The medial border is provided with a double row of slender setulose setae and a longer simple seta distally. The exopod is well developed with a broad caridean lobe. A triquetral epipod is also present.

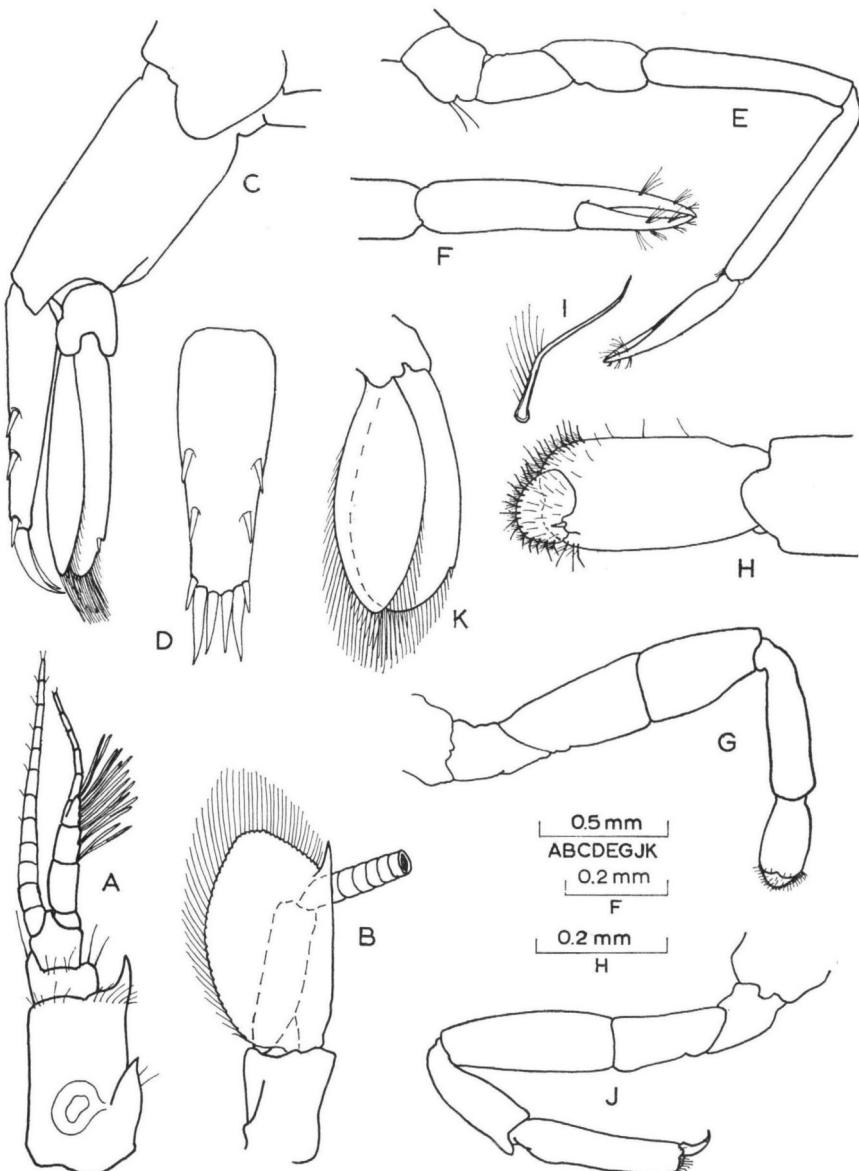


Fig. 4. *Tectopontonia maziwiae* gen. nov., sp. nov., holotype, female. A, antennule; B, antenna; C, abdominal segment and caudal fan, lateral view; D, telson; E, first pereiopod; F, chela of first pereiopod; G, second pereiopod; H, chela of second pereiopod; I, seta from dactylus of second pereiopod; J, third pereiopod.

The second maxilliped is of normal type. The medial border of the dactylus bears a double row of long and short stout serrate setae. The exopod is well developed and a small oval epipod, without a podobranch, is also present. The endopod of the third maxilliped is short and broad. The basis is completely fused with the ischiomerus and the antepenultimate segment is 2.8 times longer than broad. The medial border is sparsely provided with a few stout simple setae. The penultimate and terminal segments are subequal in length, equal to about 0.4 of the length of the antepenultimate segment. The medial border of the penultimate segment bears a few stout simple setae and the medial border of the distal segment bears a double row of short spinulate setae. The basal region bears a vestigial exopod laterally. The coxal segment is broadly rounded medially and bears a small rounded epipod laterally. A pre-coxal portion is well developed. There is no arthrobranch.

The first pereiopod is slender and exceeds the scaphocerite by about half the length of the carpus. The chela is slender with the palm subcylindrical, 3.2 times longer than wide. The fingers are slender, tapering, 6.6 times the length of the palm, with entire indistinct cutting edges. The carpus is also cylindrical, scarcely tapering, 1.4 times the length of the chela and 1.1 times the length of the merus. The merus is stouter than the carpus and slightly expanded proximally. Ischium and basis are subequal and equal to about half the length of the merus. The coxa is slightly shorter than the basis and bears a feeble medial lobe.

The second pereiopods are feebly developed. The merus reaches anteriorly to the anterior margin of the basicerite, and the chela scarcely exceeds the scaphocerite. The chelae are similar and subequal in size. The chela is very short with a cylindrical palm about twice as long as broad. The dactylus is semi-globular and the pollex is reduced to a small process bearing a small distal spine. The margins of the dactylus and the adjacent portions of the palm are provided with a border of modified setae. The shaft of these setae is angulated and bears numerous long setules on the proximal portion only of the aspect away from the angulation. The carpus is stout, subcylindrical, unarmed and 4.0 times longer than wide, slightly expanded distally and equal to approximately twice the length of the chela. The merus and ischium are robust, compressed and unarmed. The merus tapers distally and is 1.8 times longer than wide. The ischium is narrower proximally than distally, 2.1 times longer than wide, and 1.2 times longer than the merus. The basis is 0.6 times the length of the ischium and shows no special features. The coxa is without medial lobes.

The ambulatory pereiopods are short and stout. The third pereiopod exceeds the carpocerite by the length of the dactylus. The dactylus is slender, strongly hooked and simple, with a distinct unguis. A small subacute basal process is present. The base of the dactylus is about one third of the width of the distal end of the propodus, where it is attached ventrally. The propodus is 5 times longer than wide and slightly expanded proximally. It is devoid of spines and bears a few short plumose setae along the distal margin only. The carpus is 0.75 times the length of the propod and slightly expanded distally. The merus is 2.7 times longer than

broad and subequal to the length of the propod. The ischium is 0.6 times the length of the merus and 1.4 times the length of the basis. Carpus, merus, ischium and basis are all devoid of spines. The fourth and fifth pereiopods are similar to the third, but the propod of each is slightly shorter than on the more anterior limb.

The fourth thoracic sternite is without a median process and the posterior sternites are also broad and unarmed, and increase in width posteriorly.

The pleopods show no special features.

The uropods are normal. The protopodite is unarmed laterally. The lateral border of the exopod is feebly convex, entire and with a small mobile spinule distally. The uropods slightly exceed the posterior margin of the telson and the endopod is longer but narrower than the exopod.

The ova are few in number, about twenty being still present, and of normal pontoniid size, about 0.60 mm greater diameter.

Type. — The only specimen, an ovigerous female, is designated as the holotype and is deposited in the collections of the British Museum (Natural History), registration number 1971 : 198.

Measurements. — Total body length, 8.0 mm; carapace length, 2.50 mm; post orbital carapace length, 1.85 mm.

Colour. — No data, but presumably transparent or inconspicuously coloured.

Host. — The single specimen was obtained from a colony of the scleractinian coral *Acropora surculosa* (Dana).

Habitat. — The host colony was collected on the leeward side of a coral reef in 4 m of water, temperature 26.5° C.

Associated fauna. — The following pontoniid shrimps were also present in the same host coral: *Periclimenes lutescens* auct. (5 specimens), *Philaris gerlachei* (Nobili) (2 specimens), *Jocaste japonica* (Ortmann) (3 specimens), *Coralliocaris nudirostris* Heller (7 specimens).

Remarks. — Apart from the absence of an exopod on the third maxilliped, the new species *Tectopontonia maziwiae* shows many features of resemblance to *Fennera chacei* Holthuis, 1951, and it is probable that the ecology of the two species is similar, although *T. maziwiae* is found in association with acroporid corals and *F. chacei* occurs on pocilloporid corals. Both species are of small size, with small chelae on the second pereiopods and have basically similar dactyls on the ambulatory pereiopods.

The dactyls of the ambulatory pereiopods are specialized, presumably in connection with adhering to the host coral. The dactylus is highly mobile and capable of an extreme range of extension, in contrast to the condition in most carideans where much flexion but only a relatively limited amount of extension is possible. When fully extended, the longitudinal axis of the dactylus is at right angles to the axis of the propod. When the propod is perpendicular to the surface of the coral it is possible for the basal process and the unguis of the dactylus to be in contact with the coral. The basal process may therefore act as a fulcrum so that when the flexors of the dactylus contract, the tip of the dactylus is caused to dig into the coral host. A

similar form of dactylus, but less well developed, is found in other coral inhabiting genera, for example *Periclimenes consobrinus* De Man and *Philarius gerlachei* (Nobili). It is also well developed in *Metapontonia fungiacola* Bruce, in which it is very similar to *T. maziwiae*. This form of dactylus contrasts strongly with the condition found in other coral inhabiting pontoniinids, in which it is generally a robust hooked segment, broadly based upon the propod, and particularly with *Jocaste* Holthuis and *Coralliocaris* Stimpson, in which a well developed horseshoe-shaped basal process is present on the dactylus. In these two genera only the extreme tip of the basal process is normally in contact with the coral host and the tip of the dactylus projects freely.

The posterior telson spines of *T. maziwiae* are also remarkable. They are presumably adapted to helping the shrimp adhere to the coral host by flexion of the telson. This mechanism is not found in any other pontoniinid shrimp but a similar mechanism is found in *Hamopontonia corallicola*, in which the terminal telson spines are absent and a pair of fork-like processes are present (Bruce, 1970). Both species are found in relatively exposed situations on their hosts. Shrimps found in confined spaces, such as *Anapontonia denticauda* Bruce and *Ischnopontonia lophos* (Barnard) secure themselves by jamming laterally against the corallites of their host coral *Galaxea fascicularis* (L.) and have developed processes on the exopods of the uropods and not the telson. The closely related *Fennera chacei* lacks these curved telson spines but Holthuis (1951) has noted that the intermediate telson spines are particularly strong.

The chelae of the second pereiopods are unlike any found in other species of the Pontoniinae. The function of this chela is obscure but it may be concerned with the feeding habits of the shrimp, which may possibly be a predator of corals rather than a commensal, feeding upon the polyps, as has been recently demonstrated in the case of *Trapezia* and *Tetralia* (Knudsen, 1967).

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RÉSUMÉ

Un nouveau genre de crevette, *Tectopontonia*, est décrit, avec une nouvelle espèce, *T. maziwiae*, trouvée vivant en association avec le corail *Acropora surculosa* Dana sur les récifs du Tanganyika. Le nouveau genre est très proche des autres genres associés aux coraux, *Fennera* Holthuis et *Metapontonia* Bruce, desquels il peut être distingué par l'absence d'exopodite sur le troisième maxillipède. Les caractères saillants de la nouvelle espèce sont la forme du telson et les pinces des seconds péréiopodes; ces caractères diffèrent complètement de ceux observés chez les autres membres de la sous-famille des Pontoniinae.

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