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Electrolana Schädel, Hyžný & Haug, 2021 (Crustacea: Isopoda: Cirolanidae), a Junior Synonym of *Cirolana* Leach, 1818 and a New Species of *Metacirolana* Kussakin, 1978 from Cretaceous Amber of Myanmar

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Abstract. *Electrolana madelinae* Schädel, Hyžny & Haug, 2021 was described from two excellently preserved isopod specimens from *ca*. 40-million-year-old amber from Myanmar. Appraisal of the two specimens and their comparison to extant genera and species of Cirolanidae show that the genus *Electrolana* Schädel, Hyžny & Haug, 2021 is a junior synonym of *Cirolana* Leach, 1818, and that the holotype and paratype represent two distinct species. The holotype is placed in the combination *Cirolana madelinae* (Schädel, Hyžny & Haug, 2021) comb. nov., and the paratype, a species of *Metacirolana* Kussakin, 1979, is here diagnosed and named *Metacirolana jimlowryi* sp. nov. *Brunnaega roeperi* Polz, 2005 is transferred to *Cirolana roeperi* (Polz, 2005) comb. nov.

Introduction

Schädel *et al.* (2021) described a new genus and species of isopod based on two specimens found in *ca.* 40-million-year-old amber from Myanmar. The authors classified the new genus as belonging to the Cymothoida Wägele, 1989 but not to any lower taxon. The two specimens were considered to be different developmental (ontogenetic) stages of the same species, the authors stating that the specimens "*Except for the body size, the two herein studied specimens are overall very similar*" and "*Considering the similarity between the two specimens and that the differences can easily be explained by ontogenetic changes, it appears most likely that the two specimens are conspecific*." Schädel *et al.* (2021) gave no character-based evidence for their assertion of similarity. Appraisal of the figures given by Schädel *et al.* (2021) reveals that the similarities shown by the two specimens exist solely at the family level and that the specimens display a wealth of difference at both generic and species level in the details of all visible appendages as well as body characters. The two specimens were simply misidentified at genus and species level.

The purpose of this present work is to re-identify the species named in Schädel *et al.* (2021), showing that these

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amber-preserved specimens belong to the Cirolanidae, that there are two species present in two genera and to correct the taxonomy presented in that publication. The second purpose is to demonstrate three points: 1, all isopod families are not the same with regard to development and in several families mancas and immature specimens can be unequivocally identified to genus; 2, fossil isopods need thorough comparison to extant genera and an understanding of the characters defining higher taxa to obtain the highest possible resolution identifications and so avoid publication of spurious taxa; 3, species can only be precisely and clearly described if higher-taxon characters are excluded from the species description.

Materials and methods

The specimen illustrations were traced from photographs in Schädel *et al.* (2021); because the specimens are in a single piece of amber, appendages cannot be seen in a perpendicular view, therefore pereopod figures have been reconstructed to present a standard slide-mounted perspective. The hand-inked tracings were converted into digital files using Adobe Photoshop CS6. Higher classification used follows Brand & Poore (2003). The type material is held at the Naturhistorisches Museum, Wien (Vienna) (NHMW).

Taxonomy

Cymothoida Wägele, 1989

Remarks. At subordinal level, following Brandt & Poore (2003), the apomorphic states of the anterolateral and ventral attachment of the uropodal peduncle, which articulates ventro-laterally, and the ventrally flat pleotelson unambiguously identifies the suborder as Cymothoida. The plesiomorphic state of five free (unfused) pleonites is a further consistent character, with occasional fusions of pleonites in some Cirolanidae, notably the highly derived cave-dwelling genera (see Bowman, 1975; Botosaneanu *et al.*, 1986; Bruce & Herrando-Pérez, 2005; Iliffe & Botosaneanu, 2006).

Cirolanidae Dana, 1852

Remarks. Bruce *et al.* (2021), in synonymizing *Obtusotelson* Schädel, van Eldijk, Winkelhorst, Reumer & Haug, 2020 with *Cirolana* Leach, 1818, gave a detailed stepwise account of how that identification to family was made. That is not repeated here in detail but in essence, the ambulatory pereopods 1–3 that lack a prehensile dactylus excludes all micropredator and parasitic families. The Corallanidae is excluded on several character states, including the pleonite 3 lateral margin being not posteriorly produced, pleonite 4 epimera posteriorly rounded, a proportionally narrower head than seen in cirolanids, and usually with abundant and often hyaline setae on the dorsal surface of the pleotelson and pleon and in some species variably over the pereonites.

Genus *Cirolana* Leach, 1818

Restricted synonymy:

Cirolana.—Bruce 1986: 139.—Brusca *et al.,* 1995: 17.—Hyzny *et al.,* 2013: 621.
Obtusotelson Schädel, van Eldijk, Winkelhorst, Reumer & Haug, 2020: 150 [type species *Obtusotelson summesbergeri* Schädel, van Eldijk, Vinkelhorst, Reumer & Haug, 2020; by monotypy].
Electrolana Schädel, Hyžny & Haug, 2021: 21 [type species *Electrolana madelinae* Schädel, Hyžny & Haug, 2021; by monotypy] (part, holotype only), **new synonymy**.

Remarks. The genera of Cirolanidae can be placed into three major divisions, formalized, and diagnosed by Kensley & Schotte (1989) as the subfamilies Cirolaninae Dana, 1852, Eurydicinae Stebbing, 1904 and Conilerinae Kensley & Schotte, 1989.

The holotype of *Electrolana madelinae* can be excluded from the Eurydicinae by having the following character states: frontal lamina sessile, broad, ventrally flat; clypeus ventrally flat, lacking any form of ventral blade; pereopods robust, ambulatory; pleonite 5 laterally enclosed by pleonite 4 and pleonite 3 posteriorly produced, overlapping pleonite 4. Further support for exclusion from the Eurydicinae is found in pereonite 1 in *C. madelinae* being longer than pereonite 2, and the pleon is 19% of total body length, whereas in the Eurydicinae pereonite 1 is not or only slightly longer than pereonite 2 and the pleon is usually in the range of 21–30% total body length.

Electrolana madelinae can be excluded from the Conilerinae on the basis of the pereopod morphology, primarily having simple ambulatory pereopods, lacking the produced superodistal angles of the ischium and merus of pereopods 1–3, lacking elongate acute robust setae and lacking the long setae present on all or the posterior pereopods and the expanded articles on the posterior pereopods as seen in genera such as *Natatolana* Bruce 1981 (see Keable, 2006) and *Politolana* Bruce, 1981 (see Riseman & Brusca, 2002); further, the proportions of the antennal peduncle differ, those of the Conilerinae having articles 3 and 4 about subequal in length and shorter than article 5, whereas Cirolaninae have antennal peduncle articles 1–3 short and 4 and 5 longest.

The antennular and antennal peduncle morphology of the holotype of *Electrolana madelinae* further identifies it as or close to *Cirolana*, in particular peduncle articles 1–3 short, article 4 and 5 long, rather than article 1 and 2 short, 3 and 4 long and subequal in length and article 5 longest (see Bruce, 1981, 1986; Riseman & Brusca, 2002), which is the state for genera such as *Natatolana* and *Politolana* (i.e. "Conilerinae").

Electrolana madelinae has robust pereopods with a short dactylus, and sparse setae; the robust setae are comparatively short, and as such the pereopods are typical of the genus *Cirolana*. Genera such as *Aatolana* Bruce, 1993 (Keable, 1998), *Baharilana* Bruce & Svavarsson, 2003 (Schotte & Kensley, 2005; Khalaji-Pirbalouty *et al.*, 2015) and *Odysseylana* Malyutina, 1995 (see Sidabalok & Bruce, 2015) all differ in having the posterior pereopod articles either flattened or distally expanded (among other characters). The more similar *Neocirolana* Hale, 1925 differs primarily from *Cirolana* in having a narrow mandible as well as other mouthpart reductions (Bruce & Hughes, 2020). *Neocirolana* is excluded, as, in all cases, the relative width of the head is narrower than in other genera of Cirolanidae. As the type species of *Electrolana* agrees with all of the visible comparable character states for species included in the genus *Cirolana*, both extant (see Bruce, 1986; Brusca *et al.*, 1995; Kensley & Schotte, 1989; Schotte & Kensley, 2005) and fossil (Hyžný *et al.*, 2013; Bruce *et al.*, 2021), the genus *Electrolana* Schädel, Hyžny & Haug, 2021 is here placed into junior synonymy with *Cirolana* Leach, 1818.

Brunneaga Polz, 2005 was originally placed in the Aegidae, and was transferred to the Cirolanidae by Wilson *et al.* (2011). Although described in detail from excellent material, *B. tomhurleyi* Wilson in Wilson, Paterson & Kear, 2011, however, it is incorrectly placed in *Brunnaega*. In *Brunnaega* all pleonites are laterally free and not overlapped by the preceding segment, as seen for example in *Eurydice* and most species of *Metacirolana*. *Brunnaega tomhurleyi* has pleonite 5 laterally enclosed by pleonite 4 and pleonite 3 (Wilson *et al.*, 2011: fig. 5) is also strongly posteriorly produced. Pleon morphology is highly consistent in cirolanid genera, and the difference in pleon shown between the type species *Brunnaega roeperi* Polz, 2005 and *B. tomhurleyi* is of generic merit. Without some pereopodal characters it is not possible to definitively place *B. tomhurleyi* into a genus, but as no characters exclude the species from *Cirolana* it is here tentatively placed in the combination *Cirolana tomhurleyi* (Wilson *in* Wilson, Paterson & Kear, 2011) comb. nov., pending discovery of more material.

Cirolana madelinae (Schädel, Hyžny & Haug, 2021) comb. nov.

Fig. 1

Electrolana madelinae Schädel, Hyžny & Haug, 2021: 21, figs 4, 5, 6, 7A (part, holotype only; not paratype figs 2, 3, 10A = *Metacirolana jimlowryi* sp. nov).

Holotype: Published figures (Schädel *et al.,* 2021), NHMW 2017/0052/0001.

Diagnosis. Body 2.8 as long as greatest width (at pereonite 5); pleon 19% total body length. Pleotelson 1.2 as long as anterior width; lateral margins evenly convex, converging to broadly rounded posterior margin with apically bifid median point; posterior margin with 10 robust setae (as 5+5; as counted from Schädel *et al.*, 2021: fig. 4A, RS present and notches where RS are missing). Coxae 6 and7 prominent, conspicuous in dorsal view, with prominent oblique carina, posteriorly acute; coxae 6 ventral and posterior margin forming angle of *ca.* 40°, coxae 7 *ca.* 30°; coxae 7 extending posteriorly to mid-pleonite 5. Frontal lamina broad, ventrally flat, *ca.* 3.0 as long as posterior width; anterior margin obscured, narrowly rounded or acute. Antennular flagellum extending to mid-pereonite 1. Antennal flagellum *ca.* 1.8 as long as peduncle, extending to posterior of pereonite 6. Pereopods typical of *Cirolana*, distal and inferior margins of ischium and merus with short robust setae (images indistinct), distal margin noticeably wider than proximal; pereopod 1 dactylus robust with robust unguis and secondary unguis. Uropod (details principally from left uropod) peduncle posterior lobe about 0.7 as long as endopod; extending to or very slightly beyond posterior margin of pleotelson, marginal setae in single tier, apices sub-acute. Uropodal endopod apically sub-bifid; lateral margin distally convex, without prominent excision, with 3 robust setae, mesial margin strongly convex, with 6 robust setae; lateral and mesial margins forming an angle of *ca.* 45°. Uropodal exopod apically sub-bifid; 0.8 as long as endopod, not extending to end of endopod, 2.5 times as long as greatest width; lateral margin weakly convex, setation not clear, with 4 widely-spaced robust setae; mesial margin convex, setation not clear, with 3 or 4 robust setae; lateral and mesial margins forming an angle of *ca.* 37°.

Remarks. *Cirolana madelinae* was not described as such by Schädel *et al.* (2021), but rather the specimen was described using primarily absolute measurements taken from both the holotype and paratype, together with higher-taxon characters; a short differential diagnosis was also given. The diagnosis, also based on the holotype and paratype, included several errors in interpretation of the specimens and consisted of a mixture of higher-taxon characters, non-differential characters as well as some species-level information. Specifically, pleonite 5 was misinterpreted as having free lateral margins, when pleonite 5 is clearly laterally overlapped by pleonite 4 (Schädel *et al.,* 2021: fig. 4A); further, the pleopod 5 endopod is described as lacking marginal setae, but pleopod 5 is not visible in the holotype and, in any case, that is a family level character for the Cirolanidae and therefore uninformative at genus and species level. Although not stated, the “differential diagnosis” appears to include characters of both specimens, and thereby combines characters of two species in different genera. The species diagnosis presented here is based on a standard cirolanid taxonomic character data seta as used, for example, by Sidabalok & Bruce (2017, 2018a) and Bruce *et al.* (2017) and as such does not include higher-taxon characters.

Several large and definable groups of species exist within the large genus *Cirolana* (157 species; 144 extant and 13 fossil species to date; Boyko *et al.*, 2021). One such group of species is the *Cirolana* “*parva*-group” (Bruce, 2004; Sidabalok & Bruce, 2017). All “*parva*-group” species have a rostrum that folds ventrally and posteriorly and makes contact with the anterior point of the pentagonal frontal lamina. Whereas the ventral rostral characters are not visible in the specimen, the frontal lamina, while not clear, does appear to be pentagonal. Several other character states of the “*parva*-group” are present in *C. madelinae*: the antennal flagellum extending posteriorly to or beyond pereonite 4; unornamented body surfaces; and more significantly, pleonite 4 strongly produced, extending posteriorly to or beyond pleonite 5, and while pleonite 3 is not as clearly visible, it also appears strongly posteriorly produced and acute; the linguiform pleotelson with an apical point; the pattern of robust setae on the pleotelson; and the shape of the uropodal rami, notably with acute apices and at least sub-bifid apices (apices appear at least partly damaged). *Cirolana madelinae* differs from all species in the “*parva*-group” by the long acute coxae on pereonites 4–7, those of pereonite 7 extending posteriorly to pleonite 5. A further point of distinction is that the pleon in *C. madelinae* is relatively longer than all other species of the “*parva*-group” (19% total body length versus 10.4–13.2%).

Fourteen species of fossil *Cirolana* have been described (including *Cirolana tomhurleyi* (Wilson *in* Wilson, Paterson & Kear, 2011) comb. nov. Each of these species can be excluded by having either rounded uropodal endopods,

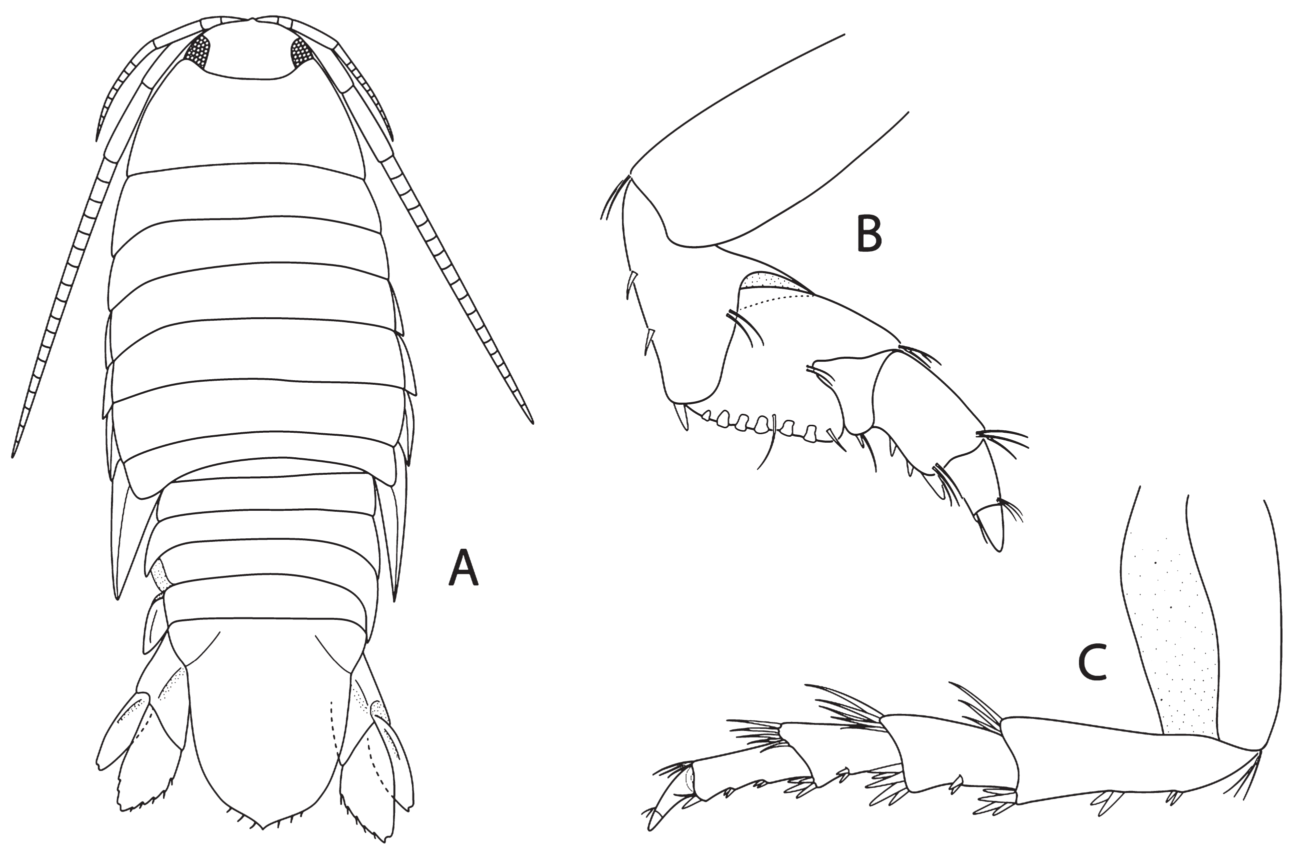

Figure 1. *Cirolana madelinae* (Schädel, Hyzny & Haug, 2021), comb. nov.: A, dorsal view; B, pereopod 1; C, pereopod 6 (partly reconstructed). Drawn from Schädel *et al.* (2021).

or the uropodal endopod being apically acute, with the rami extending clearly beyond the posterior margin of the pleotelson (e.g., Bruce *et al.*, 2021).

Metacirolana Kussakin, 1979

Restricted synonymy (complete synonymy in Bruce & Rodcharoen, 2022):

Metacirolana.—Bruce, 1981: 950.—Brusca *et al.*, 1995: 64.—Sidabalok & Bruce, 2018b: 520.—Bruce & Rodcharoen, 2021: 680.

Type species. *Cirolana japonica* Hansen, 1890; by subsequent designation (Kussakin, 1979).

Remarks. Bruce & Rodcharoen (2021) recently reviewed the genera of Eurydicinae (*sensu* Kensley & Schotte, 1989), all of which share two character states: a clypeus in the form of a ventrally or anteroventrally projecting triangular blade; and pleonites with free (not overlapped) lateral margins, notably pleonite 5 being not overlapped by pleonite 4. In some species pleonite 5 may be narrower than pleonite 4, but the posterolateral angles of pleonite 5 are visible and free rather than contained by pleonite 4. Several of these genera, notably *Metacirolana* and *Eurydice*, have a "long pleon" comprising 21–35% total body length (Bruce & Rodcharoen, 2022). Seven of the thirteen genera placed within the Eurydicinae have a posteriorly stemmed (narrowed) frontal lamina. Examination of the paratype of *Electrolana madelinae* which is described here as *Metacirolana jimlowryi* sp. nov. indicates it has these character states and unambiguously belongs to the "eurydicine" genera.

Within the "Eurydicinae", *Metacirolana jimlowryi* belongs with those genera that have the posterior of the frontal lamina markedly narrowed, a "long pleon" and relatively slender ambulatory pereopods. These are *Aphantolana* Moore & Brusca, 2003 (see Anil & Jayaraj, 2020), *Arubolana* Botosaneanu & Stock, 1979, *Eurydice* Leach, 1815 and *Metacirolana*. *Eurydice* differs on many generic-level character states, including antennular and antennal morphology, maxilliped with a reduced endite without coupling hooks and the uropod peduncle not produced (among other characters). The remaining three genera share a similar body shape, and all have a unique character state: maxilliped palp article 5 is quadrate or sub-quadrate. Of these three genera *Aphantolana* is excluded by having conate spines on the pereopods, pleonite 5 narrower than 4 and the pleotelson has strongly sinuate lateral margins. *Arubolana* is a strictly cave dwelling genus restricted to the Caribbean region, and is primarily distinguished by having a terminal or sub-terminal appendix masculina on pleopod 2, a character state not evident in the holotype of *M. jimlowryi* because the specimen is not adult. However, species of *Arubolana* can be excluded as *M. jimlowryi* has eyes (absent in *Arubolana*), and the anterior pereopods dactyli are not longer than propodus and connate spines are absent [vs. haptorial (with a long dactylus) or with connate spines in *Arubolana*]. Lastly, *M. jimlowryi* uniquely has a "putative autapomorphy" for *Metacirolana*, in antennular peduncle article 2 being longest; in all other cirolanids, antennular peduncle article 3 is the longest.

Metacirolana jimlowryi sp. nov.

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Fig. 2

Electrolana madelinae Schädel, Hyžny & Haug, 2021: 21, figs 2, 3, 8A, 10A (part, paratype only).

Holotype: Manca, NHMW 2017/0052/0002 (specimen used for published figures of the paratype of *E. madelinae* 2017/0052/0002; Schädel *et al.*, 2021; not examined in situ). Cretaceous of Myanmar.

Diagnosis. Body 2.4 as long as greatest width (at pereonite 4); pleon 21% total body length. Pleotelson as long as anterior width; lateral margins anteriorly sinuate, posteriorly straight, converging to narrowly rounded posterior margin without apical point; posterior margin robust setae not discernible. Coxae 6 not conspicuous in dorsal view, extending posteriorly to posterior of pleonite 2. Frontal lamina anterior margin rounded, with free anterior margin visible in dorsal view; clypeus with short anteroventral triangular blade. Antennular flagellum extending to anterior of pereonite 1. Antennal flagellum 2.0 as long as peduncle, extending to mid-pereonite 2. Pereopods typical of *Metacirolana*, pereopod 1 sub-prehensile, with slender dactylus and secondary unguis; pereopods 4–6 slender, distal margin not notably wider than proximally, distal and inferior margins of ischium and merus with few long acute robust setae (images indistinct). Uropod (details principally from left uropod) peduncle posterior lobe about 0.6 as long as endopod; rami extending clearly just beyond posterior margin of pleotelson, marginal setae in single tier; rami rounded, not bifid. Uropodal endopod lateral margin weakly convex, robust setae not discernible, mesial margin weakly convex, with 5 or 6 robust setae; lateral and mesial margins forming an angle of *ca.* 50°. Uropodal exopod apically broadly rounded; 0.9 as long as endopod, not extending to end of endopod, 2.9 times as long as greatest width; lateral margin straight, with 6 robust setae; mesial margin convex, setation not clear, with 3 or 4 robust setae.

Remarks. *Metacirolana jimlowryi* sp. nov. can be immediately distinguished from most other congeners by the uropodal rami having marginal robust setae and the uropodal exopod being posteriorly broadly rounded. Most species of *Metacirolana*, including all the *Metacirolana* "*serrata*-group" lack robust setae on the margins of the pleotelson and uropods. Those species that do have these robust setae are otherwise very different from *M. jimlowryi*. *Metacirolana spinosa* (Bruce, 1980), *M. halia* Kensley, 1984 and *M. riobaldoi* (Lemos de Castro & Brasil-Lima, 1976) all have a near continuous row of robust setae along the posterior margins of the uropodal endopod and pleotelson posterior margin. The large deep-water species, *Metacirolana neocaledonica* Bruce, 1996 and *Metacirolana fornicata* (Mezhov, 1981), size and habitat apart, have far more ornate body surfaces, and the uropodal endopods have subtruncate margins. There are no comparable fossil species of *Metacirolana*.

Etymology. The epithet honours the late James K. Lowry, recognizing his immense contribution to amphipod systematics, mentoring of students as well as the shared companionship both while at the Australian Museum and on the several field and other trips over the decades.

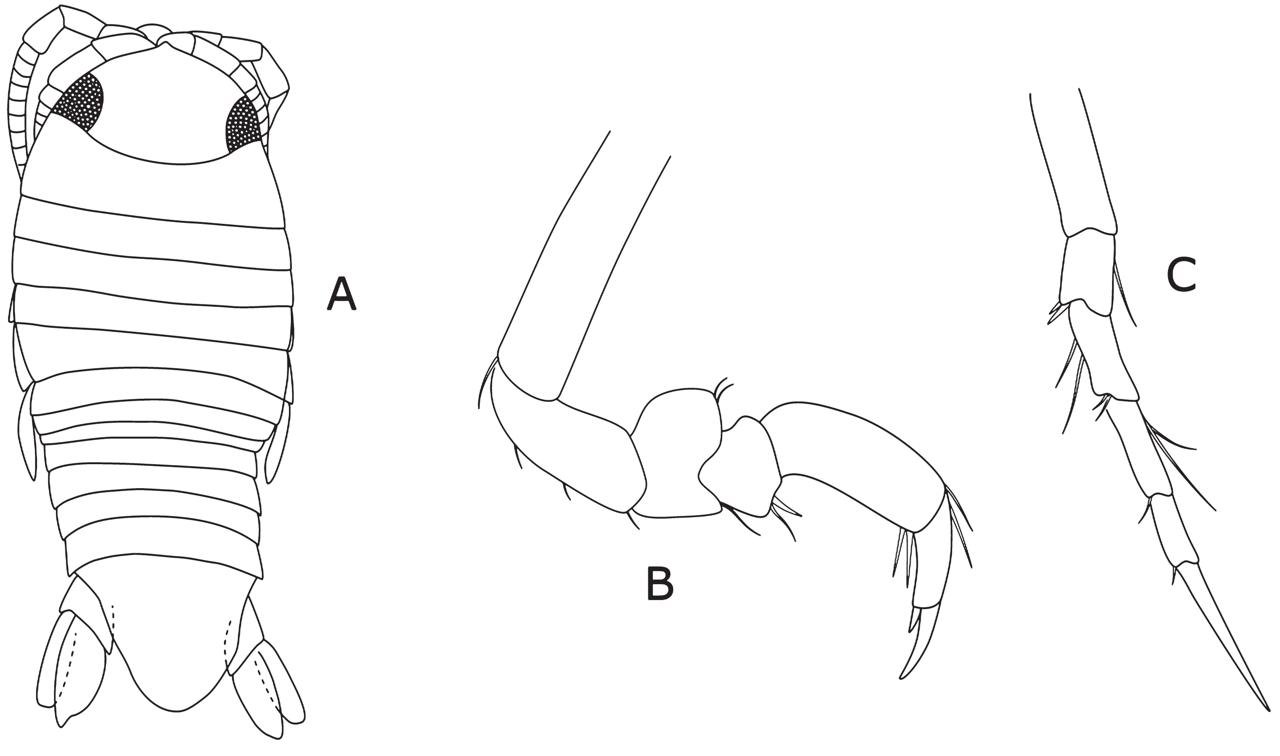

Figure 2. *Metacirolana jimlowryi* sp. nov.: A, dorsal view; B, pereopod 1; C, pereopod 6 (pereopod perspective partly reconstructed). Drawn from Schädel *et al.* (2021).

Discussion

A lengthy discussion was given by Schädel et al. (2021: 23) under the section "Systematic Interpretation …" in which most families except Cirolanidae Dana, 1852 were excluded but the only conclusion drawn, again not evidentially supported, was that "fossils with a cirolanid-like morphology must [sic] not necessarily belong to Cirolanidae" and that "The fossils could, however, also belong to a different lineage within Cymothoida that has no extant representatives." Both specimens in fact show characters of the Cirolanidae, and all other families can be confidently excluded. One of the specimens belongs to *Cirolana* and the other is here identified as belonging to *Metacirolana* Kussakin, 1979.

In naming the monotypic *Electrolana*, Schädel *et al*. (2021: 21) claimed that since "only one species will be included as of this study, no diagnosis can be given" for the genus. This is incorrect. A group within an hierarchical system containing more than one subordinate member is diagnosed by the uniquely shared features/character states of those members. In a group with only one member, the diagnosis of the group is congruent with that of its single member. It is simply the case that a group within an hierarchical system (with or without formal ranks) need not have more than one member before it can be diagnosed. Within the Linnean system, just as a family with one genus is diagnosable, so is a genus with one species. That being the case, it is fortunate for Schädel *et al*. (2021) that the provisions of Article 13 of the Zoological Code (ICZN, 1999) for availability of *Electrolana* are satisfied (albeit seemingly inadvertently). Whatever their viewpoint on binominal nomenclature, the approach of Schädel *et al*. (2021) reveals a more fundamental misunderstanding of the nature of groups and how they can be recognized.

Nevertheless, examination of the published figures shows that the two type specimens of *Electrolana madelinae* can both be identified as members of Cirolanidae, and that the two specimens represent two species that belong to different genera. Irrespective of classification and generic assignment, the two specimens of *Electrolana madelinae* present substantial differences in the detail of all visible appendages, as well as differences in the frontal lamina, clypeus, pereonite 1, pleon, pleotelson, and cannot be considered the same species, or different developmental stages of the same species. The remarks for each genus given here (above) demonstrate the genus-level differences between the two specimens. Identification of cirolanids at species level, especially in the first instance, often rests with pleotelson and uropod morphology, then details of the pereopod proportions and setation, as well as eye size, and the relative proportions of both the antennular and antennal peduncle article and flagellum. In particular, the shape and proportions of the antennular and antennal peduncle, pereopods, pleotelson, and the uropodal rami do not markedly change on maturity.

Comparing the differences between the holotype of *Electrolana madelinae* (the name bearer) and the paratype (in parentheses): pereonite 1 "long", laterally 2.16 as long as pereonite 2 (vs pereonite 1 "short", 1.07 as long as pereonite 2); pleonite 5 lateral margins laterally overlapped by pleonite 4 (pleonite 5 with free lateral margins); pleotelson 1.2 as long as wide, lateral margins convex, converging to broadly rounded apex, with median apical point (as long as wide, lateral margins straight, apex narrowly rounded, no apical point); uropodal endopod mesial margin strongly convex, apex forming an acute angle, apex sub-bifid [possibly bifid] (mesial margin proximally weakly convex and distally straight, apical angle more acute, apex not bifid); uropodal exopod lateral margin weakly convex, mesial margin convex, apex (left uropod) acute (lateral and mesial margins sub-parallel, apex broadly rounded); pereopods generally robust (vs slender); pereopod 1 with robust propodus and dactylus with robust secondary unguis (propodus sub-prehensile, dactylus relatively slender with slender secondary unguis); pereopods 5 and 6 with numerous short, stout robust setae, notably on distal margins of ischium, merus, and carpus (with few slender acute robust setae). This level of conspicuous character state difference precludes the two specimens from belonging to the same genus and same species at any stage of development. Genus-level differences are discussed under the genus accounts herein.

This straightforward genus and species misidentification seems, in part, to derive from the misunderstanding by Schädel *et al*. (2021) that immatures and mancas of Isopoda do not show family, genus, and species identifying characters, and that generic characters may change with developing maturity. The misidentification also results from the lack of any attempt to relate the specimens to the generic and species taxonomy for extant Cirolanidae. It is true that in some families, notably Sphaeromatidae Latreille, 1802 and Cymothoidae, Leach, 1818 that some taxa show very different ontogenetic stages as well as strong sexual dimorphism, and there are many publications that illustrate these male and female stages (e.g., Bruce, 1997; Hadfield & Smit, 2020; Harrison & Holdich, 1982, 1984; Trilles *et al*., 1999; Trilles & Justine, 2010). It is also true that it may not be possible to identify manca (i.e. pereopod 7 not developed) and immature stages (i.e. post-manca but not mature adult) of these families to genus. However, that is not the case for the Aegidae White, 1850, Cirolanidae Dana, 1852, Corallanidae Hansen, 1890, and Tridentellidae Bruce, 1984, in which the mancas and immature stages all show generic (and family) characters and, in many cases, species characters. None of the mentioned differences between the two specimens identified as *Electrolana madelinae* are maturity related. A further reason for this misidentification stems from the lack of rigour in comparing the specimens in relation to the generic and species level characters within the family Cirolanidae.

A large part of the content of Schädel *et al*. (2021) relates to the ontogenetic significance of the two specimens, but that discussion and the inferences drawn are meaningless as are all differences observed between the two specimens that are species in two different genera.

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