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Review of *Neoanchisquilla* Moosa, 1991 and *Neclorida* Manning, 1995 (Crustacea: Stomatopoda: Squilloidea), with Descriptions of Two New Species of *Neoanchisquilla* from the Indian Ocean

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ABSTRACT. *Neoanchisquilla* Moosa, 1991, is reviewed and two new species are described. *Neoanchisquilla tuberculata* and *N. australiensis* are described from the Comoro Islands and the Australian Northwest Shelf respectively, representing the first records of the genus from the Indian Ocean. The type species, *N. semblatae* Moosa, 1991, from New Caledonia, is redescribed. Both new species differ from *N. semblatae* in bearing seven teeth on the raptorial claw, and differ from each other in the dorsal and ventral ornamentation of the telson. A cladistic analysis supports the monophyly of *Neoanchisquilla* and shows the two newly described Indian Ocean species to be more closely related to each other than either is to the Western Pacific *N. semblatae*. Additional specimens of *Neclorida miersi* (Manning, 1968b) from Madagascar are the largest known specimens of the species, which is herein redescribed. Most diagnostic characters of the monotypic *Neclorida* are invariant with size, with the exception of the cornea width and the distinctness of the prelateral lobe of the telson. The generic diagnosis of *Neclorida* is emended to account for these new data.

AHYONG, SHANE T., 1998. Review of *Neoanchisquilla* Moosa, 1991 and *Neclorida* Manning, 1995 (Crustacea: Stomatopoda: Squilloidea), with descriptions of two new species of *Neoanchisquilla* from the Indian Ocean. *Records of the Australian Museum* 50(2): 217–229.

Examination of unidentified mantis shrimp (Stomatopoda) collections in the National Museum of Natural History, Smithsonian Institution, Washington D.C., revealed a specimen of an undescribed species of *Neoanchisquilla* Moosa, 1991, from the Comoro Islands, and additional specimens of a seldom reported species, *Neclorida miersi* (Manning, 1968b). A second species of *Neoanchisquilla* is described based on a single specimen from the Australian Northwest Shelf, in the collections of the Museum and Art Gallery of the Northern Territory.

Neoanchisquilla was established for *N. semblatae* Moosa, 1991, from New Caledonia. The two new species of *Neoanchisquilla*, are thus the first records of the genus from the Indian Ocean. The genus is herein reviewed based on re-examination of the holotype of *N. semblatae*. *Neoanchisquilla semblatae* is fully redescribed incorporating data not mentioned by Moosa (1991). Species of *Neoanchisquilla* resemble the monotypic *Anchisquilla* (Manning, 1968a), in almost every respect, sharing similar morphology and basic colour pattern. Although greatly similar, both genera were monotypic (sensu Manning, 1995) and obviously not problematic in terms of individual monophyly. The discovery of the two new species of *Neoanchisquilla*, however, prompted confirmation of their monophyly by cladistic analysis.

Neclorida Manning, 1995, is a monotypic genus erected for *Clorida miersi* Manning, 1968b. *Neclorida miersi* has been reported only from Indonesia and the type locality, Madagascar. The present specimens of *N. miersi* are the largest known to date, bearing characters requiring emendation to the generic diagnosis.

Materials and methods

Material for this study is deposited in the following institutions: Australian Museum (AM), Muséum National d'Histoire Naturelle, Paris (MNHN), Museum and Art Gallery of the Northern Territory, Darwin (NTM), and National Museum of Natural History, Smithsonian Institution, Washington D.C. (USNM). Terminology and size descriptors generally follow the conventions of Manning (1969, 1978) supplemented by some abbreviations proposed by Makarov (1979). For brevity, the "basal prolongation of the uropod" (Manning, 1969) is herein referred to as the "uropodal protopod".

Abbreviations: abdominal somite (AS), antenna (A2), antennule (A1), cornea width (CW), intermediate (IM), lateral (LT), marginal (MG), maxilliped (MXP), median (MD), pleopod 1 (PLP1), submedian (SM), and thoracic somite (TS). All measurements are in millimetres (mm). Total length (TL) is measured along the midline from the tip of the rostrum to the apices of the submedian teeth. Carapace length (CL) is measured along the midline and excludes the rostral plate. Corneal index (CI) is given as 100CL/CW.

Phylogenetic analysis of *Neoanchisquilla* was based on 17 unordered morphological characters (Appendix 1, 2) using MacClade 3.04 (Maddison & Maddison, 1993) and the *exhaustive search* in PAUP 3.1.1 (Swofford, 1993). Uninformative characters (4, 9, 10, 12, 13, 15, 16) artificially "improve" the tree statistics, but were included to show the distribution of autapomorphies useful in species diagnoses. A separate analysis was also run excluding uninformative characters. To test the monophyly of *Neoanchisquilla* with respect to *Anchisquilla*, all species of both genera comprised the ingroup. Character states were polarized by outgroup comparison. Two species of the Indo-West Pacific genus, *Levisquilla, L. jurichi* (Makarov, 1979) and *L. minor* (Jurich, 1904) were selected as outgroups, based on their close relationship to *Anchisquilla* and *Neoanchisquilla* in preliminary phylogenetic analyses of the squilloid genera (in prep.). States corresponding to each character discussed in the text are given following the character number in brackets. For example, 4[1] means character 4, state 1.

Systematics

Squilloidea Latreille, 1803

Squillidae Latreille, 1803

Neoanchisquilla Moosa, 1991

Diagnosis. Eye with cornea bilobed; cornea broader than and set obliquely on stalk, width less than 1/3CL. Ophthalmic somite with rounded anterior margin. A1 somite not extending anteriorly beyond rostral plate. Carapace anterolateral angles armed; MD and IM carinae absent; LT carina indistinct, indicated posteriorly only; with indistinct reflected MG carina. Raptorial claw dactylus with more than 6 teeth; carpus dorsal carina undivided; merus outer inferodistal angle unarmed. Mandibular palp 3-segmented. MXP1–4 each with epipod. TS5–7 lateral processes single. TS5–8 and AS1–5 each lacking SM carinae. Telson SM teeth with movable apices; prelateral lobe present; dorsolateral surface with numerous supplementary longitudinal carinae or rows of tubercles. Uropodal protopod inner margin armed with slender spines.

Description. Total length of adults less than 100 mm. Dorsal integument smooth. Eye with cornea bilobed; cornea broader than and set obliquely on stalk, width less than 1/3CL. Ophthalmic somite with rounded anterior margin. Ocular scales broad, subtruncate, rounded laterally; separate. A1 somite not extending anteriorly beyond rostral plate; dorsal processes produced to a slender spine, apices directed anterolaterally. A2 scale slender; entire margin setose. Rostral plate lacking dorsal carinae. Carapace anterolateral angles armed; lacking dorsal carinae except for indistinct LT and reflected MG carinae indicated posteriorly; lacking posterior median projection. Raptorial claw dactylus with more than 6 teeth, outer margin broadly curved; proximal margin with distinct basal notch and blunt lobe proximally; carpus dorsal carina undivided; merus outer inferodistal angle unarmed; propodus opposable margin pectinate, with 3 movable spines proximally, distal margin lacking stout tooth; merus outer inferodistal angle unarmed; basis lacking ventrally directed mesial spine. Mandibular palp 3-segmented. MXP1–4 each with epipod. MXP5 basal segment lacking ventrally directed spine. Pereiopods 1–3 basal segment unarmed; endopod segments fused, slender, entire margin setose. TS6–8 each with IM carinae, lacking SM carinae. TS5 lateral process a single, short spine, directed anterolaterally, inclined ventrally; ventral spine slender, directed ventrally. TS6–7 lateral processes single. TS8 anterolateral margin

obtusely rounded. AS1–5 each lacking SM carinae; with distinct IM, LT and MG carinae. AS6 with SM, IM and LT carinae; sternum posterior margin unarmed. Telson broader than long, flattened, trianguloid, with 3 pairs of primary marginal teeth (SM, IM, LT), each with dorsal carina; SM teeth with minute movable apices; prelateral lobe present; SM, IM and LT denticles spiniform, lacking dorsal tubercle; MD carina low, interrupted proximally, armed posteriorly with apical spine overhanging blunt tubercle; dorsolateral surface with numerous supplementary longitudinal carinae or tubercles. Telson ventral surface with long postanal carina; ventrolateral carina extending posteriorly to base of lateral tooth. Uropodal protopod terminating in 2 slender spines, inner longer; dorsally and ventrally carinate; unarmed dorsally excepting dorsal spine above proximal exopod articulation; protopod inner margin armed with slender spines; with rounded, flattened ventral lobe anterior to endopod articulation. Uropodal exopod proximal segment unarmed dorsally; exopod distal segment ovate, elongate. Uropodal exopod proximal segment with inner margin lacking prominent, rounded distal lobe; outer margin with graded movable spines; distal margin with slender ventral spine. Uropodal exopod proximal segment unarmed dorsally; endopod unarmed dorsally, entire margin setose.

Included species. *Neoanchisquilla australiensis* n.sp., *N. semblatae* Moosa, 1991 and *N. tuberculata* n.sp.

Remarks. Both cladistic analyses, including and excluding uninformative characters, found a single, identical tree (Fig. 1) supporting monophyly of *Neoanchisquilla*. The only synapomorphy of *Neoanchisquilla* identified here is the rounded anterior margin of the ophthalmic somite (1[1]). *Neoanchisquilla*, however, also differs from *Anchisquilla* in bearing indistinct lateral carinae on the carapace, there are more than six teeth on the dactylus of the raptorial claw, the proximal margin of the dactylus is distinctly notched and the SM teeth of the telson bear movable apices. Most of these characters distinguishing *Neoanchisquilla* from *Anchisquilla* are plesiomorphies (4[1], 9[0], 12[0]).

Phylogenetic relationships within *Neoanchisquilla* correlate with known geographical distributions. Hence, the two Indian Ocean species, *N. australiensis* and *N. tuberculata*, are more closely related to each other than either is to *N. semblatae* from the western Pacific. In contrast, *Anchisquilla fasciata*, occurs throughout the Indo-West Pacific (Manning, 1995). Future sampling, nevertheless, may show vastly different distribution patterns for species of *Neoanchisquilla* which are presently known only from type material.

Key to species of *Anchisquilla* and *Neoanchisquilla*

1 Dactylus of raptorial claw with 6 teeth. SM teeth of the telson with fixed apices. Ophthalmic somite anterior margin triangular ..... *Anchisquilla fasciata*

—— Dactylus of raptorial claw with more than 6 teeth. SM teeth of the telson with movable apices. Ophthalmic somite anterior margin rounded 2

2 Rostral plate ovoid; apex broadly rounded. Carapace anterolateral spines extending to base of rostral plate. Dactylus of raptorial claw with 8 teeth. Telson dorsal surface lacking accessory median carina ..... *Neoanchisquilla semblatae*

—— Rostral plate triangular; apex narrow, blunt. Carapace anterolateral spines small, not extending to base of rostral plate. Dactylus of raptorial claw with 7 teeth 3

3 Telson with numerous curved rows of tubercles. TS6–7 lateral processes flattened, margin slightly sinuous. Ventral surface of telson with rows of tubercles adjacent to postanal carina ..... *Neoanchisquilla tuberculata* n.sp.

—— Telson with numerous undivided carinae. TS6–7 lateral processes broadly rounded. Ventral surface of telson lacking rows of tubercles adjacent to postanal carina ..... *Neoanchisquilla australiensis* n.sp.

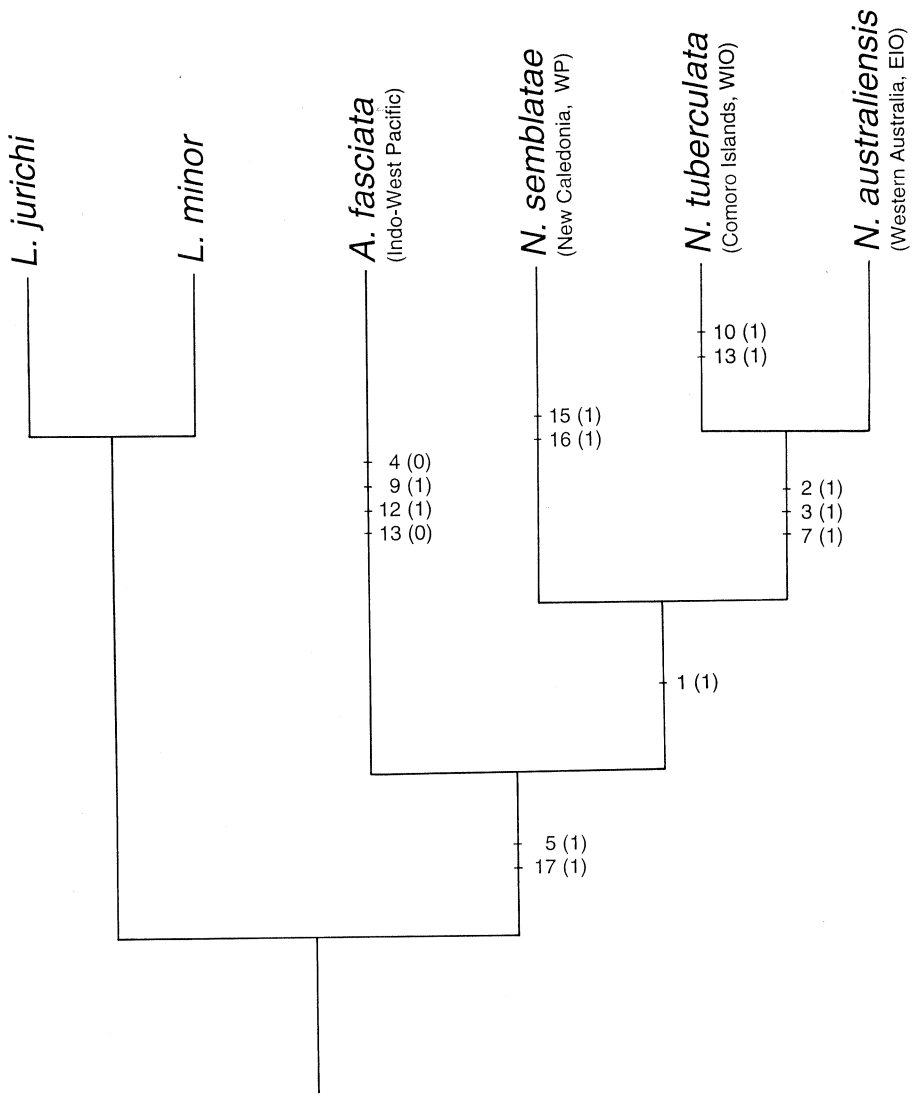

Figure 1. Single most parsimonious cladogram of *Neoanchisquilla* using all 17 characters (length 23, ci 0.87, hi 0.13, ri 0.75). Excluding uninformative characters produced an identical tree of length 15 steps, ci 0.80, hi 0.20 and ri 0.75. EIO, Eastern Indian Ocean; IWP, Indo-West Pacific; WIO, Western Indian Ocean; WP, Western Pacific. Outgroups: *Levisquilla minor, L. jurichi*. Ingroup: *Anchisquilla fasciata, N. australiensis, N. semblatae, N. tuberculata*. Apomorphic characters and states (parentheses) are indicated on each branch of the ingroup.

Neoanchisquilla australiensis n.sp.

Fig. 2

Type material. HOLOTYPE: NTM Cr012355, female (TL 25 mm), Northwest Shelf, Western Australia, 19°58.6–59.1'S 117°49.0–49.4'E, 43 m, beam trawl, FRV Soela, 25 June 1983.

Diagnosis. Rostral plate slightly longer than broad; triangular; apex narrow, blunt. Raptorial claw dactylus with 7 teeth. TS6–7 lateral processes broadly rounded. Abdominal carinae spined as follows: SM 6, IM 6, LT 6, MG 2–5. Telson dorsal surface with median carina and numerous undivided carinae; ventral surface lacking rows of tubercles lateral to postanal carina.

Description of holotype. TL 25 mm. Eye small; stalk moderately inflated; cornea bilobed, extending slightly beyond A1 peduncle segment 1; CI 421. A1 peduncle 0.85CL. A1 somite dorsal processes with acute apices. Antennal scale length 0.48CL. Rostral plate slightly longer than broad; triangular; apex rounded. Carapace anterior width 0.50CL; anterolateral spines small, not extending

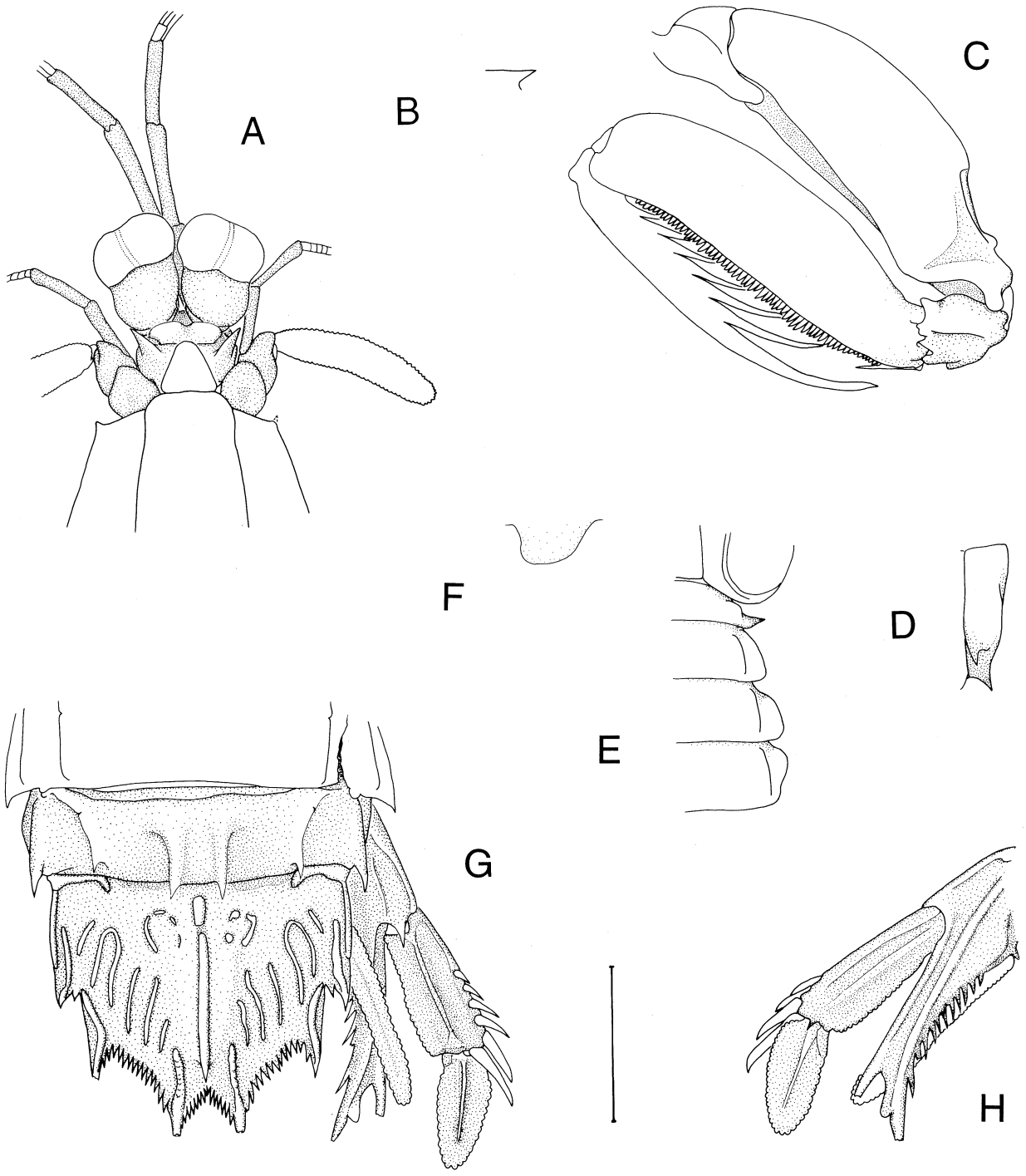

Figure 2. *Neoanchisquilla australiensis* n.sp. holotype. A, anterior cephalon, dorsal; B, A1 somite dorsal process, right lateral; C, raptorial claw, right lateral; D, TS5, right lateral; E, posterior carapace and TS5–8 lateral processes, right dorsal; F, TS8 sternal keel, right lateral; G, AS5–6, telson and uropod, dorsal; H, uropod, right ventral. Scale bar: A–E, G, 2.5 mm; F, 1.2 mm.

to base of rostral plate. Raptorial claw dactylus with 7 teeth. TS6–7 lateral processes broadly rounded. TS8 sternal keel subtruncate. AS6 with blunt tubercle anterior to uropodal articulation. Abdominal carinae spined as follows: SM 6, IM 6, LT 6, MG 2–5. Telson prelateral lobe faintly indicated, longer than margin of lateral tooth; denticles 7, 12–14, 1. Dorsolateral surface lacking accessory median carina; with six, well-developed supplementary longitudinal carinae; proximally with short, irregular carina and tubercles adjacent to median carina. Carinae of primary

teeth sinuous, irregular. Telson ventral surface with long, smooth postanal carina, lacking carinae or tubercles laterally, extending about 0.8 distance between anal pore and posterior margin. Uropodal protopod inner margin armed with 11 slender spines; with rounded, flattened ventral lobe anterior to endopod articulation. Terminal spines of uropodal protopod with lobe on outer margin of inner spine rounded, broader than adjacent spine, proximal margin concave. Uropodal exopod proximal segment with 6 graded movable spines on outer margin, distal 2 flattened with acute apices, distalmost slightly exceeding midlength of distal segment. Exopod distal segment shorter than proximal segment. Uropodal exopod proximal segment lacking tubercles ventrally, adjacent to articulation with protopod.

Measurements. Holotype female: TL 25 mm, CL 5.9 mm, CW 1.4 mm, A1 peduncle length 5.0 mm.

Colour in alcohol. Almost completely faded. Dark pigmentation around reflected marginal carina of the carapace; occasional scattered chromatophores laterally. A2 scale with black apex.

Remarks. The similarities and differences between *N. australiensis* and *N. tuberculata* are outlined under the account of the latter. *Neoanchisquilla australiensis* differs from *N. semblatae* in bearing seven instead of eight teeth on the dactylus of the raptorial claw; the rostral plate is triangular with a blunt, narrow apex, fewer intermediate carinae on the abdominal somites are armed, and the prelateral lobe of the telson is relatively longer.

Distribution. Known only from the type locality, the Australian Northwest Shelf.

Neoanchisquilla semblatae Moosa, 1991

Fig. 3

Neoanchisquilla semblatae Moosa, 1991: 208–210, fig. 15.–Richer de Forges & Moosa, 1992: 152.–Manning, 1995: 25.

Material. HOLOTYPE: MNHN Sto 1626, male (TL 26 mm), Chesterfield Islands, New Caledonia, 20°34.37'S 160°51.80'E, 74 m, CORAIL 2 stn DW 30, mud and calcareous sediment with *Halimeda*, July to August 1988.

Diagnosis. Rostral plate with broadly rounded apex. Raptorial claw dactylus with 8 teeth. TS6–7 lateral processes flattened, margin slightly sinuous. Abdominal carinae spined as follows: SM 6, IM 6, LT 4–6, MG 1–5. Telson dorsal surface with median carina and numerous undivided curved carinae, lacking accessory median carina; ventral surface lacking rows of tubercles either side of postanal carina.

Description of holotype. TL 26 mm. Eye small; stalk moderately inflated; cornea bilobed, extending slightly beyond A1 peduncle segment 1; CI 446. A1 peduncle 0.97CL. A1 dorsal processes slender, apices blunt, directed anterolaterally. A2 scale length 0.53CL. Rostral plate ovoid; slightly longer than broad; apex broadly rounded. Carapace anterior width 0.51CL; carapace anterolateral spines slender, extending to base of rostral plate. Raptorial claw dactylus with 8 teeth. TS6–7 lateral processes flattened, margin slightly sinuous. TS8 sternal keel rounded. AS6 with ventrolateral spine anterior to uropodal articulation. Abdominal carinae spined as follows: SM 6, IM 6, LT 4–6, MG 1–5 (AS2 unarmed on left side). PLP1 endopod in male with slender, curved hook process and broad, flattened tube process; apex of hook process blunt, exceeding apex of distal endite. Telson prelateral lobe length subequal to or slightly longer than margin of lateral tooth; denticles 7, 12–13, 1. Dorsolateral surface lacking accessory median carina; with 5–6 supplementary longitudinal carinae, several sinuous proximally. Carinae of primary teeth sinuous, irregular. Telson ventral surface with long, smooth postanal carina, lacking carinae or tubercles laterally, extending about 0.8 distance between anal pore and posterior margin. Uropodal protopod inner margin armed with 10–12 slender spines. Terminal spines of uropodal protopod with lobe on outer margin of inner spine rounded, broader than adjacent spine, proximal margin concave. Uropodal exopod proximal segment with 6 graded movable spines on outer margin, distal 2 flattened with acute apices, distalmost slightly exceeding midlength of distal segment. Exopod distal segment with length subequal to proximal segment. Uropodal endopod lacking tubercles ventrally, adjacent to articulation with protopod.

Colour in alcohol. A1 and A2 peduncles pale. A2 scale with dark posterior margin and apex. Carapace with dark anterior margin and four, broad, diffuse, irregular transverse bands; reflected marginal carinae enclosing black patch with diffuse margins. Thoracic and abdominal somites each with broad, diffuse submedian patches, with darker distal patch between intermediate and lateral carinae extending onto following somite. Telson with broad, diffuse, dark patch covering intermediate and lateral teeth; with broad, diffuse longitudinal median band extending from anterior margin to apices of SM teeth, excepting a short, unpigmented area distally. Raptorial claw, maxillipeds, pereiopods and pleopods unpigmented. Uropodal protopod inner margin and endopod dark; exopod proximal segment dark on outer distal half and articulation with distal segment; exopod distal segment with diffuse pigmentation on proximal and outer margin.

Measurements. Holotype male: TL 26 mm, CL 5.8 mm, CW 1.3 mm, A1 peduncle length 5.6 mm.

Remarks. In *N. semblatae* the apically rounded hook process of the male PLP1 endopod (15[1]) is unusual, because it is produced to a sharp point in *N. tuberculata*, *A. fasciata* and other *Clorida*-like genera such as *Cloridina, Neclorida, Lenisquilla* and *Levisquilla*. The condition of the hook-process in *N. semblatae* is unlikely to be size related because the penes are well developed,

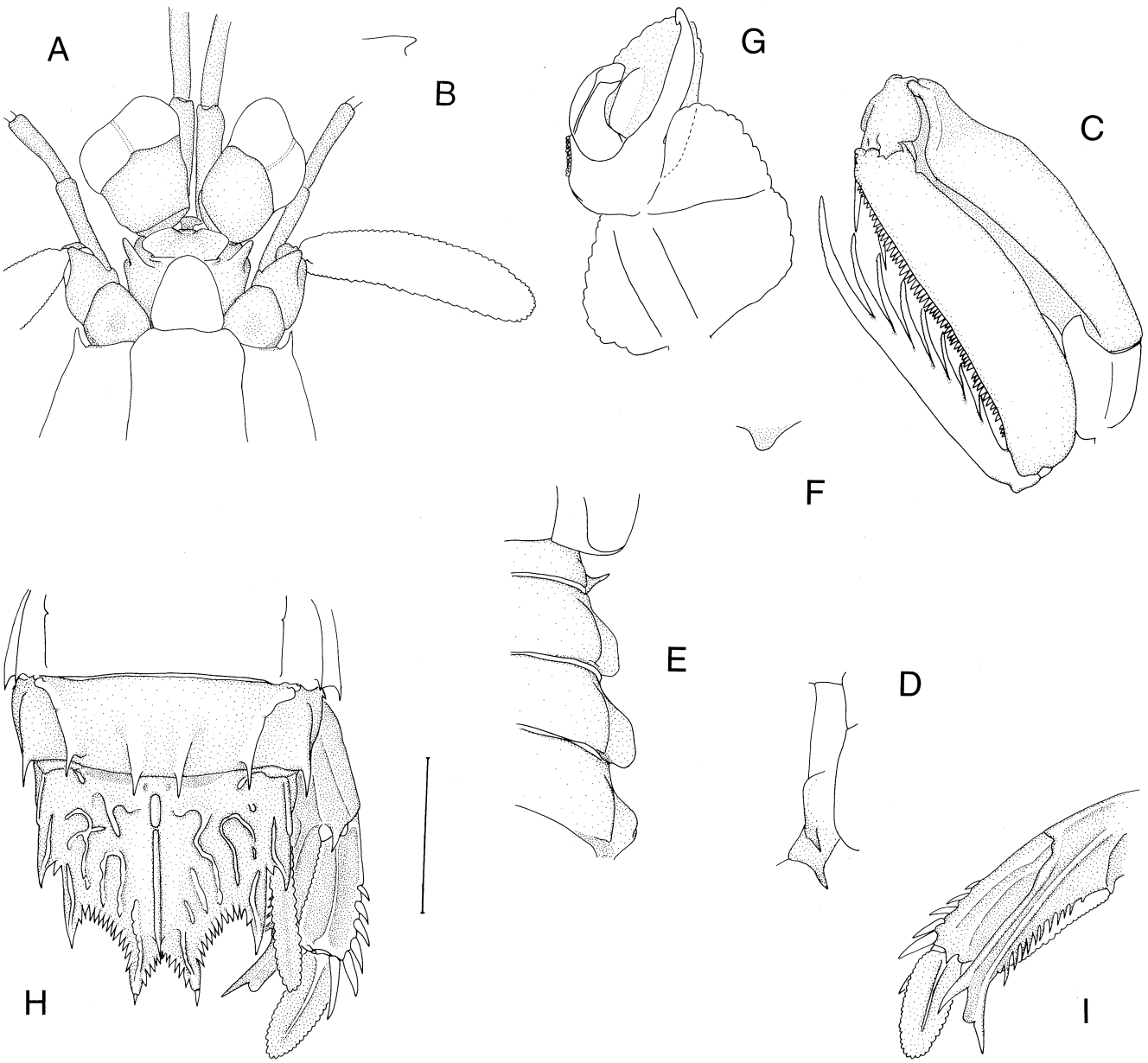

Figure 3. *Neoanchisquilla semblatae* Moosa, 1991. holotype. A, anterior cephalon, dorsal; B, A1 somite dorsal process, right lateral; C, raptorial claw, left lateral; D, TS5, right lateral; E, posterior carapace and TS5–8 lateral processes, right dorsal; F, TS8 sternal keel, right lateral; G, PLP1 endopod; H, AS5–6, telson and uropod, dorsal; I, uropod, right ventral. Scale bar A–B, D–F, 2 mm; C, H, I, 3 mm; G, 1 mm.

the male PLP1 endopod is fully formed and the sharp apex of the hook process is well developed even in juveniles of *A. fasciata* and species of other *Clorida*-like genera. The hook process in *N. semblatae* is also distinctly longer than in *N. tuberculata* n.sp., exceeding the distal margin of the distal endite (16[1]). Male PLP1 characters should readily distinguish *N. semblatae* from *N. tuberculata*, but unfortunately the male PLP1 of *N. australiensis* is unknown.

Richer de Forges & Moosa (1992) noted that the habitats around the Chesterfield Islands, the type locality of *N. semblatae*, are principally coralline, with fine sediments and carbonated mud. Collection data in Moosa (1991) show that no other stomatopods were collected from the same station as *N. semblatae*.

Distribution. Known only from the type locality, Chesterfield Islands, New Caledonia.

Neoanchisquilla tuberculata n.sp.

Fig. 4

Material. HOLOTYPE: USNM 260879, male (TL 74 mm), Comores, 12°11'09"S 44°19'03"E, 9–20 m, RW88–26, coll. R. Winterbottom, 21 November 1988.

Diagnosis. Rostral plate triangular; longer than broad; apex narrow, blunt. Carapace anterolateral spines small, not extending to base of rostral plate. Raptorial claw dactylus with 7 teeth. TS6–7 lateral processes flattened, margin slightly sinuous. Abdominal carinae spined as follows: SM 6, IM 6, LT 2–6, MG 1–5; sternum posterior margin unarmed. Telson dorsal surface with MD carina, tuberculate accessory MD carina and numerous curved rows of tubercles; ventral surface with 2 rows of irregularly spaced tubercles lateral to postanal carina.

Description of holotype. TL 74 mm. Eye with cornea strongly bilobed, not extending beyond A1 peduncle segment 1; CI 480. A1 peduncle 0.86CL. A1 dorsal processes with spiniform apices, directed anterolaterally. A2 scale length 0.62CL. Rostral plate triangular; slightly longer than broad; apex blunt. Carapace anterior width 0.55CL; anterolateral spines small, not extending to base of rostral plate. Raptorial claw dactylus with 7 teeth. TS6–7 lateral processes flattened, margin slightly sinuous. TS8 sternal keel subtruncate. AS6 with minute ventrolateral spine anterior to uropodal articulation. Abdominal carinae spined as follows: SM 6, IM 6, LT 2–6, MG 1–5; sternum posterior margin unarmed. PLP1 endopod in male with slender, curved hook process and broad, flattened tube process; apex of hook process acute, exceeding apex of tube process. Telson prelateral lobe longer than margin of LT tooth; denticles 7–8, 17–18, 1. Dorsolateral surface with proximal cluster of tubercles, tuberculate accessory MD, and 7–8 curved rows of closely set tubercles. Carinae of primary teeth tuberculate. Telson ventral surface with tuberculate postanal carina and 2 rows of irregularly spaced tubercles laterally. Uropodal protopod inner margin armed with 15–18 slender spines. Terminal spines of uropodal protopod with lobe on outer margin of inner spine rounded to angular, narrower than adjacent spine, proximal margin concave. Uropodal exopod proximal segment with 7 graded movable spines on outer margin, distal 2 flattened with acute apices, distalmost not exceeding midlength of distal segment. Exopod distal segment with length subequal to proximal segment. Uropodal endopod with row of 3 tubercles ventrally, adjacent to articulation with protopod.

Colour in alcohol. Rostral plate, antennal protopods and anterior cephalon dark brown. A1 and A2 peduncles pale. A2 scale with dark posterior margin and apex. Carapace with dark anterior margin and three, broad, diffuse, irregular transverse bands; reflected marginal carinae enclosing black patch with diffuse margins. Thoracic and abdominal somites each with posterior margin dark; broad, diffuse submedian patches, with darker distal patch between intermediate and lateral carinae extending onto following somite. Telson with darkly pigmented carinae; with broad, diffuse, dark patch covering intermediate and lateral teeth; with broad, diffuse longitudinal median band extending from anterior margin to apices of SM teeth, excepting a short, unpigmented rectangle distally. Raptorial claw propodus with dark opposable margin and dark articulation with carpus; carpus dark; merus dark distally, ventrally and dorsally, unpigmented midlaterally; meral depression unpigmented excepting black trapezoid spot proximally. Pereiopods with dark protopod. Uropodal protopod and endopod dark; exopod proximal segment dark on distal half and articulation with distal segment; exopod distal segment dark along midline and outer margin.

Measurements. Holotype male: TL 74 mm, CL 16.8 mm, CW 3.5 mm, A1 peduncle 14.5 mm.

Etymology. Named for the tuberculate dorsal ornamentation of the telson.

Remarks. *Neoanchisquilla tuberculata* is unique in the genus in bearing tuberculate dorsal and ventral telson ornamentation (10[1], 13[1]). *Neoanchisquilla tuberculata* n.sp. also differs from *N. semblatae* in bearing fewer teeth on the raptorial claw (seven instead of eight); in having shorter anterolateral spines of the carapace; in having a narrower, more pointed apex of the rostral plate; the hook process of the male PLP1 endopod is shorter and apically acute; more lateral carinae on the abdominal somites are armed; the cornea is distinctly bilobed; the inner margin of the uropodal protopod bears 15–18 instead of 10–12 spines; and there are more movable spines on the outer margin of the uropodal exopod. Although an adult (Moosa, 1991), the holotype of *N. semblatae* is small (TL 26 mm). The first four distinguishing characters are unlikely to change with age but the latter four may be size related and should be used with caution.

Neoanchisquilla tuberculata is most closely related to *N. australiensis* in sharing a similar rostral plate, short anterolateral spines of the carapace, and seven teeth on the dactylus of the raptorial claw (2[1], 3[1], 7[1]). As well as the tuberculate dorsal and ventral telson ornamentation, *N. tuberculata* differs from *N. australiensis* in the shape of the cornea, in bearing truncate lateral processes of TS6–7, in having more abdominal somites with armed lateral carinae and in having a tuberculate accessory median carinae. Whereas the dorsolateral carinae of the telson are sharp and well formed in *N. australiensis*, the accessory median carina is completely suppressed.

Other than *N. semblatae* and *N. australiensis*, the only other species likely to be confused with *N. tuberculata* is *Anchisquilla fasciata* (De Haan). Ghosh (1973) reported material of *A. fasciata* from the Gulf of Oman which differed from the account of Kemp (1913) in bearing interrupted, instead of entire, dorsal carinae and

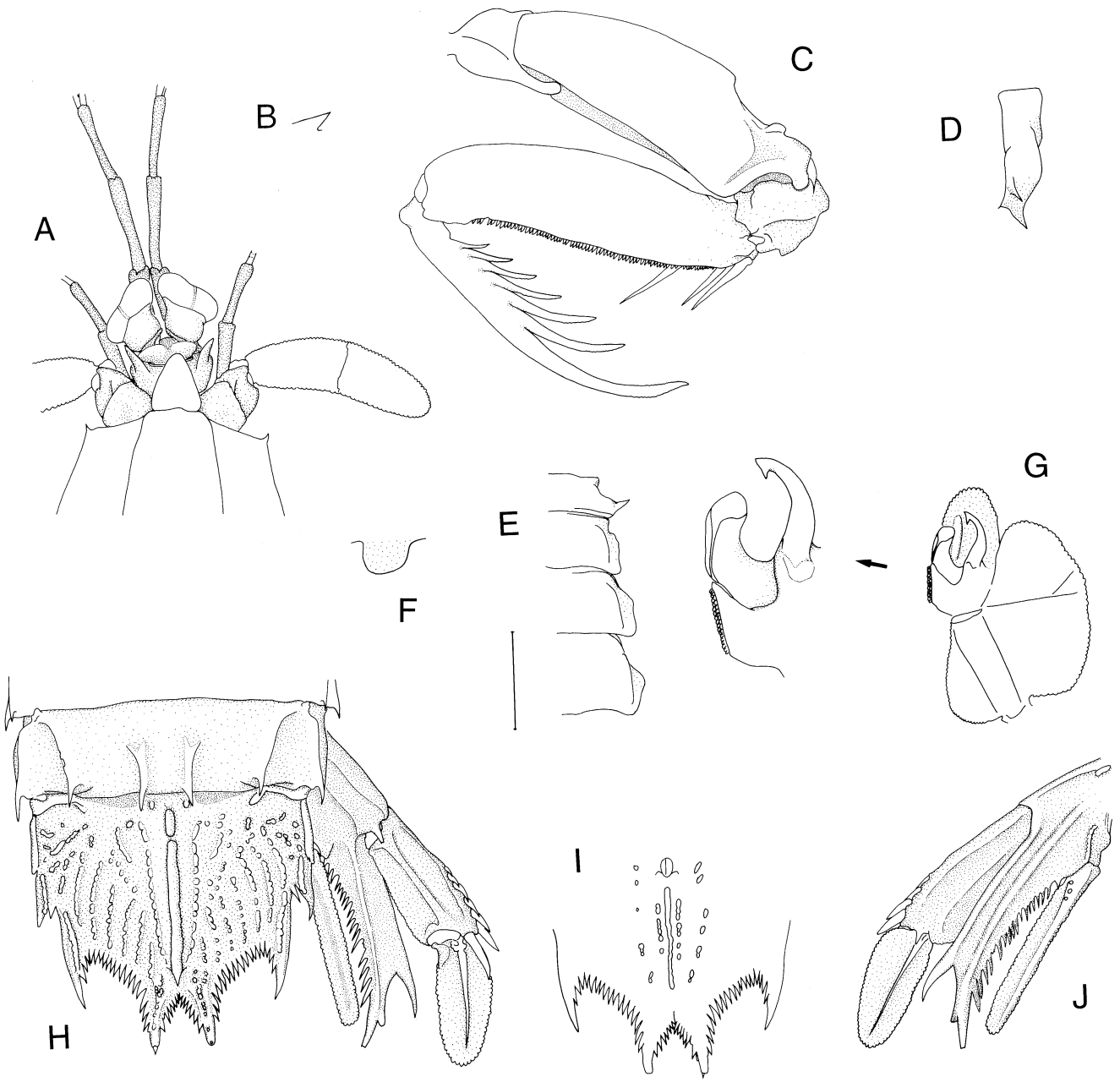

Figure 4. *Neoanchisquilla tuberculata* n.sp. holotype. A, anterior cephalon, dorsal; B, A1 somite dorsal process, right lateral; C, raptorial claw, right lateral; D, TS5, right lateral; E, TS5–8 lateral processes, right dorsal; F, TS8 sternal keel, right lateral; G, PLP1 endopod; H, AS5–6, telson and uropod, dorsal; I, telson, ventral; J, uropod, right ventral. Scale bar A–E, H–J, 5 mm; F, 3.5 mm; G, 2.4 mm.

lacking supplementary ventral carinae on the telson. Although *A. fasciata* may lack supplementary ventral carinae on the telson, the dorsal carinae are entire or only interrupted proximally. Ghosh (1973) may have been dealing with *N. tuberculata*, but his account is unfortunately too brief to confirm the identity of his material.

Distribution. Known from the type locality, the Comoro Islands, and possibly the Gulf of Oman.

Neclorida Manning, 1995

Diagnosis. Eye with cornea distinctly bilobed, broader than and set transversely on stalk; stalk slightly inflated. Ocular scales fused, faintly emarginate medially. A1 somite not extending anteriorly beyond rostral plate. Carapace with anterolateral spines; lacking carinae excepting reflected marginal carinae. Raptorial claw dactylus with 5 teeth. Mandibular palp present. MXP1–4 each with epipod. TS5–8 each lacking SM carinae. TS5–7 lateral processes single. AS1–4 each lacking SM carinae. Telson inflated; SM teeth with movable apices; prelateral lobe present (indistinct in juveniles and subadults); dorsolateral surface with numerous longitudinal rows of blunt tubercles; ventral surface with postanal and ventrolateral carina only. Uropodal protopod terminating in 2 slender spines; inner margin armed with numerous slender spines.

Included species. *Neclorida miersi* (Manning, 1968b).

Remarks. As noted by Manning (1968b, 1995), *Neclorida miersi* most closely resembles species of *Clorida* and *Cloridina*, in particular, *Cloridina verrucosa* (Hansen, 1926). The key feature distinguishing *Neclorida* from *Clorida* and *Cloridina* is the strongly bilobed cornea, which may be prove to be an autapomorphy. The monophyly of *Clorida* and *Cloridina* with respect to *Neclorida* remains to be tested.

Neclorida miersi (Manning, 1968b)

Fig. 5

Clorida miersi Manning, 1968b: 11–14, fig. 3.–Moosa, 1973: 22.–Moosa & Cleva, 1984: 77.
Neclorida miersi.–Manning, 1995: 25, 219.

Material. HOLOTYPE: USNM 124091, male (TL 33 mm), western coast of Madagascar, Banc de Pracel, 65 m, sand, coll. A. Crosnier, June 1959. USNM 124091, 1 male (TL 84 mm), 1 female (TL 85 mm), Entre Majunga et baie de Narendry, northwestern Madagascar, 40 m, coll. R. Plante, 14–15 April 1970.

Description. TL of adults to 85 mm. Dorsal integument smooth, polished. Eye with cornea distinctly bilobed, broader than and set transversely on stalk not extending beyond A1 peduncle segment 1; stalk slightly inflated; CI 400–683. Ocular scales fused, faintly emarginate anteriorly. Ophthalmic somite with triangular anterior margin. A1 peduncle 0.67–0.74CL. A1 somite dorsal processes slender, with spiniform apices, directed anterolaterally. A2 scale length 0.41–0.42CL. Rostral plate longer than broad; lateral margins convergent; apex rounded; lacking dorsal carinae. Carapace anterior width 0.41–0.45CL; anterolateral spines not extending to base of rostral plate; with reflected MG carinae only; lacking posterior median projection. Raptorial claw dactylus with 5 teeth, outer margin broadly curved, proximal margin with basal notch; carpus dorsal carina undivided; propodus opposable margin sinuous; merus outer inferodistal angle unarmed; basis lacking ventrally directed mesial spine. Mandibular palp 3-segmented. MXP1–4 each with epipod. MXP5 basal segment lacking ventrally directed spine. Pereiopods 1–3 basal segment unarmed; endopod 2-segmented, slender, entire margin setose. TS5–8 each lacking SM carinae. TS5 lateral process a single, short spine, directed anterolaterally and inclined ventrally; ventral spine triangular, acute, directed ventrally. TS6–7 lateral processes rounded to obtuse anterolaterally and posterolaterally. TS8 anterolateral margin triangular; sternal keel rounded. AS1–4 each lacking SM carinae. AS5 at most with faint indication of SM carina. AS6 with surface between SM and IM carinae irregularly sculptured; with ventrolateral spine anterior to uropodal articulation; sternum posterior margin unarmed. Abdominal carinae spined as follows: SM 6, IM 4–6 (5–6), LT 5–6, MG (3–4)5. Telson inflated, broader than long; SM teeth with movable apices; prelateral lobe shorter than margin of lateral tooth; median carina low, uninterrupted proximally, armed posteriorly; dorsolateral surface with accessory median carina composed of 4–5 tubercles and with numerous longitudinal rows of blunt tubercles; denticles triangular, 2–3, 7–8, 1; carinae of marginal teeth inflated in adult males. Telson ventral surface with long, tuberculate postanal carina; ventrolateral carina short, extending distally slightly beyond prelateral lobe. Uropodal protopod terminating in 2 slender spines, inner longer, dorsally and ventrally carinate; unarmed dorsally excepting dorsal spine above proximal exopod articulation; outer margin smooth; inner margin armed with 7–10 slender spines; with short ventral spine anterior to endopod articulation. Terminal spines of uropodal protopod with lobe on outer margin of inner spine rounded, deflected dorsally, broader than adjacent spine, proximal margin concave. Uropodal exopod proximal segment with broad, round distal lobe on inner distal half; outer margin with 6–7, graded movable spines, distal 2 flattened with acute apices, distalmost not exceeding midlength of distal segment; distal margin with short ventral spine; inner distal portion dark. Uropodal exopod distal segment longer than proximal segment; dark on inner half only; endopod unarmed dorsally, entire margin setose.

Remarks. *Neclorida miersi*, as *Clorida miersi*, has been reported only from the type locality, Madagascar, (Manning, 1968b) and Indonesia (Moosa, 1973; Moosa & Cleva, 1984) from specimens of TL 55 mm or less. The present specimens are the largest known, but agree in most respects with the holotype and Indonesian specimens. The present specimens differ from the holotype in that the cornea is distinctly broader than the stalk (approximately 0.8 eye length) and more strongly bilobed than figured for the holotype (Manning, 1968b: fig. 3b); the ventral tubercle below the lateral process of TS5 is more distinct and acute; the intermediate carinae of AS4 and lateral carina of AS5 are armed posteriorly; the dorsal surface of AS6 between the SM and intermediate carinae is irregularly sculptured; the outer margin of the proximal segment of the exopod bears seven instead of six movable spines;

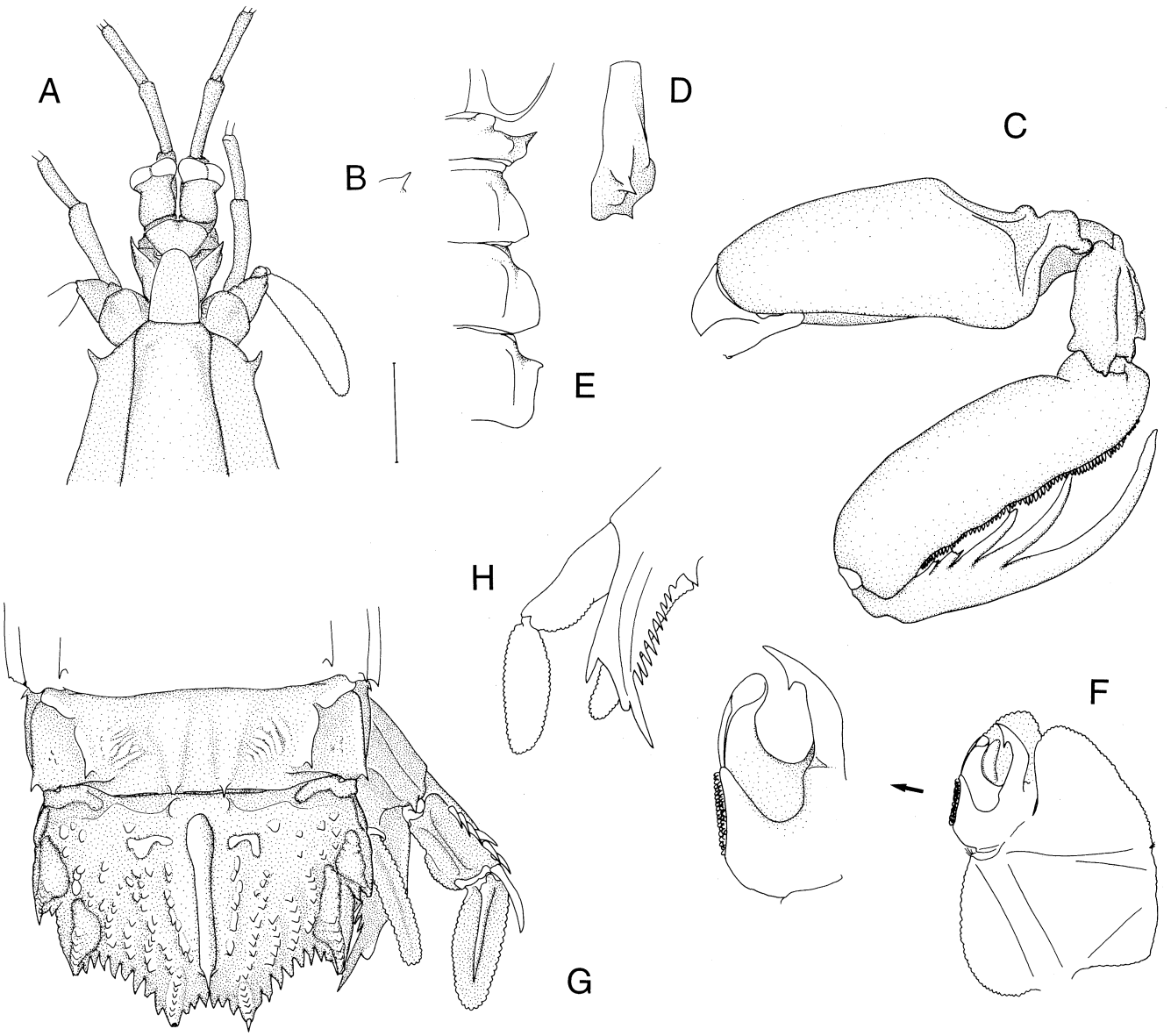

Figure 5. *Neclorida miersi* (Manning, 1968b) male (TL 84 mm), USNM 124091. A, anterior cephalon, dorsal; B, A1 somite dorsal process, right lateral; C, raptorial claw, right lateral; D, TS5, right lateral; E, posterior carapace and TS5–8 lateral processes, right dorsal; F, PLP1 endopod; G, AS5–6, telson and uropod, dorsal; H, uropod, right ventral. Scale bar A–E, G, H, 5 mm; F, 2.4 mm.

the inner margin of the uropodal protopod bears 7–10 spines instead of seven only; and the prelateral lobe of the telson is distinct. The large male differs from the large female and the holotype in bearing a slightly broader rostral plate, the PLP1 endopod is relatively larger than in the holotype, the marginal carinae of AS3–4 are armed and the dorsal ornamentation of the telson is inflated. All of the above differences are likely referable to size/age. Abdominal spination in the two largest specimens agrees with the 55 mm female reported by Moosa & Cleva (1984).

The dorsal ornamentation of the telson in the two largest specimens, the female in particular, closely resembles that of the holotype. The large male shows the inflated telson carinae and tubercles typical of adult males of similar genera such as *Clorida, Cloridina* and *Lenisquilla*. The most significant differences between the holotype and the largest specimens are in the cornea breadth (discussed above) and prelateral lobe on the telson. The prelateral lobe on the telson is an important diagnostic character for many genera and species. In the holotype of *Clorida miersi* the prelateral lobe is indistinct and considered absent in

the original diagnosis of *Neclorida*. *Neclorida miersi* therefore resembles species of *Clorida, Cloridina, Lenisquilla* and *Levisquilla*, in which the distinctness of the prelateral lobe increases with age/size, and this fact must be considered when identifying juveniles and subadults. The generic diagnosis of *Neclorida* is emended above to account for these new data.

Distribution. Known only from Madagascar and Indonesia in depths between 40 and 65 m.

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Appendix 1. Characters and states used in phylogenetic analysis of *Neoanchisquilla*.

1 Ophthalmic somite anterior margin: triangular (0); rounded (1).
2 Rostral plate: apex broad (0); apex narrow (1).
3 Carapace anterolateral spines: long, slender (0); short, triangular (1).
4 Lateral carina of carapace: distinct (0); indistinct (1).
5 Mandibular palp: absent (0); present (1).
6 TS6–7 lateral process: rounded (0); sinuous or flattened (1).
7 TS8 sternal keel: apex narrow (0); apex broad (1).
8 Raptorial claw dactylus: 6 teeth (0); 7 teeth (1); 8 teeth (2).
9 Raptorial claw dactylus: with basal notch (0); lacking basal notch (1).
10 Telson dorsal carinae: entire (0); tuberculate (1).
11 Telson accessory median carina: present (0); absent (1).
12 Submedian teeth apices: movable (0); fixed (1).
13 Telson ventral surface lateral to postanal carina: with carinae (0); with tubercles (1); smooth (2).
14 Telson prelateral lobe: shorter than marginal carinae (0); longer than marginal carina (1); length subequal with prelateral lobe (2).
15 PLP1 endopod hook process: apex sharp (0); apex blunt (1).
16 PLP1 endopod hook process: apex not exceeding distal endite (0); apex exceeding distal endite (1).
17 Uropodal protopod: broad (0); slender (1).

Appendix 2. Input data matrix of 6 taxa and 17 characters.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Neoanchisquilla australiensis	1	1	1	1	1	0	1	1	0	0	1	0	2	1	0	0	1
Neoanchisquilla semblatae	1	0	0	1	1	1	0	2	0	0	1	0	2	2	1	1	1
Neoanchisquilla tuberculata	1	1	1	1	1	1	1	1	0	1	0	0	1	1	0	0	1
Anchisquilla fasciata	0	0	0	0	1	0	0	0	1	0	0	1	0	0	0	0	1
Levisquilla jurichi	0	0	0	1	0	0	0	0	0	0	0	0	2	0	0	0	0
Levisquilla minor	0	0	0	1	0	0	0	0	0	0	1	0	2	0	0	0	0