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A Third Species of *Aatolana* Bruce, 1993 (Crustacea: Isopoda: Cirolanidae)

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ABSTRACT. A third species of *Aatolana* is described from material collected in baited traps deployed off the north east coast of Australia. This species can be distinguished from the other species in the genus principally by the morphology of the frontal lamina, coxa 7 and uropods, length of the antennae, and setation of pereopod 7 and the pleotelson. A key to the three species in the genus, an emended generic diagnosis and a discussion of the systematic position of the genus are also presented based on the examination of new material. This examination shows that, of the apomorphies which have been suggested to characterise species of *Aatolana*, only the enlarged and setose epimera of pleonite 3 can be recognised as a putative unique synapomorphy that unambiguously defines the genus. The morphology of the frontal lamina of the new species of *Aatolana* described here is also recognised as an additional character shared with species of *Booralana* Bruce, 1986, further suggesting a close relationship between species in these two genera.

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Species in the family Cirolanidae are among the most commonly encountered isopod crustaceans in shallow marine environments (Bruce, 1993a). Many cirolanid isopods are scavengers, feeding on the carcasses of animals they have not captured and killed themselves, and cause losses to fisheries by feeding on baits or catches (Stepien & Brusca, 1985; Bruce, 1986; Berrow, 1994; Mizzan, 1995). The importance of scavenging cirolanid isopods to marine food chains has been suggested by Keable (1995) who also described the design of a baited trap which can be used to readily sample these and other scavengers.

Recent revisions of the Cirolanidae include those of Bruce (1981a, 1986) and Brusca *et al.* (1995). Bruce (1981a: 961, 1986: 140, 223) considered that *Cirolana schioedtei* Miers, 1884 could not be readily placed in *Cirolana* because this species possesses several characters that are not shared with other species placed in this genus. Recognition of a second species similar to *C. schioedtei* provided Bruce (1993b) with a foundation to establish the genus *Aatolana* to accommodate these two species. Further records of these species were provided by Keable (1997). Keable (1997) also designated a lectotype for *A. schioedtei* and suggested that previous records of this species need to be revised because they may include records of undescribed species of *Aatolana*. Examination of material collected with baited traps during the SEAS (Scavengers of East Australian Seas) project (J.K. Lowry, unpublished data) revealed the existence of a third species of *Aatolana* which is described here. This allows some further information to be added to the generic diagnosis and discussion of relationships to other genera provided by Bruce (1993b) for *Aatolana*.

Methods

The anatomical terminology and the conventions regarding orientation of appendages applied here follows that used by Bruce (1986, 1993b) and adopted by Keable (1996a).

Examination and illustration of specimens follows the methods outlined by Keable (1997).

The following abbreviations are used in the text and plates: **AM**—the Australian Museum, Sydney; **BMNH**—the Natural History Museum, London; **USNM**—National Museum of National History, Smithsonian Institution, Washington, D.C.; **ZMUC**—Zoologisk Museum, University of Copenhagen, Copenhagen; n—number of specimens; **CE**—cephalon; **A1**—antennule; **A2**—antenna; **CL**—clypeal region; **FL**—frontal lamina; **MD**—mandible; **MP**—maxilliped; **MX1**—maxillule; **MX2**—maxilla; **PE**—penes; **PN**—pleon; **P1–7**—pereopods 1–7; **U**—uropod; **PL1–5**—pleopods 1–5; **PT**—pleotelson.

Taxonomy

Aatolana Bruce

Aatolana Bruce, 1993b: 2.–Brusca *et al.*, 1995: 96.

Type species: *Aatolana rapax* Bruce, 1993b (by original designation).

Diagnosis: *Frontal lamina*: short, length approximately 1.3–2.5 × basal width; anterior margin convex with a dorsally deflected apical point, or with an excavate extension; ventral surface flat, or with the posterior section projecting. *Clypeus*: ventral surface not projecting relative to frontal lamina. *Antenna*: peduncular articles 1 and 2 shortest, subequal; peduncular article 4 longer than article 3; peduncular article 5 longer than article 4 and all other articles. *Pereon* and *pleon*: dorsal surfaces without setae, tubercles, processes or furrows. *Pleonite 3*: epimera broader than that of other pleonites, with lateral row of slender setae; dorsal and ventral posterolateral margins convex, converging smoothly to a point, posteroventral excision absent; enclosing but not covering epimera of pleonite 4; extending to or beyond posterior of pleonite 5. *Pleonite 5*: posterolateral margins encompassed by pleonite 4. *Pereopods 1–7*: dactylus with secondary unguis present or absent; secondary unguis not large and strongly sclerotized when present. *Pereopod 1*: merus anterodistal angle not produced to posterodistal extent of carpus or beyond. *Pereopod 7*: basis, ischium and merus with or without plumose setae. *Penes*: present; short, approximately 2 × width; forming well separated flattened lobes. *Pleopod 2 appendix masculina*: arising basally; longer than endopod in fully developed specimens; slender. *Pleopods 1–5*: endopod plumose setae present across distal margins of pleopods 1–4 and absent on pleopod 5.

Additional characters: *Body*: narrow, length 2.0–3.5 × greatest width; lateral margins sub-parallel in dorsal view. *Cephalon*: broad, width greater than 60% of pereonite 1; moderately enclosed by pereonite 1; without tubercles or processes; anterior margin with medial indentation, not extending to cover proximal articles of antennule; rostrum not prominent. *Eyes*: well developed, ommatidia clearly defined, pigmented; elongate, length approximately 3 × width; not divided by unfaceted band. *Frontal lamina*: visible in dorsal view; forming an angle of 90° or of less than 45° with clypeus; not fused to cephalon. *Antennule*: colinear, peduncular article 2 not at right angles to article 1; much shorter than antenna, just reaching pereonite 1. Peduncular articles 1–3 not fused; article 3 well developed, longer than articles 1–2, or subequal to article 1 with article 2 shortest. Accessory flagellum absent. Primary flagellum longer than peduncle; callynophore absent. *Antenna*: not sexually dimorphic. Peduncle comprised of 5 articles. Flagellum much longer than peduncle.

Mandible: molar well developed; medial surface with slender setae; marginal robust setae present, numerous. Incisor broad, wider than narrowest part of mandible; serrate; not quadridentate on left mandible. Lacinia mobilis absent or present on left mandible as a triangular sclerotized process embedded between the setal row and the incisor. Setal row present, well developed, with numerous robust setae; intermediate slender setae absent. Palp 3-articulate; inserted adjacent to molar; article 3 distally narrow. *Maxilla*: lateral lobe and middle lobe subequal; medial lobe short and broad; lateral, middle and medial lobes with numerous setae. *Maxilliped*: palp medial margin with slender setae on more than half the length of articles 2–5; lateral margin with slender or plumose setae along most of the length of articles 2–5; article 3 with distal margin width greater than proximal margin of article 4; article 4 with distal margin width greater than proximal margin of article 5. Endite with coupling hooks.

Pereon: pereonite 1 distinctly longer than pereonite 2. *Coxae*: not forming sternal plates.

Pleon: not sexually dimorphic; five unfused segments present, all equally visible along dorsal margin, or pleonite 1 partially or completely concealed by pereonite 7, in dorsal view all appearing broader than pleotelson.

Pleotelson: dorsal surface smooth with anterodorsal depression, tubercles, pits and ridges absent, setae present or absent; margins convex, meeting at an acute apex; marginal robust setae present; marginal plumose setae present, restricted to posterolateral margins, abundant; marginal teeth-like serrations absent.

Pereopods 1–3: ischium anterodistal angle produced subequally. Merus anterodistal angle more produced on pereopods 2 and 3. Dactylus not longer than propodus. *Pereopod 7*: coxa not extending beyond posterior of pleon. Basis not noticeably broader in distal half compared to proximal half; anterior margin with long plumose or slender setae along entire length (using the conventions for pereopod orientation outlined by Bruce (1993b), not the posterior margin as he states); medial carina with plumose or slender setae along most of length of article, or slender setae only distally; posterodistal angle without long plumose setae. Ischium anterior margin with plumose and slender setae present or absent, setae abundant and occurring along entire length when present; posterior margin with plumose and slender setae absent. Merus anterior margin with slender setae absent, plumose setae

present or absent; posterior margin with plumose and slender setae absent.

Pleopods: peduncle respiratory branchiae absent; accessory lobe well developed, with complex folding. *Pleopods 1–4*: exopods with slender accessory lamella at posterior proximolateral angle; endopods with elongate laterally curving lobe arising from proximomedial angle. *Pleopod 1*: not operculate to posterior pleopods; peduncle length shorter than breadth; exopod and endopod narrow, length greater than 2 × width; exopod medial margin convex, narrow at apex, lateral margin relatively straight; endopod width greater than 0.5 × width of exopod.

Uropods: inserted ventrolaterally on pleotelson; extending posteriorly beyond pleotelson. Peduncle strongly produced along medial margin of endopod. Endopod and exopod margins with robust setae; plumose setae present on most of margin length; apices sub-bifid, without robust setae. Endopod lateral margin sinuate, straight or slightly convex (not concave); without prominent lateral excision; without distinct pit. Exopod dorsoventrally flattened, not extending posteriorly beyond endopod.

Remarks. The diagnosis and description of *Aatolana* provided by Bruce (1993b) is emended here based on the material of *Aatolana* examined in this study and in that of Keable (1997). Particularly important changes to the original diagnosis of *Aatolana* include: the recognition of a small secondary unguis on the dactylus of pereopods 1–7 in the species described here; variation in the form of the frontal lamina; and variation in the setation of pereopod 7.

Three unique apomorphies characterising species of *Aatolana* were recognised by Bruce (1993b): the prominent, posteriorly acute epimera of pleonite 3; the complex refolded lobe on the lateral margin of the peduncle of pleopods 1–5; and the structure of the frontal lamina. Of these suggested apomorphies, only the enlarged epimera of pleonite 3 (which is made additionally distinctive by having a row of slender setae along the medial longitudinal carina of the lateral surface) is shared exclusively between species of *Aatolana* and remains as a putative unique synapomorphy of these species that unambiguously defines the genus. Examination of all three species of *Aatolana* and also the figures of *A. rapax* Bruce, 1993b, shows that the refolding of the lobe on the lateral margin of the pleopod peduncle is poorly developed on pleopod 1 but characteristic of pleopods 2–5 (Keable, 1996b). On these pleopods the lobe extends distally on the peduncles (see Fig. 2). Furthermore, examination of specimens of species of *Bathynomus* A. Milne Edwards, 1879, *Booralana* Bruce, 1986 and an undescribed taxon similar to *Dolicholana elongata* (H. Milne Edwards, 1840) show that they have a comparable lobe on the lateral margin of the peduncle of the pleopods (Keable, 1996b). Additionally, the structure of the frontal lamina cannot be recognised as a unique synapomorphy shared by species of *Aatolana* because this character varies considerably among the three species now placed in this genus and can actually be used to discriminate these species (Keable, 1997; this study). However, the variation in structure of the frontal lamina found in these species is relatively simple and it may be possible to hypothesize a transformation series for this character when the phylogeny of the Cirolanidae is better understood.

Bruce (1993b) suggested that species of *Aatolana* were similar only to species of *Booralana*, with which they share comparable elongate eyes, prominent flattened penes, a medially indented cephalon and prominent epimera on pleonite 3. Bruce (1993b) further noted that the structure of the frontal lamina differed between species placed in these two genera. However, the frontal lamina of species of *Booralana* has been described as being formed from two parts, an anterior half and a posteroventral section which projects (Bruce, 1986; Camp & Heard, 1988). This description matches that of the frontal lamina of the species of *Aatolana* described here. Furthermore, an additional character shared between species placed in these two genera, which has not been remarked upon previously, is the slender accessory lamella at the posterior proximolateral angle of the exopod of pleopods 1–4 which has been described in species of *Aatolana* (Holdich *et al.* 1981; Bruce, 1986, 1993b; this study). The shape and position of this lamella indicates its homology with the upturned lobe found in this location in species of *Booralana* (see Camp & Heard, 1988, figs 4A–E; Keable, 1996b). While *Aatolana* has not been placed in a subfamily these additional characters further suggest a close relationship with *Booralana*. *Booralana* has also been linked with *Bathynomus*, *Parabathynomus* Barnard, 1924 and *Cirolana quadripustulata* Hurley, 1957 (Bruce, 1981a, b, 1986; Botosaneanu *et al.*, 1986; Wägele, 1989). *Bathynomus* and *Parabathynomus* have been placed in the subfamily Cirolaninae Dana, 1852 while *C. quadripustulata* remains *incertae sedis*. However, according to Bruce (1986: 223) *C. quadripustulata* also shares characters found in *Natatolana* Bruce, 1981a which is placed in the Conilerinae Kensley & Schotte, 1989.

An additional noteworthy character found in species of *Aatolana*, which has not been remarked upon previously, is the presence of a large, triangular, highly sclerotized structure imbedded in the body of the left mandible between the setal row and the incisor (Fig. 1). This structure occurs in *A. rapax* and the species described here but not *A. schioedtei*. A similar large triangular structure is found partially fused to the distal side of the setal row on the left mandible of species of *Bathynomus* (see illustrations of *B. giganteus* A. Milne Edwards, 1879 by A. Milne Edwards & Bouvier (1902, plate 4) and also *B. immanis* Bruce, 1986 and *B. pelor* Bruce, 1986 by Bruce (1986, figs 90F, 91F); Keable (1996b, plate 2.2.2). This structure appears to be absent in many other genera of the Cirolanidae (Keable, 1996b). The function and phylogenetic significance of this structure is unknown. Although Brusca *et al.* (1995) concluded that a lacinia mobilis is absent in the Cirolanidae, the morphology and position of this structure in *Bathynomus* suggest it is homologous to the lacinia mobilis of other peracaridan crustaceans. It also appears to play a similar role as a guiding and locking mechanism for the mandible (Dahl & Hessler, 1982). This structure cannot act in the same way as a lacinia mobilis in species of *Aatolana* because it is embedded in the mandible surface. However, this may represent a transition from the condition found in *Bathynomus*.

Key to species of *Aatolana*

1 Frontal lamina, anterior margin forming an excavate process; coxa 7, posterior margin concave; basis of pereopod 7, anterior margin with plumose setae; pleotelson, dorsal surface with setae; uropod rami, lateral margins sinuate ..... *A. schioedtei*

—— Frontal lamina, anterior margin convex with a small process protruding between the antennal bases, or acute and deflected dorsally from a rounded posteroventral projection; coxa 7, posterior margin straight or convex; basis of pereopod 7, anterior margin with setae which lack setules; pleotelson, dorsal surface without setae; uropod rami, lateral margins straight or slightly convex 2

2 Frontal lamina, anterior margin convex with a small process protruding between the antennal bases; antenna extending to the posterior of pereonite 5 ..... *A. rapax*

—— Frontal lamina, anterior margin acute and deflected dorsally from a rounded posteroventral projection; antenna extending to the posterior of pereonite 4 ..... *A. springthorpei* n.sp.

Aatolana springthorpei n.sp.

Figs 1–2

Type material: HOLOTYPE: ♂, 48 mm, AM P47650. PARATYPES: ♂, AM P47651; ♂, ZMUC CRU2395; ♂, USNM 282732; ♂, BMNH 1997.1752.

Type locality: off East Fitzroy Reef, Queensland, Australia, 23°32.16'S 152°17.98'E, baited trap, 17.8°C, 203 m, J.K. Lowry, P. Freewater & R.T. Springthorpe on MV Reefknot, 16–17 June 1993, SEAS QLD-958.

Additional material examined: 2 ♂♂, 2 ♀♀ (1 damaged), AM P47652, east of Coffs Harbour, New South Wales, Australia, 30°14.63'S 153°27.68'E, baited trap, 199 m, P.B. Berents, R.T. Springthorpe & W. Vader 12–13 Aug. 1993, SEAS NSW-883.

Diagnosis: *Frontal lamina*: with a rounded posteroventral projection. *Antenna*: 0.4 × as long as body; when extended against the body reaching to posterior of pereonite 4. *Pereopod 7*: basis anterior margin with long slender setae present along entire length. *Uropods*: endopod lateral margin slightly convex; exopod lateral margin convex.

Material described: Holotype.

Description: Male. *Overall body form*: large; 48 mm long; narrow, length approximately 3.3 × width. Colour cream in alcohol. Chromatophores absent.

Cephalon: anterior margin recessed with a small ventrally directed rostrum below margin; submarginal cephalic furrow well developed, runs entire length of anterior margin. *Eyes*: with 20 ommatidia in horizontal diameter; with 9 ommatidia in vertical diameter; rectangular (bisected by anterior margin); black-red/brown in alcohol. *Interocular furrow*: moderately developed, distinct but not extending across the cephalon. *Frontal lamina*: length approximately 1.3 × basal width; pentagonal in ventral view, with a rounded posteroventral projection. *Clypeus*: triangular; not sculpted. *Labrum*: flat; narrower than clypeus. *Antennule*: peduncular article 1 longer than article 2; article 2 with 1 slender seta on posterior margin, 2 penicillate setae at posterodistal angle and 2 penicillate setae on anterior margin; article 3 long, larger than article 1 or 2 but shorter than their combined lengths. Flagellum 32-articulate; aesthetascs present. *Antenna*: of medium length, 0.4 × as long as body; when extended against the body reaching to posterior of pereonite 4. Peduncular article 4 with several slender setae on distal margin; article 5 with several slender and penicillate setae along distal margin. Flagellum 49-articulate.

Mandible: molar medial surface smooth, short fine slender setae restricted to posterior margin, long slender setae along anterior margin; incisor tridentate, with strongly developed posterior tooth; palp article 2 approximately 2 × the length of article 3, provided with numerous slender setae distally and minutely biserrate slender setae proximally; lacinia mobilis-like structure present on left mandible only, forming a dark brown highly sclerotized triangular structure, embedded in the body of the mandible separate to the raised setal row; setal row with 19 robust setae. *Maxillule*: medial lobe with 3 large and 1 smaller robust pappose setae, lateral margin with protuberance well developed; lateral lobe with 13 robust setae on distal surface (2 of which are slender). *Maxilla*: lateral lobe slender, with 10 slender setae; medial lobe with 22 slender and 11 plumose setae; middle lobe with 18 slender setae. *Maxilliped*: palp moderately setose; articles

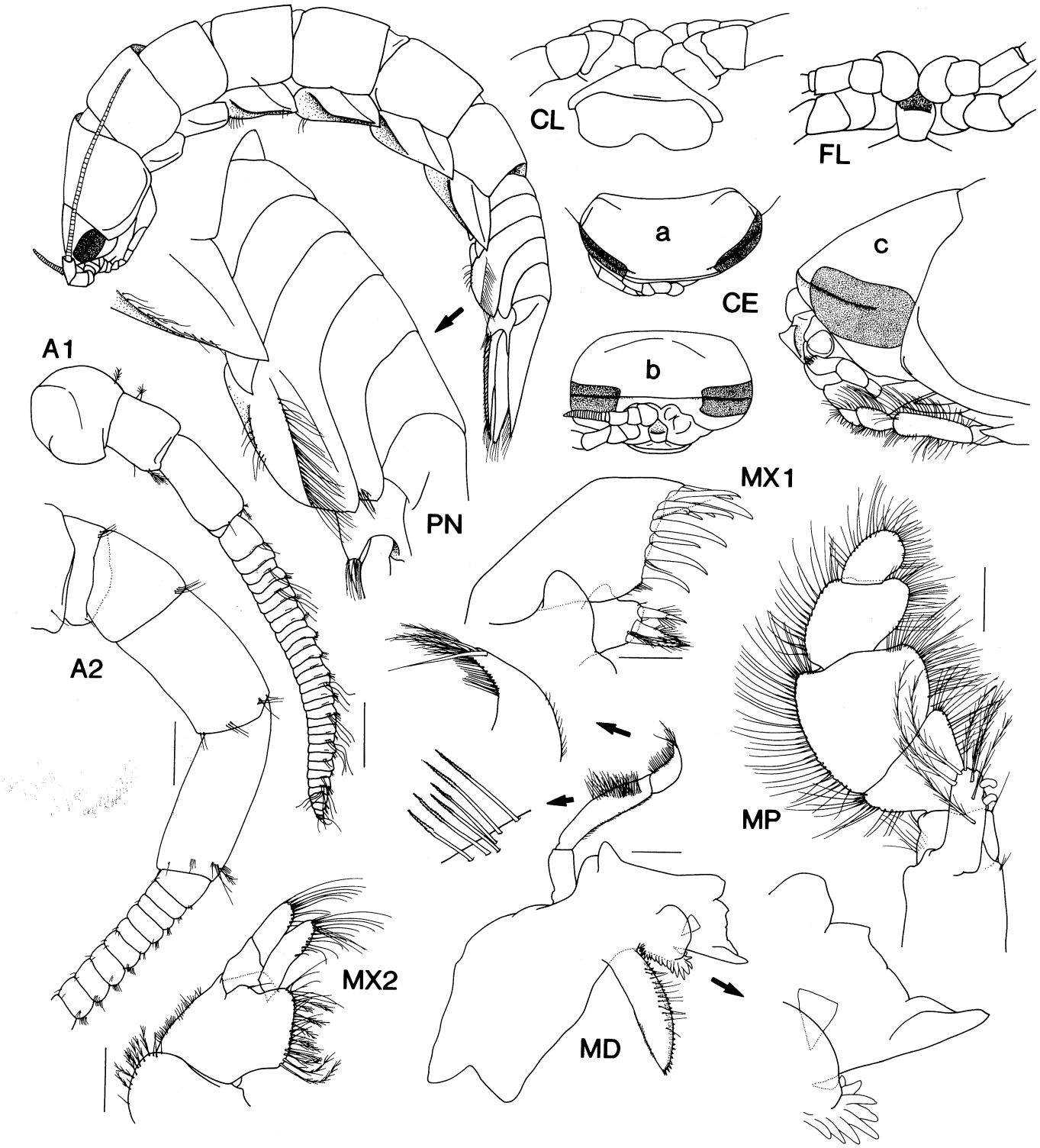

Fig. 1. *Aatolana springthorpei*, holotype. CE a, b and c are dorsal, anterior and lateral views of cephalon, respectively. Scales = 0.5 mm.

not fused; article 3 length subequal to breadth; article 4 length less than breadth; article 5 length greater than breadth, with serrate setae present; lateral margin with slender setae along most of the length of articles 2–5, plumose setae absent. Endite with 2 coupling hooks, and 8 plumose setae.

Pereon: ornamentation consists of 1 strongly developed furrow on lateral margin of pereonite 1 and 1 short, medial furrow on lateral margins of pleonites 4–7; pereonite 1 longest, 4–6 subequal and longer than 2–3 and 7 which are subequal. *Coxae*: furrows strongly developed, on all coxae, anteroventral corners of coxae 4–7 sloping

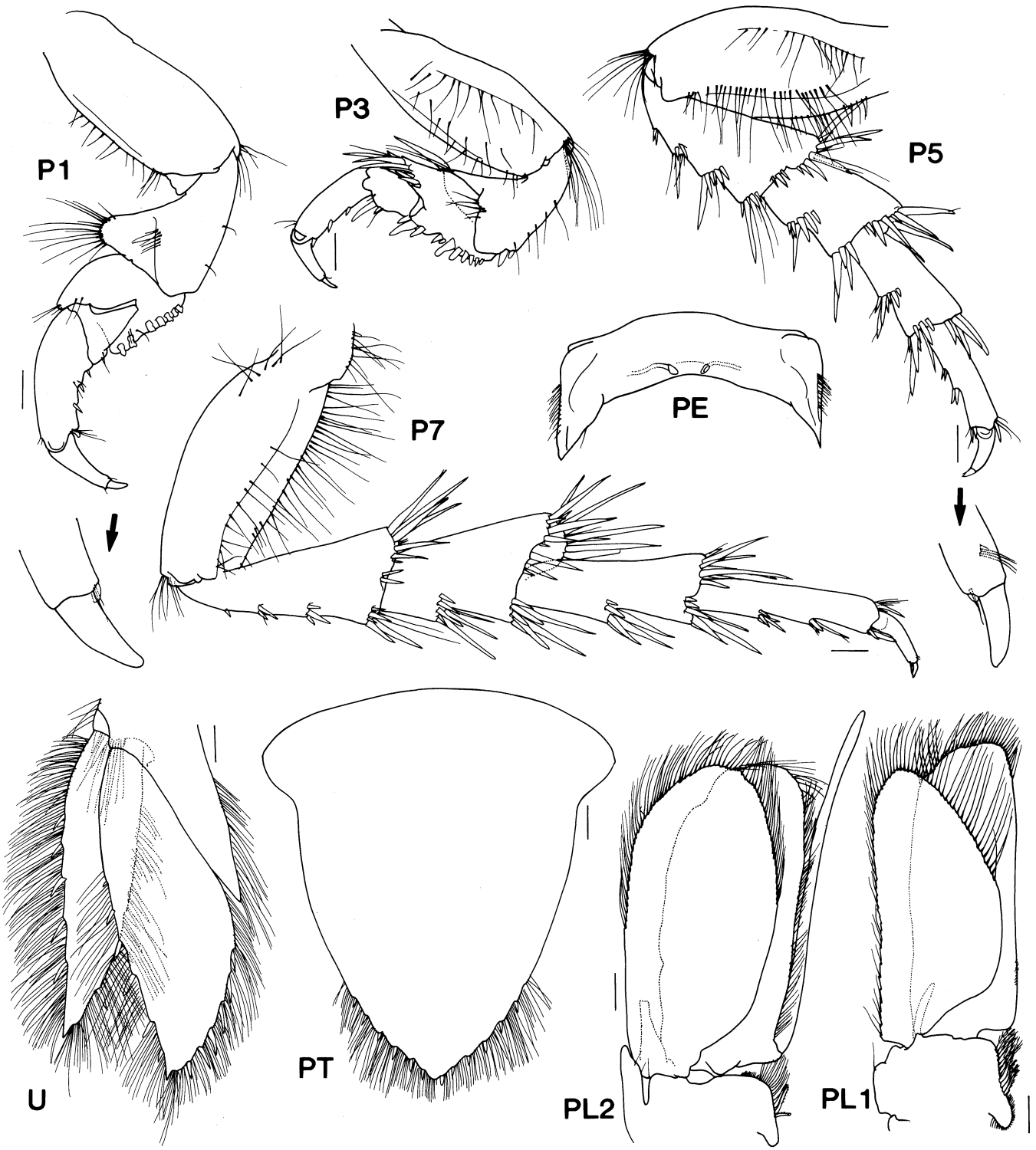

Fig. 2. *Aatolana springthorpei*, holotype. Scales = 0.5 mm.

ventromedially. Coxal points variously developed, pereonite 1 and coxae 2–3 with rounded posteroventral corners, coxae 4–7 with increasingly produced, broad, acute posteroventral corners.

Pleonites: 5 present, all equally visible along dorsal margin; ornamentation consists of 2 strongly developed furrows on lateral margin of pleonite 2 and 3 on lateral margin of pleonite 3. *Pleonite 1*: posterolateral margins produced, dorsal margin much more produced than ventral margin. *Pleonite 2*: dorsal posterolateral margin clearly projecting posterior to ventral posterolateral margin. *Pleonite 4*: posterolateral margins extending subequal to pleonite 3; posterodorsal margin strongly concave proximal to meeting posteroventral margin at apex; apex slightly rounded.

Pleotelson: narrow, length 1.1 × basal width; dorsal surface smooth, setae, ornamentation and sculpting absent; anterolateral margins convex; posterolateral margins convex, meeting smoothly to a point; robust setae present, 12 altogether, 6 on each posterolateral margin; marginal plumose setae present, restricted to posterolateral margins, abundant.

Pereopods 1–7: dactylus with a distinct secondary unguis. *Pereopod 1*: basis with slender setae on anterior margin; posterodistal angle with a group of slender setae. Ischium anterodistal angle without robust setae, 1 row of slender setae along margin; posterior margin without robust setae, slender setae present, sparse. Merus anterodistal angle without robust setae, but with approximately 4 slender setae; anterior margin without robust setae; posterior margin bisinuate, with 7 robust setae and approximately 3 slender setae. Carpus without robust setae, slender setae present. Propodus with 3 robust setae on palm, with 1 robust seta opposing dactylus; marginal slender setae present; anterodistal angle with sparse slender setae. Dactylus long, subequal in length to propodus. *Pereopod 2*: ischium anterodistal angle with 1 robust seta; posterior margin with 2 robust setae. Merus anterodistal angle with 5 robust setae; posterior margin with 10 robust setae. Carpus with 2 robust setae. Propodus with 2 robust setae on palm; 1 robust seta opposing dactylus. *Pereopod 3*: ischium posterior margin with 2 robust setae. Merus anterodistal angle with 8 robust setae; posterior margin with 11 robust setae. Carpus with 2 robust setae. Propodus with 2 robust setae on palm; 1 robust seta opposing dactylus. *Pereopods 4–6*: becoming progressively longer. *Pereopod 4*: similar to pereopods 5–7. *Pereopods 5–7*: relative morphology similar, width and setation of articles not varying markedly. *Pereopod 6*: basis broader than that of pereopod 7; propodus shorter than that of pereopod 7. *Pereopod 7*: basis narrow, width 0.4 × length; anterior margin straight, long slender setae present along entire length; medial carina with slender setae present; posterior margin convex, with slender setae present on proximal quarter; posterodistal angle with slender setae present. Ischium length greater than width; anterior margin without setae; anterodistal angle with 7 robust setae, non-robust setae absent; posterior margin with 8 robust setae, non-robust setae absent; posterodistal angle with 5 robust setae, slender setae present. Merus length greater than width; anterior margin without setae; anterodistal angle with 16 robust setae, 1 slender seta present; posterior margin with 6 robust setae; posterodistal angle with 7 robust setae, non-robust setae absent. Carpus anterior margin without setae; anterodistal angle with 9 robust setae, slender setae present; posterior margin with 6 robust setae, 1 slender seta present; posterodistal angle with 7 robust setae, non-robust setae absent. Propodus subequal to carpus; anterior margin without setae; anterodistal angle with 1 robust seta, slender setae present; posterior margin with 8 robust setae, non-robust setae absent; posterodistal angle with 2 robust setae, non-robust setae absent.

Pleopod 2 appendix masculina: 1.3 × length of endopod; margins bent slightly medially, somewhat broader proximally but otherwise approximately parallel along entire length; slender; apex not at angle to margins, bluntly rounded. *Pleopods 1–5*: exopod suture strongly developed on pleopods 3–5 only.

Uropods: peduncle ventrolateral angle with 2 robust setae, and 10 plumose setae. Endopod lanceolate; medial margin convex, with 6 robust setae, plumose setae present, along entire length; lateral margin slightly convex, with 6 robust setae, plumose setae present, on distal two-thirds. Exopod slightly shorter than endopod, 0.88 × the length of the endopod; lanceolate; medial margin convex, with 4 robust setae, plumose setae present, on distal three-quarters; lateral margin convex, with 6 robust setae, plumose setae present, along entire length.

Sexual dimorphism: Female similar to male.

Variation: Pleotelson and uropod robust setal counts from margins (n = 4 but damaged specimens omitted; paratypes): Pleotelson: 7:6 100% (3 specimens damaged); endopod (medial): 7–50%, 6–25%; (lateral): 6–25%, 5–50%; exopod (medial): 4–50%, 3–25%; (lateral): 9–25%, 8–25%, 6–25%, 5–25%. AM P47652 (n = 4—but damaged specimens omitted): Pleotelson: 7:8–25%, 7:7–25%, 6:6–25%; endopod (medial): 10–25%, 7–50%, 6–25%; (lateral): 6–25%, 5–50%; exopod (medial): 5–25%, 4–75%; (lateral): 9–50%, 8–50%.

Size range: Adults to approximately 50 mm.

Etymology: This species is named after Mr R. Springthorpe who assisted in collecting the type specimens, in recognition of the help he has given me with this and other projects.

Remarks. *Aatolana springthorpei* is most similar to *A. rapax* but can be distinguished by the posteroventrally projecting frontal lamina and shorter antennae (extending to the posterior of pereonite 5 in *A. rapax*). *Aatolana schioedtei* is also similar. However, in *A. schioedtei* the structure of the frontal lamina differs, the posterior margin of coxa 7 is distinctly concave, the lateral margins of the uropod rami are strongly sinuate (especially the exopod), pereopod 7 has a greater number of distinctly plumose setae on the margins of the basis, ischium and merus, and the pleotelson of adults has fine setae covering much of the dorsal surface.

Parker (1995) reported that iridescence may be displayed by light reflected from diffraction gratings occurring on the aesthetascs of the antennule of *Aatolana rapax*. This was based on observations of the material examined by Keable (1997). Similar iridescence is also encountered in a variety of other cirolanid isopods, such as *A. springthorpei*, *A. schioedtei*, *Bathynomus* spp., *Booralana* spp., *Cirolana* spp., *Plakolana* spp. and an undescribed taxon similar to *Dolicholana elongata*, but has not been found in any species of *Natatolana* (personal observation).

Distribution: east coast of Australia—off northern Queensland and New South Wales. In depths of approximately 200 m.

Ecology: *Aatolana springthorpei* is a scavenger as are other members of the genus (Bruce, 1993b; Keable, 1997).

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References

Barnard, K.H., 1924. Description of a new genus and species of isopod crustacean belonging to the isopod family Bathynomidae, procured in South African marine survey. Fisheries Marine Biological Survey special report 2: 1–4.

Berrow, S., 1994. Fish predation by the marine crustaceans *Orchomene nana* and *Natatolana borealis*. Irish Naturalists' Journal 24(12): 514.

Botosaneanu, L., N. Bruce & J. Notenboom, 1986. Isopoda: Cirolanidae. Pp. 412–422. **In** L. Botosaneanu (ed.). Stygofauna Mundi. A Faunistic, Distributional and Ecological Synthesis of the World Fauna inhabiting Subterranean Waters (including the Marine Interstitial). E.J. Brill, W. Backhuys, Leiden.

Bruce, N.L., 1981a. Cirolanidae (Crustacea: Isopoda) of Australia: diagnoses of *Cirolana* Leach, *Metacirolana* Nierstrasz, *Neocirolana* Hale, *Anopsilana* Paulian & Debouteville, and three new genera—*Natatolana*, *Politolana* and *Cartetolana*. Australian Journal of Marine and Freshwater Research 32: 945–966.

Bruce, N.L., 1981b. The Cirolanidae (Crustacea: Isopoda) of Australia: new species and a new genus from southeastern Australia. Records of the Australian Museum 33(13): 644–672.

Bruce, N.L., 1986. Cirolanidae (Crustacea: Isopoda) of Australia. Records of the Australian Museum Supplement 6: 1–239.

Bruce, N.L., 1993a. Two new genera of marine isopod crustaceans (Flabellifera: Sphaeromatidae) from southern Australia, with a reappraisal of the Sphaeromatidae. Invertebrate Taxonomy 7: 151–171.

Bruce, N.L., 1993b. Two new genera of marine isopod crustaceans (Cirolanidae) from Madang, Papua New Guinea. Memoirs of the Queensland Museum 33(1): 1–15.

Brusca, R.C., R. Wetzer & S.C. France, 1995. Cirolanidae (Crustacea: Isopoda: Flabellifera) of the tropical eastern Pacific. Proceedings of the San Diego Society of Natural History 30: 1–96.

Camp, D.C., & R.W. Heard, 1988. *Booralana tricarinata*, a new species of isopod from the western Atlantic Ocean (Crustacea: Isopoda: Cirolanidae). Proceedings of the Biological Society of Washington 10(3): 603–613.

Dahl, E., & R.R. Hessler, 1982. The crustacean lacinia mobilis: a reconsideration of its origin, function and phylogenetic implications. Zoological Journal of the Linnean Society 74: 133–146.

Dana, J.D., 1852. On the classification of the Crustacea Choristopoda or Tetradecapoda. American Journal of Science and Arts, second series 14(41): 297–316.

Holdich, D.M., K. Harrison & N.L. Bruce, 1981. Cirolanid isopods from the Townsville region of Queensland, Australia, with descriptions of six new species. Journal of Natural History 15: 555–605.

Hurley, D.E., 1957. Some Amphipoda, Isopoda and Tanaidacea from Cook Strait. Zoological Publications of Victoria University Wellington 21: 1–20.

Keable, S.J., 1995. Structure of the marine invertebrate scavenging guild of a tropical reef ecosystem: field studies at Lizard Island, Queensland, Australia. Journal of Natural History 29: 27–45.

Keable, S.J., 1996a. The synonymy of *Natatolana miyamotoi* Nunomura, 1991 with *Natatolana japonensis* (Richardson, 1904) (Crustacea: Isopoda: Cirolanidae) and a redescription of the species. Crustacean Research 25: 15–23.

Keable, S.J., 1996b. Revision of the taxonomy, systematics and biogeography of *Natatolana* (Crustacea: Isopoda: Cirolanidae). Unpublished PhD thesis, Macquarie University, pp. 751.

Keable, S.J., 1997. The Cirolanidae (Crustacea: Isopoda) of Darwin Harbour, Northern Territory, with additional records from northern Australia and Papua New Guinea. Pp. 245–278. **In** J.R. Hanley, G. Caswell, D. Megirian & H.K. Larson (eds). Proceedings of the Sixth International Marine Biological Workshop. The marine flora and fauna of Darwin Harbour, Northern Territory, Australia. Museums and Art Galleries of the Northern Territory and the Australian Marine Sciences Association, Darwin.

Kensley, B., & M. Schotte, 1989. Guide to the marine isopod crustaceans of the Caribbean. Smithsonian Institution Press, Washington, pp. 308.

Miers, E.J., 1884. Crustacea. Pp. 178–322, 513–575, pls 18–34, 46–52. **In** Report on the zoological collections made in the Indo-Pacific Ocean during the voyage of H.M.S. "Alert" 1881–2. Trustees of the British Museum, London.

Milne Edwards, A., 1879. Sur un Isopode gigantesque des grandes profondeurs de lar mer. Comptes Rendus Hebdomadaire des Séances de l'Academie des Sciences, Paris 88: 21–23.

Milne Edwards, A., & E.L. Bouvier, 1902. Reports on the results of dredging, under the supervision of Alexander Agassiz, in the Gulf of Mexico (1877–78), in the Caribbean Sea (1878–79), and along the Atlantic coast of the United States (1880), by the U.S. Coast Survey Steamer "Blake", Lieut.-Com. C.D. Sigsbee, U.S.N., and Commander J.R. Bartlett, U.S.N., commanding. XL. Les Bathynomes. Memoirs of the Museum of Comparative Zoology, Harvard 27: 133–175, pls 1–8.

Milne Edwards, H., 1840. Histoire naturelle des Crustacés, comprenant l'anatomie, la physiologie et la classification de ces animaux. Roret, Paris, pp. 638, pls 1–42.

Mizzan, L., 1995. *Cirolana* cfr. *neglecta* Hansen, 1890 (Crustacea, Isopoda, Cirolanidae) nelle coste del Veneziano: note su di un attacco ad una postazione di pesca. Bolletino del civico di Storia naturale, Venezia 44: 145–151.

Parker, A.R., 1995. Discovery of functional iridescence and its coevolution with eyes in the phylogeny of the Ostracoda (Crustacea). Proceedings of the Royal Society of London; Biological Sciences 262: 349–355.

Stepien, C.A., & R.C. Brusca. 1985. Nocturnal attacks on nearshore fishes in southern California by crustacean zooplankton. Marine Ecology—Progress Series 25: 91–105.

Wägele, J.-W., 1989. Evolution und phylogenetisches System der Isopoda. Zoologica 140: 1–262.

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