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Pacific Epimeriidae (Amphipoda: Crustacea): *Epimeria*

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Epimeriidae is an amphipod family with a worldwide distribution. A new species was found from the Tasman Sea at a depth of 12 m depth and described in detail. Epimeria norfanzi *sp. nov. can be distinguished from other* Epimeria *by a combination of the following characters: coxal plates 1–3 ventrally rounded; protrusion of coxa 5 reaching the distal end of epimeral plate 2; and urosomite 1 with dorsal keel, telson not cleft. This new species increases the number of Pacific* Epimeria *species to ten. A brief synopsis of the Pacific* Epimeria *species is given and a key provided.*

Keywords: Amphipoda, Epimeriidae, new species, New Zealand, Pacific, taxonomy

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INTRODUCTION

The Epimeriidae Boeck, 1871 is an amphipod family with a worldwide distribution. The by far largest genus *Epimeria* has 46 species, including the new species described below. Twenty-four *Epimeria* species are known from the Antarctic, 11 from the Atlantic, one from the Indian Ocean and now ten from the Pacific. Examination of material collected north-west of New Zealand in the Tasman Sea revealed one species new to science, which is here described. This paper increases the number of known species of *Epimeria* from the Pacific to ten, five from the south-west (off New Zealand), three from the north-west (off Japan) and further two from the north-east (off Oregon). All except one species were collected below 1000 m depths. A key to the Pacific *Epimeria* is provided.

MATERIALS AND METHODS

Amphipods were collected during an RV 'Tangaroa' voyage to the Tasman Sea north-west of New Zealand. Specimens were immediately sorted on deck, often pictured alive on board, fixed in 98% ethanol and later transferred to 70% ethanol. Specimens were examined and dissected using a Leica MZ9.5 stereomicroscope and drawn using a camera lucida attachment. Small appendages (mouthparts, uropods and telson) were temporarily mounted in lactic acid and examined and drawn using a Nikon compound microscope fitted with a camera lucida. The body lengths of specimens examined were measured by tracing individual's mid-trunk lengths (tip of the rostrum to end of telson) using a camera lucida. All illustrations were inked electronically using a Wacom Intuous2 Graphics Tablet and Adobe Illustrator CS4 following Coleman (2003). Setal terminology follows Watling (1989).

Type material is held at the Sydney Museum, Australia.

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RESULTS

SYSTEMATICS
Order AMPHIPODA Latreille, 1816
Suborder GAMMARIDEA Latreille, 1802
Family EPIMERIIDAE Boeck, 1871
Genus *Epimeria* Costa, 1851
Epimeria norfanzi sp. nov.
(Figures 1–5)

TYPE MATERIAL

Holotype: P66441, female 32 mm, TAN0308/145, West Norfolk Ridge, 34°17′50″S 168°25′49″E, depth 1268 m, collected 2 June 2003.

ETYMOLOGY

The species is named after the NORFANZ Expedition—NOrfolk Ridge, France, Australia and New Zealand Expedition during which it was collected on the West Norfolk Ridge.

DIAGNOSIS

Anterior cephalic margin sinuous, lateral cephalic lobe slightly produced; rostrum same length as head, reaching proximal part of antenna 1 peduncle article 1; eye present, round, 0.5 × head height. Pereonite 1 shorter than head (excluding rostrum), pereonite 2 ~0.75 × length of 1, pereonites 1 to 6 lacking mid-dorsal or dorsolateral processes; pereonite 7 posterior margin with tooth, dorsolateral carina weakly developed; pleonites 1–3 each with acute mid-dorsal tooth curved posteriorly to overhang following somite. Epimeron 1 antero- and posteroventral angle rounded; epimerons 2 and 3 posteroventral angle produced. Urosomite 1 with a keel-like middorsal process; urosomites 2 and 3 lacking mid-dorsal processes. Coxa 5 strongly produced, reaching posterior margin of second epimeron.

DESCRIPTION

Antenna 1 peduncle article 1 with 3 short processes; article 2 with no process, shorter than article 1; article 3 shortest with 2

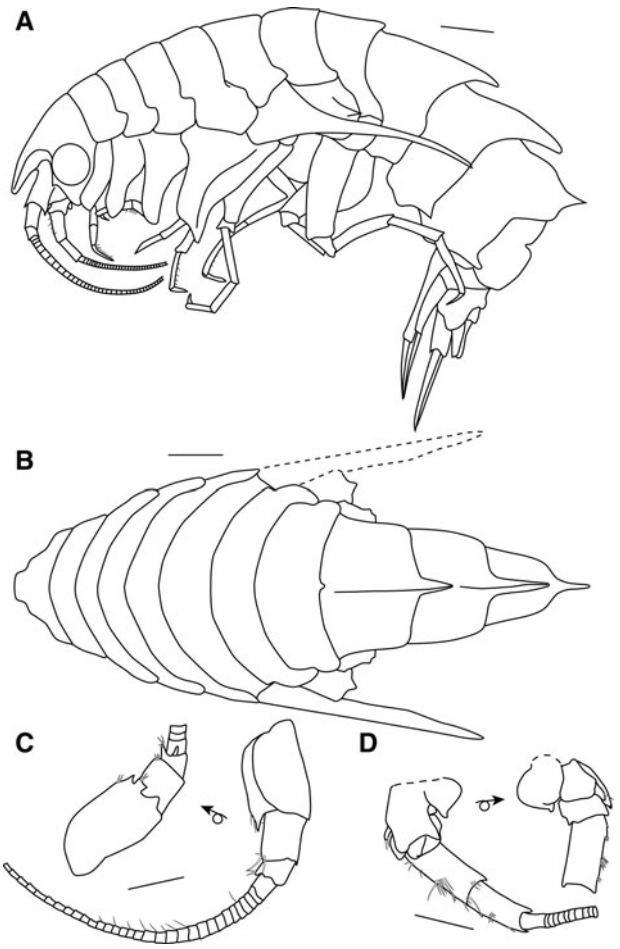

Fig. 1. *Epimeria norfanzi* sp. nov., holotype: adult female 32 mm, P66441; (A) habitus lateral; (B) habitus dorsal; (C) antenna 1; (D) antenna 2. Scale bars A, B: 2 mm; C, D: 1 mm.

short processes; accessory flagellum scale-like; primary flagellum of 32 articles. Antenna 2 articles 1 and 5 with short distal processes, articles 2 and 3 with several setae.

Mandible: incisor and lacinia mobilis strongly dentate; molar produced, not triturative; palp article 3 densely setose medially and distally. Maxilla 1 medial plate subtriangular, inner margin with 11 stout, plumose slender setae; lateral plate distal margin oblique, with 11 medially lobate robust setae; palp strongly exceeding outer plate; palp article 1 short, article 2 slightly curved medially with, stout robust setae distally. Maxilla 2 with long, crenulate setae distally on lateral and medial plates. Maxilliped lateral plate broadly rounded distally, reaching half length of palp, medial plate with nodular robust setae and a row of long plumose slender setae on medial, anterior face; palp medial margin strongly setose. Hypopharynx damaged, not setose.

Pereopods: Gnathopod 1: coxa 1 long and slender, ventrally rounded; basis linear, slender; merus slightly longer than ischium, anterior margin very short, distal margin oblique, posterodistal angle acute, setose; carpus linear, posterior margin with long slender setae; propodus slightly expanded distally, with clusters of robust setae, anterior margin naked except for distal fringe of short slender setae, palm finely crenulate, slightly oblique, posterior margin with numerous long slender setae; dactylus slender, slightly curved, posterior margin strongly serrate. Gnathopod 2: coxa 2 wider than coxa 1, ventrally rounded; basis linear, ischium anterior margin very short, carpus slightly expanded distally, anterior margin naked except for transverse row of slender setae distally, posterior margin with numerous stout slender setae distally; propodus linear, palm almost transverse, convex, finely crenulated, lined with numerous submarginal robust setae; dactylus slightly curved, posterior margin serrate, as long as palm. Pereopod 3: coxa larger than coxa 2, basis linear, anterior and posterior margin finely setulose; merus slightly expanded distally, carpus slightly shorter than merus, anterior margin naked, posterior margin with 5 pairs of robust setae; propodus almost naked anteriorly, posterior margin with 6 pairs of robust setae; dactylus stout, curved. Pereopod 4: coxa longer and wider than 3, anterior margin straight, produced into posterodistal cusp directed posterodistally, posterior margin straight, ridge parallel to posterior margin; basis to dactylus as for pereopod 3. Pereopod 5 smaller than pereopods 3 and 4; coxa subrectangular, posterodistal corner extremely produced, reaching distal end of epimeral plate 2; basis nearly linear, strong ridge at distal part; merus dorsally expanded; carpus linear, posterior margin with 5 pairs of robust setae; propodus linear, posterior margin with 7 pairs of robust setae; dactylus curved, stout, ~0.3 × propodus length. Pereopod 6: coxa anterior half hidden by coxa 5, pointed process, posterior margin convex; basis similar shape than pereopod 5, with ridge along entire length; ischium to dactylus as in pereopod 5. Pereopod 7: coxa subrectangular; basis expanded midposteriorly; ischium to dactylus as in pereopods 5 and 6.

Pleopod 3 rami with 27 and 35 articles, peduncle about half the length of rami.

Urosome and telson: Uropod 1: peduncle longer than rami, bearing keel, distal margin with row of short robust setae; outer magins of rami with few short setae. Uropod 2: peduncle naked, with keel, produced into acute process, slightly shorter than outer ramus; inner ramus length 1.3 × outer ramus, both margins sparse robust setae; outer ramus, both margins with few short robust setae. Uropod 3: peduncle short, ~0.3 × length of inner ramus, medial and inner margins of both rami with sparse row of short robust setae. Telson 1.2 × wider than long, quadrate, not cleft.

Twenty-four eggs were counted, all having about the same size and oval–roundish in shape.

COLORATION

Freshly captured specimen of *Epimeria norfanzi* sp. nov. shows distinct orange eyes (Figure 5) and a rose-coloured body.

DISTRIBUTION

Only known from type locality, West Norfolk Ridge, west off northern New Zealand, 1268 m.

REMARKS

The new species, *Epimeria norfanzi* sp. nov., superficially resembles *Epimeria pacifica* Gurjanova, 1955 but can be distinguished via several characters (Table 1).

KEY TO THE PACIFIC *EPIMERIA*

1. Pereon segments lacking dorsal carinae. 4
   — Pereon segments bearing dorsal carinae. 2

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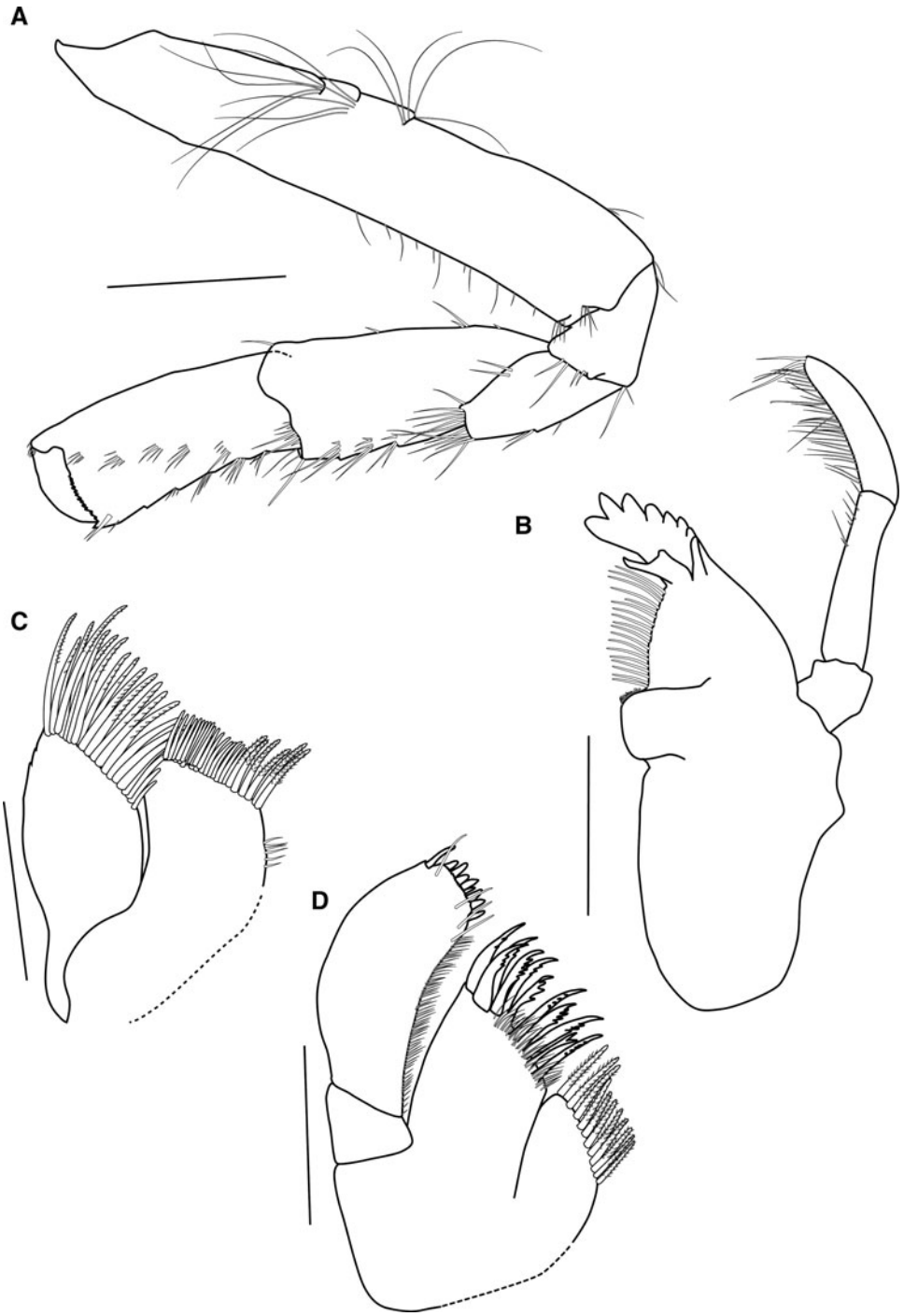

Fig. 2. *Epimeria norfanzi* sp. nov., holotype: adult female 32 mm, P66441; (A) gnathopod 2; (B) mandible; (C) maxilla 2; (D) maxilla 1. Scale bars: A–D 1 mm.

2. Coxa 5 produced; third epimeral plate posterolaterally produced 3
   — Coxa 5 not produced; third epimeral plate posterolateral corner rounded . . . . . .*Epimeria bruuni*
3. Dorsal carinae starting on pereon 4; epimeral plates bearing postero-lateral produced corners and at least two produced lateral teeth each. . . . . *Epimeria victoria*
   — Dorsal carinae starting on pereon 6; posterolateral corners of epimeral plates 1 and 2 rounded . . . . . .*Epimeria horsti*
4. Eyes present. 7
   — Eyes absent 5
5. Coxa 5 produced. 6
   — Coxa 5 not produced . . . . . .*Epimeria yaquinae*
6. Pleonites 1–3 with dorsal carinae, urosomite 1 dorsally produced, coxa 1–3 ventrally rounded. . . . . .*Epimeria glaucosa*
   — Pleonites 1–2 smooth, pleonite 3 and urosomite 1 dorsally produced, coxa 1–3 ventrally pointed . . . . . .*Epimeria subcarinata*
7. Urosomite 1 bearing dorsally pointed tooth, rostrum expanding beyond first peduncle article of antenna 1 9
   — Urosomite 1 lacking dorsally pointed tooth, rostrum

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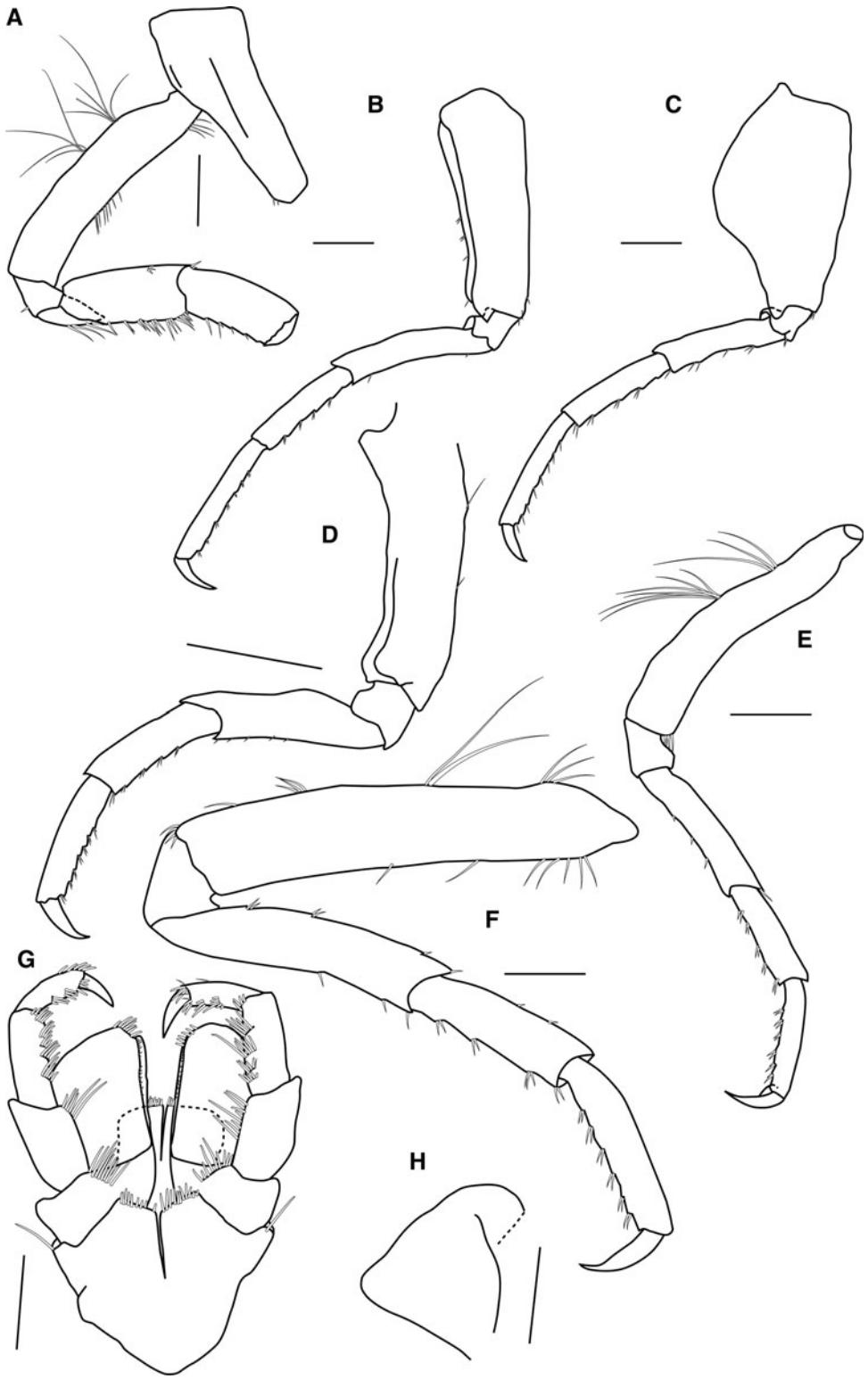

Fig. 3. *Epimeria norfanzi* sp. nov., holotype: adult female 32 mm, P66441; (A) gnathopod 1; (B) pereopod 6; (C) pereopod 7; (D) pereopod 5; (E) pereopod 4; (F) pereopod 3; (G) maxilliped; (H) part of hypopharynx. Scale bars A–H: 1 mm.

not expanding beyond first peduncle article of antenna 1 8

8. Protrusion of coxa 5 reaching posterior margin of epimeral plate 2, telson not cleft, coxal plates 1–3 ventrally rounded. . . . . .*Epimeria norfanzi* sp. nov.
— Coxa 5 not produced, telson cleft, coxal plates 1–3 ventrally pointed. . . . . .*Epimeria pelagica*

9. Head ventral lobe not produced, coxa 4 ventral protrusion as long as posterior protrusion, coxa 5 protrusion not reaching epimeral plates. . . . . *Epimeria cora*
— Head ventral lobe produced, coxa 4 twice as long as wide, coxa 5 protrusion nearly reaching second epimeral plate. . . . . .*Epimeria pacifica*

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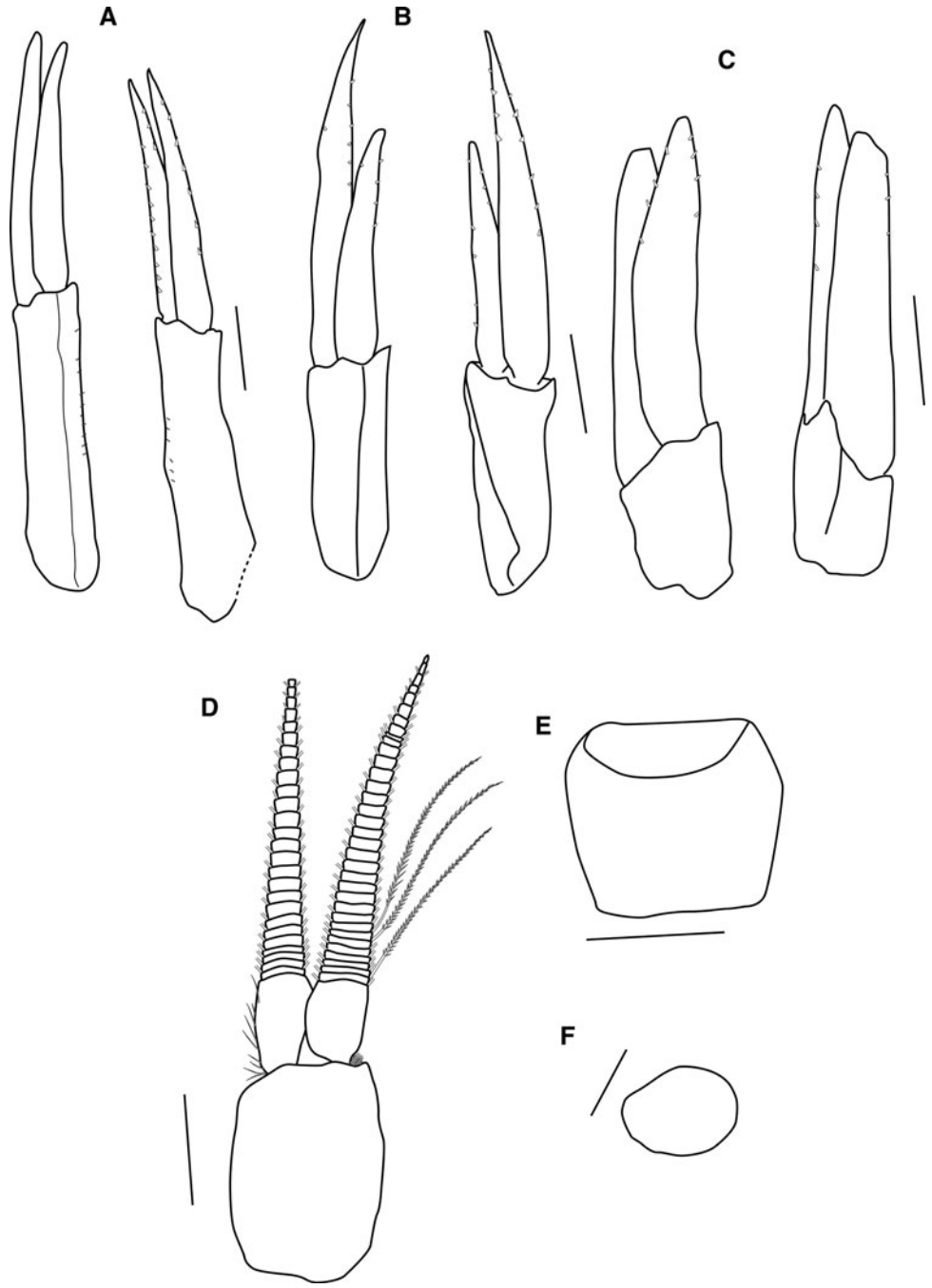

Fig. 4. *Epimeria norfanzi* sp. nov., holotype: adult female 32 mm, P66441; (A) uropod 1 dorsal and ventral; (B) uropod 2 dorsal and ventral; (C) uropod 3 dorsal and ventral; (D) pleopod 3; (E) telson; (F) egg. Scale bars: A–G 1 mm.

DISCUSSION

Barnard (1971) noted that the species *Epimeria cora* has very close affinities with *E. glaucosa* J.L. Barnard, 1961 and *E. subcarinata* Nagata, 1963, and the three entities may be subspecies of a common stem. Even though seven more species of *Epimeria* are now known from the Pacific, and these were collected more than 80 degrees of latitude and 90 degrees of longitude apart from the north-east, south-west and north-west Pacific, the morphological similarities amongst them are strong. In other words, the morphological differences amongst the species known from the Pacific are minor compared to the morphological differences observed amongst the species from the Antarctic or the species from the Atlantic. I agree with Barnard (1971) that presumably all Pacific species belong to the same clade.

Synopsis of Pacific *Epimeria* species

Epimeria bruuni Barnard, 1961
(Figured by Barnard, 1961 and Lörz, 2008, descriptions in English)

The original description of *E. bruuni* is based on a single juvenile specimen, 7 mm in length from the Danish 'Galathea' expedition, Kermadec Trench, 36°38′S 178°21′E

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Fig. 5. *Epimeria norfanzi* sp. nov., holotype: adult female 32 mm, P66441; photographed by Karen Gowlett-Holmes (CSIRO) immediately after sampling. Scale bar 5 mm.

in 2470 m. The redescribed material by Lörz, 2008 is based on an adult specimen, 25 mm in length, collected in 2526 m depth from the New Zealand Young Hicks seamount, Hikurangi Plateau.

Epimeria cora J.L. Barnard, 1971
(Figured by Barnard, 1971, description in English)

Epimeria cora is described from the north-east Pacific off Oregon from 2086 m depth.

Epimeria glaucosa Barnard, 1961
(Figured by Barnard, 1961, description in English)

Described from the Kermadec Trench north of New Zealand from 3710 m depth.

Epimeria horsti Lörz 2008
(Figured by Lörz, 2008, description in English)

Described from the New Zealand graveyard seamounts complex, type material is from the Ghoul and Gothic seamounts, east off New Zealand from 970–1030 m.

Epimeria pacifica Gurjanova 1955
(Figured by Gurjanova, 1955, description in Russian)

Epimeria pacifica is described from 1450–1430 m depth from the slopes of the Japan trench, east of Shikotan.

Epimeria pelagica Birstein & Vinogradov 1958
(Figured by Birstein & Vinogradov, 1958, description in Russian)

Described from the Kamchatka Trench off Japan. While all other known epimeriids are regarded as benthic, this species was collected in the water column between 0 and 8000 m depth.

Table 1. Character differences between *Epimeria norfanzi* sp. nov. and *Epimeria pacifica* Gurjanova, 1955.

***E. norfanzi* sp nov.**	***E. pacifica***
Rostrum as long as head	Rostrum twice as long as head, reaching end of third peduncle of antenna 1
Coxa 1–3 ventrally rounded	Coxa 1–3 ventrally produced/pointed
Coxa 4 slightly longer than coxa 3, ventrally pointed	Coxa 4 much longer than coxa 3, strongly produced, curved posteriorly
Coxa 5 slim long protrusion, reaching third epimeron	Coxa 5 large robust, protrusion, reaching end first epimeron
Telson uncleft, square	Telson cleft, proximal end less wide than base

Also recorded from Nagata (1963) in a summary of species from the Japan Trench, south-east of the Kamchatka Trench.

Epimeria norfanzi sp. nov.
(Figured in present paper, description in English)

Described from the Tasman Sea, on the West Norfolk Ridge east off North New Zealand in 1268 m.

Epimeria subcarinata Nagata, 1963
(Figured by Nagata, 1963, description in English)

Nagata (1963) summarized the species from the Japan Trench, 37–42°N 143–148°E and described *E. subcarinata* from 2230 m, off Onagawa. According to Nagata (1963) *E. subcarinata* is potentially a synonym of *E. pacifica*.

Epimeria victoria (Hurley, 1957)
(Figured by Hurley, 1957 and Moore, 1985, descriptions in English)

Epimeria victoria (Hurley, 1957) is known from shallower waters at 130 m depth, off Otago, South Island New Zealand (Moore, 1985) and 140 m in the Cook Strait (Hurley, 1957). Hurley (1957) described a male specimen, *Epimeria victoria*, from the Cook Strait. Moore (1985) complemented the description with a female from off Otago, extending the known distribution of this species to the South Island and moved it to the genus *Epimeriella* Walker, 1906. The diagnostic character of the genus *Epimeria*, the large, ridged mandibular molar processes, is missing in the *victoria* specimens and Moore (1985) classified this species as *Epimeriella* on the basis of the thin setose lamina. Lörz *et al.* (2009) synonymized the genus *Epimeriella* with the genus *Epimeria*.

Epimeria yaquinae McCain, 1971
(Figured by McCain, 1971, description in English)

This species is described from two stations on 2800–2862 m depth in the north-east Pacific off Oregon.

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