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Biremia kensleyi, new species of Bathynataliidae, a small Southern Hemisphere family (Crustacea: Isopoda: Sphaeromatidea)

Gary C. B. Poore

Museum Victoria, GPO Box 666E, Melbourne, Vic. 3000, Australia,
e-mail: gpoore@museum.vic.gov.au

Abstract.—*Biremia kensleyi,* the second species of its genus and fourth in the Bathynataliidae, is described from the tropical east coast of Australia. *Biremia ambocerca* Bruce, 1985, also from tropical eastern Australia, is diagnosed and compared with the new species. The family and genus are rediagnosed. Homologies of structures in the mandibles of bathynataliids and serolids are discussed.

The Bathynataliidae Kensley, 1978 is a family of three species erected by different authors for monotypic genera: *Bathynatalia gilchristi* Barnard, 1957, *Naudea louwae* Kensley, 1979 and *Biremia ambocerca* Bruce, 1985. The first two are from South Africa and the last from eastern Australia. Traditionally placed with flabelliferan isopods close to Serolidae, the family is now placed within the Seroloidea Dana, 1852, a superfamily of the suborder Sphaeromatidea Wägele, 1989 (Brandt & Poore 2003). The Seroloidae comprise Serolidae Dana, 1852, Basserolidae Brandt & Poore, 2003, Plakarthriidae Hansen, 1905, and the fossil Schweglerellidae Brandt, Crame, Polz & Thomson, 1999. Here, a second species of *Biremia* is described, from north-eastern Australia, to recognize the contribution of the late Brian Kensley to the taxonomy of isopods in general and to this family in particular.

Family Bathynataliidae Kensley, 1978

Bathynataliidae Kensley, 1978:41–42; Poore & Lew Ton, 2002:209.

Type genus.—*Bathynatalia* Barnard, 1957.

Diagnosis.—Head and pereonite 1 fused, as broad as pereonite 2. Pereopods 5–7 sternites and ventral coxal plates all fused together and at midline. Pereonites 6 and 7 tergites visible dorsally; 7 reduced. Coxal plates of pereopods 2–6 laterally expanded and delimited by sutures from tergites; 7 not expanded. Pleonites 1–3 without medial sternite plate between pleopods. Pleotelson with broad, flattened ventrolateral margins alongside vaulted pleopodal space, without middorsal longitudinal carina. Antenna 2 peduncle without groove on posterior margin for antenna 1. Mandibular incisor multidentate. Mandibular lacinia mobilis present on left, sometimes on right. Maxilla 1 lateral lobe with 10 setae. Maxillipedal palp 3-segmented, second segment largest, third minute. Pereopod 1 propodus with 1 posterior row of robust setae. Pleopods 1–3 peduncles rectangular. Uropods articulating in notches on posterior margin of pleotelson; with 2 free short rami.

Remarks.—The family was diagnosed by Kensley (1978, 1979), Bruce (1985) and most recently by Poore & Lew Ton (2002). Bruce (1985) provided a key to differentiate the three genera. The new diagnosis presented here is modelled on those based on clade synapomorphies for Serolidae Dana, 1852 and Basserolidae Brandt & Poore, 2003 in Brandt & Poore (2003). Males are known only for *Bathynatalia,* meaning generalities about the setation of male limbs or other sexual differences can not be made.

Pereopod 1, consistent within Serolidae and Basserolidae, differs markedly between bathynataliid genera. I can confirm after examining holotypes that the uropod has two short rami in all genera; Kensley (1978, 1979) interpreted them as lobes and stated that *Naudea louwae* has only one ramus.

The mandibles of seroloids are reduced, never with a complex molar process as seen, for example, in most valviferans and sphaeromatoids, and therefore somewhat enigmatic. The plesiomorphic seroloid mandibles have multitoothed incisors, a broad left lacinia mobilis and a narrower denticulate right lacinia mobilis. Poore & Brandt (2003) interpreted the one other spine that always occurs (articulating or fixed) as a reduced molar and any intermediate spines as a remnant spine row. Serolids possess the spine-like molar but lack any spine row. Basserolids have obsolete incisors and no other features. Mandibles of bathynataliid genera vary. *Bathynatalia* and *Naudea* lack a right lacinia mobilis, lack the spine row on both sides, and have a fixed conical molar process. *Biremia* has an articulating denticulate molar process and one or two spines between it and the lacinia mobilis on the left; on the right is either a bifid lacinia mobilis (*kensleyi*) or a simple lacinia mobilis plus two spines (*ambocerca*). Although the similarities and apparent homologies across all seroloid genera can be traced (leaving aside the more reduced *Plakarthrium*), this interpretation of processes as molar and spine row is equivocal. Kensley (1978) did not decide on the homology of the "single conical spine" of *Bathynatalia* but called this a "molar process" in *Naudea* in 1979, thereby agreeing with Brandt & Poore's interpretation. Bruce (1985), on the other hand, believed that the molar process is absent and all the spines in *B. ambocerca* part of the spine row.

Bruce (1985) noted the similarity of Bathynataliidae to Serolidae, especially to the genus *Basserolis* Poore, 1985. The two species of *Basserolis* (Poore, 1985, 1990) have a strikingly similar pereopod 1 to those of species of *Biremia*. First pereopods in other bathynataliid genera are much broader and have diverse palmar setal patterns. On balance, *Basserolis* was found by Brandt & Poore (2003) to be the sister taxon of Serolidae s.s. and to warrant family status. The unique structure of the uropods and pleotelson unite members of the Bathynataliidae and exclude *Basserolis*.

Biremia Bruce, 1985

Biremia Bruce, 1985:296.

Type species.—*Biremia ambocerca* Bruce, 1985.

Diagnosis.—Dorsal coxal plate 7 and pleonite 1 not laterally extended to body margin. Without coxal keys linking adjacent coxal plates. Pleonites 1–4 separated by sutures dorsally from each other and from pleonite 5. Mandibular spine-row present, at least on left; molar a denticulate articulating spine. Pereopod 1 propodus flattened, longer than broad, tapering, palm with row of tooth-like setae; dactylus closing on carpal robust setae. Pleopod 1 lamelliform (not indurate). Pleopod 3 peduncle without broad lobe on distomesial margin; exopod with marginal row of closely-spaced setae on both articles. Pleopod 5 rami without marginal setae.

Remarks.—Bruce illustrated what he called a "second endite" on the maxilliped and used this feature in his generic diagnosis. Examination of the holotype and the new species reveals that the feature he figured is a broad flange along the mesial edge of the anterior face of the basal endite (Fig. 2i) such as found in many isopods.

The type species is diagnosed and a new species described below.

Biremia ambocerca Bruce, 1985
Figs 2j, k

Biremia ambocerca Bruce, 1985:296–298, figs. 1–3.

Material.—Holotype, female, 5.0 mm, off Lady Elliot Island, southern Great Bar-

rier Reef (24°03.7′S, 152°49.4′E); Australian Museum P35697.

Diagnosis.—Pereonites 2–4 with middorsal tubercles. Pleotelson tapering posteriorly, with 7 dorsal longitudinal ridges. Pereopod 1 propodus scarcely tapering. Left mandible with broad dentate lacinia mobilis and 2 fused spines in spine row; right mandible with simple lacinia mobilis and 2 separate spines in spine row.

Distribution.—Australia, Queensland, southern Great Barrier Reef (~24°S), 150 m depth.

Remarks.—Examination of the mandibles of the holotype enabled the structures to be reinterpreted. The single spine on the left mandible figured by Bruce (1985) is in fact two spines fused or adpressed (Fig. 2j). Bruce interpreted four spines on the right mandible as comprising the spine row. The most proximal, with scale-like denticles on the proximal margin, is the molar process and the most distal is the lacinia mobilis; the lacinia mobilis has a broader base than the second and third which comprise the spine row (Fig. 2k).

Biremia kensleyi, new species
Figs 1–3

Material.—Holotype, manca, 6.0 mm. Australia, Queensland, Great Barrier Reef, E of Innisfail (17°31′S, 146°53′E), 458 m depth, M. Pichon, A. Birtles and P. Arnold, 15 May 1986, Museum of Tropical Queensland 971 (with 2 slides).

Diagnosis.—Pereonites without middorsal tubercles. Pleotelson waisted at midlength, anterodorsally flattened between pair of longitudinal submedian corners, with sloping lateral sides defined dorsally by sublateral ridges posteriorly, with transverse depression about two-thirds along and broad 4-lobulate ridge posterior. Pereopod 1 propodus tapering distally. Left mandible with broad dentate lacinia mobilis and 1 fixed spine in spine row; right mandible with bifid lacinia mobilis, without spine row.

Description.—Body almost regularly oval except for produced pleotelson, 1.35 times as long as greatest width. Head 0.43 greatest width of pereonite 1, with lateral eyes (clear in holotype). Pereonites without dorsal sculpture. Pereonites 2–4 with similar middorsal lengths, 5 shorter, and 6 and 7 half length of 5; pereopods 2–6 with subrectangular dorsal coxal plates; pereonite 7 reaching short of pereonite 6-coxal suture; pereonites 5–7 sternites fused midventrally. Pleonites 1–4 and pleotelson separated dorsally by sutures, more mobile anteriorly; pleonite 1 middorsal length short, not extending as far laterally as pereonite 7; pleonites 2 and 3 with epimera reaching to margin and extending posteriorly two-thirds of length of pleotelson; pleonite 4 shorter than and reaching only half as far laterally as pleonite 3. Pleonites 5 and 6 fused into pleotelson; pleotelson waisted at midlength, anterodorsally flattened between pair of longitudinal submedian corners, with sloping lateral sides defined dorsally by sublateral ridges posteriorly, with transverse depression about two-thirds along and broad 4-lobulate ridge posterior to this, posterior magin produced as rounded apex between uropodal excavations. Pleotelson ventrolateral margins flattened and broadened, especially posteriorly to partially enclose pleopodal chamber.

Antenna 1 article 2 with convex anterior margin; flagellum of 13 articles, first article short and broad. Antenna 2 article 3 with minute scales; flagellum of 9+ articles.

Clypeus with concave margins each side of anterior point; upper lip slightly cleft. Left mandible with denticulate articulating molar process; fixed terminally denticulate spine (=spine row remnant); lacinia mobilis broader than incisor, with 9 rounded teeth; incisor of 4 prominent and 1 obsolete teeth. Right mandible with denticulate articulating molar process; bifid lacinia mobilis; 7-toothed incisor process. Mandibular palp article lengths in ratio: 1:3.3:1.5; article 2 with 6 setae mesiodistally, article 3 with 7 setae mesiodistally. Maxilla 1 inner endite

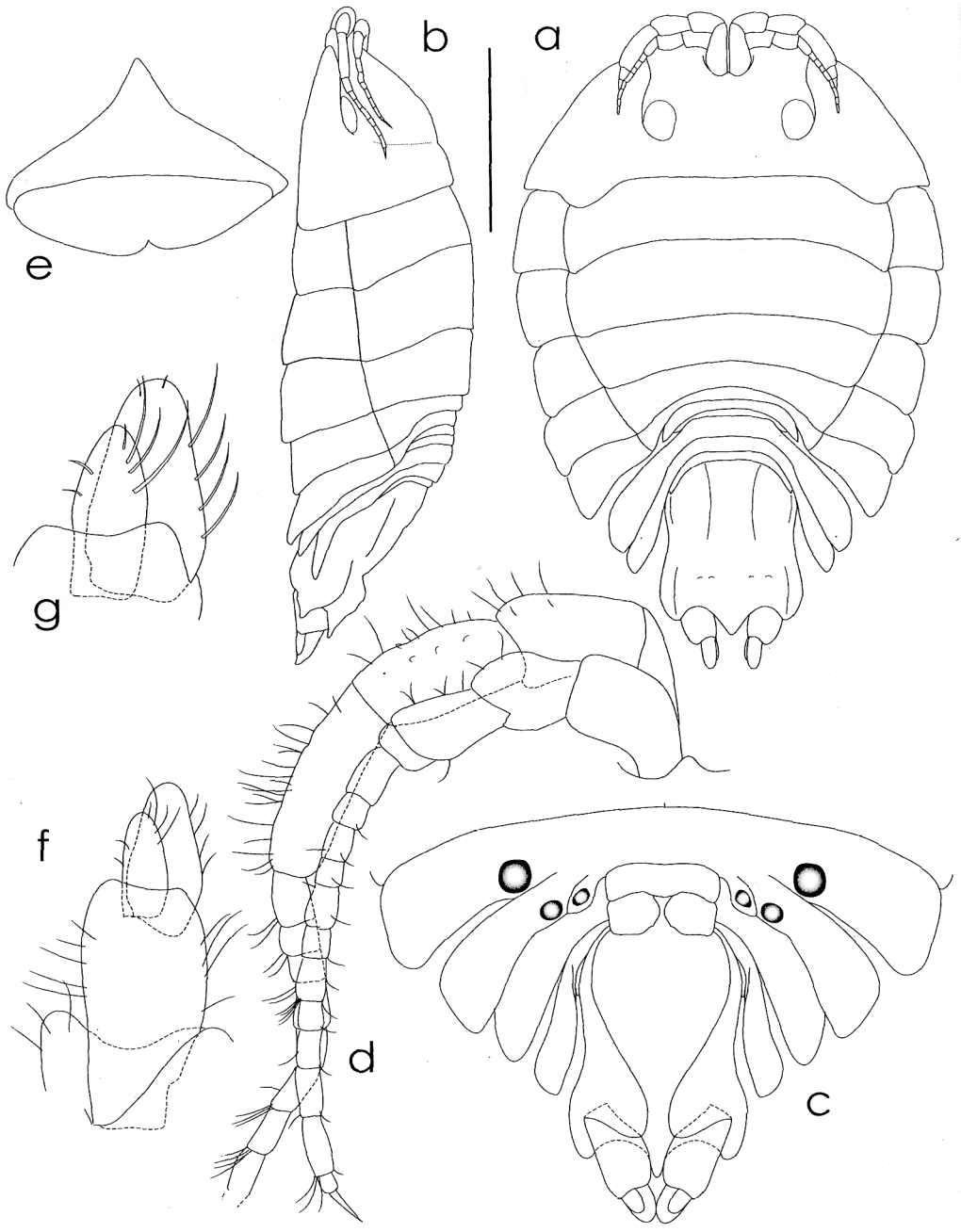

Fig. 1. *Biremia kensleyi,* holotype. a, b, dorsal and lateral views (scale bar = 2 mm). c, ventral view of pleotelson and coxal plates of pereopod 5–7 (attachment of bases of pereopods 5–7 shaded, peduncles of pleopods 1 shown). d, left antennae 1 and 2 (distal articles of antenna 2 broken). e, clypeus and upper lip. f, g, right uropod, ventral view and detail of uropodal rami.

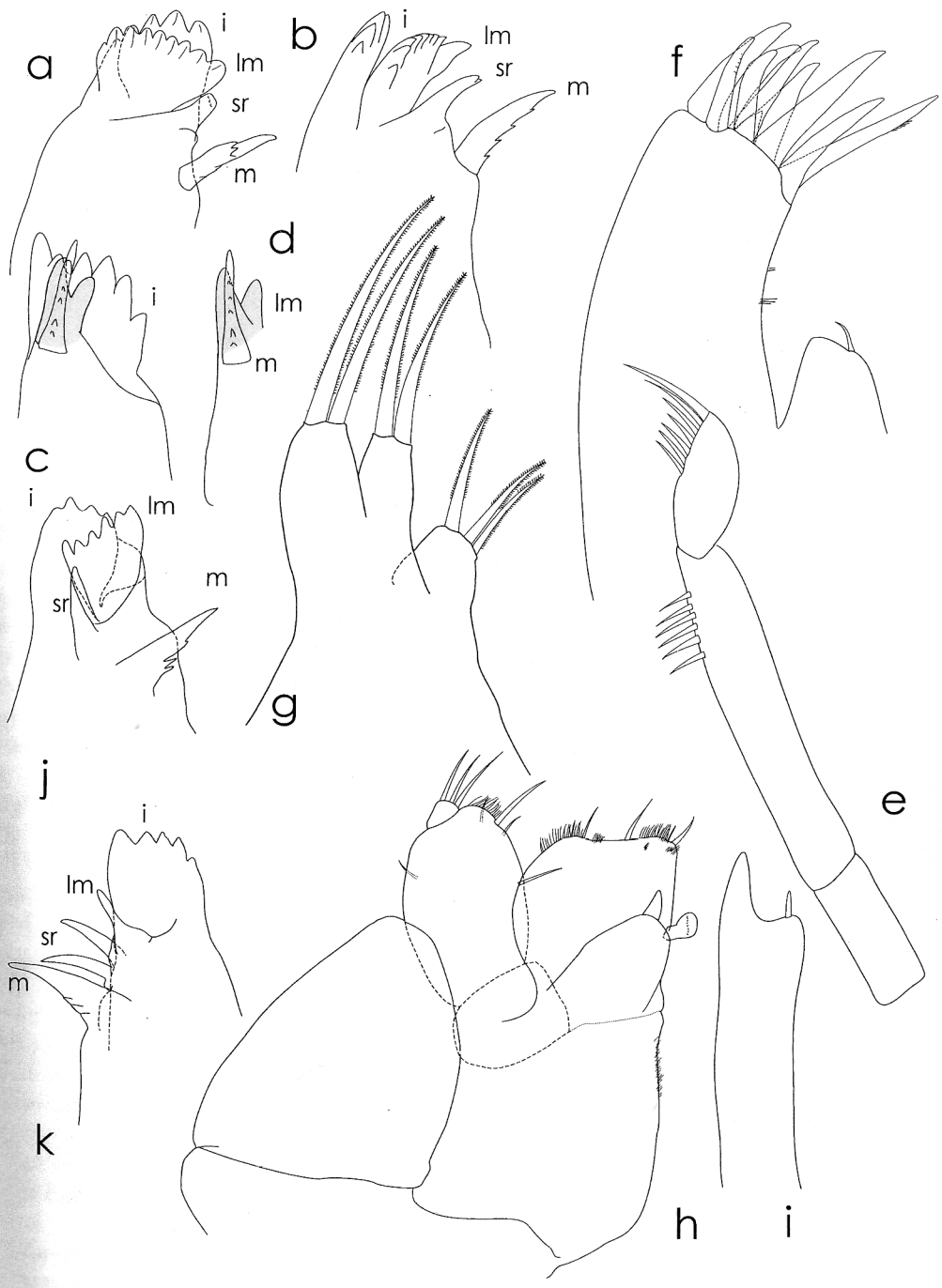

Fig. 2. *Biremia kensleyi,* holotype. a, b, left mandible (dorsal and lateral views of distal part only). c, right mandible (dorsal views of distal part). d, right lacinia mobilis and molar (dorsal view). e, mandibular palp. f, maxilla 1. g, maxilla 2. h, maxilliped, ventral view. i, maxilliped, mesial view of basis and endite. *Biremia ambocerca* Bruce, holotype. j, left mandible (dorsal view of distal part). k, right mandible (dorsal view of distal part). (i, incisor process; lm, lacinia mobilis; sr, spine row; m, molar process).

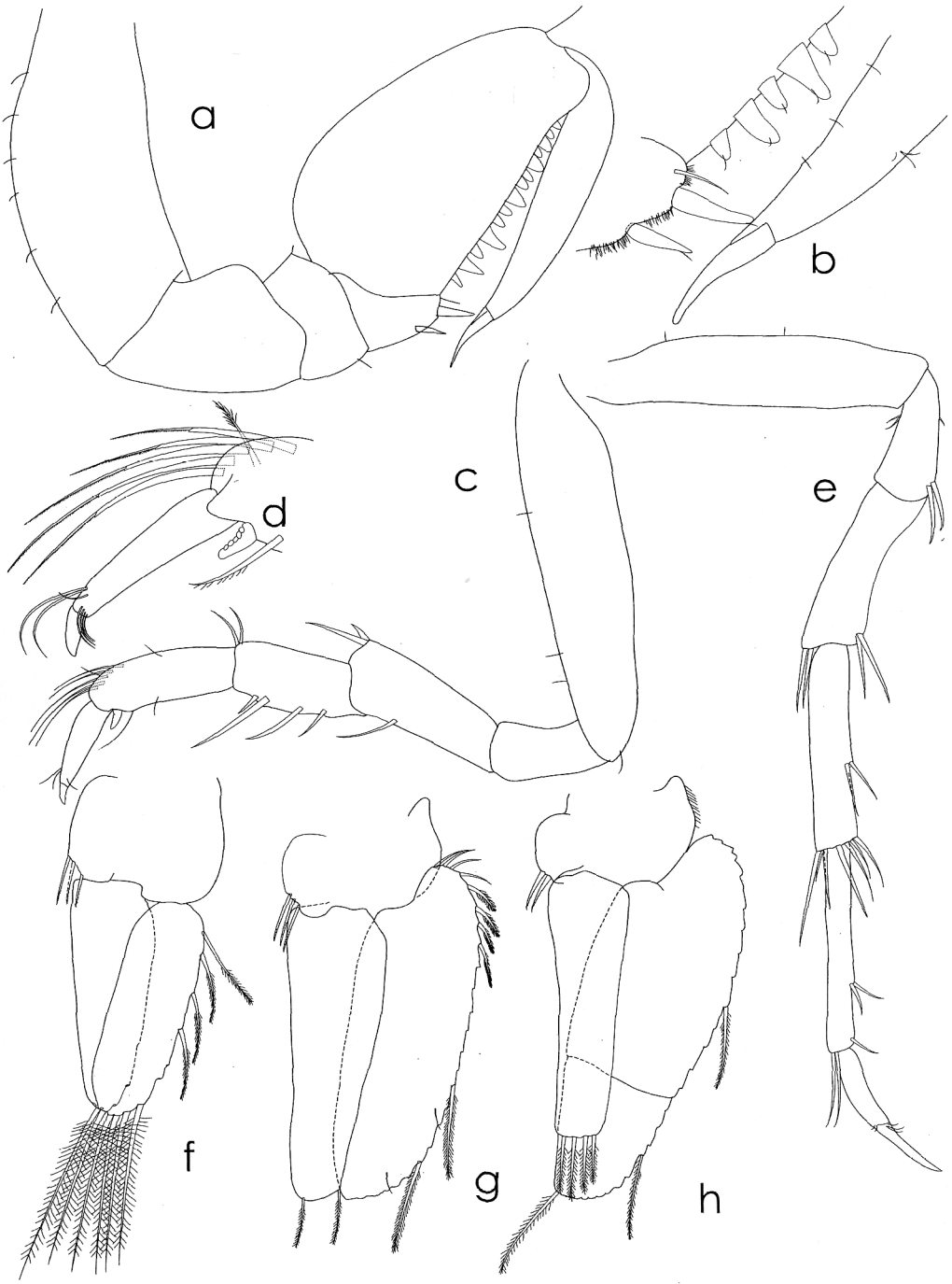

Fig. 3. *Biremia kensleyi,* holotype. a, b, left pereopod 1 with detail of carpal and propodal palm and dactylus. c, d, left pereopod 2 with detail of end of propodus and dactylus in lateral view. e, left pereopod 6. f–h, left pleopods 1–3 (not all plumose setae shown).

with 1 short distal seta; outer endite with 10 distal robust setae of various lengths. Maxilla 2 inner, middle and outer endites with 3, 2 and 2 setae respectively. Maxilliped basal endite with mesial flange on anterior face, produced distally, with blunt distal seta; with 1 coupling hook, distally truncate, with 3 simple setae and finer setules, laterally convex; palp article 1 about 1.3 times as wide as long; second segment (articles 2 and 3 fused) oval, about 1.3 times as long as wide, with 2 mesial marginal setae, 2 submesial and 1 sublateral on distal face; third segment (articles 4 and 5 fused) very short, with 3 terminal setae on oblique margin; epipod semi-elliptical, as wide as basis.

Pereopod 1 carpus with 2 robust setae on posterior margin; propodus width 0.53 length, widest in proximal quarter; palm straight, with 14 irregular tooth-like flagellated setae; dactylus closing along palm, with anteriorly deflected unguis opposite carpal setae. Pereopod 2 merus with 2 setae on anterodistal angle, 1 on posterior margin; carpus with 2 setae on anterodistal margin, 4 on posterior margin; propodus with 5 complex setae at anterodistal margin, each with tooth near midpoint and pectinate beyond, posterodistal angle with 'lower jaw'-like robust seta with row of 5 'molars' opposing dactylus; dactylus tapering, with short robust unguis. Pereopods 3–5 with similar setation to pereopod 2 but becoming more elongate. Pereopod 6 more elongate than more anterior pereopods; distal margins of ischium–propodus with 2, 4, 7 and 3 setae; carpus and propodus with addition 2 setae on posterior margins; dactylus with unguis half total length. Pereopod 7 reduced (manca).

Pleopod 1 peduncle length about 0.9 width, with 3 coupling setae; endopod with 5 setae along distolateral margin; exopod with 11 setae along distolateral margin. Pleopod 2 peduncle length 0.6 width, with 3 coupling setae; endopod with ? distal setae (damaged); exopod broader, with ?30 distal and lateral setae (damaged). Pleopod 3 length about 0.55 length, laterally lobed, with 2 coupling setae; endopod with 4 distal setae; exopod 2-articulate, with 30 distal and lateral setae. Pleopods 4 and 5 damaged.

Uropod peduncle set in deep notch on posterior margin of pleotelson, covered with concave flange of pleotelson dorsally, with about two-thirds exposed dorsally and more so ventrally; mesial margin straight, lateral margin convex; rami deeply set in end of peduncle; endopod lying ventral to exopod, 0.75 times as long and 0.45 times as wide as exopod, with 8 setae on ventral surface; exopod about 0.63 length of peduncle, with 4 long setae along lateral margin.

Etymology.—For Brian Kensley.

Distribution.—Australia, Queensland, northern Great Barrier Reef (c. 17°S), 458 m depth.

Remarks.—Although both species of *Biremia* are based on single individuals, and this one a manca, the morphological differences are sufficient to be confident that they are separate species. *Biremia kensleyi* differs from *B. ambocerca* in the presence of a complete dorsal suture between pleonites 1 and 2, absence of dorsal pereonal sculpture, more elongate and less sculptured pleotelson, tapering propodus of pereopod 1, a bifid lacinia mobilis on the right mandible, and closer and more regular setation on mandibular palp article 2. Both species are from tropical Queensland, Australia, *B. kensleyi* from 458 m depth whereas *B. ambocerca* is from a shallower 150 m depth.

The waisted shape of the pleotelson differs from that of *B. ambocerca* which is tapered; in fact it resembles more closely that of *Naudea louwae,* or to a lesser extent, *Bathynatalia gilchristi.* This is another case, like the *Basserolis*-like pereopod 1, of convergence in related taxa.

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