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A new deep-water species of *Natatolana* (Crustacea: Isopoda: Cirolanidae) from the Chatham Rise, eastern New Zealand

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Abstract

Natatolana rekohu sp. nov. from the Chatham Rise, off southeastern New Zealand is described and figured. *Natatolana rekohu* was collected at a depth of 2799 metres, close to the greatest recorded depth for this genus. The species is a scavenger, and was feeding on dead fish in a sediment trap. *Natatolana rekohu* is characterised by: reduced eyes; strongly indented anterior margin of the head; pentagonal frontal lamina, with weakly convex lateral margins; pleonites 1 and 2 not produced, 3 weakly and pleonite 4 rounded; pereopods 1 and 2 usually with 5 or 6 setae on the propodal palm. In males the large flat and widely separated penes and the strongly curved, wide and terminally toothed appendix masculina are additional diagnostic characters. As in most *Natatolana* the numbers of robust setae on the margins of the uropodal rami and pleotelson are also important in making a correct identification.

Key words: Isopoda, Cirolanidae, *Natatolana*, New Zealand, Pacific, scavenger, deep sea, taxonomy

Introduction

The cirolanid isopod genus *Natatolana* Bruce 1981 is the second largest in the family with 70 species (Keable unpublished), exceeded in number only by *Cirolana* Leach 1818. Nearly all species are carnivorous scavengers, and some have been known to harm commercial fishing operations (Bird 1981; Bruce 1986; Hale 1925, 1929; Brusca *et al*. 1995). In New Zealand the genus is represented by three named species, *Natatolana narica* (Bowman, 1971), *Natatolana pellucida* (Tattersall, 1921) and *Natatolana rossi* (Miers, 1876). Hayward et al. (2001), in a survey report, listed three shallow-water species of *Natatolana* (as *Notatolana* [sic]) from northern New Zealand, two not named, the third, *Natatolana albicaudata* (Stebbing, 1900), a probable misidentification (that species being

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absent from all New Zealand collections that I have examined and known primarily from tropical coral-reef habitats). *Natatolana rossi* is the often abundant and most frequently encountered species in New Zealand coastal waters (e.g. Marsden 1999), occurring in shallow coastal shelf waters and around North Island and South Island.

In *Natatolana* the greatest apparent species diversity is to be found in the Southwest Pacific (Bruce 1986; Bruce *et al.* 2002; Keable unpublished), with 28 species in the region of southeastern Australian (southeastern Queensland to South Australia and Tasmania). Beyond Australia there are very few Southwest Pacific or South Pacific records, with seven species recorded from New Zealand, of which three are undescribed (Keable unpublished), and one from Fiji (Bruce & Olesen 1995).

Most species of *Natatolana* are recorded at depths ranging from extreme low-tide level to approximately 1000 meters. Seven species have been recorded from depths greater than 1000 metres and of these only three are known from depths in excess of 2000 metres, the greatest published depth recorded for the genus being that of the single specimen of *Natatolana natalis* (Menzies & George, 1972), taken off Peru at a depth of between 2966–2945 m. The present material described here is therefore of interest as it is the one of the few recorded species from such a depth and greatest depth recorded for any cirolanid isopod from New Zealand waters.

Methods and abbreviations

In order to conserve the holotype the description was prepared from the holotype and dissected paratype. The individual specimens are identified in the material examined section and in the figure captions.

Abbreviations used in the text: PS – plumose setae/setae; RS – robust seta/setae; CP – circumplumose; CPS – circumplumose seta/setae. Institutions: AM – Australian Museum, Sydney; NIWA – National Institute of Water and Atmospheric Research, Ltd., Greta Point, Wellington; NMNZ – National Museum of New Zealand Te Papa Tongarewa, Wellington; USNM – United States National Museum, Smithsonian Institution, Washington, DC.

CIROLANIDAE Dana 1852

Natatolana Bruce, 1981

See Brusca et al. (1995) and Keable & Bruce (1997) for synonymy and recent accounts.

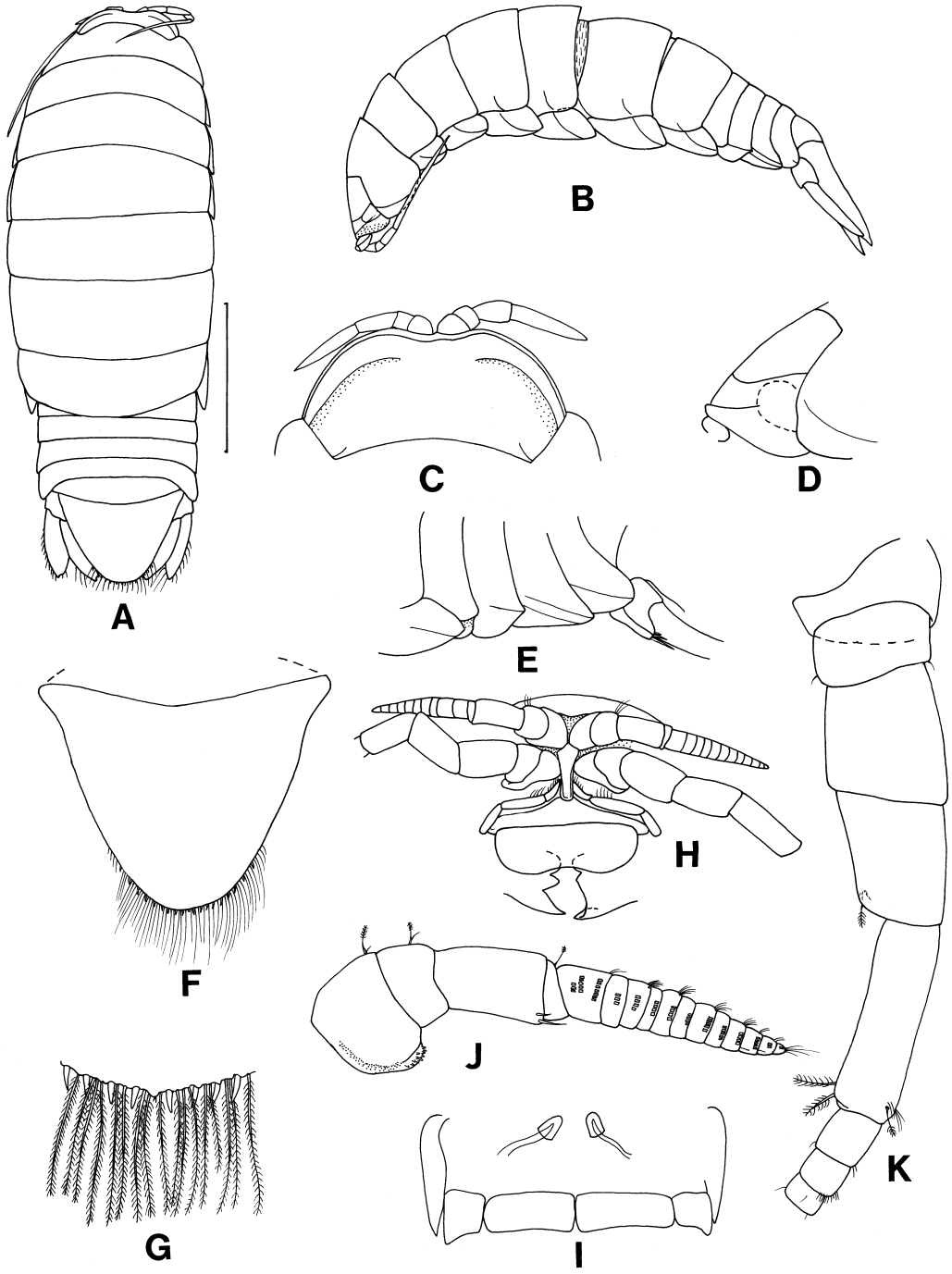

FIGURE 1. *Natatolana rekohu* sp. nov. A–I holotype, J, K, paratype (24 mm). A, dorsal view; B, lateral view; C, head, dorsal view; D, head, lateral view; E, pleonites, lateral view; F, pleotelson, dorsal view; G, pleotelson distal margin; H, frons: I, sternite 7 showing penial openings; J, antennule; K, antenna peduncle. Scale bar = 7 mm.

***Natatolana rekohu* sp. nov. (Figs 1–4)**

Material examined.— Holotype. Male (19.5 mm), Chatham Rise, 46°38.24'S 178°31.39'E, 27 July–14 August 2002, in benthic lander sediment trap, 2769 m, R.V. *Tangaroa* (NIWA H831). Paratypes. 5 males (18.5, 20.0, 20.5, 23.3, 24.0 [dissected] mm), 13 females (non-ovigerous 17.5–26.5 mm), 3 mancas (8.5, 9.1, 12.0 mm), same data as (NIWA P1380). Topotypic material: 86 unmeasured specimens (mostly non-ovigerous females) (NIWA, NMNZ Cr.9950; AM P65202).

Also examined.— Holotype, *Natatolana natalis* (Menzies & George, 1972), male (17 mm, without previously dissected appendages), Peru–Chile Trench, Mine-Edwards Deep, 8°23'S, 80°25'W, 31 Oct 1965, 2966–2945 metres, Anton Bruun (USNM 121737).

Description: *Male*. *Body* 2.9 times as long as greatest width; lateral margins sub-parallel, widest at pereonite 5. *Head* with incomplete but deep dorsal inter-ocular groove and distinct entire submarginal groove; eyes pale orange in colour, without visible facets. *Pereonite* 1 about as long as pereonite 2, pereonite 2<3<4>5<6>7; pereonite 2 shortest, pereonite 6 longest. *Coxae* all with entire oblique suture and fine ventral submarginal suture; posterior margins of coxae 2–3 posteriorly rounded, subtruncate; 4–6 posteriorly narrowly rounded, coxae of pereonites 6 and 7 produced posteriorly beyond pereonite. *Pleonite* 1 largely visible in dorsal and lateral view, pleonite 2 epimera not produced; pleonite 3 epimera weakly produced, posteriorly acute; pleonite 4 epimera posteriorly rounded, with 1 longitudinal suture. *Pleotelson* 0.7 times as long as greatest width, lateral margins weakly convex, converging to rounded apex, posterior margin with long PS and 18 RS.

Antennule peduncle article 3 as long as combined lengths of articles 1 and 2; flagellum 0.9 length of peduncle, extending to anterior margin of pereonite 1, with 12 articles, article 1 of which is longest, all articles with aesthetascs. *Antenna* peduncle article 3 with single cluster of short simple setae at superior distal angle; article 4 1.3 times as long as wide, 1.1 times as long as article 3, narrowing slightly distally, inferior distal angle with 1 plumose seta, superior distal angle with single cluster of short simple setae; article 5 3.2 times as long as wide, 1.5 times as long as article 4, inferior distal angle with 2 plumose setae, superior distal angle with ~4 simple and 1 PS; flagellum 1.5 times as long as peduncle, extending to middle of pereonite 3, 22-articled, each article with anterodistal cluster of 6–12 short simple setae.

Frontal lamina 3.3 times as long as basal width, lateral margin concave, anterior margins abruptly angled, forming acute median point towards posterior. *Mandible* spine row with 20 RS, distal 3 bluntly rounded, remainder acute, progressively decreasing in size proximally; molar process without setae or microtrichs, with about 45 acute spines along anterior margin; palp article 2 lateral margin with approximately 45 biserrate setae, article 3 with 13 biserrate RS, distal 3 of which are longest. *Maxillule* lateral lobe with 13 stout RS on gnathal surface, mesial lobe with 3 large CP robust setae, proximal seta being angled and longest, and 2 small setae. *Maxilla* lateral lobe with 4 slender simple setae,

middle lobe with 13 long and 6 short simple setae; mesial lobe with 6 simple distal setae and about 18 CPS, proximal 3 curved, distinctly longer than others. *Maxilliped* palp articles 2–5 with both margins setose, those of lateral margins being finely biserrate, longer and less close-set than those of mesial margins; articles 2–5 lateral margins with 10, 18, 10 and 9 slender simple setae respectively; articles 2–4 mesial margins with ~27, ~34 and ~25 slender simple setae respectively; article 5 distal margin with about 14 simple and 5 serrate setae; endite with single coupling hook, 7 large CPS with setules on distal half only and one long simple seta.

Pereopod 1 basis 2.7 times as long as wide, superior proximal margin with 1 small simple seta, superior distal angle with ~11 long simple submarginal setae, inferior margin distal half with row of ~12 long slender simple setae; *ischium* 0.6 times as long as basis, distal half of inferior margin with cluster of 6 long simple setae, row of 7 long simple setae, mesiodistal angle with 3 large acute RS, lateral surface with submarginal row of 5 long simple setae, distal row of ~ 12 long simple setae; distal half of superior margin with continuous long simple setae; *merus* 0.7 times as long as ischium, superior distal angle extending to distal three-quarters of propodus, with continuous long slender simple setae, distally with 1 large RS, inferior margin irregular, with 10 acute RS, 2 of which are large; lateral surface with 2 rows of 8 and 5 long simple setae; *carpus* inferior distal angle with 3 acute RS and 2 simple setae; lateral surface with 2 simple setae; *propodus* about 2.4 times as long as wide, 0.7 times as long as ischium, inferior margin with 5 RS on palm, distally with 1 large RS and 4 slender setae opposing dactylus, mesial surface with 2 long simple setae, superior distal angle with 4 slender setae; *dactylus* about 0.7 times as long as of propodus, with long accessory seta and low blunt secondary unguis. *Pereopod 2* proportions similar to that of pereopod 1, slightly longer, *carpus* proportionally longer; *merus* superior distal angle with 3 large acute RS, inferior margin with 10 RS, 7 of which are large; *carpus* inferior margin with 10 acute RS and clusters of 2 and 3 short simple slender setae; *propodus* inferior margin with 4 acute RS. *Pereopod 3* similar to pereopod 2. *Pereopod 4* intermediate in form between pereopods 1–3 and 5–7. *Pereopod 6* similar to pereopod 7. *Pereopod 7 basis* 2.5 times as long as wide, superior margin weakly convex, inferior margin straight, with continuous row of close-set long PS, lateral margin with continuous median row of close-set PS, these being shorter than distal or inferior PS, superior margin with distal two-thirds with short simple setae, 4 small widely-spaced setae, distal margin with long plumose setae extending to distal margin of ischium; *ischium* 0.5 times as long as basis, 1.6 times as long as distal width, superior distal margin with ~ 4 widely spaced simple setae, superior distal angle with ~5 long simple setae and 9 acute RS, mediodistal margin with 3 acute RS, inferior margin with 2 clusters of 2 and 2 submarginal acute RS and continuous long PS, inferior distal angle with 4 small acute RS; *merus* 0.7 times as long as ischium, 1.3 times as long as distal width, superior distal angle with 12 long acute RS and ~ 4 long simple setae, inferior margin with 8 long simple setae on distal half with 2 clusters of 2 and 2 acute submarginal RS and 1 marginal RS, inferior distal angle with 11

RS and 5 long simple setae; *carpus* 0.7 times as long as ischium, 2.1 times as long as distal width, superior distal angle with 10 long acute RS and ~ 6 long simple setae, inferior margin with 2 clusters of 3 and 3 marginal RS and one cluster of 3 submarginal RS, inferior distal angle with about 15 long and short RS; *propodus* 0.8 times as long as ischium, 5.5 times as long as greatest width, superior angle with 6 slender setae, inferior margin 3 clusters of 2, 3 and 3 RS and 2 slender seta, inferior distal angle with 4 acute RS.

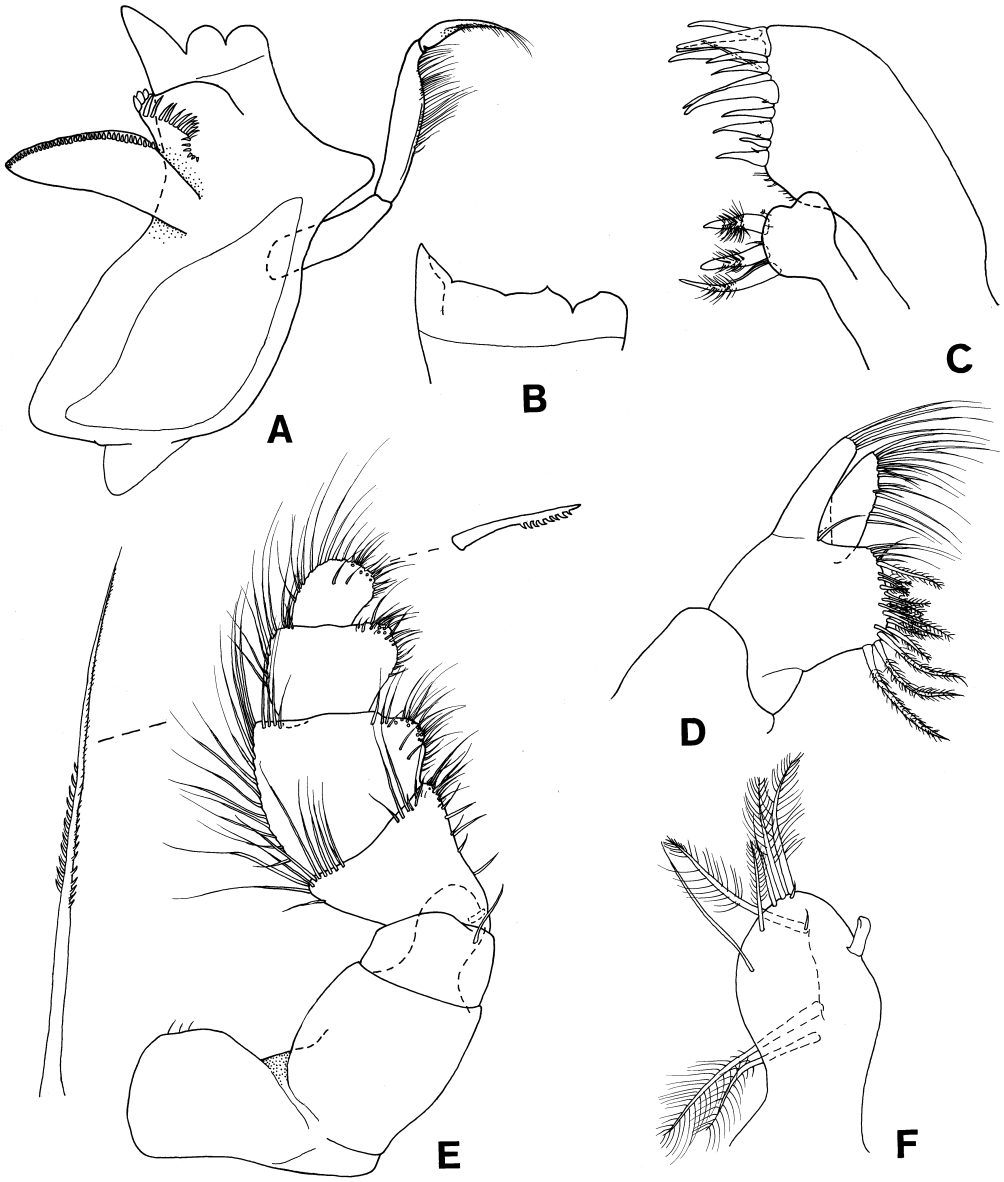

FIGURE 2. *Natatolana rekohu* sp. nov. All figs paratype (24 mm). A, right mandible; B, left mandible incisor; C, maxillule; D, maxilla; E, maxilliped; F, maxilliped endite.

Penes flat, separated by 2.5 basal width of penial process, 1.5 times as long as basal width, with lateral margins converging slightly to broadly rounded apex.

Pleopod 1 endopod 0.9 times as long as exopod, mesial margin straight, lateral margin weakly concave, both margins with PS on distal half only; exopod widest distally, distal margin subtruncate, lateral margin straight, mesial margins weakly convex, PS present on distal margin and on distal three-quarters of lateral margin; peduncle with 11 coupling hooks. *Pleopod 2* exopod with PS on distal half, endopod PS on distal margin and distal two-thirds of lateral margin; peduncle with 5 coupling hooks; *appendix masculina* curving laterally, about 8.5 times as long as basal width, 5.5 times as long as greatest width, widest subdistally, distolateral margin convex, apex with short lobe armed with approximately 10 teeth. Pleopods 3–5 with exopod suture indistinct, visible only marginally.

Uropod peduncle ventrolateral angle with 4 acute RS and 3 long slender PS; *exopod* 4.5 times as long as greatest width, 0.9 times as long as endopod, lateral margin with 11 acute RS and continuous row of short PS, mesial margin with 6 RS, both margins weakly convex, converging to narrow apex; *endopod* 2.6 times as long as wide, lateral margin weakly convex with 6 RS, and PS on distal three-quarters, mesial margin convex with 7 RS and continuous PS.

Female: Similar to male with the exception of the sexual characters. No significant differences in terms of setation or body proportions.

Variation: (from holotype and paratypes; *n* = 19 specimens, 6 males, 13 females; for uropodal rami *n* equals the number of rami). Pleotelson (*n* = 18) with 12–18 RS, with 16 (as 8+8) and 15 most frequent (each 22%), 17 and 18 each at 17%, and 22% with 12–14; a large number of specimens had received some damage to pleotelson resulting in asymmetric distribution of RS on either side of the apical point. Uropod (all rami *n* = 38 except exopod *n* = 37) endopod mesial margin with 5–9, with 7 (47%) and 8 most (26%) frequent, lateral with 4–8 RS 5 (26%) and 6 (50%) most frequent, with the most frequent pattern being 3+3, with 5+3, 4+3, 2+3, 2+2, 3+2 and 4+2 also occurring at least once; exopod mesial margin with 5–7, 6 (66%) or 7 RS (18%) most frequent, lateral margin with 9–13, 11 (38%) or 12 (32%) most frequent, with 13 occurring twice. The variation in the number of RS on the uropod exopod lateral margin is probably greater than is actual owing to the difficulty of discerning the anterior-most 1 or 2 RS, when these were missing so the maximum number of RS is likely to be an underestimate.

Pereopod 1 (*n* = 38) had 5–9 RS on the palm (one specimen with 9) with 5 (63%) or 6 (29%) most frequent; palm of pereopod 2 (n = 38) with 3–7 RS, usually with 4 (50%) or 5(26%) occasionally 3 (five times), or 6 (three times) or 7 (once). The variation in the number of RS on the pereopod palm is usually due to a small RS positioned adjacent to one or more of the large RS. Larger specimens had the greater number of RS.

Mancas (3 measured) had fewer slender setae and less robust setae, though one had 14 RS on the uropodal exopod lateral margin.

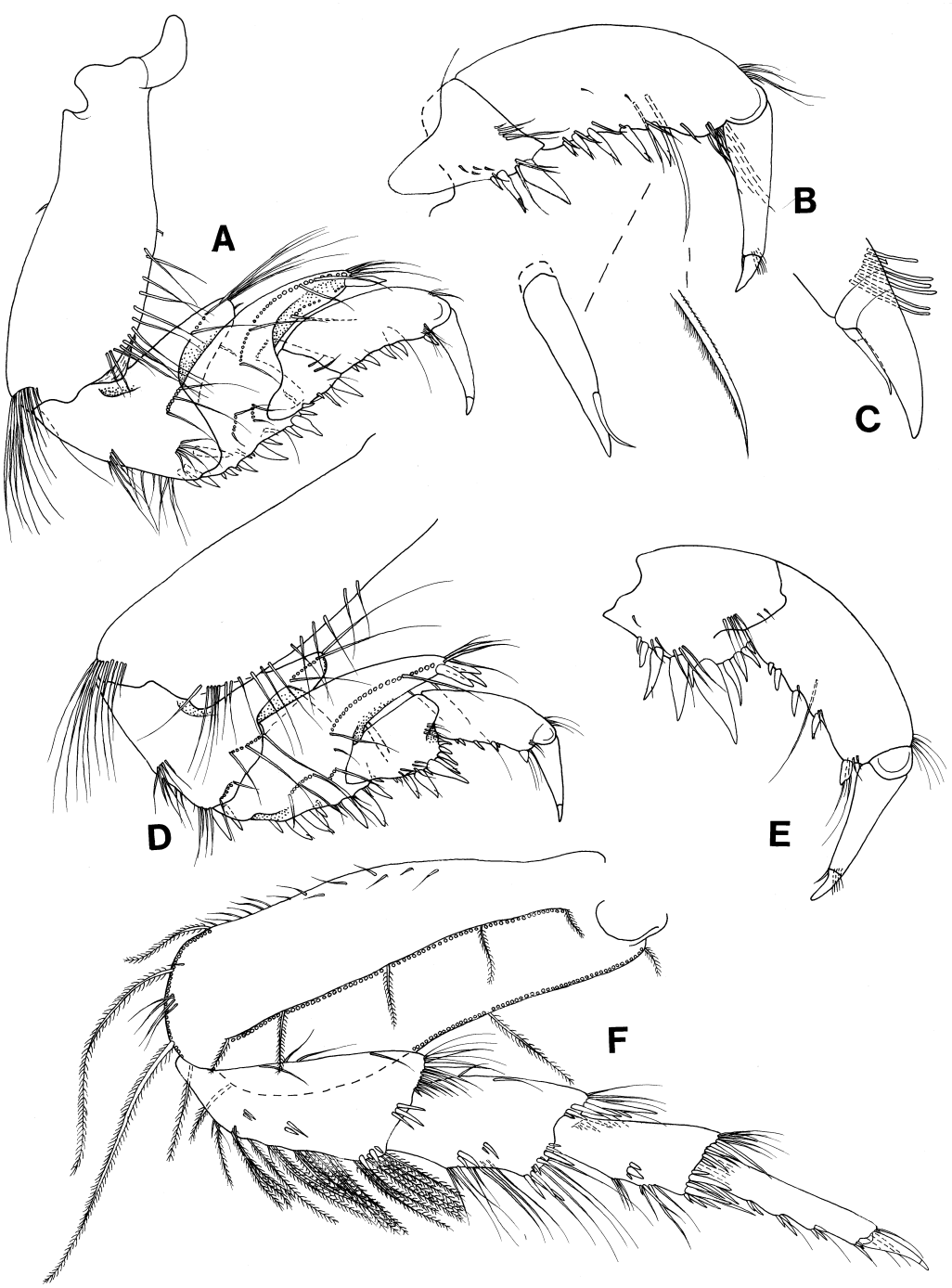

FIGURE 3. *Natatolana rekohu* sp. nov. All figs paratype (24 mm). A pereopod 1; B, pereopod 1, carpus and propodus; C, pereopod 1, tip of dactylus; D, pereopod 2; E, pereopod 2, carpus and propodus; F, pereopod 7.

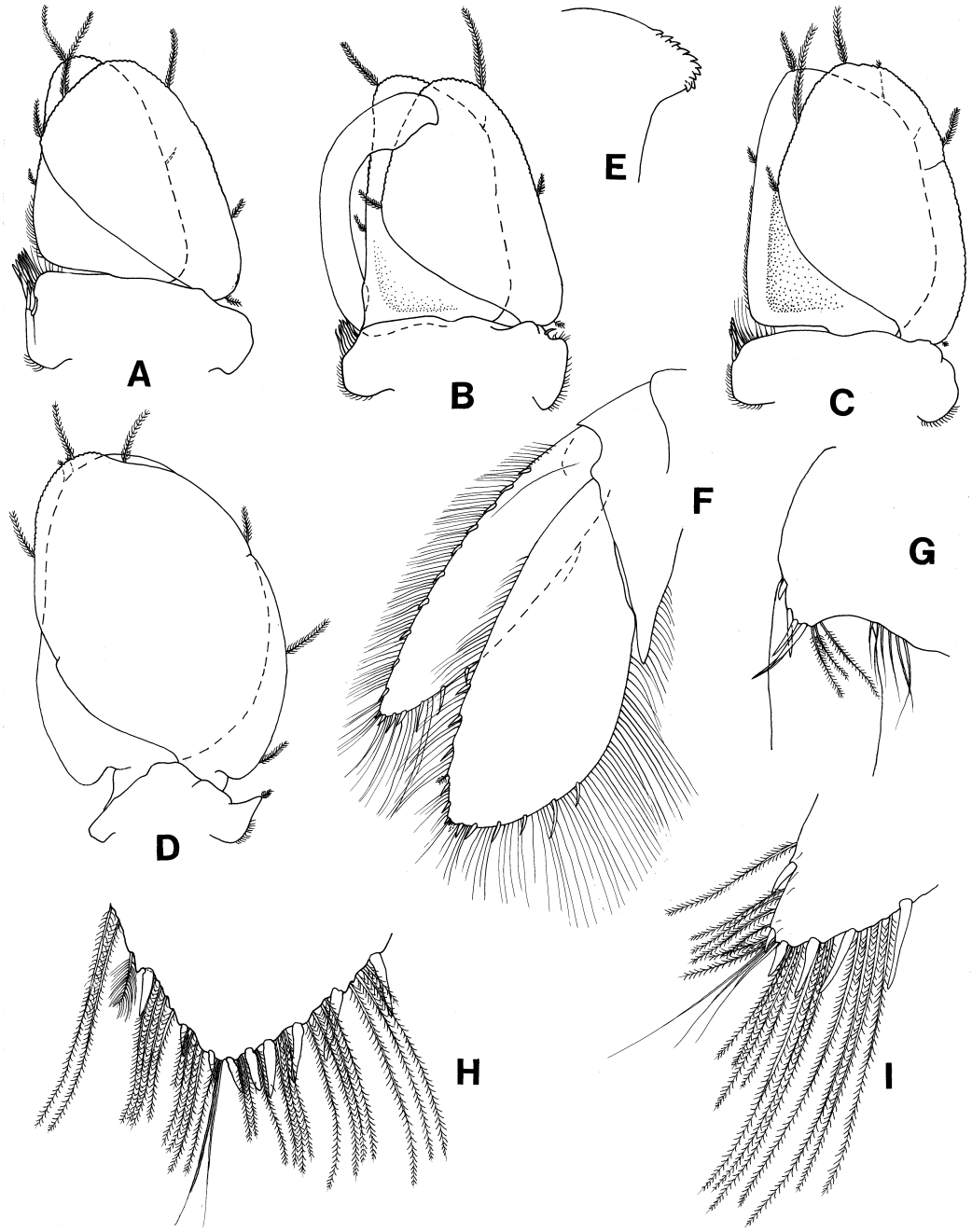

FIGURE 4. *Natatolana rekohu* sp. nov. All figs paratype (24 mm). A–D, pleopods 1–3 and 5 respectively; E, tip of appendix masculina; F, uropod; G, uropod peduncle, ventral view; H, uropod endopod, apex; I, uropod exopod apex.

Size: Males 18.5–24.0 mm, females 17.5–24.5 mm, both with a mean of 21 mm; mancas 8.5–12.0 mm.

Remarks: *Natatolana rekohu*, sp. nov. can be identified by the eyes lacking facets and pigment; strongly indented anterior margin of the head; pentagonal frontal lamina with weakly convex lateral margins; pleonites 1 and 2 not produced, 3 weakly so (no 'point') and pleonite 4 rounded; and pereopods 1 and 2 usually with 5 or 6 setae on the propodal palm. In males the large flat and widely separated penes and the strongly curved, wide and terminally toothed appendix masculina are species-specific characters. As in most *Natatolana* the number of robust setae on the margins of the uropodal rami and pleotelson is important in making a correct identification—details of these for *N. rekohu* are noted under the heading variation.

Three species display a similar appearance to *N. rekohu* the North Atlantic *Natatolana imicola* (Dollfus, 1903) (redescribed by Keable & Bruce 1997), the poorly-known southern East Pacific species *Natatolana natalis* (Menzies & George, 1972) and the southern Indian Ocean *Natatolana anophthalma* (Kussakin & Vasina, 1982). *Natatolana imicola* differs in numerous details, the most obvious of which are, pereopod 2 propodal palm with only 2 robust setae, penial processes tubular or absent (there appear to be two 'forms' of this species), and in generally having fewer robust setae on the uropods and pleotelson margins as follows: (number(s) in brackets is that which is most frequent) pleotelson with 10–12 vs 12–18 (15–16] in *N. rekohu*; endopod mesial 4–7 (5) vs 5–9 (7 or 8), lateral 4–4 (4) vs 4–8 (6); exopod mesial 3–5, (4) vs 5–7 (6), lateral 6–8 (7) vs 9–14 (11 or 12). Keable & Bruce (1997) did not include 2 distal-most small robust setae on uropod rami (apex) in the marginal counts for *N. imicola*, so the counts presented here have been adjusted to include these. The difference on number of robust setae in the propodal palm of pereopods 1–3 and in the margins of the pleotelson and uropodal rami allow males and females of the two species to be unambiguously identified.

Natatolana natalis is known only from the holotype, and the original description is too poor and incomplete to allow for accurate comparisons to be made to other similar species. The holotype is in poor condition and has been dissected but the removed appendages are not with the specimen (which retains only a single uropodal ramus). Examination of the holotype revealed that the penial processes are longer and more widely set apart than in *N. rekohu*, and the original figures show that the appendix masculina is more slender, while Keable & Bruce (1997) noted in the 'Remarks' for *N. imicola*, that the appendix masculina of *N. natalis* has an acute and projecting apex. The pleotelson is rubbed, and it is not possible to be certain as to the number of robust setae that would be present, but sockets indicate that it is likely to be 12 not 15 or 16 as in *N. rekohu*; the apex of the pleotelson is narrower than in *N. rekohu*, and while only a multi-specimen description will allow for full characterisation of *N. natalis*, the observable differences are convincing that it is distinct to *N. rekohu*.

Natatolana anophthalma (Kussakin & Vasina, 1982) lacks eyes, and is generally similar in appearance to *N. rekohu.* The description is minimal with little species-level detail, and counts for robust setae were not given for the pleotelson and uropodal rami. It was stated that the pleotelson is 'serrate with moderately long setae' and 'lateral margins of pleotelson without spines'. Comparing the figures to *N. rekohu*: the body shape is wider; appendix masculina is similar but narrower; pleonite 3 possibly more strongly produced and it appears that the uropod endopod is distally more acute than in *N. rekohu.* The two nominal taxa occupy greatly different depth ranges — *N. rekohu* at 2769 metres, *N. anophthalma* 175 metres at the type locality; [Kensley (1989) recorded *N. anophthalma* at 1430–1600 metres at St. Paul and Amsterdam Islands, although the identity of that record was regarded as doubtful by Keable (unpublished)] further supporting that these are different species.

The specimens were taken from a 'benthic lander' sediment trap together with the remains of single fish which had died in the trap and on which the isopods has been feeding. This indicates that, in common with most species of *Natatolana*, *N. rekohu* is a scavenger.

Distribution: Known only from the type locality.

Etymology: The epithet is taken from the Moriori name for Chatham Island from which the rise takes its name.

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