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## Two species of benthopelagic calanoid copepods of the genus *Neoscolecithrix* Canu, 1896 s.s. from New Zealand and the segregation of *Cenognatha* n. gen.

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**Abstract** Two species of benthopelagic calanoid Copepoda, *Neoscolecithrix* cf. *magna* (Grice, 1972) and *N. ornata* n. sp., are described from the upper slope off North Cape, New Zealand. *Neoscolecithrix ornata* is distinguished from other species of *Neoscolecithrix* Canu, 1896 s.s. that have a female leg 5 terminal segment with 4 spines (2 terminal and 1 on each border) principally by the transverse row of long, fine spines on the female genital double somite; and by the more squat terminal segment of leg 5 (length/width ratio about 3.7). This is the second time *Neoscolecithrix* has been recorded from New Zealand. A new genus, *Cenognatha* n. gen., is distinguished from *Neoscolecithrix* principally because: rostrum short (bearing 2 filaments); mandibular gnathobase masticatory margin with slender dorsal spinulose seta; maxilla endite 1 with 5 well-developed setae, endite 3 without brush-like sensory seta, endopod usually with 3 long worm-like sensory setae and 5 brush-like setae; posterodistal border of basis of legs 1–3 without spines; distal segment of female leg 5 and its basis subequal in length; male leg 5 of similar lengths on both sides (styliform on right), endopod present at least on 1 side, 1-segmented and spine-like on right.

**Keywords** Copepoda; Calanoida; benthopelagic; new species; new genus; *Neoscolecithrix*; *Cenognatha*; Tharybidae

## INTRODUCTION

Recent collections of benthopelagic calanoid copepods (Bradford-Grieve 2001) are adding to our knowledge of these crustaceans from off the New Zealand slope. To date, the slope benthopelagic copepod fauna of New Zealand is known from Bradford (1969) and Bradford-Grieve (2001) and shallow water species were reported from Wellington Harbour (Bradford-Grieve 1999). The currently examined samples were taken from the upper slope of the south-eastern coast of North Island using a plankton net with a 250 µm mesh suspended from the warps to the trawl boards on a 28 m vessel *Kaharoa* (see Bradford-Grieve 2001). Among the calanoid copepods taken in these samples were two species of *Neoscolecithrix* Canu, 1896.

Simultaneously Alvarez (1985) and Hulsemann (1985) reviewed the species in *Neoscolecithrix* and noted that they fall into two groups. The genus *Neoscolecithrix* contains the following species: Group I: *N. caetanoi* Alvarez, 1985; *N. koehleri* Canu, 1896 (= *Oothrix bidentata* Farran, 1905); *N. magna* (Grice, 1972); and *Neoscolecithrix* sp. Bradford, 1973. Group II: *N. antarctica* Hulsemann, 1985; *N. farrani* Smirnov, 1935 (= *Oothrix borealis* Wiborg, 1949); and *N. watersae* (Grice, 1972). It is not possible to assign *Neoscolecithrix* sp. of Chahsavar-Archad & Razouls (1982) to a group as it is not described and only a female leg 5 (possibly CV) is illustrated.

Group I species are large (usually >3 mm); rostrum wide and long with two points usually with filaments; dorsal masticatory margin of mandibular gnathobase with very wide dorsal spinulose seta; endopod of maxilla with 4–6 long worm-like sensory setae; posterodistal border of basis of legs 1–3 and often coxa of legs 2 and 3 with posterior surface spine; distal segment of female leg 5 at least twice as long as basis; male leg 5 asymmetrical with one of them very short, if endopod present it is rudimentary and fused to basis. Group II species are smaller (c. 2 mm); rostrum short with two filaments; dorsal masticatory margin of mandibular gnathobase

with slender spinulose seta; endopod of maxilla with 3 long worm-like sensory setae; posterodistal border of basis of legs 1–3 without spines; distal segment of female leg 5 and its basis subequal in length; male leg 5 of similar lengths on both sides, styliform on right, endopod present, spine-like, at least on one side (right).

The present specimens include an adult female of the juvenile *Neoscolecithrix* sp. reported by Bradford (1973) that is similar to *N. magna*, and an undescribed *Neoscolecithrix* both in Group I. Group II species are here placed in a new genus.

## METHODS

Calanoid copepods were collected in a non-closing plankton net with 250 µm mesh net that was attached to the warps of the trawl boards of R.V. *Kaharoa* when it was fishing on the upper slope on the south-east coast of North Island New Zealand (Table 1). The sediment and organisms taken by the net were preserved in 2% formaldehyde. Sorted copepods were observed whole in lactic acid, and dissected parts mounted, stained with chlorazol black, in gum-chloral (Pantin 1964). Mounted specimens were observed using phase contrast and Nomarski differential interference contrast. The system of morphological nomenclature used is based mainly on that of Huys & Boxshall (1991) but the major body segments are referred to as “somites” and the somites bearing swimming legs are “pedigerous somites”.

## *Neoscolecithrix* cf. *magna* (Grice, 1972)

?*Oothrix magna* Grice, 1972: 228, fig. 70–82.

### Materials examined

One adult female from KAH0005/05, length 4.2 mm.

### Female

Cephalosome fused to pedigerous somite 1; pedigerous somites 4 and 5 separated (Fig. 1A,B). In lateral view posterolateral corners of prosome

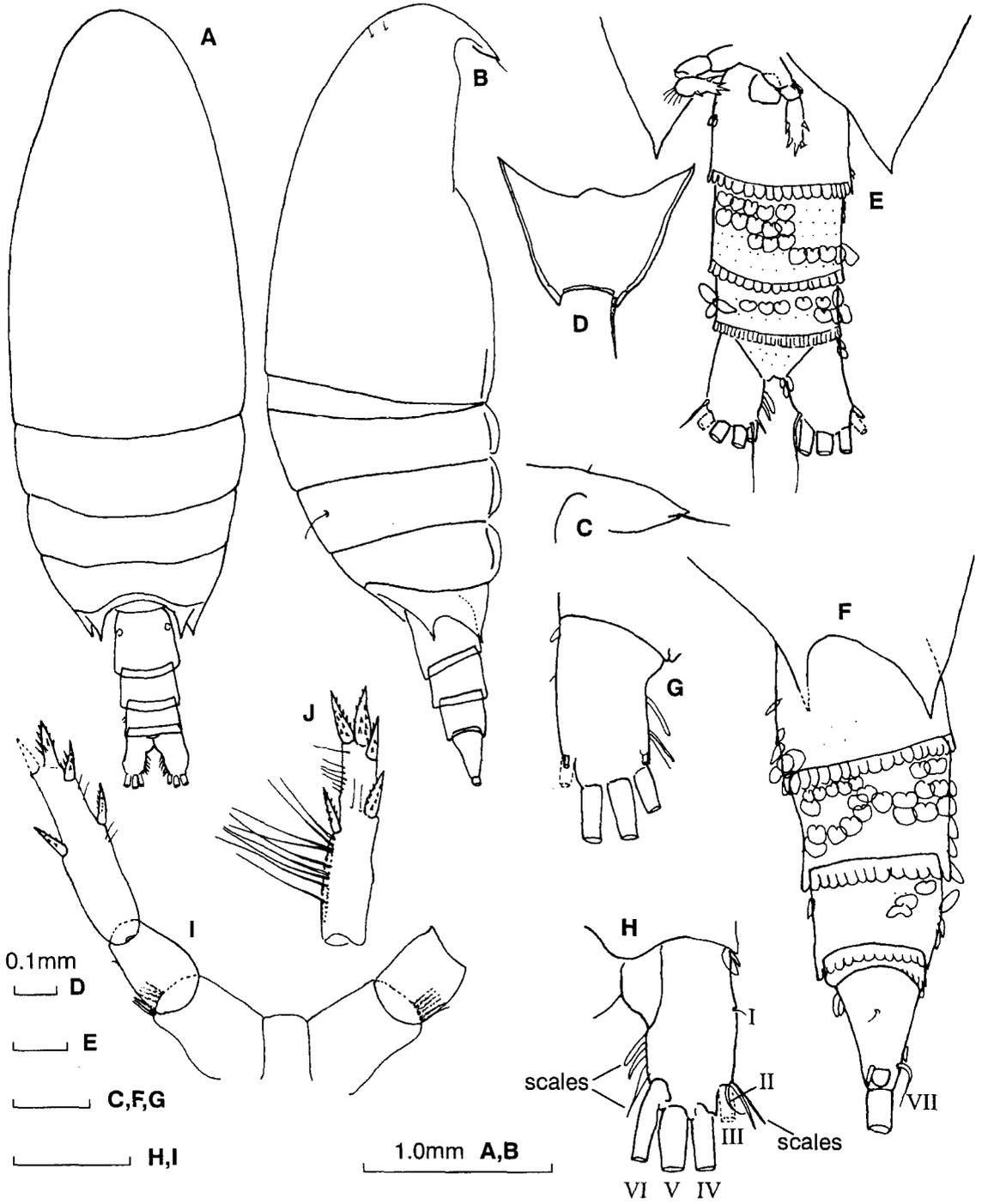
extend posteriorly into 2 spines (1 dorsal and 1 ventral) with U-shaped notch between them; ventral spine does not extend to posterior border of genital double somite. Rostrum in form of strong ventroposteriorly directed plate bearing two small spines terminally into which inserted, subterminally on posterior surface, small filament (Fig. 1C,D). Urosome composed of genital double somite followed by 3 articulated somites, genital double somite and following 2 somites apparently covered in large, rounded scales (presence of these in many cases inferred from small attachment location as many scales had apparently dropped off) (Fig. 1E,F); genital double somite symmetrical, not swollen in dorsal view, ventral genital operculum small with straight, parallel borders anteriorly and posteriorly, placed anteriorly on somite; pair of small seminal receptacles located anterolaterally (Fig. 1A); posterior border fringed with rounded scales. Urosomite 3 (abdominal segment 2) and urosomite 4 (abdominal segment 3) posterior borders fringed with rounded scales; anal somite small, appears to be fused with caudal rami dorsally. Caudal rami symmetrical, longer than wide, with vestigial seta in position I, seta II (Fig. 1G,H) located dorsally near base of seta III, four strong terminal plumose setae in positions III–VI, seta VII small, situated on ventral surface directed posteriorly.

**Antennule** (Fig. 2A) 24-segmented, extending to posterior border of pedigerous somite 3; armature elements referring to ancestral segments as follows (setae of annulate type and only few heavily plumose: 2 on segment I, 1 on XXV, 1 on XXVI, 1 on XXVII–XXVIII): I–3, II–IV–6? + aesthetasc, V–2 + aesthetasc, VI–2, VII–2 + aesthetasc, VIII–2?, IX–2 + aesthetasc, X–XI–4? + aesthetasc, XII–1?, XIII–1?, XIV–2? + aesthetasc, XV–1?, XVI–2? + aesthetasc, XVII–2, XVIII–2, XIX–2, XX–1 + aesthetasc, XXI–1 + aesthetasc, XXII–1, XXIII–1, XXIV–1 + 1, XXV–1 + 1, XXVI–1 + 1, XXVII–XXVIII–4. “?” indicates that total number of setae also includes those inferred from presence of visible attachment sites although setae themselves missing.

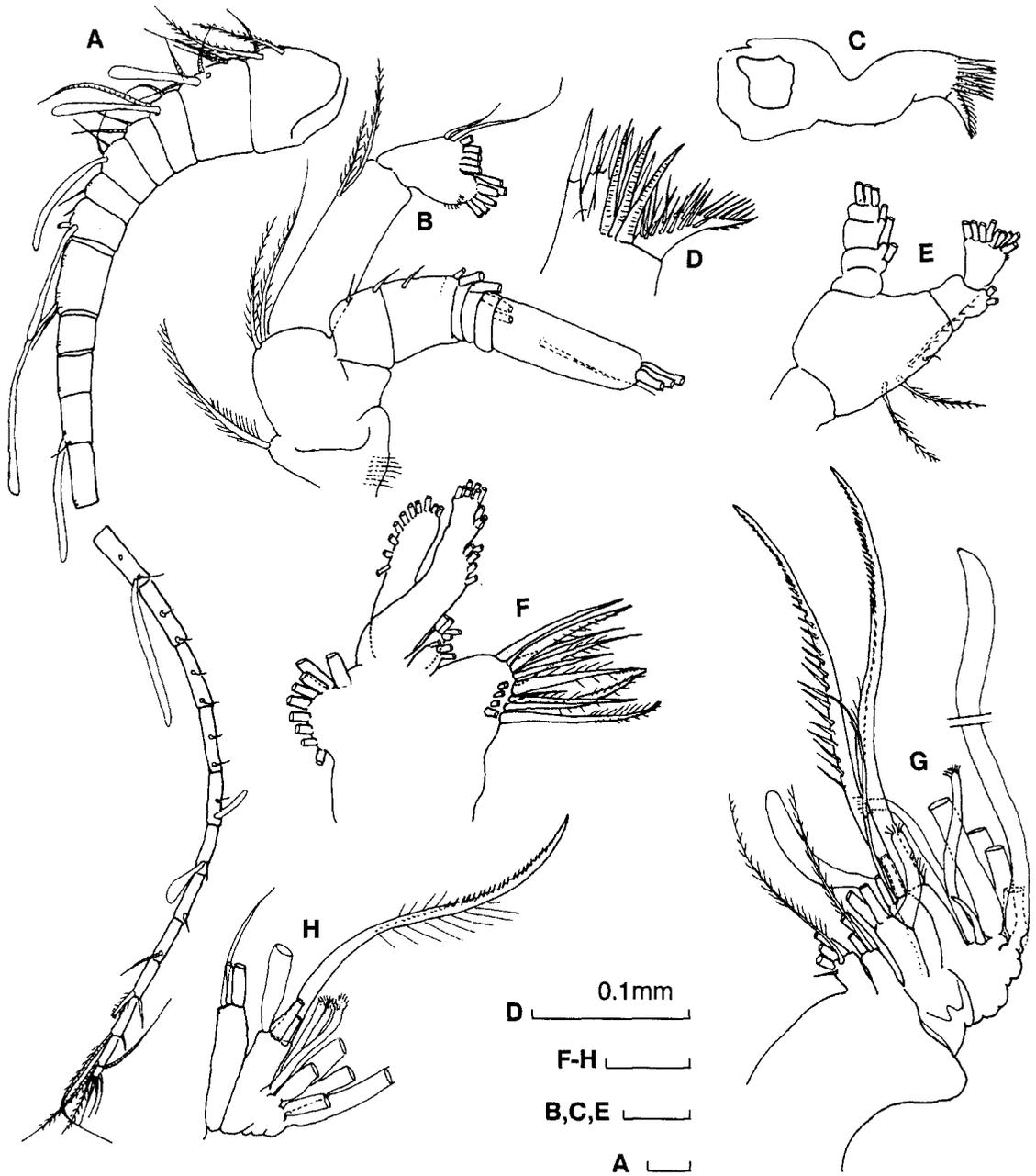
**Antenna** (Fig. 2B) Endopod just greater than half length of exopod; coxa and basis separate, coxa with

**Table 1** Sampling stations.

Station number	Date	Depth (m)	Latitude	Longitude
KAH0001/79	23 Feb 2000	306	41°04.10'S	176°22.05'E
KAH0005/05	13 Apr 2000	452	41°04.67'S	176°23.48'E



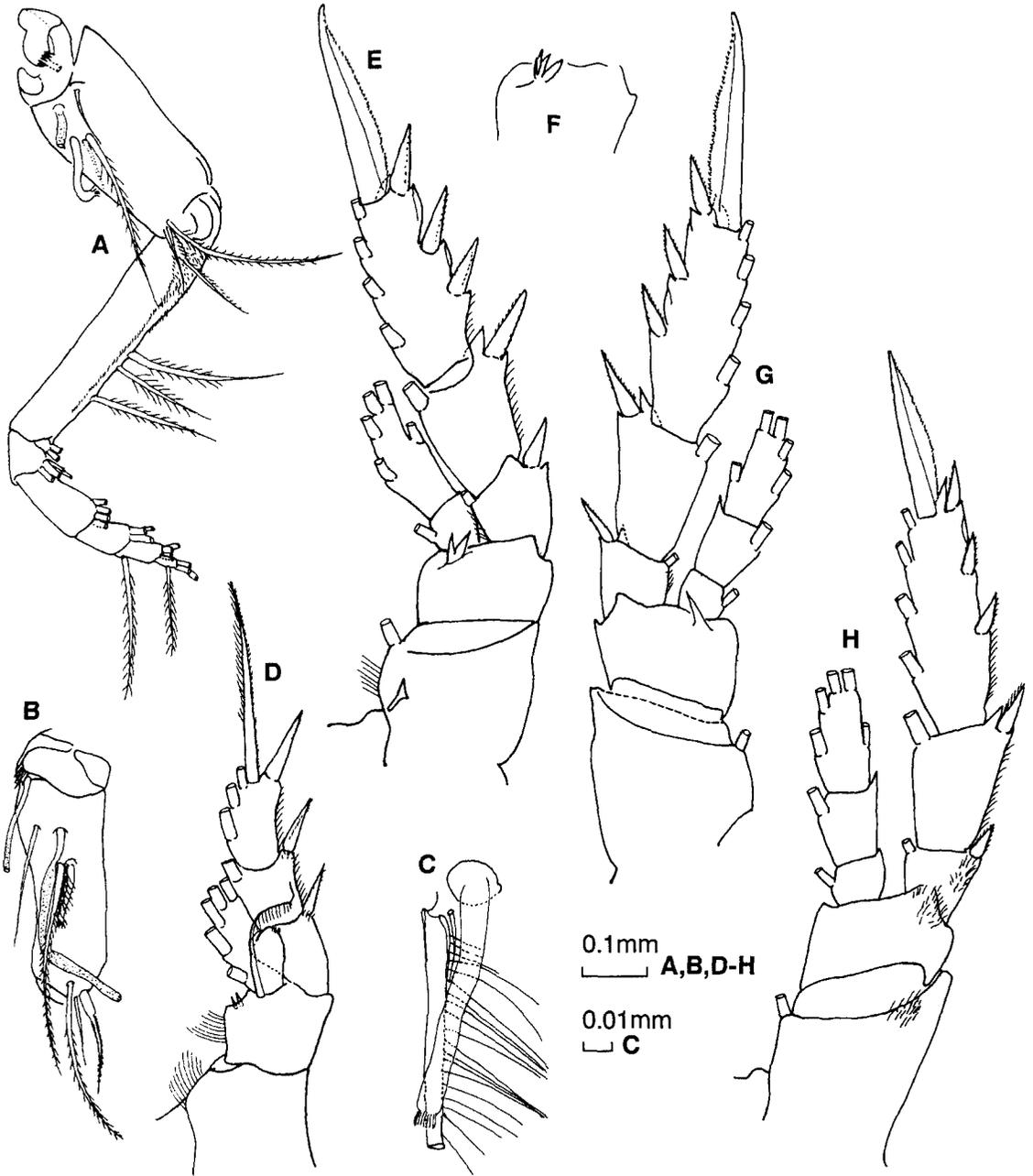
**Fig. 1** *Neoscolecithrix* cf. *magna* female: **A**, dorsal view; **B**, lateral view; **C**, rostrum in lateral view, lateral view; **D**, rostrum, posterior view; **E**, urosome, ventral view; **F**, urosome, right side; **G**, caudal ramus, ventral view; **H**, caudal ramus, dorsal view; **I**, leg 5, anterior view; **J**, leg 5, right terminal segment, posterior view.



**Fig. 2** *Neoscolecithrix* cf. *magna* female: **A**, antennule; **B**, antenna; **C**, mandibular gnathobase; **D**, masticatory part of mandibular gnathobase; **E**, mandibular palp; **F**, maxillule; **G**, left maxilla; **H**, terminal part of right maxilla.

1 seta and patch of hair-like setae, basis with 2 setae; endopod segment 1 with 2 setae, segment 2 with 6+7 setae and outer border lined with small spinules; exopod 6-segmented, segment 1 (composed of ancestral segments I and II) with 2 setae, segment 2

(composed of ancestral segments III–V) with 3 setae (the proximal boundary of ancestral segment V evident), segments 3–5 with 1 seta each, segment 6 (composed of ancestral segments IX and X) with 1 proximally placed seta and 3 terminal setae.



**Fig. 3** *Neoscolecithrix* cf. *magna* female: **A**, right maxilliped, coxa flattened; **B**, left praecoxa and coxa of maxilliped; **C**, detail of setation of coxal endite 2; **D**, leg 1, anterior view; **E**, leg 2, posterior view; **F**, leg 2, right basis, posterior view; **G**, leg 3, posterior view; **H**, leg 4, posterior view.

**Mandible** (Fig. 2C–E) Gnathobase masticatory margin with 1 thick dorsal seta bordered by heavy spinules, 3 large spine-like teeth apparently with wrinkly cuticle (there are more delicate spines

behind these), then about 5 more normal ventral teeth; basis with 3 long and 1 very short setae; endopod segment 1 with 2 setae and segment 2 with 9 setae; exopod with 6 setae.

**Maxillule** (Fig. 2F) Praecoaxal arthrite with 4 posterior surface setae as well as 10 marginal spines and setae; coxal endite and basal endites 1 and 2 with 3, 4, 5, setae respectively; basis and endopod segments fused; endopod with 3+7 setae; exopod with 10 setae; basal exite without seta; coxal epipodite with 9 setae.

**Maxilla** (Fig. 2G,H) Praecoaxa with an outer distal protrusion, endite 1 with 4 well-developed setae and one small, spine-like seta, endite 2 with 3 setae, endite 3 with 2 setae and one brush-like seta characteristically directed distally, endite 4 with 3 setae, endite 5 with 3 setae and one worm-like seta; endopod with 5 very long, wide, worm-like sensory setae on both sides and 3 shorter, brush-like sensory setae on right and 2 brush-like and 1 very short (brush-like?) sensory seta on left.

**Maxilliped** (Fig. 3A–C) Praecoaxa plus coxa shorter than basis; praecoaxa and coxa apparently not fused, praecoaxal endite with 1 sensory seta and group of spinules, coxal endites with groups of 1 + worm-like sensory seta; 2 (1 very small) + 1 brush-like sensory seta, and 3 terminal setae (one of these with a bulbous base); basis with elongate patch (widest proximally) of very small, inner edge spinules extending from proximal to just beyond the medial setae; endopod segment 1 incorporated into basis with 2 setae, free endopod segments 2–6 with 4, 4, 3, 3+1, 4 setae respectively.

**Swimming legs** (Fig. 3D–H) Segmentation and disposition of spines and setae as in Clausocalanoidea. Terminal spines of legs 2–4 with outer finely toothed lamella, outer edge exopod spines of legs 1–3 bordered by very small spines, and by hairs on leg 4.

**Leg 1** Basis with 2 inner distal spinules, endopod outer swelling with a row of very fine spinules, outer distal border of exopod segments 1 and 2 with very small spinules.

**Leg 2** Coxa with posterior inner spine (chitinous ridge but no spine on other side), basis with 2 posterodistal spines (4 on other side).

**Leg 3** Coxa without inner spine, basis with 1 posterodistal spine.

**Leg 4** Basis without posterior spines, outer posterior surface of coxa, basis and exopod segment 1 with patches of fine hairs.

**Leg 5** (Fig. 1I,J) Uniramous, slightly asymmetrical because lateroposterior hairs, directed posteriorly, located along the whole outer proximal border of right leg segment 3 only. Coxae separated from

intercoxal sclerite and with outer posterodistal hairs on both sides; basis more or less naked, about same length as coxa; terminal segment extending into a toothed spine (evidence of separation from joint), with 4 articulated toothed spines, 2 each on inner and outer borders (teeth mainly on posterior surface), numerous long lateroposterior hairs, directed posteriorly, located along whole outer proximal border of right leg (some of these are broken off), shorter hairs along distal outer border of right leg, shorter and fewer hairs on inner border of left leg.

### Male

Unknown.

### REMARKS

As recognised by Alvarez (1985), this adult female is similar to *N. magna* (Grice, 1972) in its large size, general form and many details, especially the endopod of the maxilla and the terminal part of the gnathobase. A notable feature of the south-west Pacific specimen is the large scales on the urosome. Grice (1972) notes that in *N. magna* the “urosomal segment and furcae pitted”; these pits may be the location of attachment of scales that have been damaged but we do not know the nature of any decoration. The present specimen appears to differ from the description of *N. magna* in the following points: mandible with 4 setae on basis, one of them very small (*N. magna* is illustrated as having 3 setae); maxillule endopod with total of 10 setae (*N. magna* is illustrated as having 8); basis of leg 1 with 2–3, of leg 2 with 2–4, of leg 3 with 1 posterodistal spine (*N. magna* with 4, 5, 2 spines respectively); and leg 5 has numerous long outer posterior hairs along whole proximal border of right leg terminal segment (*N. magna* has hairs also asymmetrically placed but fewer in number and not inserted parallel to the outer border, nor along whole border). Inner edge of terminal segment without hairs on right side, with very few hairs on left side (*N. magna* with more numerous short hairs on inner borders on both sides). Examination of the female specimen of *N. magna* deposited at the Smithsonian Institution confirmed that *N. magna* also has an additional small seta on the basis of the mandibular palp and that there are 10 setae on the endopod of the maxillule. The leg 5 was not located.

The present specimen is considered to be the adult female of the *Neoscolecithrix* copepodite V described by Bradford (1973). The leg 5 is slightly

asymmetrical, as in the adult female, in that the terminal segment on the right leg alone has long, posteriorly-directed spinules on its posterior surface. I have decided not to give this specimen a new name until the morphology of *N. magna* is better known.

### *Neoscolecithrix ornata* n. sp.

#### Materials examined

Four adult females from KAH0001/79, length 2.85, 2.90, 2.65, 2.80 mm and one juvenile length 2.15 mm. One is designated as the holotype (2.80 mm) and is deposited in the NIWA collection in Wellington (H745). One is dissected and is registered as paratype (P1216/1)—the description below is made from this specimen. The remaining two adult females and one juvenile are registered as a paratype lot (P1216/2).

#### Type locality

NIWA Station KAH0001/79 near the sea floor in 306 m of water off the south-east coast of North Island, New Zealand (41°04.10'S 176°22.05'E) collected on 23 February 2000.

#### Female

Cephalosome and pedigerous somite 1 and pedigerous somites 4 and 5 fused (Fig. 4A,B). In lateral view posterolateral corners of prosome extend posteriorly into two spines (one dorsal and one ventral) with U-shaped notch between them; ventral spine extends slightly beyond posterior border of genital double somite. Rostrum in form of relatively strong ventroposteriorly directed plate bearing two spines terminally into which filament inserted subterminally on posterior surface (Fig. 4F,G). Urosome composed of genital double somite followed by 3 articulated somites although anal somite extremely small and covered almost entirely by urosomite 4 (abdominal segment 3) (Fig. 4C,D); genital double somite symmetrical, not swollen in dorsal view, with dorsal transverse row of soft spinules just posterior to mid length; patch of dorsolateral spinules/scales at about mid length on both sides, ventral surface may also bear spinules/scales posterior and lateral to the operculum (but these could not be seen on all specimens examined); ventral genital operculum small with curved borders anteriorly and posteriorly, placed anteriorly on somite; pair of small seminal receptacles located anterolaterally (Fig. 4E); posterior border fringed with pointed soft spines. Urosomite 3 (abdominal

segment 2) and urosomite 4 (abdominal segment 3) posterior borders fringed with pointed soft spines; anal somite very small, appears to be fused with caudal rami dorsally. Caudal rami symmetrical, longer than wide, with vestigial seta in position I, seta II (Fig. 4C,D) located dorsally near base of seta III, four strong terminal plumose setae in positions III–VI, seta VII small, situated on ventral surface directed posteriorly.

**Antennule** (Fig. 5A) 24-segmented, extending to posterior border of pedigerous somite 3; armature elements referring to ancestral segments as follows (setae are of annulate type and only few heavily plumose: 1? on segment I, 1 on XXV, 1 on XXVI, 1 on XXVII–XXVIII): I–3?, II–IV–6 + aesthetasc, V–2 + aesthetasc, VI–2, VII–2 + aesthetasc, VIII–2, IX–2 + aesthetasc, X–XI–4 + aesthetasc, XII–1?, XIII–1?, XIV–1? + aesthetasc, XV–1?, XVI–2 + aesthetasc, XVII–2, XVIII–2, XIX–2, XX–2, XXI–1 + aesthetasc, XXII–1, XXIII–1, XXIV–1 + 1, XXV–1 + 1, XXVI–1 + 1, XXVII–XXVIII–4 + aesthetasc. “?” indicates that total number of setae also includes those inferred from presence of visible attachment site although setae themselves missing.

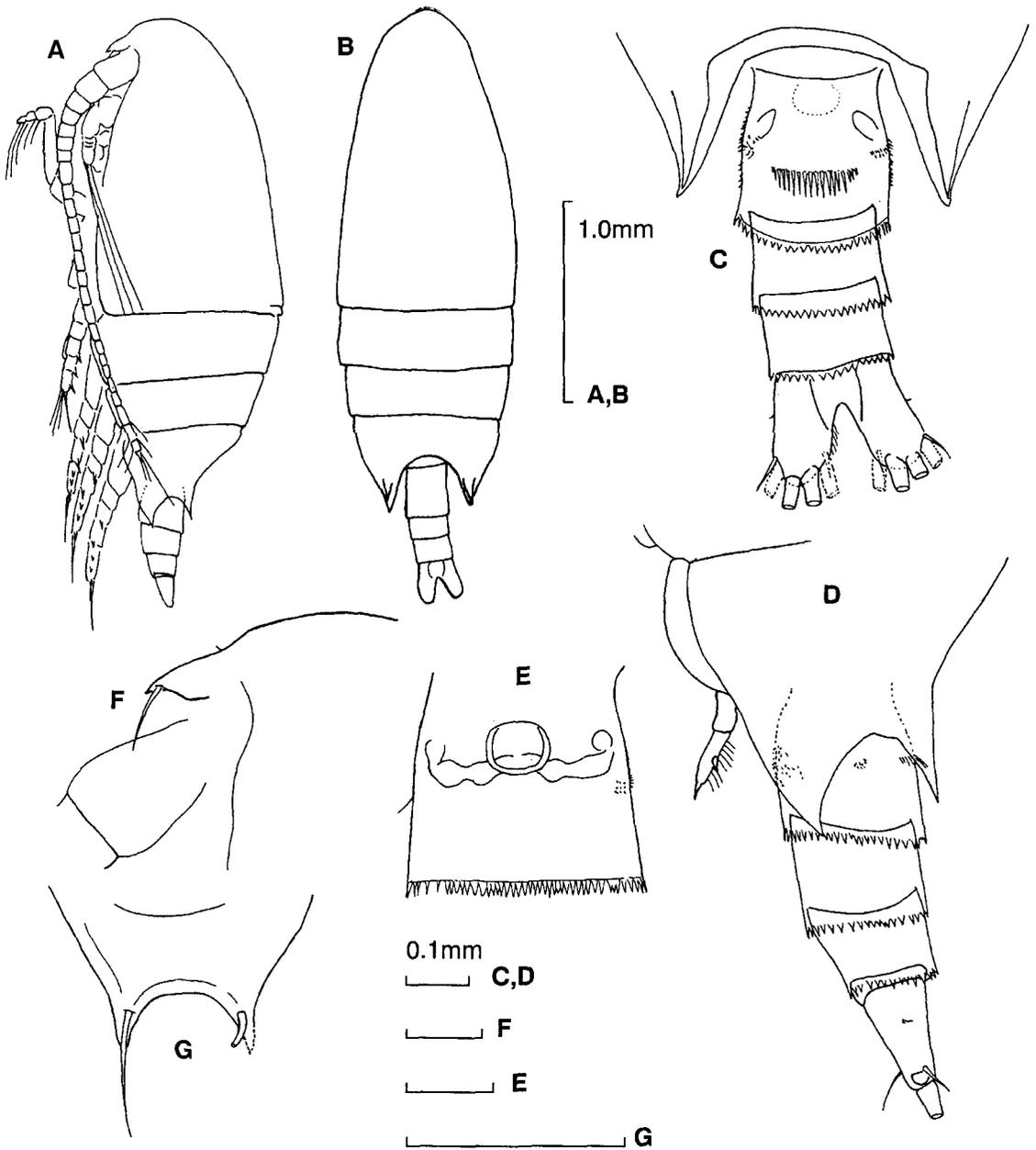
**Antenna** (Fig. 5B) Similar to that of *Neoscolecithrix* cf. *magna*; endopod segment 2 with 6+8 setae and outer border lined with small spinules.

**Mandible** (Fig. 5C) Gnathobase masticatory margin with 1 thick dorsal seta bordered by heavy spinules, 3 large spine-like teeth apparently with wrinkly cuticle (there are more delicate spines behind these), and ventrally about 5 more normal teeth; basis with 3 long setae; endopod segment 1 with 2 setae and segment 2 with 9 setae; exopod with 6 setae.

**Maxillule** (Fig. 5D) Similar to that of *Neoscolecithrix* cf. *magna*; basis and endopod segments fused; praecoxal arthrite with 10 terminal spines (2 broken off in the figured specimen) and 4 posterior surface setae; endopod with 3+6 setae; exopod with 10 setae and long anterior surface hairs.

**Maxilla** (Fig. 5E) Similar to that of *Neoscolecithrix* cf. *magna*.

**Maxilliped** (Fig. 5F) Praecoxa and coxa apparently not fused, praecoxal endite with 1 seta and group of spinules at its base, coxa with groups of 1+1 worm-like sensory seta; 2+1 brush-like sensory seta, and 3 distal setae one of which has bulbous base; basis with elongate patch of very small, inner edge spinules extending from proximal part of segment to just short of medial setae; free



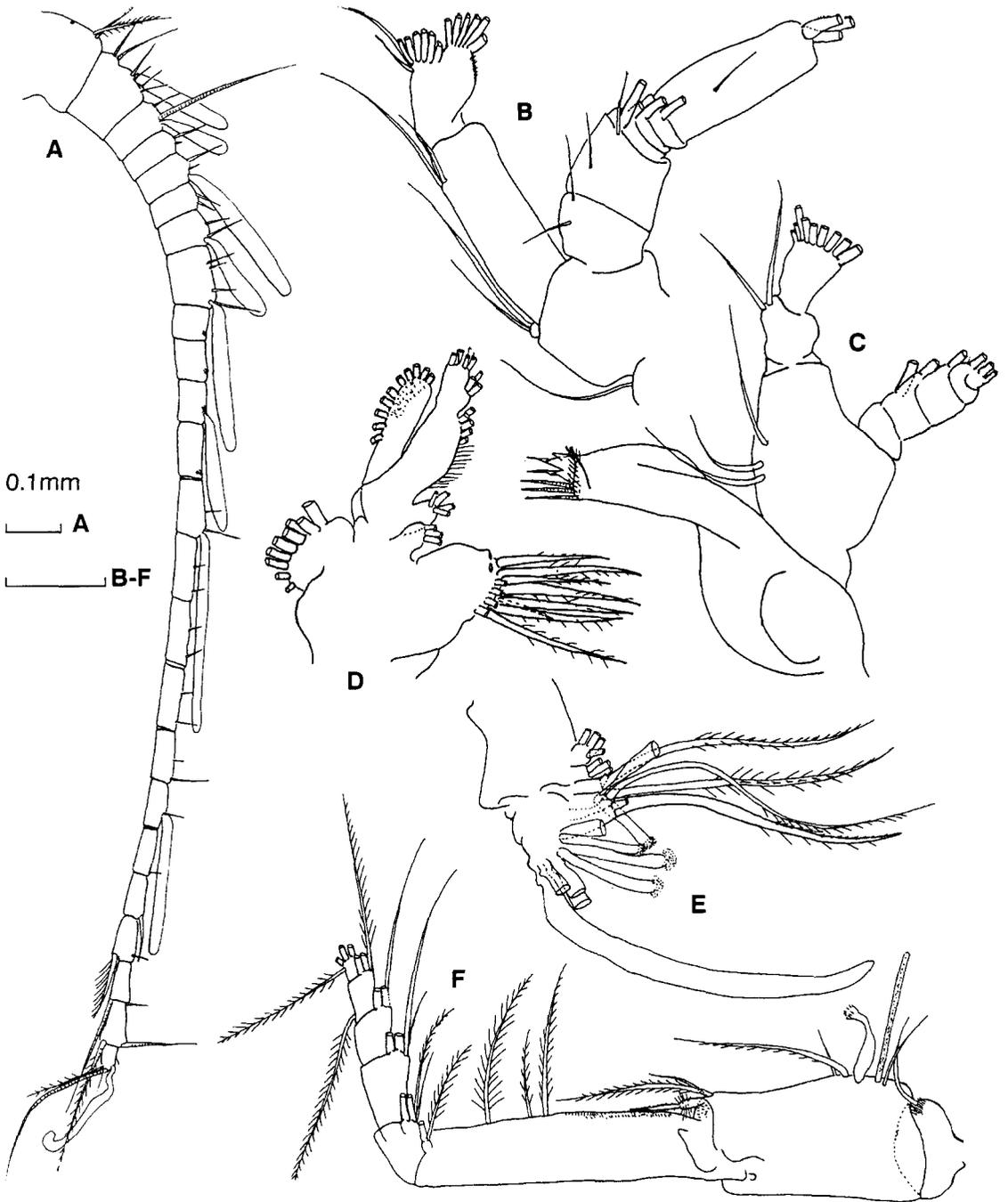
**Fig. 4** *Neoscolecithrix ornata* n. sp. female: **A**, lateral view; **B**, dorsal view; **C**, urosome, dorsal view; **D**, urosome, lateral view; **E**, genital double somite, ventral view; **F**, rostrum, lateral view; **G**, rostrum, posterior view.

endopod segments 2–6 with 4, 4, 3, 3+1, 4 setae respectively.

**Swimming legs** (Fig. 6A–D) Segmentation and disposition of spines and setae as in Clausocalanoida. Terminal spines of legs 2–4 with outer finely

toothed lamella, outer edge exopod spines of leg 1 naked, of legs 2 and 3 bordered by very small spinules, and by hairs on exopod segment 1 of leg 4. Surfaces of rami generally naked.

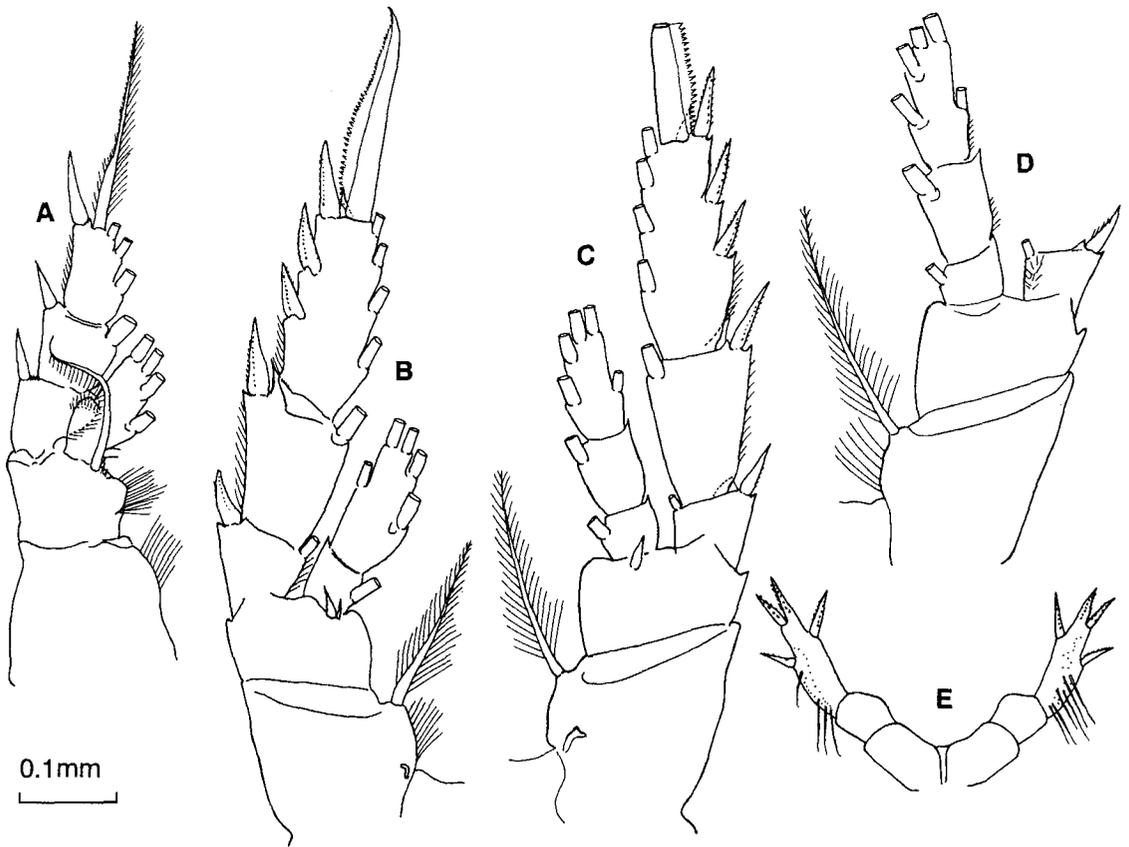
**Leg 1** Basis with 2 small subequal inner distal



**Fig. 5** *Neoscolecithrix ornata* n. sp. female: A, antennule; B, antenna; C, mandible; D, maxillule; E, maxilla; F, maxilliped.

spinules, endopod outer swelling with row of very fine long spinules, outer distal border of exopod segment 1 with very small spinules.

**Leg 2** Coxa with inner posterior surface chitinous ridge (no spine), basis with 2 posterodistal spines at base of endopod.



**Fig. 6** *Neoscolecithrix ornata* n. sp. female: **A**, leg 1, anterior view; **B**, leg 2, posterior view; **C**, leg 3, posterior view; **D**, leg 4, posterior view; **E**, leg 5, posterior view.

**Leg 3** Coxa with inner posterior surface chitinous ridge with blunt spine, basis with 1 posterodistal spine at base of endopod.

**Leg 4** Basis without posterior spine, outer posterior surface of basis naked and inner posterior surface of exopod segment 1 with hairs (exopod segments 2 and 3 missing).

**Leg 5** (Fig. 6E) Uniramous, more or less symmetrical, coxae separated from narrow intercoxal sclerite with naked outer posterodistal border; basis naked, slightly shorter than coxa. Terminal segment extending into non-articulated toothed spine, with 3 articulated toothed spines, 1 on inner and outer borders (teeth mainly on posterior surface), and 1 terminal. Lateroposterior surface with numerous long hairs, directed posteriorly, located along whole outer proximal surface on both sides (many of these appear to be broken off but their

position of attachment is evident). Terminal segment about 3.7 times as long as wide at its widest part (length measured from tip of spine-like extension to inner proximal corner of segment).

#### Male

Unknown.

#### Remarks

Only two other species of *Neoscolecithrix*, both in Group I, (*N. caetanoi* and *N. koehleri*) are known to have a female leg 5 terminal segment with 4 spines: 2 terminal and 1 on each border. The present species may be distinguished from these two species principally by the surface features on the genital double somite (the other two species apparently have none), and by the more squat terminal segment of leg 5 (*N. caetanoi* has a length/width ratio >4.4,

*N. koehleri* 5.8, whereas *N. ornata* has this ratio about 3.7). In addition *N. ornata* is smaller (2.65–2.90 mm) than *N. caetanoi* (3.2–3.9 mm) and *N. koehleri* (3.50–4.0 mm).

### Etymology

The specific name *ornata* is from the Latin word meaning “decorate” referring to the long fine spines on the female genital double somite.

## DISCUSSION

The family relationship of the genus *Neoscolecithrix* s.l. is problematical (Schulz & Beckmann 1995; Ohtsuka et al. 1998). These species have been variously placed in the Phaennidae (e.g., Bradford-Grieve et al. 1999) or Tharybidae (Bradford et al. 1983) and Vyshkvartzeva (2000) considers that species that are in Group II fit well within the Scolecitrichidae on the basis of the number of 3 worm-like and 5 brush-like sensory setae on the maxilla endopod. Nevertheless Group II species differ from the majority of Scolecitrichidae in important respects. In most Scolecitrichidae the posterolateral corners of the prosome are rounded or single-pointed, the second endite of the maxilliped coxa usually has only 1 seta (Ferrari & Markhaseva 2000), whereas in *Neoscolecithrix* s.l. this endite has 3 setae and in this respect is similar to some species currently placed in the Scolecitrichidae, for example, *Puchinia obtusa* Vyshkvartzeva, 1989, *Xantharus renatehaasae* Schulz, 1998, *Landrumius* Park, 1983, *Grievella shanki* Ferrari & Markhaseva, 2000, as well as the Diaixidae and Tharybidae. The male mouthparts of *Neoscolecithrix* s.l. are similar to those of the female in both Groups I and II (Fosshagen 1972; Alvarez 1985), a condition found in the Tharybidae, but unlike most Scolecitrichidae, in which male mouthparts are usually, but not always, reduced (Bradford-Grieve et al. 1999). Similar differences between *Neoscolecithrix* s.l. and the Phaennidae are noted. Phaennid maxillae have 1 worm-like and 7 brush-like sensory setae on the endopod and endites 3 and 5 may have 1 seta each modified into a worm-like sensory seta; the maxilliped coxal endite 2 usually has 2 setae, one of which may be brush-like (Ferrari & Markhaseva 2000); the male mouthparts are reduced relative to those of the female (Bradford-Grieve et al. 1999).

Ferrari & Markhaseva (2000), assuming that 3 setae on coxal endite 2 is an ancestral state, believe that this character contains no phylogenetic information

concerning relationships with related calanoids. They recommend careful re-examination of the setation of the antenna, maxillule, maxilla and maxilliped to identify the derived states for the Scolecitrichidae, Phaennidae, Tharybidae, Diaixidae, and Parkidae and their included genera.

### Status of Group II

I concur with the reviews that divide *Neoscolecithrix* s.l. into two groups (Alvarez 1985; Hulsemann 1985): Group I (*N. caetanoi*, *N. koehleri*, *N. magna*, and *N. ornata* n. sp.) and Group II (*N. farrani*, *N. watersae*, and *N. antarctica*). These two groups can be defined on the basis of derived characters, compared with their presumed near relatives in the Tharybidae. Group I retains the name *Neoscolecithrix* as it contains the type species of *Neoscolecithrix*, and Group II is here given separate generic status.

## *Neoscolecithrix* Canu, 1896

### Type species

*Neoscolecithrix koehleri* Canu, 1896.

### Diagnosis

Large copepods usually >3 mm long; posterior prosome, in lateral view, extends into 2 posteriorly-directed spines; rostrum wide and long with 2 points each with filament; masticatory margin of the mandibular gnathobase with very wide dorsal spinulose seta; maxilla endite 1 usually with 4 well-developed setae (sometimes an additional small spine present), endite 3 with 1 seta modified as a large brush-like sensory seta directed distally, endite 5 with 1 strong spine-like seta, 2 smaller setae and 1 worm-like sensory seta, and endopod with 5 long worm-like and 3 brush-like sensory setae; maxilliped coxal endite 3 with 1 of 3 setae with bulbous base; posterodistal border of basis of legs 1–3 and often coxa of legs 2 and 3 with posterior surface spine(s); distal segment of female leg 5 at least twice as long as basis; male leg 5 asymmetrical, very short on one side, if endopod present it is rudimentary and fused to basis. Male mouthparts fully developed.

### Additional description

Antenna exopod with full complement of ancestral setae as in *Clausocalanus* Giesbrecht, 1888: 2 on segment 1, 3 on segment 2, 1 seta each on segments 3–5, segment 6 with 1 proximal seta and 3 terminal seta; maxilliped praecoxa and coxa separate, coxal

endite 2 with 2 setae and 1 brush-like sensory seta; male mouthparts similar to those of female.

## *Cenognatha* n. gen.

### Type species

*Neoscolecithrix antarctica* Hulsemann, 1985.

### Diagnosis

Medium-sized copepods about 2 mm long; posterior prosome in lateral view extends into 2 posteriorly-directed spines; rostrum short and rounded with 2 filaments; maxilla endite 1 with 5 well-developed setae, endite 5 with 1 strong spine-like setae and 3 seta (2 of these possibly worm-like sensory setae in *C. antarctica*), endopod usually with 3 long worm-like setae and 5 brush-like sensory setae; maxilliped coxal endite 3 with 1 of 3 setae with bulbous base; distal segment of female leg 5 and its basis subequal in length; male leg 5 of similar lengths on both sides, styliform on right, endopod present on at least one side, 1-segmented and spine-like on right.

### Additional description

Antenna exopod with full complement of ancestral setae as in *Clausocalanus*: 2 on segment 1, 3 on segment 2, 1 seta each on segments 3–5, segment 6 with 1 proximal seta and 3 terminal seta; masticatory margin of the mandibular gnathobase with dorsal spinulose seta unmodified; endite 3 of maxilla without modified seta; posterodistal border of basis of legs 1–3 without spines; maxilliped praecoxa and coxa fused (based on *C. farrani*—Dr N. Vyshkvartzeva pers. comm.), coxal endite 2 with 2 setae and 1 brush-like sensory seta. Male mouthparts fully developed.

### Etymology

From the Greek “koinos” meaning common and “gnathos” meaning jaw; to denote the ordinary mandibular gnathobase with a small dorsal spinulose seta on the masticatory margin compared with the extraordinary development of this seta on the gnathobase of *Neoscolecithrix*.

### Remarks

Comparisons of the descriptions of New Zealand species of *Neoscolecithrix* and other species, suggest that the state of the maxilla and maxilliped needs to be re-examined in several species of *Neoscolecithrix* and *Cenognatha*. For example, the maxilla endite 3 brush-like sensory seta, characteristically directed

distally, and endite 5 1 worm-like sensory seta is probably present in species of *Neoscolecithrix*. Nevertheless this feature has not been explicitly described and illustrated for *N. caetanoi* (1 seta on male and female endite 3 shown as being directed more distally but not described as sensory), in *N. magna* this seta is illustrated as originating from endite 2 and the sixth worm-like sensory setae is described as originating from the endopod (Grice 1972), whereas the disposition of sensory setae on the maxilla of *N. koehleri* was not described at all (Canu 1896). Similarly some characteristics of the maxilla in *Cenognatha* possibly occur consistently but are not clearly described by all authors. For example Hulsemann (1985) describes the maxilla of *C. antarctica* without a brush-like sensory seta on endite 3 and with 2 worm-like sensory seta on endite 5. Likewise Fosshagen (1972) and Grice (1972) figure the maxillae of *C. farrani* and *C. watersae* respectively without a brush-like sensory seta on endite 3 but do not mention explicitly the state of the seta on endite 5. The maxilliped coxal endite 3, apparently in both *Neoscolecithrix* and *Cenognatha*, have one of the 3 setae with a bulbous base (the wide basal part is covered in long setae, whereas the narrower terminal part is densely lined with stiff spinules). This characteristic is described or illustrated for only the present two species, *N. magna*, and *C. caetanoi*.

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