

Revision of *Paralamyctes* (Chilopoda: Lithobiomorpha: Henicopidae), with Six New Species from Eastern Australia

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ABSTRACT. *Paralamyctes* Pocock, 1901 has a classic Gondwanan distribution, with species previously known from New Zealand, southern Africa, Madagascar and Chile. The genus as hitherto conceived is paraphyletic, with *Triporobius* Silvestri, 1917 (India) and *Haasiella* Pocock, 1901 (New Zealand, Tasmania) nesting within the group. Species from Argentina and New Caledonia originally assigned to *Paralamyctes* belong to *Analamyctes* Chamberlin, 1955. Revision of *Paralamyctes* based upon monophyletic subgroups recognizes four subgenera: *P. (Paralamyctes)*, *P. (Haasiella)*, *P. (Nothofagobius)* n.subgen. and *P. (Thingathinga)* n.subgen. The eastern Australian occurrence of *Paralamyctes* is demonstrated by six new species. *Paralamyctes (Thingathinga) grayi* n.sp. is distributed from the Blue Mountains to the Budawang Range, New South Wales; *P. (Thingathinga)* from the Barrington Tops may be specifically distinct. *Paralamyctes (T.) grayi* and the allied *P. (T.) hornerae* n.sp. from northern New South Wales have affinities to the New Zealand *P. (T.) validus*. *Paralamyctes (Nothofagobius) cassisi* n.sp. occurs in northern New South Wales, while the closely related *P. (N.) mesibovi* n.sp. inhabits northern Tasmania. Australian *P. (Nothofagobius)* is sister to the Patagonian *P. (N.) chilensis* (Gervais), which is illustrated based upon new collections. *Paralamyctes (Paralamyctes) monteithi* n.sp. is widespread in Queensland; *P. (P.) neverneverensis* n.sp. is endemic to the Dorrigo region, northern New South Wales. In addition to these two Australian species, the nominate subgenus occurs in New Zealand, southern Africa, Madagascar and India, the latter record based on the junior subjective synonym *Triporobius*. All new species are included in a key to Australian Lithobiomorpha.

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Most native Australian species of lithobiomorph centipedes belong to the family Henicopidae. Published systematic work on eastern Australian henicopids was undertaken long ago (Newport, 1845; Pocock, 1901; Chamberlin, 1920) based on scant material. Like most of the Australian chilopod fauna except for the Scolopendridae, the few henicopid species formalised in the literature are in need of

modern revision, and most of the fauna is undescribed. This study initiates a systematic survey of Australian Henicopidae by documenting the genus *Paralamyctes*.

Pocock (1901) erected *Paralamyctes* for a new species, *P. spenceri*, from Durban, South Africa. Additional species were subsequently assigned from Argentina (*P. andinus* Silvestri, 1903), South Africa (*P. asperulus* and *P. weberi*

Silvestri, 1903; *P. laevigatus* and *P. tabulinus* Attems, 1928), New Zealand [*P. validus* Archey, 1917 and its junior synonym *P. dubius* Archey, 1917 (Archey, 1921, 1937); *P. harrisi* Archey, 1922], New Caledonia (*P. humilis* Ribaut, 1923) and Madagascar (*P. tridens* and *P. quadridens* Lawrence, 1960). The Chilean species *Henicops chilensis* Gervais in Walckenaer & Gervais, 1847, was recognized as *Paralamyctes* by Silvestri (1905), a reassignment followed by subsequent workers. Attems (1928) and Archey (1937) revised previously named taxa from South Africa and New Zealand, respectively, and provided keys to species of the genus. Further work on the southern African fauna by Lawrence (1955a,b) recognized *P. weberi* as a junior synonym of the widespread *P. spenceri*, which occurs in the Cape region, Swaziland-Eastern Lowveld and throughout KwaZulu-Natal, as well as in Madagascar

(Lawrence, 1960). Chamberlin (1955) removed five species from *Paralamyctes* (*P. andinus*, *P. asperulus*, *P. humilis*, *P. laevigatus* and *P. tabulinus*), assigning them to a new genus *Analamyctes*.

Though species from most fragments of Gondwana have been recognized as *Paralamyctes*, none have as yet been reported from Australia. Herein, six new species of this genus are described from eastern Australia (see Fig. 1 for distributions). These and other species accepted as members of *Paralamyctes* are accommodated in four subgenera that are diagnosed based on shared derived characters. The systematic revision recognizes *Haasiella* Pocock, 1901, as a clade within *Paralamyctes*, and *Triporobius* Silvestri, 1917, as a synonym of the nominate subgenus *P. (Paralamyctes)*. This revision identifies *Paralamyctes* in India, but rejects its occurrence in northern Argentina and

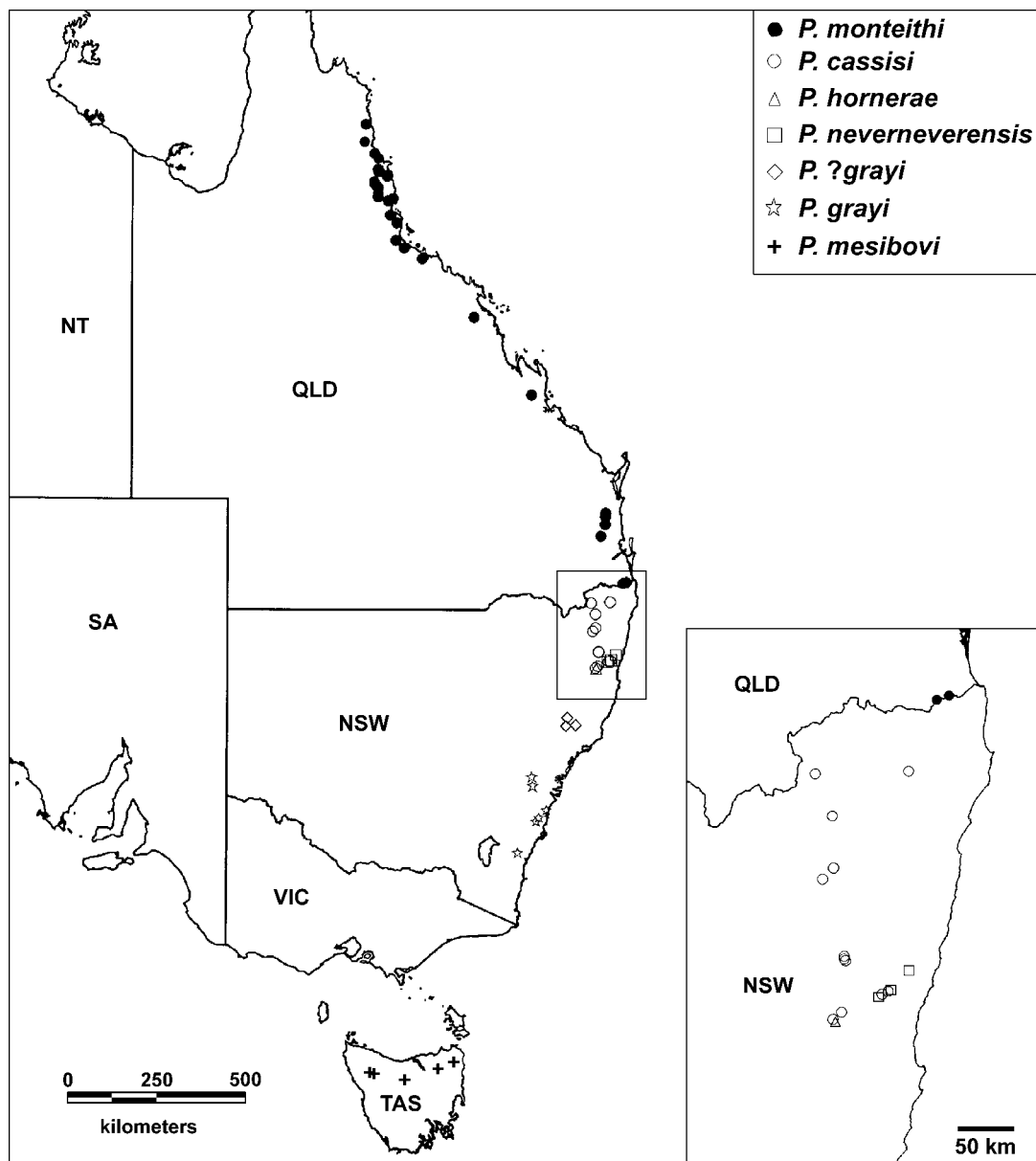


Figure 1. Map of eastern Australia, showing records of *Paralamyctes* species. Detail of northern New South Wales indicates sympatric occurrences of *P. cassisii*/*P. hornerae* and *P. cassisii*/*P. neverneverensis*.

New Caledonia. *Paralamyctes* is unknown from Western Australia. Species of *Dichelobius*, *Henicops* and *Lamyctes* described by Attems (1911) represent all known henicopid diversity in the southwest (examination of the Western Australian Museum collection by the author, March 2001).

Methods and terminology

Each species in this work is illustrated by electron microscopy, with a particular focus on the largely neglected mouthparts. This method has proven useful in examining and figuring characters for henicopid phylogeny. Details of the mandible in particular emerge as new taxonomic characters for identifying clades within *Paralamyctes*. The electron micrographs in the present paper accompany illustrations of non-Australian species of *Paralamyctes* and other genera of Henicopidae in a cladistic analysis based on morphological and molecular sequence data (Edgecombe *et al.*, 2001). Specimens were air-dried, and photographed on a Leo 435VP using a Robinson backscatter detector.

In all descriptions, length of specimens is measured from the margin of the head shield to the end of the telson; because this measure is affected by telescoping, length of the head shield is cited as a measure of body size (Andersson, 1978). Nomenclature for the segments of the second maxillary telopod and the maxillipede follows Borucki (1996: figs. 41 and 57, respectively). The so-called *Spingriffel* (Rilling, 1968: fig. 17) is called a penis, following Eason (1964). Terminology applied to the anogenital region is that used by Eason (1964: figs. 279, 280). Antennal sensilla are described as by Lewis (1981: figs. 81, 88). In descriptions of the mandible, the “sickle-shaped bristles” (Attems, 1928) that comprise the pectinate lamella are referred to as aciculae, following Chamberlin (1912). The cluster of bristles on the dorsal edge of the mandible is called a furry pad, after Attems (1928) (= pulvillus of Crabill, 1960: 15). Rows of scale- or peg-like structures on the mandibular teeth (*denticules accessoires* of Lawrence, 1960: 93) are called accessory denticles.

The following abbreviations are used for repositories of specimens examined:

AM	Australian Museum, Sydney
ANIC	Australian National Insect Collection, Canberra
BM/BMNH	Department of Entomology, Natural History Museum, London
CAS	California Academy of Sciences, San Francisco
FMHD	Division of Insects, Field Museum of Natural History, Chicago
IAEP	Instituto di Entomologia e Zoologia Agraria, Università degli Studi di Napoli Federico II, Portici
MCZ	Museum of Comparative Zoology, Harvard University, Cambridge
QM	Queensland Museum, Brisbane
QVMAG	Queen Victoria Museum and Art Gallery, Launceston
SAM	South African Museum, Cape Town
TMAG	Tasmanian Museum and Art Gallery, Hobart
ZMUC	Zoological Museum, University of Copenhagen

Abbreviations for collectors are: DKY, D.K. Yeates; GBM, G.B. Monteith; GC, G. Cassis; GDE, G.D. Edgecombe; GT, G. Thompson; MRG, M.R. Gray; ZJ, Z. Johanson.

Systematics

Chilopoda Latreille, 1817

Order Lithobiomorpha Pocock, 1902

Family Henicopidae Pocock, 1901

Subfamily Henicopinae Attems, 1914

Tribe Henicopini Chamberlin, 1912

Paralamyctes Pocock, 1901

Type species. *Paralamyctes spenceri* Pocock, 1901; by original designation.

Diagnosis. Henicopini with relatively large, bell-shaped sternite on first maxilla bordered by unsclerotised inner edge of coxa; suture between coxa and sternite confined to a narrow contact at posterior edge of maxilla; coxa separate in front of sternite, median suture lacking. Median furrow on head shield well impressed, continuous to transverse suture (= *Paralamyctes* + *Haasiella* of previous workers).

Discussion. Attems' (1928) detailed diagnosis of *Paralamyctes* accurately describes most features of new Australian species, and only a few modifications need noting. The number of aciculae (“sickle-shaped bristles”) on the mandible was cited by Attems as 10, but ranges up to 15 in *P. grayi* n.sp. A purportedly diagnostic presence of four lobes on the claw (pretarsus) of the second maxilla is in fact atypical for the genus, whilst Archey's (1937) citation of a trifid claw as diagnostic of this genus does not apply to *P. spenceri*, any Australian species, or the New Zealand *P. validus*. Most species of *Paralamyctes*, including representatives of each of the four subgenera recognized herein (e.g., *P. monteithi* n.sp., Fig. 6B; *P. grayi*, Fig. 14L; *P. cassisi* n.sp., Fig. 20I; *P. mesibovi* n.sp., Fig. 23L; *P. chilensis*, Fig. 25G) have a five-part claw, as is also shared by *Haasiella trailii* (Archey, 1917). The details of branching of the claw are identical to those in Lithobiidae (e.g., *Australobius scabrior* Chamberlin, 1920), with two slender digits interspersed between three larger digits. As such, a five part claw is considered to be plesiomorphic, probably a general character for Lithobiomorpha. Attems listed 2+2 genital spurs in the female gonopod as diagnostic of *Paralamyctes*. Because this number is plesiomorphic for Henicopidae (indeed, for Lithobiomorpha), the discovery of species with 3+3 spurs (*P. cassisi* n.sp. and *P. mesibovi* n.sp.) must be identified as an apomorphy, and cannot serve to exclude these species from *Paralamyctes* if monophyly is to be maintained.

Whether *Paralamyctes* sensu Attems (1928) and Archey (1937) is monophyletic is not adequately established. Like the second maxillary claw and 2+2 gonopod spurs noted above, most purportedly diagnostic characters are symplesiomorphies. A bisegmented tarsus on all trunk legs, perhaps the most obvious character used to define *Paralamyctes*, is shared with *Analamyctes* Chamberlin, 1955, *Zygethobiini* and Lithobiidae, and may therefore be

plesiomorphic relative to the single tarsal segment found in some legs of other Henicopini (e.g., *Lamyctes* Meinert, 1868; *Lamyctinus* Silvestri, 1909; *Haasiella* Pocock, 1901). Attems (1928) cited a labrum “with numerous ramifying bristles on the inside” in the diagnosis of *Paralamyctes*. Despite a thorough survey by electron microscopy, no aspect of labral bristling emerges as diagnostic of *Paralamyctes* sensu Attems; *Henicops* Newport, 1844, for example, has a distribution and branching structure of the labral bristles completely within the range of *Paralamyctes* species. Other symplesiomorphies cited by Attems (1928) are as follow: a single ocellus (general for Henicopidae); presence of posterior and lateral borders on the head shield (general for Lithobiomorpha); stigmata on segments 1, 3, 5, 8, 10, 12 and 14 (general for Henicopini); gonopod segmentation typical of all Henicopidae; a simple claw on the female gonopod (general for Henicopidae, probably general for Lithobiomorpha, and perhaps for Chilopoda); a three-segmented telopod of the second maxilla (general for Pleurostigmophora); “simple and branched bristles” on the tarsus of the second maxilla (general for Lithobiomorpha); an undivided sternite on the first genital segment (general for Chilopoda, the division being informative only for *Henicops* + *Lamyctes*); and a row of coxal pores on legs 12–15 (general for Lithobiomorpha). These characters cannot serve as synapomorphies within Henicopini.

Attems (1928) noted a first maxillary sternite being “triangular, partially fused with the coxae” in the diagnosis of *Paralamyctes*. The relative enlargement and bell (“triangular”) shape of the sternite in all species of *Paralamyctes* (Figs. 6F, 14E,G, 18F, 20G, 23G) is, however, shared with *Haasiella* Pocock, 1901 (= *Wailamyctes* Archey, 1917; Johns, 1964), and is considered synapomorphic for this broader group. Outgroup lithobiids (e.g., *Lithobius*) possess a smaller, triangular sternite that lies at the end of a median suture, similar to that of *Henicops* (Edgecombe *et al.*, 2001: fig. 8B), *Lamyctes* and *Analamyctes*. A large, bell shaped sternite is observed in *Haasiella insularis* (= *Wailamyctes munroi*: Archey, 1937: pl. 22, fig. 5) as well as *H. trailli* (Edgecombe *et al.*, 2001: fig. 8D). In addition to the size and shape, the sternite of *Paralamyctes* and *Haasiella* is distinctive for the less complete fusion of its sutures than in other lithobiomorphs, the sternite lying against an unsclerotised strip along the inner margin of the coxa. A sutural contact with the coxa is confined to the posterolateral extent of the sternite. The only comparable development of the sternite in Henicopidae is in *Esastigmatobius japonicus* Silvestri, 1909 (tribe Zygethobiini) (Edgecombe *et al.*, 2001: fig. 8E). Other Zygethobiini, such as *Zygethobius pontis* Chamberlin, 1911, have the typical, smaller sternite, such that the similarity between *Paralamyctes* + *Haasiella* and *Esastigmatobius* may be convergent.

Another character that serves as a synapomorphy for *Paralamyctes* + *Haasiella* is a pronounced median furrow on the head shield (Figs. 13A, 15H). Attems (1928) accurately noted “median furrow deep” in his diagnosis of *Paralamyctes*, but the same condition is present in *Haasiella*. The status of this character as a synapomorphy is revealed by outgroup comparison with *Henicops* +

Lamyctes, *Zygethobius* and Lithobiidae, in which the median furrow is confined to the anteriormost part of the head shield or forms a shallow depression rather than a sharp furrow. The only instances of a median furrow resembling that of *Paralamyctes* and *Haasiella* within the Henicopidae are within Anopsobiinae (e.g., in *Anopsobius*), in which the median furrow likewise extends to the transverse suture, and in *Esastigmatobius japonicus*, in which the median furrow extends about three-quarters the length to the transverse suture (Edgecombe *et al.*, 2001: fig. 1C).

All species of *Paralamyctes* described here possess a cluster of small basiconic sensilla between the coxal process and telopod of the first maxilla (Fig. 14I). Attems (1928: 55) cited this “little cluster of spinules” as a diagnostic character of *Lamyctes*, but this must be dismissed based on its ubiquitous presence in *Paralamyctes* (e.g., see Archey, 1937: pl. 22, fig. 5 for *P. (Haasiella) insularis*). The sensilla cluster does not provide evidence for a *Lamyctes/Paralamyctes* clade because it is widely present throughout Henicopidae and Lithobiidae (pers. obs. for *Henicops*, *Zygethobius*, *Anopsobius*, *Lithobius*, *Australobius*) and thus appears to be a general character for Lithobiomorpha.

A taxonomic issue of particular biogeographic significance is the status of *Triporobius* Silvestri, 1917, a monotypic genus based on *T. newtoni* Silvestri, 1917, from India. I have examined the holotype of this species (IAEP collection). Silvestri (1917) distinguished *Triporobius* from *Paralamyctes* based on a single character, the restriction of coxal pores to legs 13–15 in *Triporobius*. Given that this state is certainly an autapomorphy for *T. newtoni*, *Triporobius* falls within the cladistic structure of *Paralamyctes*. It shares the large, bell-shaped sternite and long median furrow in the head shield that define the *Paralamyctes* + *Haasiella* clade, and additionally has certain characters unique to *Paralamyctes* (*Paralamyctes*) as defined below. As such, biogeographic hypotheses that regard *Paralamyctes* as absent from India are based on a taxonomic artifact. Attems’ (1928) statement that *Triporobius* possesses eight ocelli on each side of the head is puzzling; the holotype of *T. newtoni* bears a single ocellus per side, as described and figured by Silvestri (1917). This anomaly may be explained if Attems misread Silvestri’s paper, which has a description of a species of *Archilithobius* with eight ocelli printed just above the figure of *Triporobius newtoni*.

Some morphological details in Silvestri’s (1917) illustrations of *Triporobius newtoni* require emendation. Silvestri (1917: fig. 5.8) depicted only simple setae on the tarsus of the telopod of the second maxilla, whereas the holotype possesses eight or nine plumose setae, and thus conforms to *Paralamyctes* and other henicopids. More significantly, Silvestri (1917: fig. 5.3, 5.4) drew the aciculae with notches along their dorsal sides, but each of these eight or nine aciculae is actually pinnulate along its distal half. An arrangement of pinnules along the dorsal side of the aciculae is elsewhere observed in *Paralamyctes* species from South Africa (*P. spenceri*; Attems, 1928: fig. 448; Edgecombe *et al.*, 2001: fig. 5E), Madagascar (*P. quadridens*; Lawrence, 1960: fig. 28B), New Zealand (*P. harrisi* Archey, 1922; Edgecombe *et al.*, 2001: fig. 5F), Queensland (*P. monteithi* n.sp.: Fig. 5I,J) and New South

Wales (*P. neverneverensis* n.sp.: Fig. 11A,J) (see discussion of that subgenus for evidence that pinnules confined to the dorsal side of the aciculae is a synapomorphy for this group).

Several species that were originally assigned to *Paralamyctes* were reassigned to the new genus *Analamyctes* by Chamberlin (1955). Chamberlin distinguished the two genera based on a single character, the number of antennal articles being fixed at 19–20 in *Paralamyctes* versus 23–43 in *Analamyctes*. Although antennal segmentation is taxonomically useful at some levels in Henicopini, Chamberlin's classification is incongruent with a larger body of character evidence that retains some supposed *Analamyctes* within a monophyletic *Paralamyctes* while grouping typical *Analamyctes* with *Lamyctes*, *Lamyctinus* and *Henicops*. The reliability of Chamberlin's two character states for antennal segmentation (19–20 versus 23–43) is weakened by new Australian species, some of which have article counts that fall between these two states (e.g., 20–21 in *P. neverneverensis*, 20–22 in *P. hornerae*), and others that range between both states (18–25 in *P. monteithi*). I have examined two specimens that represent two named species of *Analamyctes*, the type species, *A. tucumanus* Chamberlin, 1955, and *A. andinus* (Silvestri, 1903). BM 1903.7.2.0 (Fig. 2), a male labelled as "Tucuman 450 m", represents *A. tucumanus*, the holotype being from Cerro San Xavier, Tucumán, Argentina. The type locality for *A. andinus* is Punta de Vacas, Mendoza, Argentina; a specimen from 25 km north of Villaviciencio, Mendoza (ZMUC collection: Fig. 3) is assigned to this species. Based on these specimens, *Analamyctes* lacks both synapomorphies of *Paralamyctes* + *Haasiella*; it has no median furrow on the head shield (Fig. 2), and the sternite of the first maxilla is small, lying behind a median suture. Antennal segmentation with short, ring-like articles occurring in pairs between series of longer articles in both species (Fig. 2) resembles *Lamyctes* (Edgecombe *et al.*, 2001: fig. 1D) and *Henicops*. The subtriangular shape and dentition of the maxillipede coxosternite suggest closest affinities to *Lamyctes* and *Lamyctinus*; a minute, conical seta set in a prominent socket at the anterolateral edge of the dental margin in both *A. tucumanus* and *A. andinus* (Edgecombe *et al.*, 2001: fig. 3J) is certainly homologous with the "pseudoporodont" of *Lamyctinus* (Negrea & Matic, 1996: fig. 3; Edgecombe *et al.*, 2001: fig. 3K) and some species of *Lamyctes* ("ectodont" of Chamberlin, 1955; "porodont" of Zaleskaja, 1994). A porodont is not differentiated in *Paralamyctes*. Mandibular morphology, examined for *A. andinus* (Fig. 3), also most closely resembles *Lamyctes*, *Lamyctinus* and *Henicops*. Detailed similarities include: bipinnulate aciculae in which the pinnules are relatively long (Fig. 3B); an abrupt differentiation of the branching bristles along the length of the fringe, with multifurcating bristles splaying from scale-like bases on the dorsal part of the fringe, and pectinate bristles on the ventral part of the fringe (Fig. 3C); accessory denticles near the fringe of branching bristles on the dorsal part of the mandible being developed as flattened, multifurcating scales (Fig. 3D) rather than simple conical elements as in other Henicopinae. Also similar to *Lamyctes* and *Lamyctinus* is the lack of posterolateral projections on any tergites in *A. andinus* and *A. tucumanus* (Fig. 2).

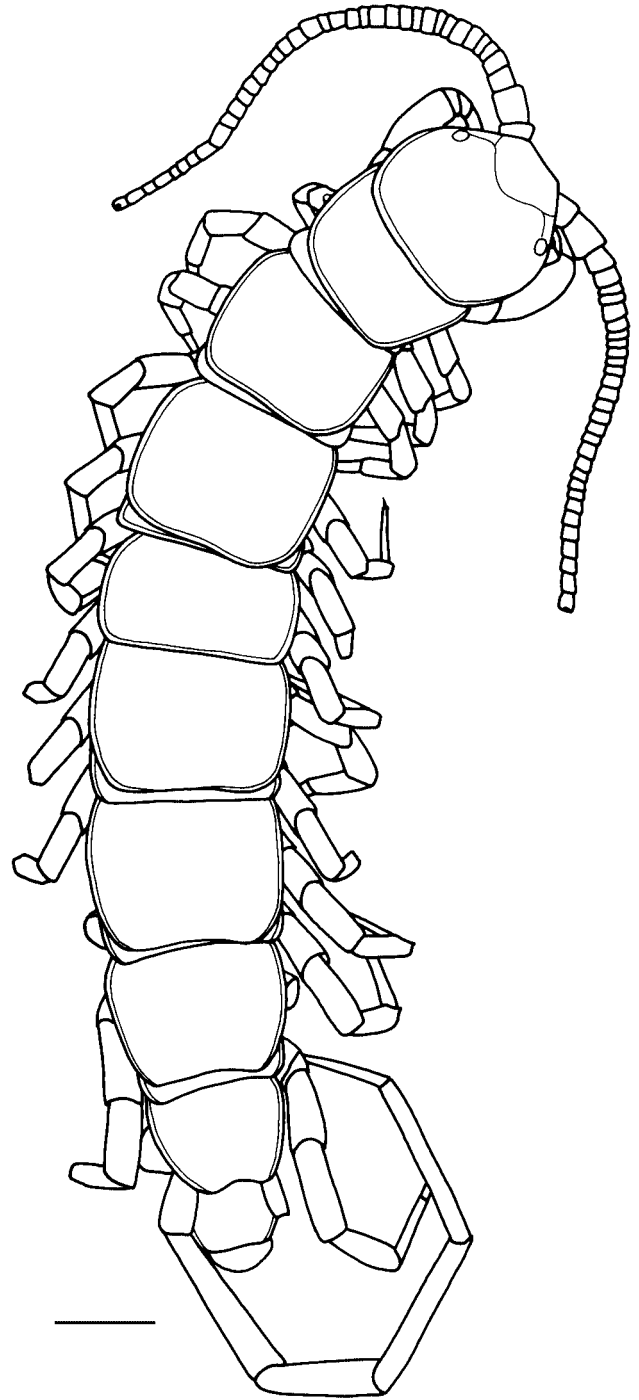


Figure 2. *Analamyctes tucumanus* Chamberlin, 1955. ♂ BM 1903.7.2.0, Tucumán, Argentina. Scale 1 mm.

At least one of the South African species reassigned by Chamberlin (1955) from *Paralamyctes* to *Analamyctes*, *P. asperulus*, is more appropriately retained in *Paralamyctes* [see discussion of *P. (Paralamyctes)* below]. The status of two others, *P. laevigatus* and *P. tabulinus* is uncertain; no specimens have been illustrated and descriptions are imprecise. However, maxillipede dentition of these species (6+6 teeth in both fide Attems, 1928) is more consistent

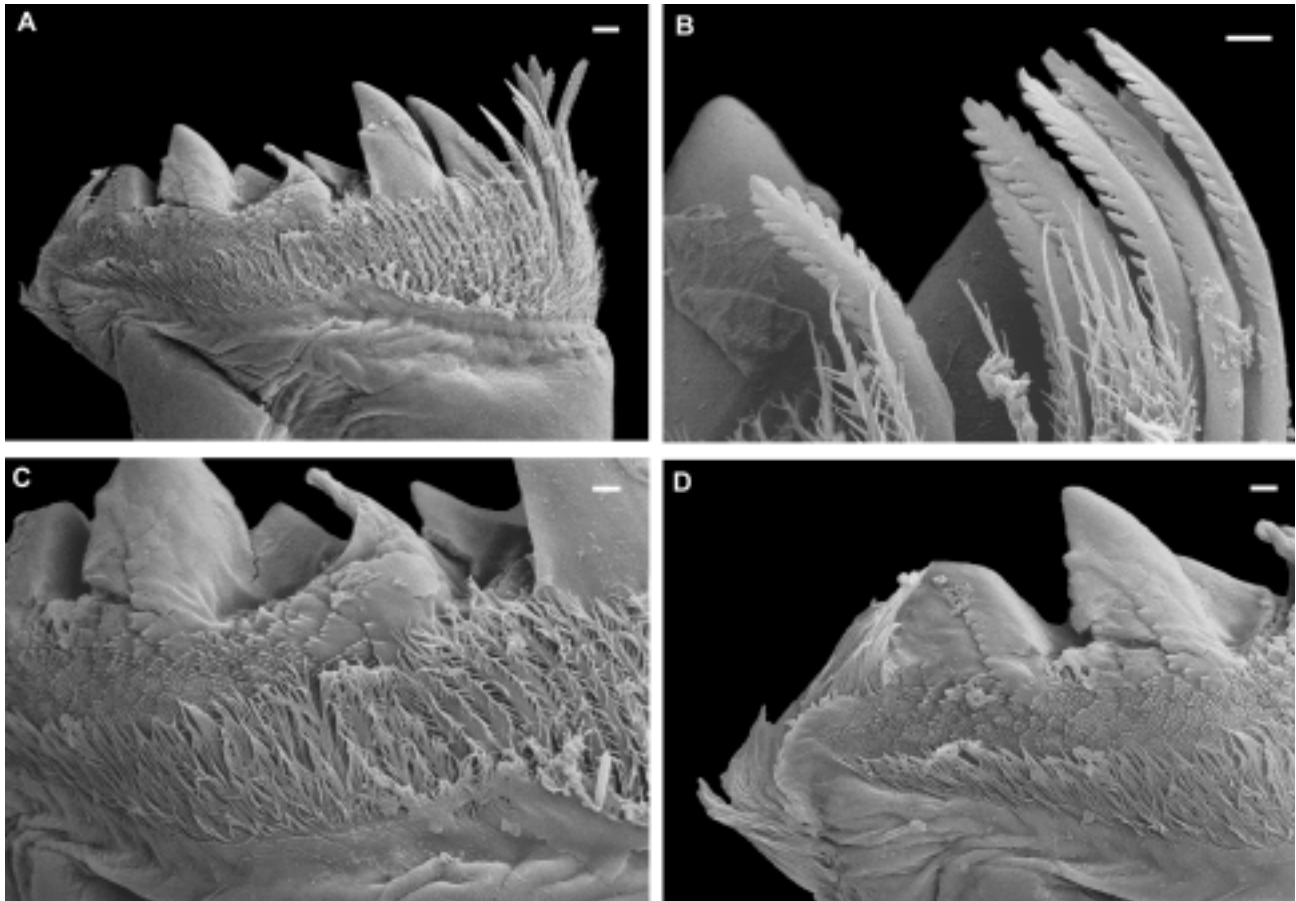


Figure 3. *Analamyctes andinus* (Silvestri, 1903). Scanning electron micrographs of mandible. ZMUC, sex undetermined (genital region damaged), 25 km N of Villaviciencio, Mendoza, Argentina. A, gnathal lobe; B, aciculae; C, fringe of branching bristles; D, teeth and furry pad. Scales 5 µm except A, 10 µm.

with membership in *Paralamyctes* than *Analamyctes*, and *P. laevigatus* was described by Attems (1928) as having a deep median furrow on the head shield (synapomorphy of *Paralamyctes*). Of the non-Argentine species referred to *Analamyctes* by Chamberlin (1955), only the reassignment of *Paralamyctes humilis* Ribaut, 1923, from New Caledonia is accepted here. This placement accounts for its triangular, few-toothed maxillipede coxosternite, large number of antennal articles, and weak definition of an articulation between tarsomeres. With the exclusion of *A. andinus* and *A. humilis* from *Paralamyctes*, the occurrence of the latter genus in South America is limited to *P. chilensis* in northern Patagonia (Chile and Argentina), and *Paralamyctes* is not known to occur in New Caledonia.

Paralamyctes (Paralamyctes) Pocock, 1901

= *Triporobius* Silvestri, 1917

Diagnosis. *Paralamyctes* with mandibular aciculae bearing elongate pinnules along dorsal side of acicula only; accessory denticle field intergrading with furry pad; antenna with relatively few (typically 17–20) elongate, tubular articles; articulations between tarsomeres strong; longitudinal median furrow on sternites well defined.

Assigned species. *Paralamyctes asperulus* Silvestri, 1903; *Paralamyctes weberi* Silvestri, 1903; *Triporobius newtoni* Silvestri, 1917; *Paralamyctes harrisi* Archey, 1922; *Paralamyctes quadridens* Lawrence, 1960; *Paralamyctes tridens* Lawrence, 1960; *Paralamyctes (Paralamyctes) monteithi* n.sp.; *Paralamyctes (Paralamyctes) neverneverensis* n.sp.

Distribution. South Africa (KwaZulu-Natal, Western Cape Province, Eastern Lowveld, Northern Province), Swaziland, Madagascar, southern India, Australia (Queensland, northern New South Wales), New Zealand (North Island).

Discussion. Several apparently apomorphic characters are shared between *Paralamyctes monteithi* from Queensland, *P. neverneverensis* from the Dorrigo region of New South Wales, *P. newtoni* from India, *P. spenceri* and *P. weberi* from southern Africa and *P. harrisi* from New Zealand. These species all have pinnules on the mandibular aciculae branching from a single side (dorsally). The same distribution of the aciculae was illustrated by Lawrence (1960: fig. 28B) in *P. quadridens* from Madagascar. Other species of *Paralamyctes* have either bipinnulate aciculae (branching from both sides), for example *P. (Nothofagobius) chilensis* (Fig. 251,K) and *P. (Haasiella) trailli* (Edgecombe

et al., 2001: fig. 5B), or simple (non-pinnulate) aciculae, as in *P. validus* (Edgecombe *et al.*, 2001: fig. 5G), *P. grayi* (Fig. 13F) and *P. hornerae* n.sp. (Fig. 18K). The bipinnulate condition is regarded as plesiomorphic, based on the presence of bipinnulate aciculae in *Henicops* (Edgecombe *et al.*, 2001: fig. 5C), *Lamyctes* (Edgecombe *et al.*, 2001: fig. 5A), *Lamyctinus*, *Analamyctes* (Fig. 3B), *Zygethobiini* (*Esastigmatobius*, *Zygethobius*; Edgecombe *et al.*, 2001: fig. 5H), Anopsobiinae (*Anopsobius*) and Lithobiidae (*Lithobius*, *Australobius*, *Bothropolys* [Edgecombe *et al.*, 2001: fig. 5D]). Species with pinnules along only one side of the aciculae, *P. (Paralamyctes)*, also share an intergradation between the accessory denticles on the mandible and the furry pad, the distal projections of the furry pad merely being progressively elongated (Fig. 5F,M). In other Henicopini and in the Lithobiidae, the furry pad is well differentiated from the accessory denticles. This involves either an abrupt elongation of the elements of the furry pad (Figs. 13E, 15M), or an intervening smooth region that lacks bristle-like morphology (Fig. 20E,F). *Paralamyctes (Paralamyctes)* as defined by morphological (largely mandibular) characters is also identified as a monophyletic group based upon molecular sequence data (Edgecombe *et al.*, 2001).

Species of *P. (Paralamyctes)* share strong joints between the tarsomeres on all legs, with a small condyle commonly developed at the articulation dorsally. The status of this character as a synapomorphy [relative to the weak articulations in *P. (Thingathinga)*] is uncertain. Most lithobiids have strong articulations, so this state is possibly plesiomorphic for *Paralamyctes*. Ambiguity is caused by the inapplicability of the character in some relevant outgroups (e.g., *Lamyctes* and Anopsobiinae, in which the tarsi lack articulations). Another character shared by all species of *P. (Paralamyctes)* by which they are distinguished from other *Paralamyctes* is the elongation of the longitudinal median furrow on the sternites. This is especially pronounced on the posterior sternites, running along most of the length of the sternite (Fig. 6L). The character is variably developed in outgroups, and its polarity is uncertain.

Among South African species referred to *Paralamyctes* by Attems (1928), I have examined *P. spenceri* (Natal Museum collections), its alleged junior synonym *P. weberi* (including its holotype), and the holotype of *P. asperulus* Silvestri, 1903 (IAEP collection). Lawrence's (1955b) synonymy of *P. weberi* is unconvincing. Lawrence cited little material from the Cape region and claimed to "have never seen a specimen which could be ascribed to *weberi*" (1955b: 18). I have observed material from Table Mountain (MCZ 28614) that conforms to the holotype of *P. weberi* in having four blunt, widely-separated teeth on each margin of the maxillipede coxosternite and having a distal spinose projection on the tibia of leg 14, and follow Attems (1928) in considering it and *P. spenceri* as distinct species. Contrary to Chamberlin's (1955) reassignment of *P. asperulus* to *Analamyctes*, this species can be confirmed as a member of *Paralamyctes* based on its deep median furrow on the head shield and the large, bell-shaped sternite of the first maxilla. An elongate distal part of the maxillipede tarsungulum and knob-like teeth on the dental margin of the coxosternite

indicate membership in *P. (Paralamyctes)*, *P. (Haasiella)* or (*Thingathinga*). The shape of the maxillipede coxosternite resembles that of *P. spenceri*, and the strong articulations defining the tarsomeres on all legs are also like that species (but strikingly different from *Analamyctes*, in which tarsal articulation are faint). *Paralamyctes asperulus* is apparently referable to *P. (Paralamyctes)*. Antennal articles are mostly elongate, resembling species of that subgenus. The description by Lawrence (1960) is sufficient to indicate that *P. quadridens* from Madagascar is a member of *P. (Paralamyctes)*. Two males of this species (FMHD 94-60) from Réserve Anjanaharibe-Sud, Befingotra, confirm the single, dorsal row of pinnules on the aciculae, and the accessory denticles intergrade with the furry pad as in other *P. (Paralamyctes)*. The other endemic Malagasy species, *P. tridens* Lawrence, 1960, is provisionally assigned to *P. (Paralamyctes)* based on Lawrence's (1960) assertion that it bears very close resemblance to *P. (P.) spenceri*, and description of a single row of eight or nine thick "teeth" (pinnules) on the distal part of the aciculae (Lawrence, 1960: 93).

Paralamyctes (Paralamyctes) monteithi n.sp.

Figs. 4–7, 8A,B, 9A

Etymology. For Geoff Monteith, Queensland Museum, whose collections in the Wet Tropics include much of the material of this species.

Diagnosis. *Paralamyctes (Paralamyctes)* usually with 20 long, tubular antennal articles; body relatively elongate, long tergites extended (e.g., TT3 and 5 as long as wide); 3–6 (very rarely 7) small teeth on dental margin of maxillipede coxosternite; cephalic pleurite constricted just behind Tömösváry organ, which lies on ventral margin of head shield; groove in accessory denticle field lacking on mandibular teeth; 3–6 coxal pores (usually 4–6); posterior margin of sternite 15 of male typically rounded.

Type material. HOLOTYPE QM S42683, ♂ (Fig. 4A,C), south end of Bluewater Range, 45 km NW of Townsville, Queensland, 19°11'51"S 146°24'16"E, 750 m, GBM, GT and S. Hamlet, 7 Dec 1986–16 Feb 1987, pitfall, rainforest. PARATYPES: QM S42682, 1 ♀, QM S42684, 1 ♂, Bluewater Range, same locality as holotype, 700–800 m, GBM, GT and S. Hamlet, 6–8 Dec 1986.

Other material. NE QUEENSLAND (Wet Tropics): QM S42652, 2 ♂♂, Cardwell Gap, 18°31'53"S 146°11'E, R. Raven, P. and E. Lawless and M. Shaw, 24 Sep–25 Nov 1992, pitfall; QM S42685, 2 ♂♂, 1 ♀, Cardwell Range, Upper Broadwater Creek Valley, 18°19'15"S 145°58'34"E, 750 m, GBM, GT and S. Hamlet, 18 Dec 1986–14 Jan 1987, pitfall, rainforest; QM S42680 1 ♂, S42681 1 ♀, Mt Elliot, summit, 19°29'29"S 146°58'00"E, 1150 m, A. Graham, Jan–26 Mar 1991, pitfall and intercepts, fern glade; QM S42686, 1 ♀, Emerald Creek, Lamb Range, 17°05'06"S 145°36'06"E, 950 m, GBM, DKY and GT, 11 Oct 1982, sieved litter, rainforest; QM S42691, 1 ♀, Douglas Creek, Lamb Range, 17°06'51"S 145°37'26"E, 900 m, 12 Oct 1982, GBM, DKY and GT, 12 Oct 1982, Pyrethrum, rainforest; QM S42687, 1 ♀, Mt Hypipamee NP, tower near the Crater, 17°27'23"S 145°29'12"E,

1230 m, GBM and J. Hasenpusch, 7 Mar–15 May 1995, intercept trap; QM S42689, 1 ♂, Mt Misery Rd, 15°52'39"S 145°12'58"E, 730 m, 6 Dec 1990–17 Jan 1991, Queensland Museum and ANZSES, pitfall; QM S42690, 2 ♂♂ and 1 ♀, North Bell Peak, Malbon Thompson Range, 1000 m, GBM and GT, 20–22 Nov 1990, pitfall; QM S42692, 1 ♂, Mt Tyson, 2 km W of Tully, 17°55'35"S 145°54'34"E, 650 m, DKY, 7 May 1983, sieved litter, rainforest; QM S42693, 1 ♂, Malaan SF, 17°35'30"S 145°36'45"E, R. Raven, P. and E. Lawless and M. Shaw, 25 Jul–26 Nov 1992, pitfall; QM S42694, 1 ♀, Mt Fisher, Kjellberg Rd, 7 km SW of Millaa Millaa, 17°32'34"S 145°33'31"E, 1000 m, GBM and DKY, 3 May 1983, sieved litter, rainforest; QM S42688, 1 ♂, Mt Bartle Frere, 0.5 km N of South peak, 1500 m, 6–8 Nov 1981, Earthwatch/Queensland Museum; QM S42695, 2 ♂♂, summit, Mt Bellenden Ker, 17°15'40"S 145°51'25"E, 1560 m, GBM, H. Janetzki and D. Cook, 8 Oct 1991; QM S42696, 1 ♂, S42704, 1 ♀, Bellenden Ker Range, Cableway base station, 100 m, Earthwatch/Queensland Museum, 17 Oct–7 Nov 1981, pitfall; QM S42697, 1 ♀, S42699, 1 ♂, Bellenden Ker Range, Cable Tower 5, 17°16'32"S 145°53'00"E, 532 m, Earthwatch/Queensland Museum, 1–7 Nov and 17–24 Oct 1981; QM S42700, 1 ♂, S42705, 1 ♀, summit TV station, Mt Bellenden Ker, 1560 m, S. Montague, Apr–Oct 1982, pitfall (S42700), GBM and DKY, 29 Apr–2 May 1983, moss on ground (S42705), rainforest; QM S42701, 2 ♂♂, several immatures, S42703, 2 ♂♂, 3 ♀♀ (Figs. 4B, 6A–C,G,J), summit, Mt Bellenden Ker, 1560 m, Earthwatch/Queensland Museum, 17 Oct–5 Nov 1981, pitfall; QM S42706, 1 ♂, S45147, larva, Bellenden Ker Range, Cable Tower 3, 1054 m, Earthwatch/Queensland Museum, 17–31 Oct 1981; AM KS 57900, 2 ♂♂, 1 ♀, Black Mountain Rd, 28.1 km NW of Kuranda, 16°40'25"S 145°30'08"E, GDE, 28 Apr 1998, sifted litter, rainforest; AM KS 57901, 1 ♀ (DNA voucher specimen), KS 57902, 2 ♀♀, Mt Hypipamee NP, The Crater, 17°25'29"S 145°29'00"E, GDE and G. Milledge, 25 Apr–2 May 1998, sifted litter and pitfall, rainforest; AM KS 57903, 1 ♂, Danbulla SF, 1.9 km E of Mobo Creek Crater, GDE, 27 Apr 1998, sifted litter, rainforest; ANIC, 1 ♀, Kuranda, 16°45'S 145°35'E, 430 m, R.W. Taylor, 29 Jul 1977, rainforest; ANIC, 1 ♂, Tully Falls SF, 17°46'S 145°33'E, A. Walford-Huggins, 4 Oct 1978, rainforest; ANIC, 1 ♂, Koombuloomba, 17°50'S 146°36'E, 750 m, R.W. Taylor and J. Feehan, 4 Jul 1971, Berlese, wet sclerophyll; ANIC, 6 ♀♀, Mission Beach, 17°50'S 146°06'E, 10 m, M. Cemak, 2 Sep–1 Oct 1996; ANIC, 2 ♂♂, 2 ♀♀, Mission Beach, 17°52'S 146°04'E, 40 m, M. Cemak, 2 Sep–4 Nov 1996, pitfall; ANIC, 1 ♀, 5 km W of Paluma, 19°01'S 146°10'E, ca. 950 m, R.W. Taylor and J. Feehan, 13 Jul 1971, Berlese, rainforest; CAS, 1 ♂, Tinaroo Lake near Kairi, 700 m, 8 Nov 1962, E.S. Ross and D.Q. Cavagnaro; CAS, 1 ♀, 1 mile NE of Ravenshoe, 975 m, 7 Nov 1962, E.S. Ross and D.Q. Cavagnaro; MCZ 34824, 1 ♂, Mt Spurgeon, 3500–4000 ft, Jul 1932, G.H. Curry.

CENTRAL EASTERN QUEENSLAND (Eungella/Rockhampton): AM KS 57904, 1 ♂ (Figs. 7A, 8A,B), KS 57905, 1 ♀ (Fig. 7B), KS 57906, 1 ♀ (Figs. 7C, 9A), KS 57907, 1 ♀ (Figs. 5A–J, 6H,I,K–M), KS 57908, 1 ♀ (DNA voucher specimen), KS 57909, 1 ♂, 3 ♀♀, Eungella NP, Dalrymple Rd, 1.7 km NE of Snake Rd, 21°04'S 148°34'30"E, GDE, S. Davis and G. Milledge, 18 and 21 Apr 1998, rainforest litter; QM S45184, 1 ♂, Eungella, Schoolhouse, 21°08'S 145°29'E, R. Raven and J. Gallon, 13 Feb 1986, sieved litter, rainforest; ANIC, larva, presumed fourth larval stadium (12 legs plus three limb-buds), Cammoo Caves, 23°10'S 150°28'E, R.W. Taylor and A. Weir, 25 Oct 1976, dense low closed forest.

SE QUEENSLAND—KENILWORTH/IMBIL REGION: AM KS 57910, 1 ♀ (Figs. 5K–M, 6D–F), KS 57911, 1 ♀ (DNA voucher specimen), Kenilworth SF, Sunday Creek Rd, 9.8 km W of Charlie Moreland Park, 26°40'11"S 152°36'35"E, GDE, S. Davis and G. Milledge, 6–7 May 1998, sifted litter, wet sclerophyll; QM S42679, 1 ♂,

Amamoor Creek via Imbil, 26°21'45"S 152°37'56"E, 91 m, GBM and S.R. Monteith, 1975–1976, pitfall, rainforest; QM S42678, 1 ♂ (Fig. 7D), Cold Creek via Imbil, 26°27'20"S 152°37'26"E, 122 m, GBM and S.R. Monteith, 1974–1975, pitfall, rainforest; QM S42677, 1 ♀, Deer Reserve SF via Kilcoy, 26°59'29"S 152°28'33"E, 457 m, GBM and S.R. Monteith, 1974–1975, pitfall, rainforest. LAMINGTON REGION: QM S42669, 1 ♀, Lamington NP, Mt Bithongabel, 28°15'55"S 153°10'13"E, 1160 m, GBM and S.R. Monteith, 1975–1976, pitfall, rainforest; QM S42675, 1 ♀, Repeater Station, Springbrook, 28°14'23"S 153°15'58"E, 1000 m, GBM and S.R. Monteith, 1975–1975, pitfall, rainforest; QM S42676, 2 ♂♂, Lamington NP, Nagarijooon, V.E. Davies and R. Raven, 5 Apr 1976.

Description. Length up to 27 mm; length of head shield up to 2.4 mm. Colour (based on specimens in absolute ethanol): antennae dark orange; head shield orange with chestnut mottled network; tergites pale orange with dark mottling concentrated in longitudinal median band and near margins; maxillipedes bright orange; sternites yellow/pale orange, becoming darker orange with more abundant chestnut mottling posteriorly; prefemur to tibia pale orange or yellow with purple mottling; tarsi orange; genital sternite and gonopods orange.

Head shield smooth. Frontal margin with strong median notch; posterior margin transverse. Median furrow extends back to transverse suture, length about 30% that of head shield, deep throughout. Antenna extends back to tergite 4 or 5; 18–25 antennal articles, overwhelming majority of specimens with 20; all articles substantially longer than wide; basal two articles only slightly enlarged relative to adjacent ones (Fig. 6A), with gradational rather than abrupt changes in setation (increased abundance of short trichoid sensilla from about fifth article, fewer longer setae). Posterior side of polygonal area surrounding hair socket of trichoid sensilla on antenna raised as a semicircular stop (*Kragen*) (Fig. 8B); two or three finger-shaped thin-walled basiconic sensilla at anterior edge of antennal articles adjacent to band of arthroal membrane (Fig. 8A,B). Ocellus whitish, moderately domed. Cephalic pleurite usually inclined, narrowed to a slender band behind Tömösváry organ (Figs. 5H, 6D), which lies on ventral margin of head immediately posteroventral to ocellus (Fig. 5G), encircled by sutures that define anterior limits of pleurite; Tömösváry organ moderately large, elliptical.

Tergites faintly to distinctly wrinkled, more so on posterior segments. T1 generally trapeziform, considerably smaller than T3, slightly narrower than head shield (Fig. 4A), about 75% width of widest tergite (T8), posterior angles rounded and posterior margin transverse; lateral borders subparallel in TT3 and 5, posterior angles rounded, posterior borders transverse or T5 faintly concave; TT1, 3 and 5 bordered posteriorly; lateral borders of TT7–14 convex; border of T7 incomplete posteriorly, posterior margin with shallow transverse median embayment, posterior angle rounded; TT8–14 (variably T6) bordered laterally; posterior margin of T8 gently concave, posterior angle rounded, TT10 and 12 elongate, posterior borders weakly to gently concave, posterior angles form obtuse, blunt corners; TT9, 11 and 13 embayed posteriorly, with largely transverse median extent, posterior angle of T9 blunt, TT11 and 13 sharp but not toothed; T14 longer than wide,

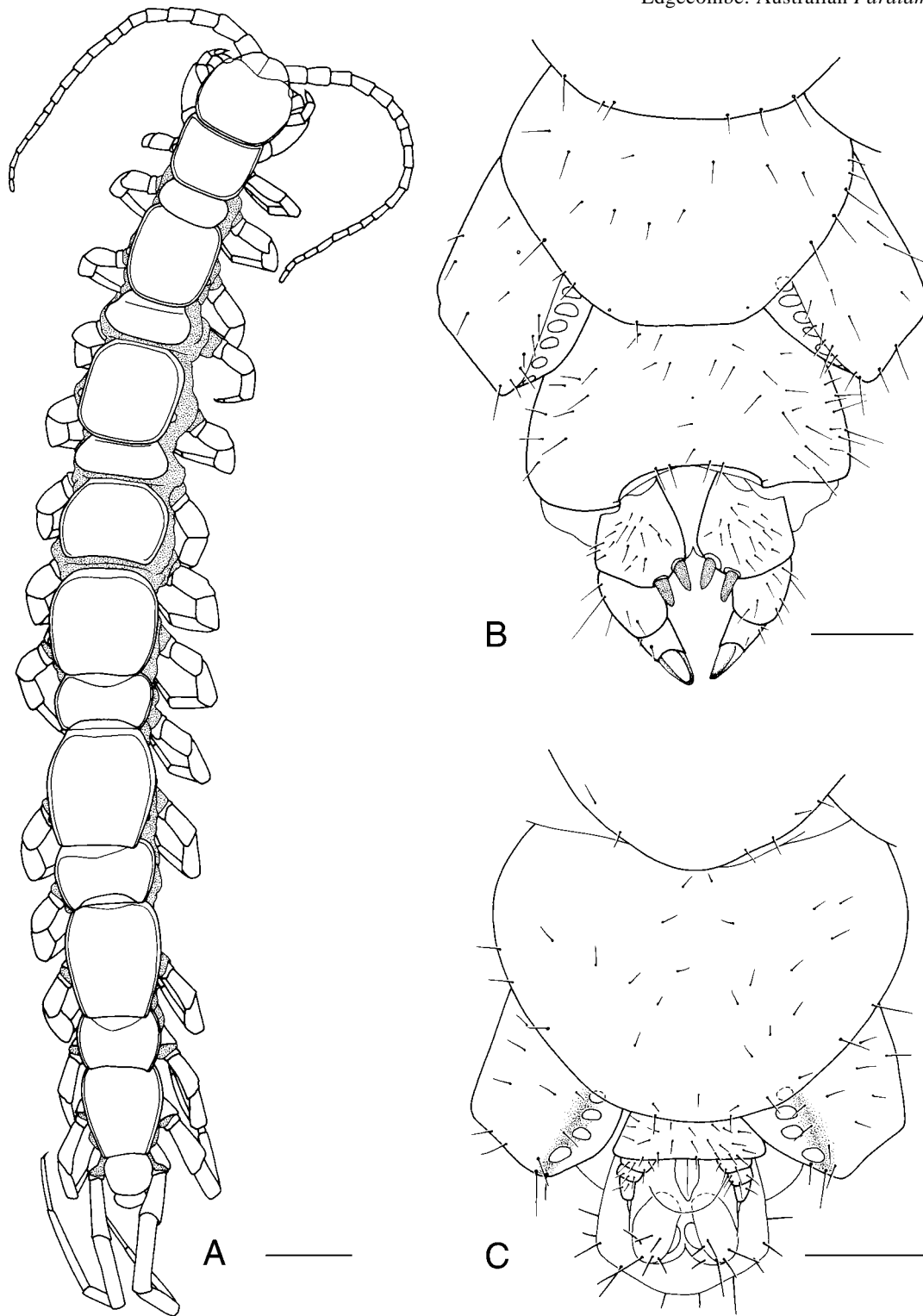


Figure 4. *Paralamyctes (Paralamyctes) monteithi* n.sp. A,C, holotype ♂ QM S42683, south end of Bluewater Range, northeastern Queensland; C, terminal segments and gonopods; scales 2 mm, 0.5 mm. B, ♀ QM S42703, terminal segments and gonopods, summit of Mt Bellenden Ker, northeastern Queensland; scale 0.5 mm.

posterior border usually gently concave in both sexes, with blunt posterior angles (Fig. 6M); in males from Mt Bellenden Ker, posterior margin of TT12 and 14 transverse to weakly convex and posterior angles rounded, posterior margin of T13 gently concave. Short, slender setae along

lateral borders of all tergites; anterior tergites with few additional setae, concentrated anterolaterally; short setae evenly scattered over surface of posterior tergites (Fig. 6M).

Small transverse seta projects medially from pit in labral sidepiece (Fig. 5B). Labral margin with rounded shoulder

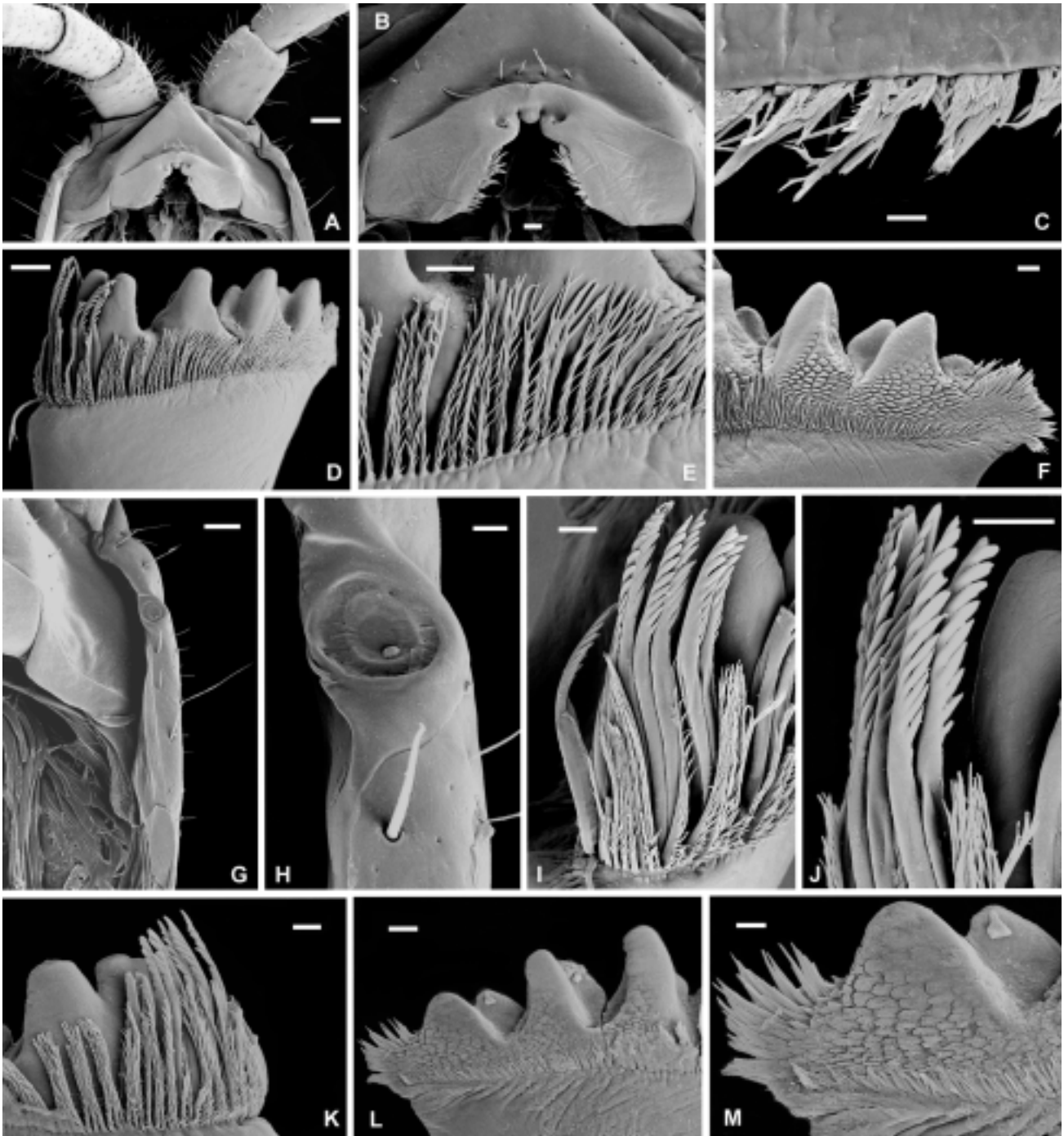


Figure 5. *Paralamyctes (Paralamyctes) monteithi* n.sp. Scanning electron micrographs. A–J, ♀ AM KS 57907, Eungella NP, central eastern Queensland. A, ventral view of head, scale 200 μ m; B, clypeus and labrum, scale 50 μ m; C, branching bristles on labral margin, scale 10 μ m; D, gnathal lobe of mandible, scale 50 μ m; E, fringe of branching bristles on mandible, scale 20 μ m; F, mandibular teeth and furry pad, scale 20 μ m; G, cephalic pleurite, scale 100 μ m; H, Tömösváry organ, scale 20 μ m; I, J, mandibular aciculae, scales 20 μ m. K–M, ♀ AM KS 57910, Kenilworth SF, southeastern Queensland. K, ventral part of mandible, scale 20 μ m; L, mandibular teeth, scale 20 μ m; M, accessory denticles and furry pad on mandible, scale 10 μ m.

beside midpiece, with pronounced break in curvature where dense, long fringe of branching bristles overhangs margin; bristles branch as irregular, elongate bifurcations or multifurcations (Fig. 5C).

Maxillipede coxosternite trapezoidal to subsemicircular, dental margin broad, each half gently convex (Figs. 6G,H,

7); median notch lacking; teeth small, blunt bulbs, ranging from 3+3 to 6+6 (one specimen with 7+7), set off by furrow that parallels dental margin. Coxosternite bearing relatively few large, scattered setae, usually with distinctly denser setation behind dental margin and anterolaterally (Fig. 6H). Tarsungulum with long, slender pretarsal section (Fig. 6G).

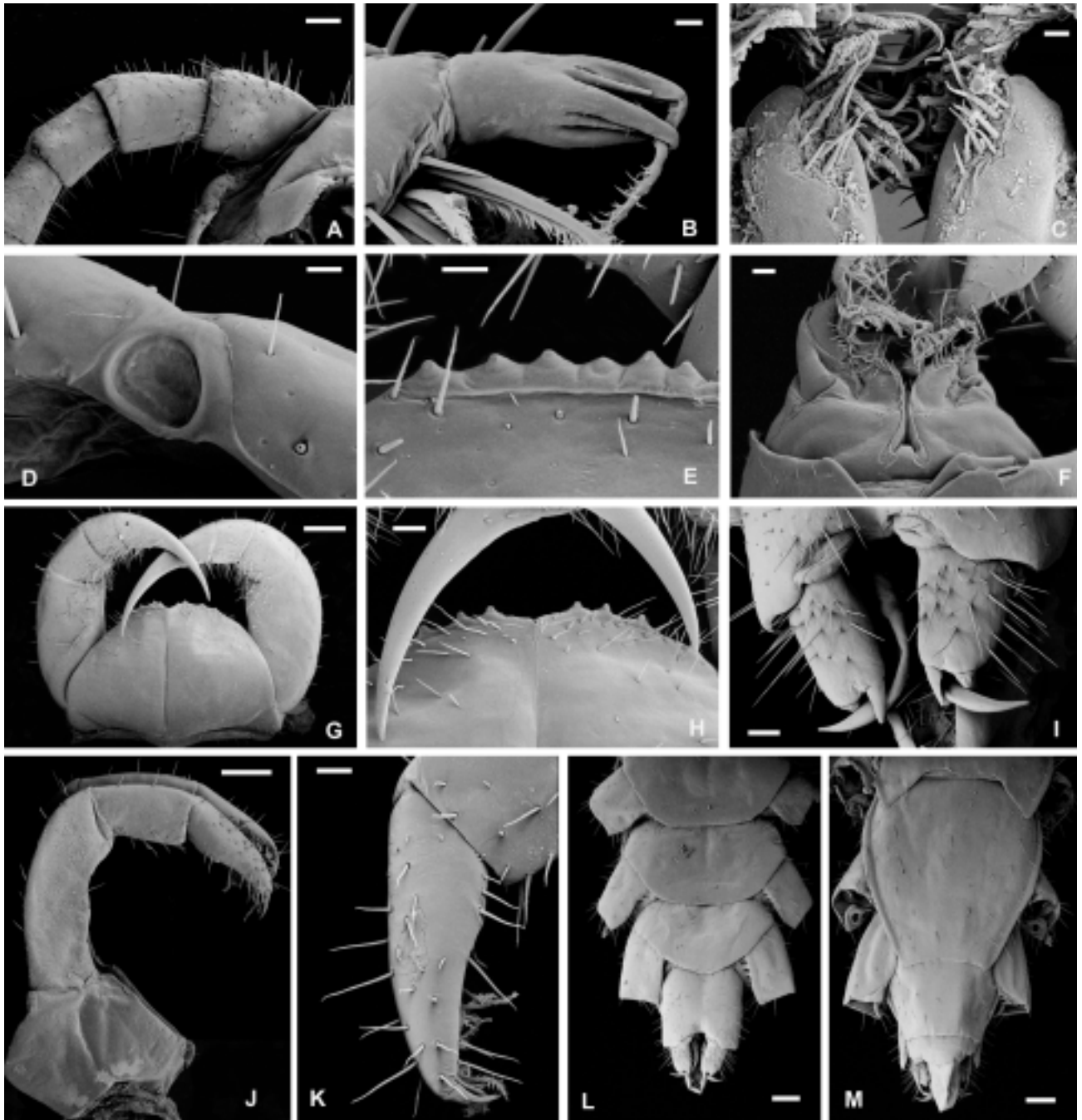


Figure 6. *Paralamyctes (Paralamyctes) monteithi* n.sp. Scanning electron micrographs. A–C,G,J, ♀ QM S42703, summit of Mt Bellenden Ker, northeastern Queensland. A, proximal part of antenna, scale 200 μ m; B, pretarsus of second maxillary telopod, scale 10 μ m; C, coxal processes of first maxillae, scale 20 μ m; G, maxillipede, scale 400 μ m; J, coxa and telopod of second maxilla, scale 200 μ m. D–F, ♀ AM KS 57910, Kenilworth SF, southeastern Queensland. D, Tömösváry organ, scale 20 μ m; E, dental margin of maxillipede coxosternite, scale 50 μ m; F, first maxillae, scale 50 μ m. H,I,K–M, ♀ AM KS 57907, Eungella NP, central eastern Queensland. H, dental margin of maxillipede coxosternite, scale 100 μ m; I, gonopods, scale 90 μ m; K, distal part of telopod of second maxilla, scale 50 μ m; L, ventral view of terminal segments, scale 300 μ m; M, dorsal view of terminal segments, scale 300 μ m.

Setae on forcipule concentrated on inner part of trochanteroprefemur, femur, tibia and tarsal part of tarsungulum, these setae relatively long, of fairly uniform diameter.

Mandible: Four paired teeth (Fig. 5D). Ten aciculae; up to 10 finger-shaped pinnules aligned against each other on distal third of dorsal side of each acicula (Fig. 5I,J). Fringe

of branching bristles skirts aciculae, evenly shortening dorsally to very short fringe beneath furry pad (Fig. 5F,M); bristles narrow-based, evenly branching along entire length (Fig. 5E), bifurcate or pauciramous distally. Accessory denticle field without grooves between rows of denticles or at margin of denticle field (Fig. 5F,L); largest accessory

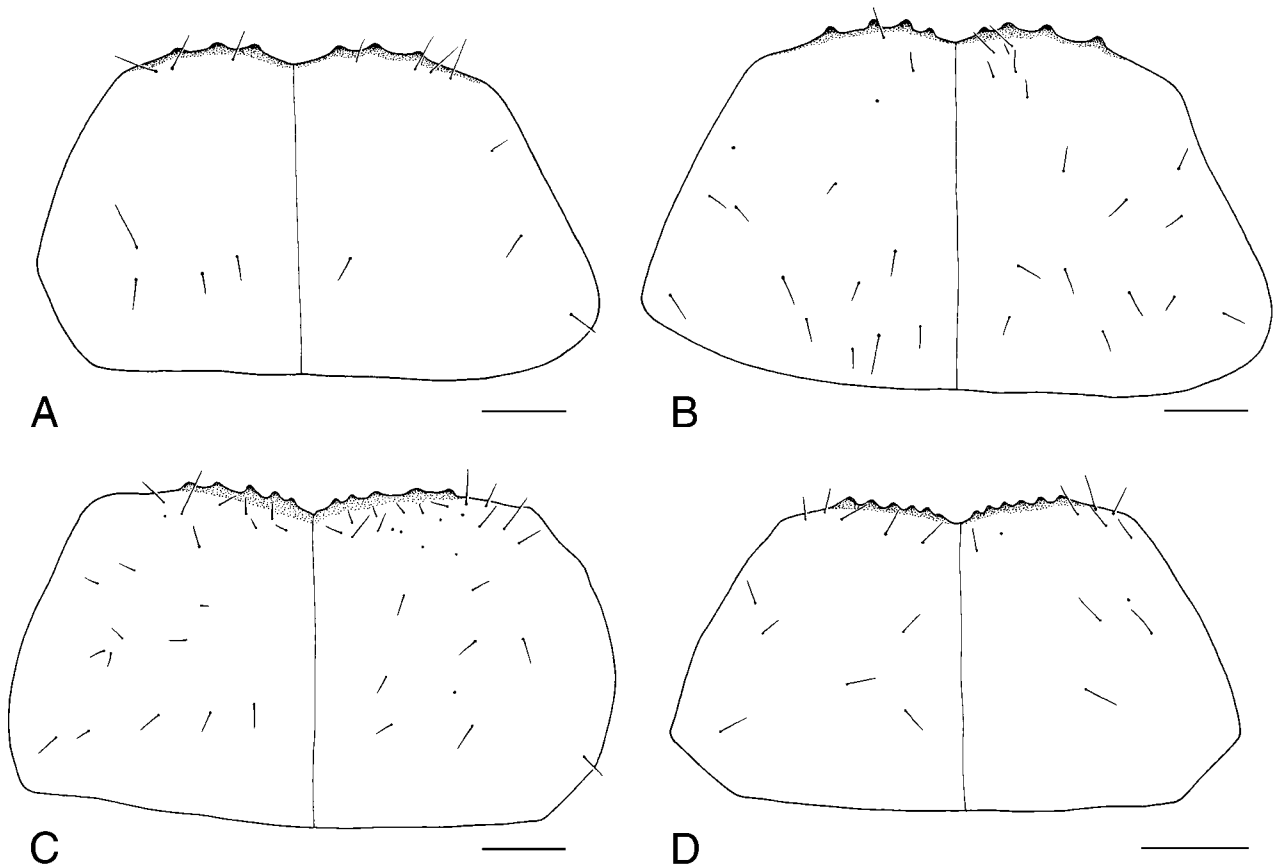


Figure 7. *Paralamyctes (Paralamyctes) monteithi* n.sp. Maxillipede coxosternite, showing variation in number of teeth on dental margin. A–C, Eungella NP, Dalrymple Rd, central eastern Queensland. A, ♂ AM KS 57904, 3+3 teeth; B, ♀ AM KS 57905, 4+4 teeth; C, ♀ AM KS 57906, 5+5 teeth. D, ♂ QM S42678, 6+6 teeth, Cold Creek via Imbil, southeastern Queensland. All scales 0.25 mm.

denticles scale-like, flattened, grading into rod-shaped scales then small elongate scales near fringe of branching bristles (Fig. 5M); slender, rod-like accessory denticles grade into furry pad; furry pad with many elongate, simple bristles, some bifid or pauciramous bristles.

First maxilla: Bell-shaped sternite of typical size for genus (Fig. 6F), anterolateral margins set in arthrodial membrane, posterolateral edge delimited from coxa by well-defined suture. Coxal process triangular, with 8–12 simple setae on anteromedial edge (Fig. 6C), this cluster usually separated from a few setae aligned on inner edge of coxal process. Cluster of minute, barb-like basiconic sensilla between coxal process and telopod. Distal article of telopod with two rows of long, plumose setae along inner margin; branches developed along distal half of these setae; short, simple setae on membranous strip alongside inner margin; main, more sclerotised field of distal article of telopod largely barren of setae, a few along outer margin.

Second maxilla: Sternite small, fused with coxae. Band of short setae along anterior part of coxa not prominent (Fig. 6J). Tarsus bearing numerous simple setae on outer surface, dense cluster of plumose setae on membranous patch on inner surface (Fig. 6K); branches on plumose setae mostly confined to distal half. Claw small, composed of five digits, median and outer pair long, thick, with shorter, needle-like digit between median and each outer digit (Fig. 6B).

Strong, pointed distal projections with sclerotised tips on tibiae of legs 1–14. Setae on legs of relatively uniform diameter, gracile. Premur with few short setae on anterior and posterior faces, numerous setae of varied lengths dorsally, some longer setae on ventral edge of prefemur; prefemur lacking ventral recess; longest setae on femur and tibia equal to or slightly shorter than longest on prefemur; a few slightly to indistinctly thickened setae encircling distal margin of femur; seta at ventrodial edge of tibia distinguished by slightly darker (orange-brown) pigmentation but not significantly thickened; tarsal setae uniformly slender, of fairly even length. Articulation between tarsomeres strong on all legs, with small condyle dorsally. Distitarsus about 45% length of basitarsus on anal leg; anal leg basitarsus 9.5–11 times longer than broad (Fig. 9A). Pretarsal claws curved; pair of accessory claws symmetrical, about 25% length of main claw (Fig. 9A).

Longitudinal median furrow shallow on anterior half of sternites, extending to or behind midlength on sternites 14 and 15 (Fig. 6L), sometimes present along entirety of sternite. Short setae scattered across anterior third of sternites and along lateral margin, with strongest marginal setae anterolaterally; sternal setation similarly developed along length of trunk.

Coxal pores round or transversely ovate (Fig. 4B,C), commonly 4555/4555 or 5666/5666 in females, maximum

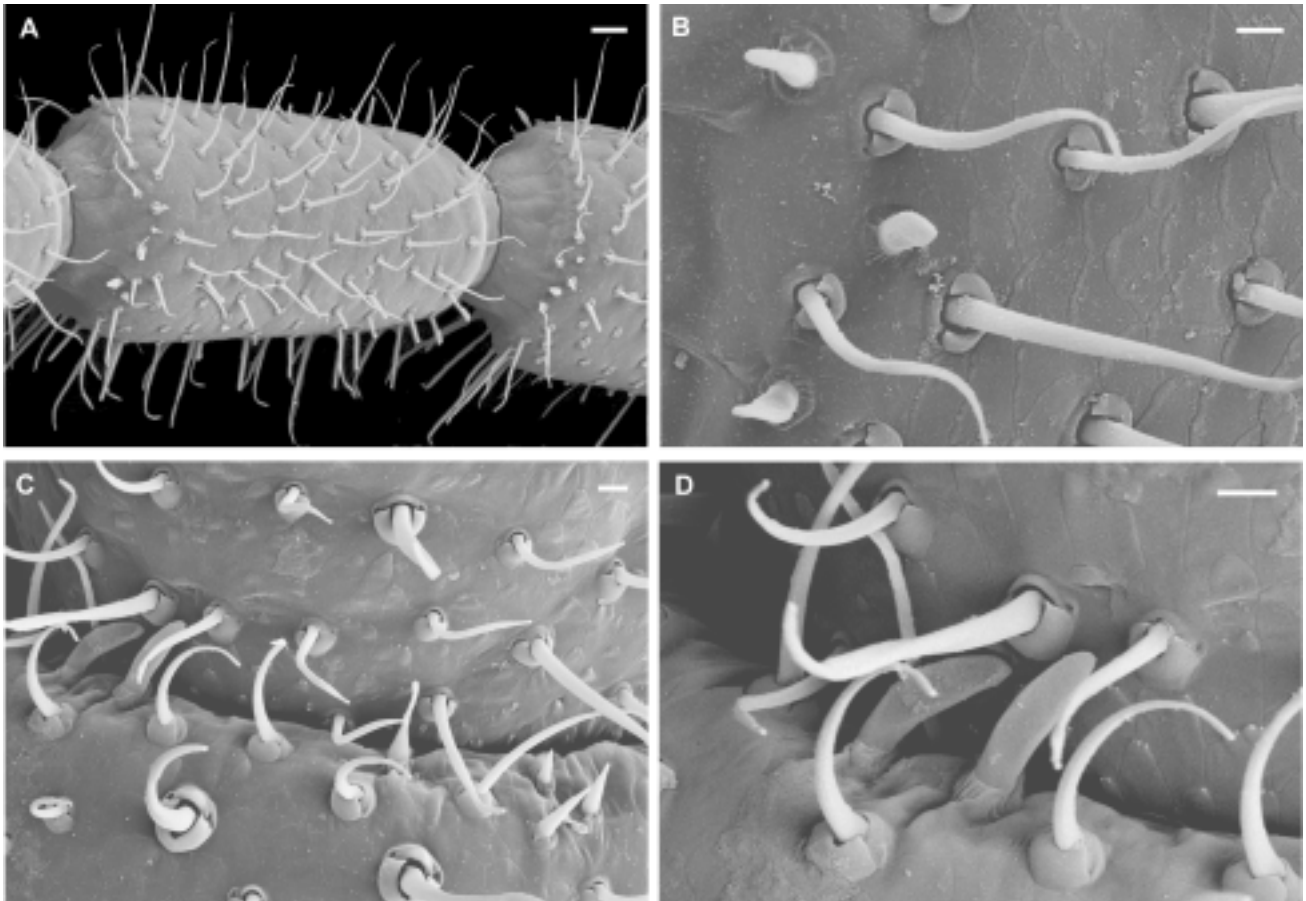


Figure 8. Antenellar sensilla. A,B, *Paralamyctes (Paralamyctes) monteithi* n.sp. AM KS 57904, ♂, Eungella NP, Queensland. A, nearly dorsal view of second- to fourth-last antennal articles, showing trichoid sensilla, pair of thin-walled basiconic sensilla, scale 20 µm; B, seventh-last antennal article, anterior to left, showing trichoid sensilla with stop (*Kragen*) basally, three thin-walled basiconic sensilla, scale 5 µm. C,D, *Paralamyctes (Thingathinga) grayi* n.sp. ♂ AM KS 58466, Mt Barrengarry, NSW. C, fourth- and fifth-last antennal articles, showing pair of thin-walled basiconic sensilla at left, cluster of three thick-walled basiconic sensilla at right, scale 5 µm; D, detail of thin-walled basiconic sensilla, scale 5 µm.

6666/6666, minimum 3444/3444; males most commonly 4444/4444, maximum 5555/5555, not uncommonly 3333/3333. Coxal pore field delimited from anteroventral face of coxa by rounded edge in most specimens, or with variably developed fold, when present, distal coxal pores may be partly concealed in ventral view by fold (Fig. 6L). Anal pores large in both sexes (Fig. 4C).

Male (Fig. 4C): Sternite of segment 15 rounded posteriorly/posterolaterally. Sternite of first genital segment small, undivided, with transverse posterior margin, bearing numerous short, evenly scattered setae. Gonopod of three articles and tapering, seta-like terminal process, the three articles each bearing a few short setae; maximum length of penis equal to that of gonopod exclusive of terminal process, in some specimens only as long as first article of gonopod.

Female (Fig. 4B): Sternite of segment 15 transverse or convex posteromedially. Tergites of first genital segment and telson usually well sclerotised. Sternite of first genital segment large, posterior margin concave between condyles of gonopods, surface evenly scattered with short setae. First article of gonopod bearing two conical spurs of equal size; spurs gently curved such that tip points up; first and second articles of gonopod with mix of short and moderately long

setae (Fig. 6I); third article with a few small setae. Claw undivided.

Discussion. Comparison with the only other Australian species of *P. (Paralamyctes)*, *P. (P.) neverneverensis* n.sp., is made in discussion of that species below.

Paralamyctes (Paralamyctes) monteithi appears to be most closely related to *P. (P.) harrisi* Archey, 1922, from North Island, New Zealand. These taxa are particularly similar in the elongation of the antennomeres (all being longer than wide versus some subequally-proportioned antennomeres in other species of *Paralamyctes*, e.g., Figs. 13B, 15C), the identical structure of the mandibular aciculae, a much elongated pretarsal component of the maxillipede tarsungulum, particularly dense setation on the inner part of the forcipule (e.g., numerous long setae on the tibia and femur; Fig. 6G), and the shape of the maxillipede coxosternite. In both species, the dental margin of the coxosternite is wide and usually biconvex, and the outer part of the margin is conspicuously devoid of teeth (Fig. 7). *Paralamyctes (P.) harrisi* also resembles *P. monteithi* in having the Tömösváry organ shifted lateral to the main surface of the cephalic pleurite, such that the organ comes

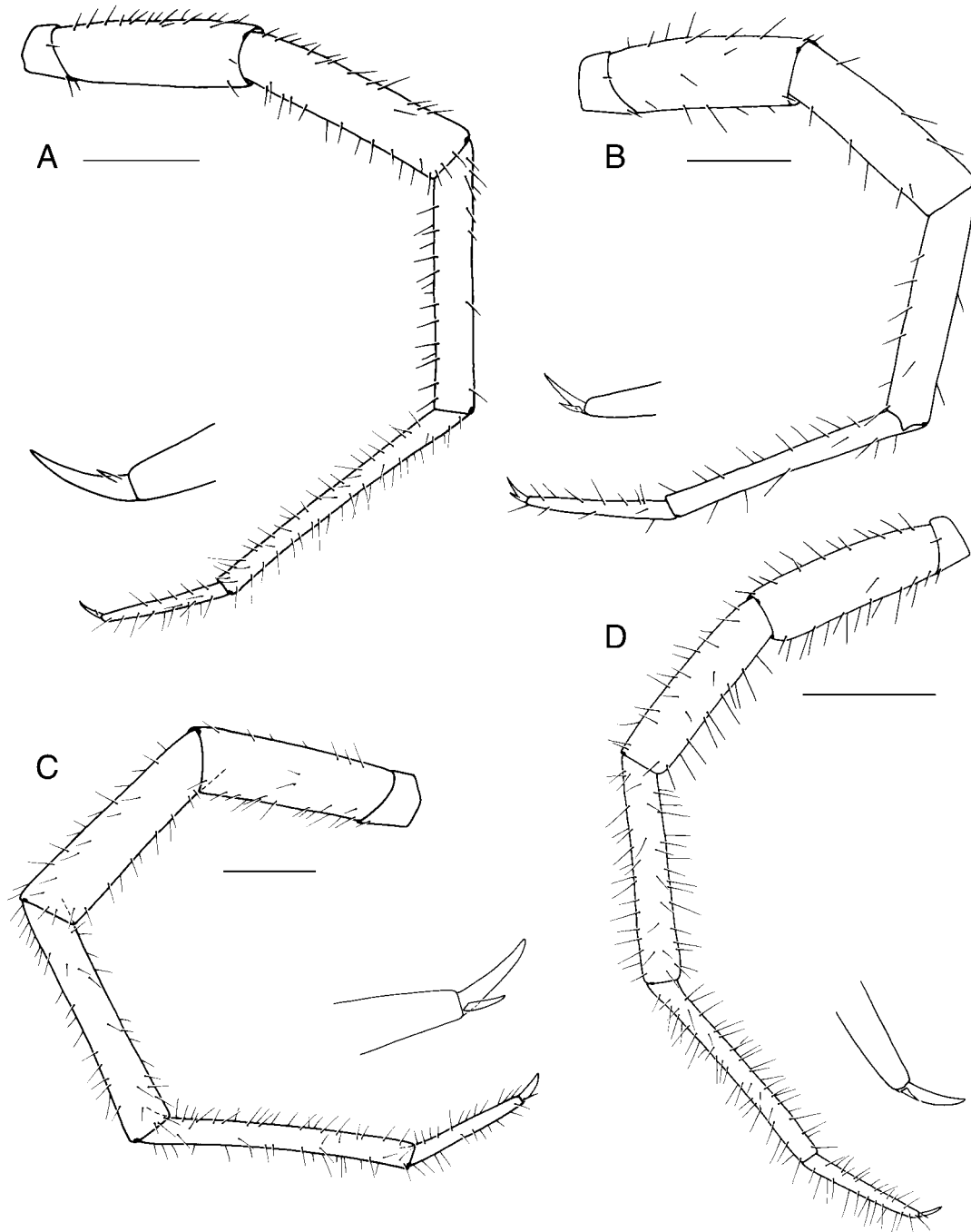


Figure 9. Anal legs of *Paralamyctes* (*Paralamyctes*), with details of pretarsi. A, *P. (P.) monteithi* n.sp., ♀ AM KS 57906, Eungella NP, Queensland. B, *P. (P.) neverneverensis* n.sp., ♂ AM KS 57955, Dorrigo NP, NSW. C, *P. (P.) harrisi* Archey, 1922, ♀, CAS, White Pine Bush, Hawkes Bay, New Zealand. D, *P. (P.) spenceri* Pocock, 1901, ♂, Natal Museum, Town Bush, Pietermaritzburg, KwaZulu-Natal, South Africa. Scales 1 mm except B, 0.5 mm.

to lie on the ventral margin of the head (Fig. 5A,G). In other species of *Paralamyctes* and in other Henicopidae, the Tömösváry organ is situated on the flat surface of the pleurite (Figs. 11G, 14J, 20L, 21I, 25M). These characters provide evidence for a sister species relationship between the Queensland and New Zealand taxa. *Paralamyctes* (*P. monteithi*) is distinguished from *P. (P.) harrisi* by usually having more antennal articles (typically 17 in *P. harrisi*, but occasionally as many as 20), having a less setose

anterolateral part of the maxillipede coxosternite, and by having a constriction of the cephalic pleurite behind the Tömösváry organ (see discussion below).

Paralamyctes monteithi has a broad geographic range, but it has not proven possible to consistently differentiate populations from different parts of the range based on external morphology. All Queensland samples share a typical development of 20 elongate antennomeres and have the Tömösváry organ at the ventral margin of the head. The

cephalic pleurite that bears the Tömösváry organ is relatively steeply inclined, whereas it more consistently lies horizontally in other species of *Paralamyctes*. The suture that delimits the cephalic pleurite displays a most peculiar course around the Tömösváry organ, the pleurite narrowing sharply behind the organ (Figs. 5G,H, 6D). An elongate body, expressed by the relative lengthening of the head shield and long tergites, is developed throughout the range of the species. These characters indicate that all of the Queensland material is closely related (a monophyletic group).

Within this widespread species, the most distinctive variant is observed from the summits of Mt Bellenden Ker and Mt Bartle Frere, in which the posterior margins/angles of tergites 12–14 exhibit a measure of sexual dimorphism that is otherwise not observed in the species (or in other *Paralamyctes*, in which dimorphism in the tergites is usually limited to the tergite of the intermediate segment being relatively wider in females). Males on Bellenden Ker have less concave posterior margins of TT12–14 and more rounded posterior angles than do females, or males from other localities. The Bellenden Ker sample has either 3+3 or 4+4 teeth on the dental margin of the maxillipede coxosternite, whereas material from other parts of the range (including other localities in the Wet Tropics region) usually has more teeth. Specimens from the southern part of the range (Lamington and Kenilworth/Imbil regions) have 5+4, 5+5 or 6+6 teeth (Fig. 7D), and the dental margin is more trapezoidal than semicircular (compare Fig. 6E,H for maximum difference). However, these same characters are present in specimens from the Bluewater Range and Cardwell Range/Cardwell Gap in the Wet Tropics, so the southeastern Queensland samples cannot be segregated on this basis. Indeed, the sample from Eungella confounds distinguishing geographic groupings within *P. monteithi* based on tooth number or shape of the coxosternite, having 3+3, 4+4, and 5+5 teeth about equally represented in a single population (Fig. 7A–C), and the dental margin varies from wide/biconvex (Fig. 7C) to approximately semicircular (Figs. 6H, 7A).

***Paralamyctes (Paralamyctes) neverneverensis* n.sp.**

Figs. 9B, 10, 11

Etymology. For the Never Never, Dorrigo NP, where the species occurs.

Diagnosis. *Paralamyctes (Paralamyctes)* with Tömösváry organ on cephalic pleurite, without modification of sutures around it as in *P. (P.) monteithi*; dental margin of maxillipede coxosternite relatively narrow, with 5+5 or 6+6 large, pointed teeth; pretarsal section of tarsungulum relatively short; spinose distal projection on tibia of leg 15.

Type material. HOLOTYPE AM KS 61063, ♀ (Fig. 10A,B), Nana Creek SF, 5 km ENE of Lowanna, NSW, 30°11'51"S 152°56'53"E, MRG, G. Milledge and H. Smith, 10–23 Nov 1999, pitfall. PARATYPES: QM S42666, 1 ♂ (Fig. 11), S42667, 1 ♀, Dorrigo NP, NSW, Never Never, 700 m, GBM, 1980–1981, pitfall, rainforest; AM KS 57955, 1 ♂ (Figs 9B, 10C; DNA voucher specimen), Dorrigo NP, Wonga Walk,

200 m E of Tristania Falls, 30°22'S 152°44'E, G. Giribet, M.K. Nishiguchi and Y.-y. Zhen, 29 Mar 2000, rainforest litter.

Description. This species is sufficiently similar to *P. (P.) monteithi*, described in full above, to limit description to features that differ. Description of colour in a freshly collected specimen is also provided because this information is often lacking in preserved material.

Length of head shield up to 1.4 mm. Head with irregular chestnut mottling, bright orange band along transverse suture; antennae dark orange, lighter distally; maxillipede bright orange; tergites light orange with chestnut median longitudinal patch and posterior and lateral margins; sternites with irregular purple and chestnut network; proximal part of legs light yellow with blue patches, tarsi orange.

Antenna with 20–21 articles; basal two articles considerably larger than succeeding ones, several articles of subequal length and width, including on distal part of antenna (Fig. 11H). Inner margin of labrum gently shouldered. Tergite shapes as for *P. (P.) monteithi* except for slightly shorter TT12 and 14 (Fig. 10A). Maxillipede coxosternite trapezoidal (Fig. 11K); dental margin convex, each half sloping posteromedially; narrow band along dental margin sclerotised to same extent as teeth; median notch shallow or lacking (Fig. 11M); pretarsal part of tarsungulum slightly longer than tarsal part (Fig. 11L). About five setae on anteromedial edge of coxal process of first maxilla (Fig. 11I). Distitarsus about 55% length of basitarsus on anal leg; anal leg basitarsus about 10 times longer than broad (Fig. 9B). Coxal pores round; 2344/2344, 2443/2344 in females; 2222/2222, 2333/2233 in males. Genital sternite and gonopods of both sexes (Fig. 10B,C) indistinguishable from *P. (P.) monteithi*.

Discussion. *Paralamyctes neverneverensis* co-occurs with *P. (Nothofagobius) cassisi* in the Dorrigo region. They are most readily distinguished by the former's fewer antennal articles, more dentate margin of the maxillipede, larger T1, and two (versus three) spurs on the female gonopod, without an extension on the spur-bearing segment. Mandibular characters also provide obvious distinction (e.g., strongly pinnulate versus simple aciculae).

Paralamyctes (Paralamyctes) neverneverensis is distinguished from the Queensland species *P. (P.) monteithi* by having the Tömösváry organ on the surface of the cephalic pleurite (Fig. 11G) rather than on the ventral margin of the head. The peculiar sutural course around the Tömösváry organ is unique to *P. (P.) monteithi*, whereas *P. (P.) neverneverensis* retains the typical pleurite morphology that is primitive for *Paralamyctes* (indeed, general for Henicopidae). Further distinction between the New South Wales and Queensland species is provided by the larger teeth on the maxillipede coxosternite in the former, the narrower dental margin, the shorter tarsungulum on the maxillipede (Fig. 11K–M), and the presence of some short antennal articles (Fig. 11H). The differences cannot be attributed to ontogeny (all specimens of *P. neverneverensis* being relatively small) because the specific differences can be discerned in equivalent sized and even smaller specimens of *P. monteithi*. Even the larval stage with 10 legs and two limb-buds (equivalent to the third larval stadium of

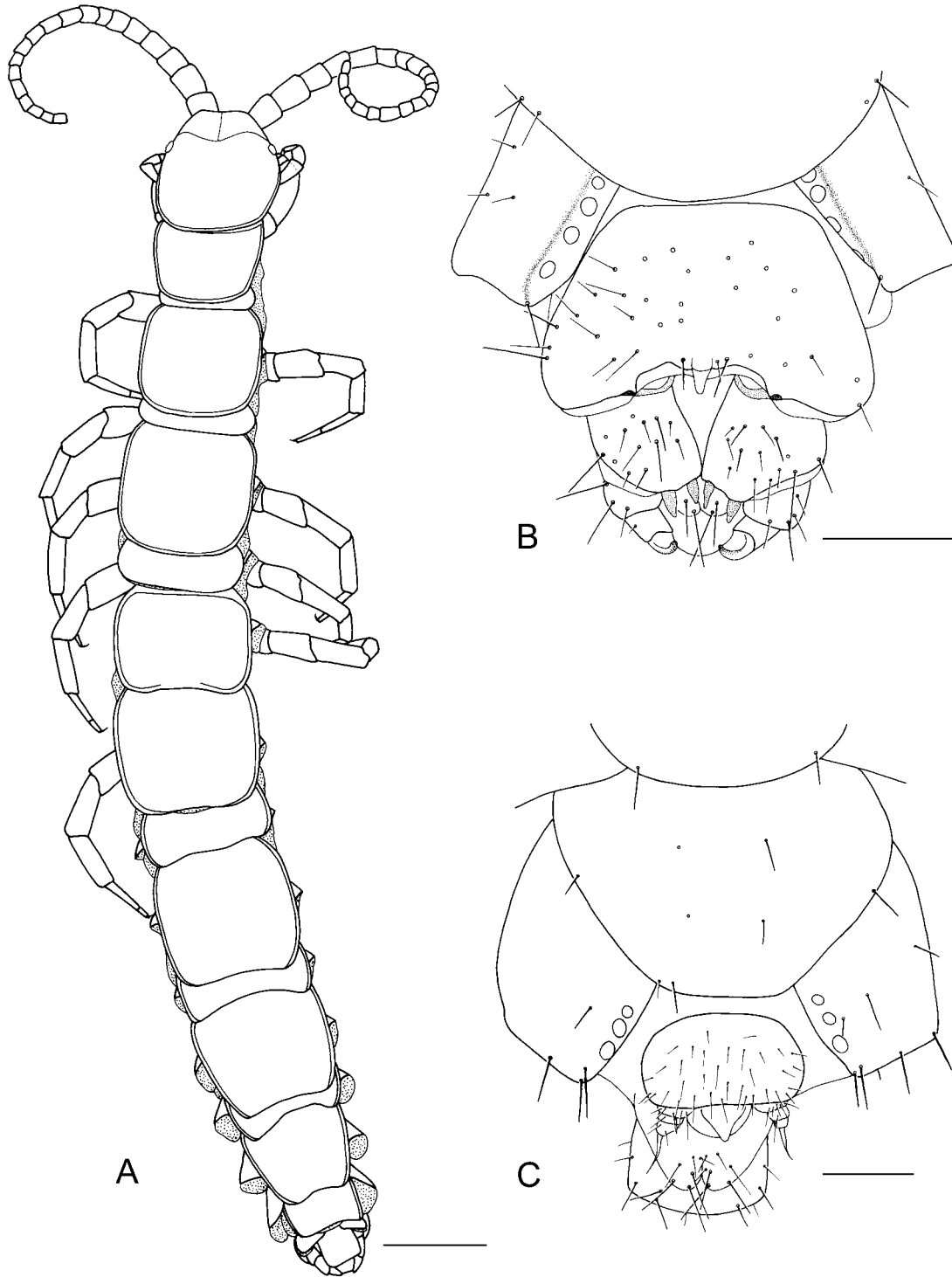


Figure 10. *Paralamyctes (Paralamyctes) neverneverensis* n.sp. A,B, holotype ♀ AM KS 61063, Nana Creek SF, NSW; B, terminal segments and gonopods; scales 1 mm, 0.25 mm. C, paratype ♂ AM KS 57955, terminal segments and gonopods, Dorrigo NP, NSW; scale 0.25 mm.

Lithobius variegatus: Eason 1964) already has a long maxillipede tarsungulum and only 3+3 blunt teeth on the dental margin in *P. monteithi* (QM S45147).

The maxillipede coxosternite in *P. (P.) neverneverensis* is similar in shape to that of *P. (P.) spenceri* from southern Africa, and these species also share larger, more pointed

teeth than are developed in other species of the subgenus. *Paralamyctes neverneverensis* is distinguished from *P. spenceri* by having distal spinose projections on the tibiae of all trunk legs [see Fig. 9 for comparison of anal legs in *P. (Paralamyctes)*] and by having a shorter maxillipede tarsungulum.

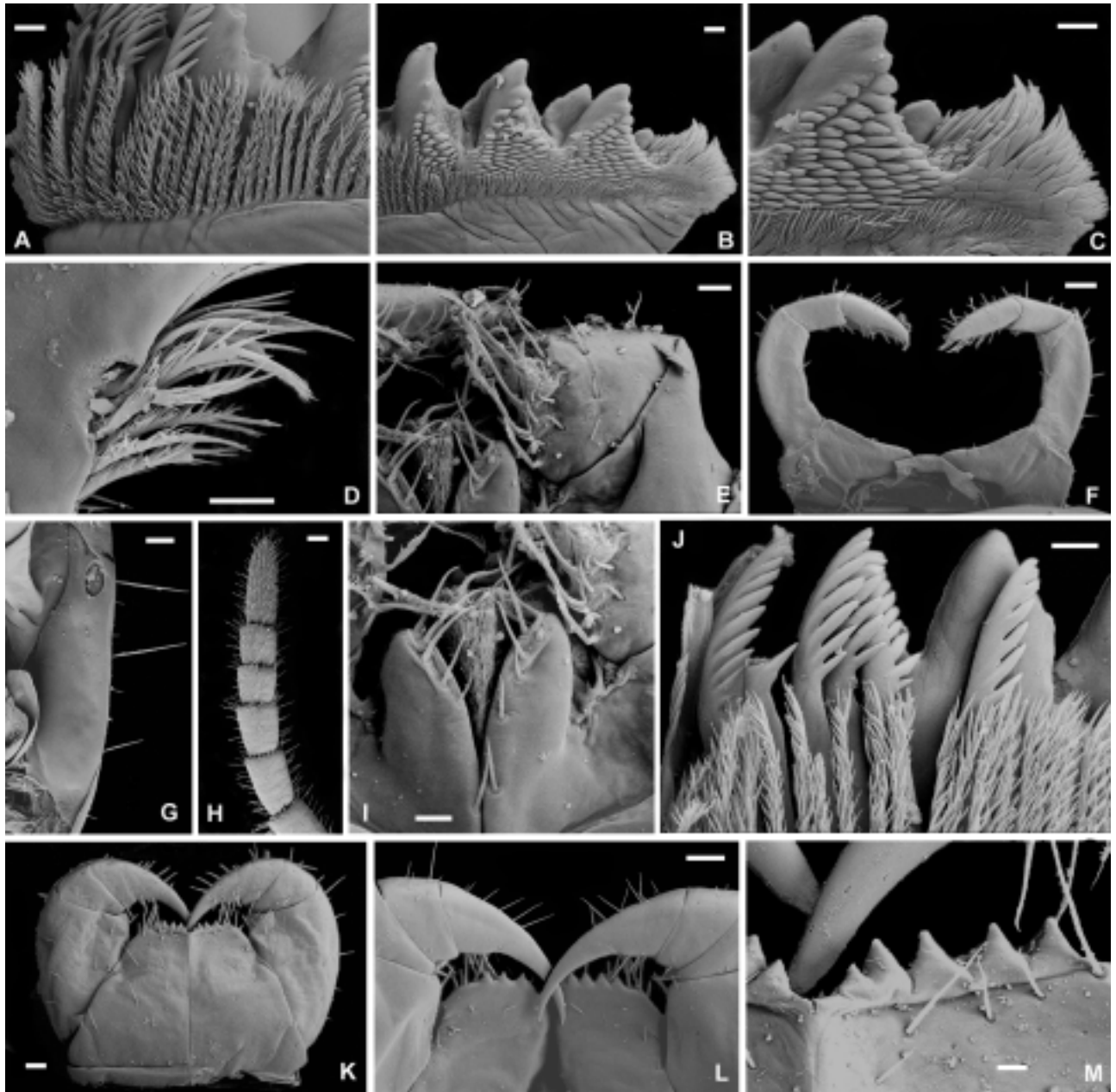


Figure 11. *Paralamyctes (Paralamyctes) neverneverensis* n.sp. ♂ QM S42666, Never Never, Dorrigo NP, NSW. Scanning electron micrographs. A, fringe of branching bristles on mandible, scale 10 μ m; B,C, mandibular teeth and furry pad, scales 10 μ m; D, branching bristles on labral margin, scale 10 μ m; E, telopod of first maxilla, scale 20 μ m; F, second maxillae, scale 100 μ m; G, cephalic pleurite, scale 50 μ m; H, distal articles of antenna, scale 20 μ m; I, coxal processes of first maxilla, scale 20 μ m; J, mandibular aciculae, scale 10 μ m; K, maxillipedes, scale 100 μ m; L,M, dorsal and ventral views of maxillipede dental margin, scales 100 μ m, 20 μ m.

Paralamyctes (Thingathinga) n.subgen.

Etymology. *Thingathinga*, the Yaurorka name for centipede (Johnston, 1943).

Diagnosis. *Paralamyctes* with simple (non-pinnulate) mandibular aciculae; dental margin of maxillipede coxosternum wide, subtransverse, bearing numerous (6–12) small, knob-like teeth; coxal process of first maxilla gently tapering, blunt, with cluster of setae concentrated on tip; articulation between tarsomeres of anterior legs

developed ventrally but fused dorsally; longitudinal median furrow confined to anterior part of sternites.

Type species. *Paralamyctes (Thingathinga) grayi* n.sp.

Assigned species. *Paralamyctes validus* Archey, 1917 (= *P. dubius* Archey, 1917); *Paralamyctes (Thingathinga) hornerae* n.sp.

Distribution. Australia (New South Wales), New Zealand (North and South Islands).

Discussion. *Thingathinga* n.subgen. is endemic to New South Wales and New Zealand. The simple mandibular aciculae that unite species of *Thingathinga* (Figs. 13F, 18K; Edgecombe *et al.*, 2001: fig. 5G) are elsewhere observed in Hemicopidae only in Australian species of *P. (Nothofagobius)*, but a majority of character data suggests independent origins of simple aciculae from bipinnulate aciculae in these two groups. Congruent with simple aciculae in *Thingathinga* are a wide, subtransverse dental margin of the maxillipede that bears at least six small teeth (Figs. 15B,I, 18E), and a blunt and weakly tapering coxal process on the first maxilla (Figs. 14G,H, 15K, 18G). The setae on the tip of the coxal process are segregated from those along the medial margin of the process more so than in the other subgenera of *Paralamyctes*, in which the setae are developed along a sloping anteromedial edge of the coxal process (compare Figs. 14H and 11I, 20G). Species of *P. (Thingathinga)* have weaker tarsal articulations than other *Paralamyctes*, the articulation in anterior legs having a narrow fused region along the dorsal edge. The relatively incomplete median furrow on the sternites in *P. (Thingathinga)* provides a distinction from *P. (Paralamyctes)* in particular.

The subdued tarsal articulations of *P. (Thingathinga)* invite comparison with *Lamyctopristus validus* Attems, 1928, from South Africa, in which a faint trace of a joint is sometimes present on legs 1–12. Assignment of *Thingathinga* to *Lamyctopristus* can be dismissed based on the deep median notch on the maxillipede coxosternite of *L. validus* and *L. granulatus* Lawrence, 1955b, and presence of only three large teeth on the dental margin in both species of *Lamyctopristus*. I have examined the sole specimen of the type species (SAM ENW X7515). Attems (1928) did not describe a small conical node lateral to these teeth in the holotype of *L. validus* that corresponds to the pseudopododont of *Lamyctes*, *Lamyctinus* and *Analamyctes*. The median furrow on the head of *Lamyctopristus validus* terminates just behind the median notch, thus excluding this species from the *Paralamyctes/Haasiella* clade. An alliance between *Lamyctopristus* and *Lamyctes*, *Lamyctinus* and *Analamyctes* is indicated by short antennomeres occurring in pairs between groups of longer antennomeres in the proximal part of the antenna, the subtriangular outline of the maxillipede coxosternite (narrow, curved dental margin), and presence of a pseudopododont (characters 4(1), 11(0), and 14(0), respectively, of Edgecombe *et al.*, 2001).

***Paralamyctes (Thingathinga) grayi* n.sp.**

Figs. 8C,D, 12–14, 15A–G,H–M?, 16A?, 16B

Paralamyctes n.sp.–Edgecombe *et al.*, 1999: 295.

Paralamyctes n.sp.–Edgecombe *et al.*, 2000: fig. 3C,D.

Etymology. For Michael R. Gray, in recognition of his career in terrestrial arthropods at the Australian Museum, and for collecting this species throughout much of its range.

Diagnosis. *Paralamyctes (Thingathinga)* with antenna of 22–29 articles; ocellus weakly convex; mandible with up to 15 simple aciculae; coxal process of first maxilla bearing up to 25 simple setae, usually about 15; 6–12 small teeth

on dental margin of maxillipede coxosternite (most commonly 7+7 at type locality); ventral edge of prefemora commonly recessed; five to eight coxal pores on each of legs 12–15, set in deep grooves and largely concealed by anteroventral face of coxa; coxal pores usually ovate or figure eight-shaped; distal spinose projection on tibia of leg 14 but not 15; short setae abundant on genital sternite and female gonopods; penis small; terminal process on male gonopod short.

Type material. HOLOTYPE AM KS 57912, ♂ (Fig. 12A), from former Scout camp, Mt Keira Fauna Reserve, NSW, 34°24'S 150°50'E, C. Horseman, 20 Nov 1978–17 Jan 1979, pitfall. PARATYPES: all from type locality, C. Horseman and MRG, pitfalls: Australian Museum KS 35607, 4♂♂, 6♀♀, KS 57913, 1♀ (Fig. 15A–E), 14 Nov 1974; KS 35833, 1♂, KS 35835, 4♂♂, 2♀♀, KS 35836, 2♂♂, 1♀, KS 57916, 1♂, KS 57917, 1♂, 2♀♀, KS 57918, 3♂♂, 23 Nov–20 Dec 1978; KS 35834, 1♂, 23 Jun–20 Dec 1978; KS 35837, 2♂♂, KS 35838, 1♂, KS 35839, 7♂♂, KS 35840, 1♂, 17 Jan–14 Feb 1979; KS 35841, 1♂, 1♀, 7 Sep–4 Oct 1979; KS 35858, 1♂ (Fig. 15G), KS 57914, 1♂ (Figs. 13A,B, 14A–C,J,K, 15F), KS 57915, 1♀ (Figs. 13F, 14D–F,L), 31 Jan 1979; KS 35860, 1♂, KS 35863, 1♂, KS 35866, 1♂, KS 35868, 2♀♀, 14 Mar–11 Apr 1979; KS 57919, 2♂♂, 1♀, KS 57920, 6♂♂, 1♀, 20 Nov 1978–17 Jan 1979; KS 57921, 6♂♂, 1♀, 23 Nov–20 Dec 1978; KS 41430, 1♀ (Fig. 16B), KS 57922 (Figs. 13C–E,G–M, 14G–I), KS 57923, 1♂ (Fig. 12C), KS 57924, 1♀ (Fig. 12B), KS 57925, 9♂♂, 6♀♀, KS 57926, 1♂ (Fig. 14M), KS 57927, 6♂♂, 1♀, 20 Nov 1978–17 Jan 1979; KS 57928, 6♂♂, 6♀♀, 14 Feb 1979; KS 57929, 1♂, 14 Mar–11 Apr 1979; KS 57930, 1♂, 1♀, 11 Apr–17 Jun 1979; ANIC, 1♀, Mt Keira Scout camp, 320 m, L.C. Calder, 4–5 Mar 1981, litter Berlese.

Other material. ILLAWARA: AM KS 57931, 2♀♀, KS 57932, 2♂♂, 1♀ (DNA voucher specimens), KS 58466, 9♂♂ (Fig. 8C,D), 6♀♀, Mt Barrengrarry, 6.8 km N of Hampden Bridge, 34°42'S 150°30'E, GDE and ZJ, 2 Mar 1997, 13 Nov 1997, 30 Sep 2000, rainforest; CAS, 5♂♂, 5♀♀, Robertson, 760 m, E.S. Ross and D.Q. Cavagnaro, 8 Dec 1962. BUDAWANG RANGE: AM KS 57933, 2♂♂, Budawang NP, Clyde Mountain, 35°33'S 149°57'E, GDE and ZJ, 2 Jan 2000, hand collected in litter, open eucalypt forest. BLUE MOUNTAINS: AM KS 35600, 1♀, KS 35826, 1♂, KS 35828, 1♂, KS 35861, 2♂♂, KS 35865, 2♂♂, KS 57934, 5♂♂, Cathedral of Ferns, Mt Wilson, 33°30'S 150°23'E, MRG and C. Horseman, Jun 1978–Jun 1979, pitfall; KS 30391, 1♂, Kanangra-Boyd NP, Boyd Plateau, 33°44'S 150°25'E, MRG, 15 May 1971; AM KS 57935, 1♂ and 1♀, road to Ingar picnic area, 33°46'05"S 150°24'30"E, Australian Museum Business Services, 3 Oct 1996; AM KS 57936 (DNA voucher specimen), Ingar picnic area, 33°46'S 150°28'E, GDE, G. Giribet and ZJ, 21 Apr 2000. BARRINGTON TOPS: AM KS 57937, 1♀ (Fig. 16A), Chichester SF, Mt Allyn Rd, adjacent to Mt Allyn Forest Park, 32°07'04"S 151°25'33"E, 970 m, GC and MRG, 4 Feb–9 Apr 1993, pitfall; AM KS 57938, 1♂, from Chichester SF, 1.8 km N of ford on Karuah River on Karuah River Rd, 32°05'58"S 151°43'18"E, GC and MRG, 4 Feb–9 Apr 1993, pitfall; AM KS 57939, 1♂, Barrington Tops SF, W of junction of Thunderbolts Track and Devils Hole Track, 31°54'S 151°28'E, 1420 m, MRG and GC, 4 Feb–9 Apr 1993, pitfall; AM KS 57940, 1♀ (Fig. 15H–M; DNA voucher specimen), Chichester SF, Mt Allyn Forest Park, GDE and ZJ, 16 Mar 1999, rainforest.

Description. Length up to 32 mm; length of head shield up to 3.3 mm. Antennae and maxillipedes bright orange, antennae lighter distally; head shield and tergites mottled orange-brown, with darker pigment concentrated near

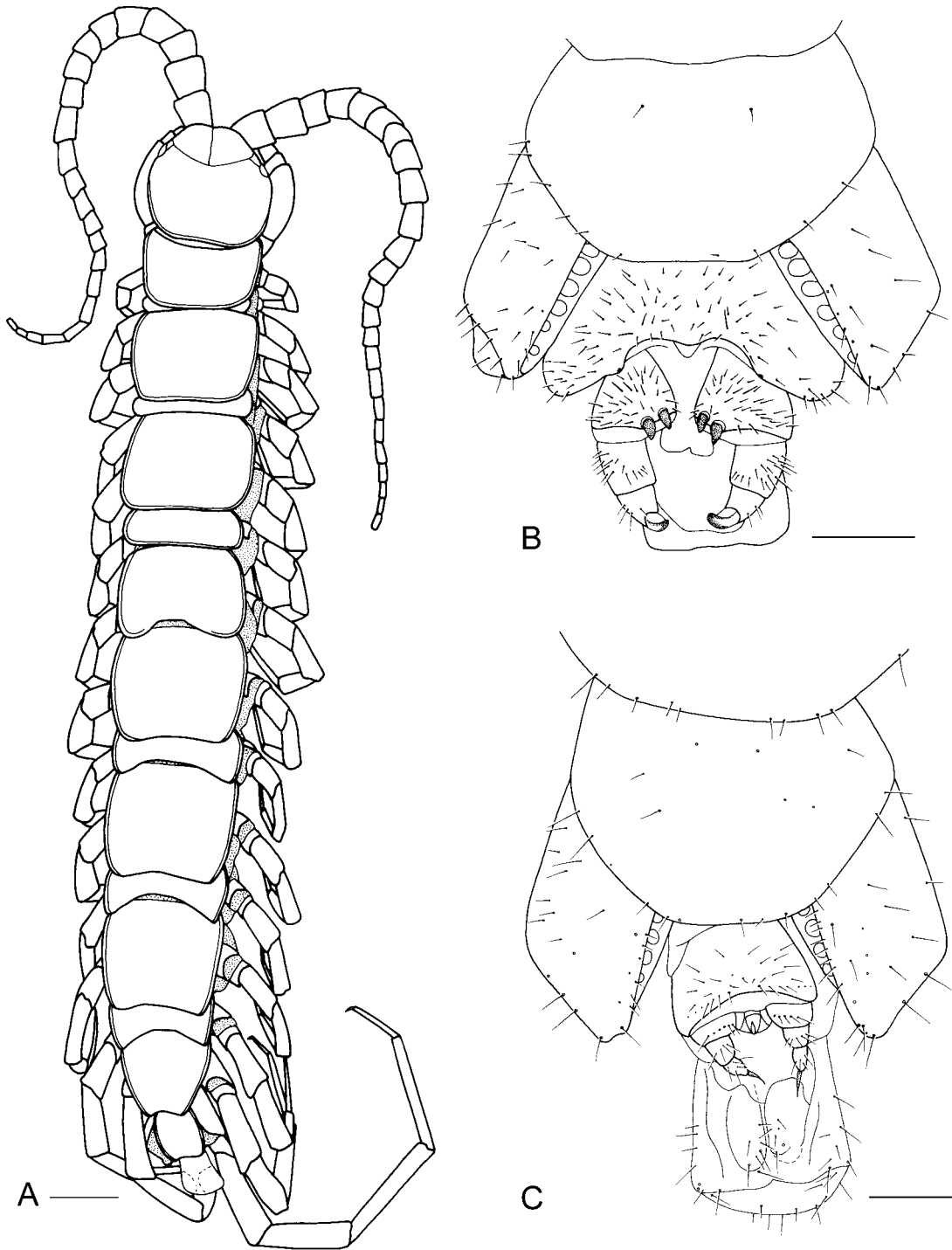


Figure 12. *Paralamyctes (Thingathinga) grayi* n.sp. Mt Keira Fauna Reserve, NSW. A, holotype ♂ AM KS 57912. Antennae incomplete distally; scale 2 mm. B, paratype ♀ AM KS 57924, terminal segments and gonopods; scale 0.5 mm. C, paratype ♂ AM KS 57923, terminal segments and gonopods; scale 0.5 mm.

lateral and posterior borders; sternites mottled, predominantly yellowish or light orange in anterior segments, darker orange-brown in posterior segments; legs relatively uniformly orange, pigmentation of tarsus only slightly deeper than tibia.

Head shield smooth. Frontal margin with strong, short median notch (Fig. 12A); posterior margin gently concave. Median furrow extends back to transverse suture, length

about 30% that of head shield, deep throughout. Antenna extending back to T5 or T6 (Fig. 12A); 22–29 antennal articles, most commonly 23 at Mt Wilson (range from 22–28), 25 at Mt Keira (range 23–29); basal two articles large, succeeding six or so of similar length and width, some wider than long (Figs. 13B, 15C), more distal articles considerably longer than wide; distal article variably longer than preceding one, typically about 40% longer; antennal articles

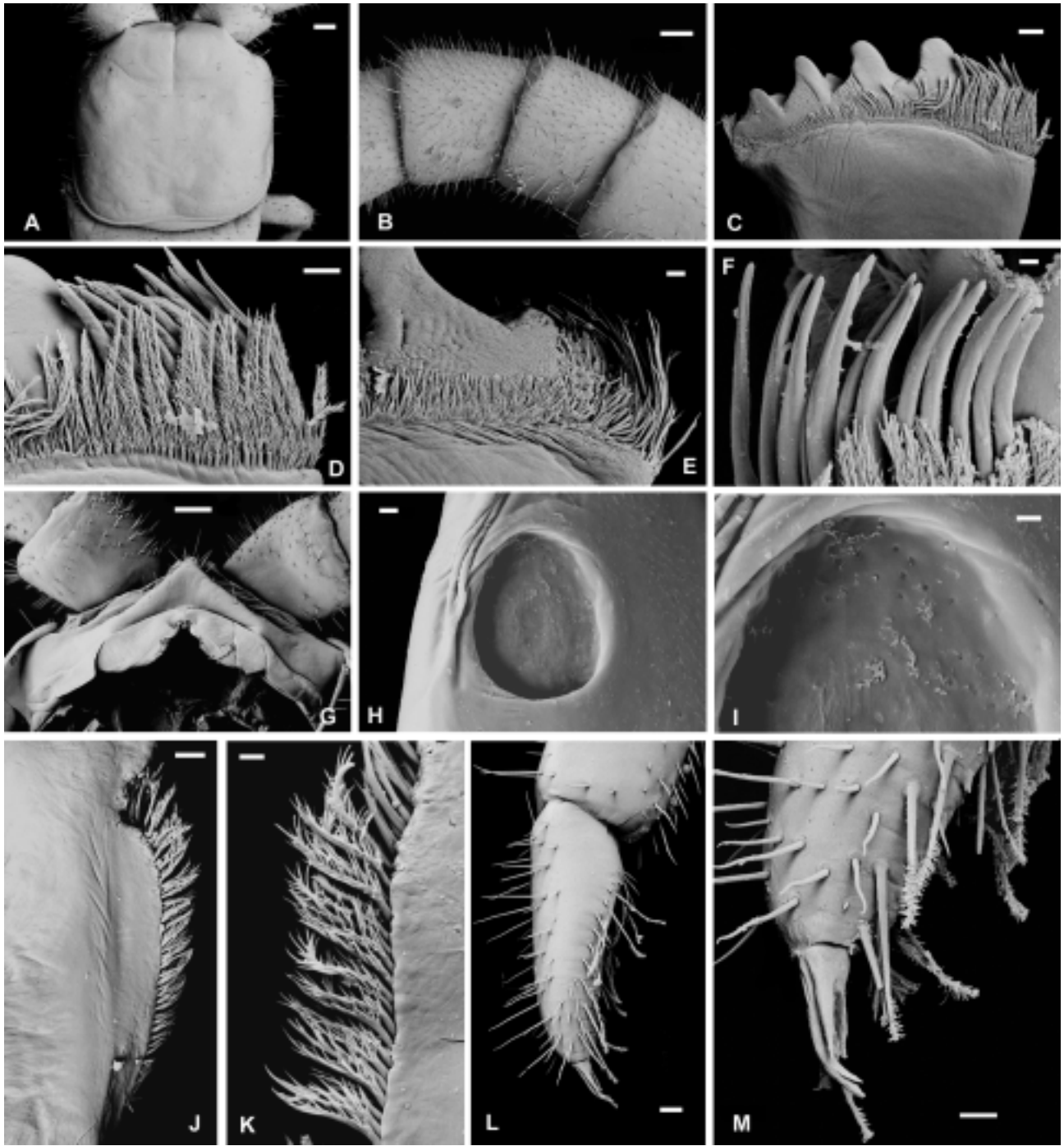


Figure 13. *Paralamyctes (Thingathinga) grayi* n.sp. Mount Keira Fauna Reserve, NSW. Scanning electron micrographs. A,B, ♂ AM KS 57914. A, head shield, scale 300 μ m; B, proximal antennal articles, scale 200 μ m. C–E,G–M, AM KS 57922. C, gnathal lobe of mandible, scale 50 μ m; D, fringe of branching bristles and aciculae of mandible, scale 30 μ m; E, furry pad on mandible, scale 10 μ m; G, ventral view of head, scale 300 μ m; H,I, Tömösváry organ, scales 10 μ m, 5 μ m; J,K, labral margin and detail of branching bristles on margin, scales 30 μ m, 10 μ m; L,M, distal part of telopod of second maxilla, scales 60 μ m, 30 μ m. F, ♀ AM KS 57915, mandibular aciculae, scale 10 μ m.

densely, finely setose, with distinctly longer setae (ridged trichoid sensilla) encircling distal edge (Fig. 13B); basal articles with sparser, more robust setae (Figs. 13G, 14A). One to three (usually two) finger-shaped thin-walled basiconic sensilla (Fig. 8D) and one to four (usually two or three) shorter, conical thick-walled basiconic sensilla at

anterior edge of antennal articles (Fig. 8C); cluster of thick-walled basiconic sensilla (*blasse Borsten*) at tip of distal article; stop (*Kragen*) at base of trichoid sensilla as described for *P. (P.) monteithi*. Ocellus whitish, gently bulging. Tömösváry organ moderately large, ovate, with outer edge at margin of cephalic pleurite (Figs. 13H, 14J), membranous

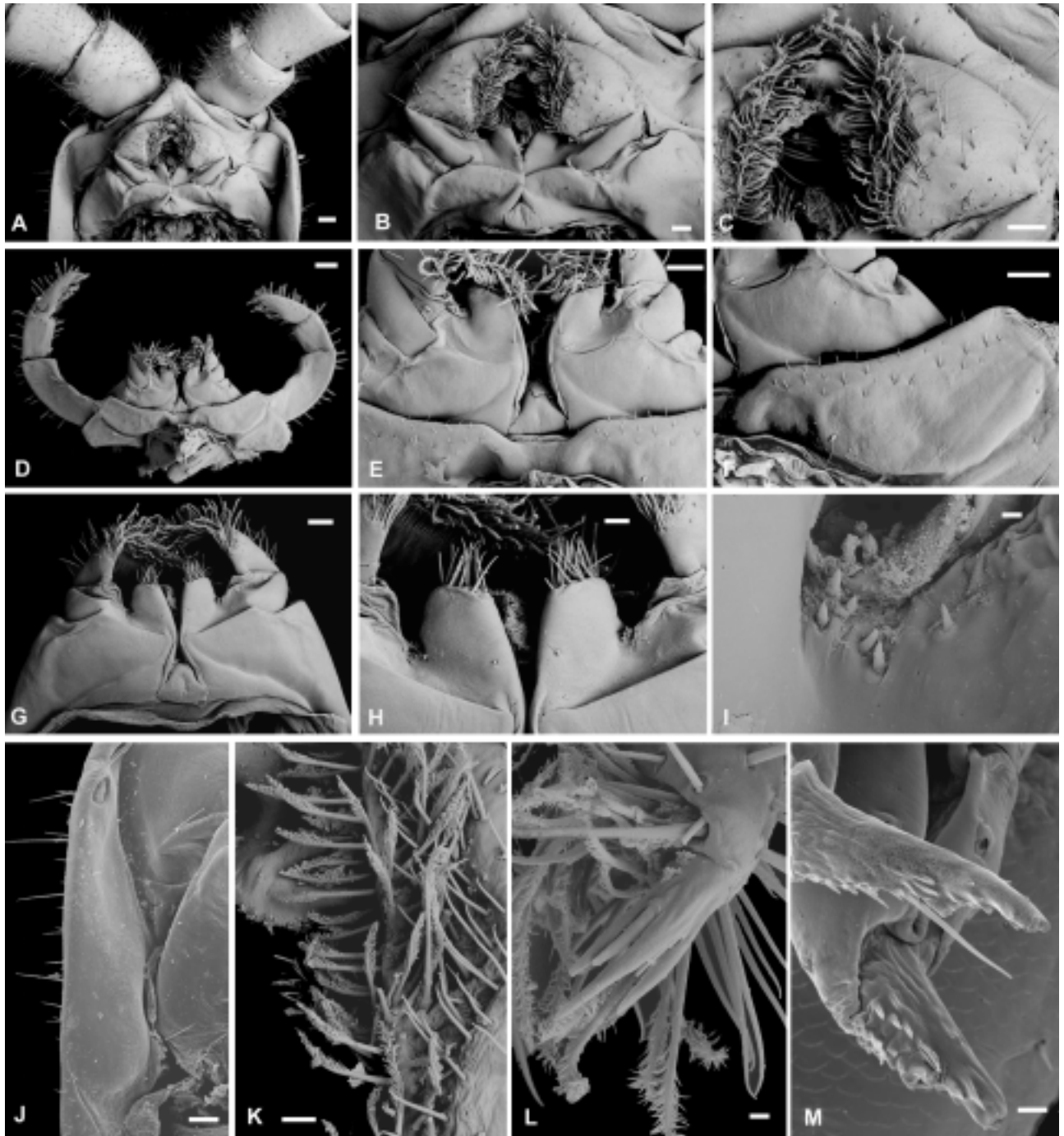


Figure 14. *Paralamyctes (Thingathingia) grayi* n.sp. Mount Keira Fauna Reserve, NSW. Scanning electron micrographs. A–C, J, K, ♂ AM KS 57914. A, ventral view of head, scale 200 µm; B, C, first maxillae and detail of distal article of telopod, scales 100 µm; J, cephalic pleurite, scale 100 µm; K, pectinate setae on inner margin of distal article of first maxillary telopod, scale 30 µm. D–F, L, ♀ AM KS 57915. D, maxillae, scale 200 µm; E, first maxillae and coxosternite of second maxillae, scale 100 µm; F, coxa of second maxilla, scale 100 µm; L, tarsus and claw of second maxilla, scale 10 µm. G–I, AM KS 57922. G, first maxillae, scale 100 µm; H, coxal processes of first maxillae, scale 50 µm; I, basiconic sensilla between coxal process and telopod of first maxilla, scale 5 µm. M, ♂ AM KS 57926, gonopod flagellum, scale 10 µm.

medially, numerous small pores (openings of gland ducts) scattered around edges of inner surface (Fig. 13I). Head shield sparsely setose, two pairs of setae on frontal margin outside median notch, a few setae around ocellus and along lateral border.

Tergites nearly smooth. T1 trapeziform, smaller than T3, very slightly narrower than head shield (Fig. 12A), about 90% width of widest tergite (T8), posterior angles rounded and posterior margin faintly concave; lateral borders subparallel anteriorly in TT3 and 5, posterior angles

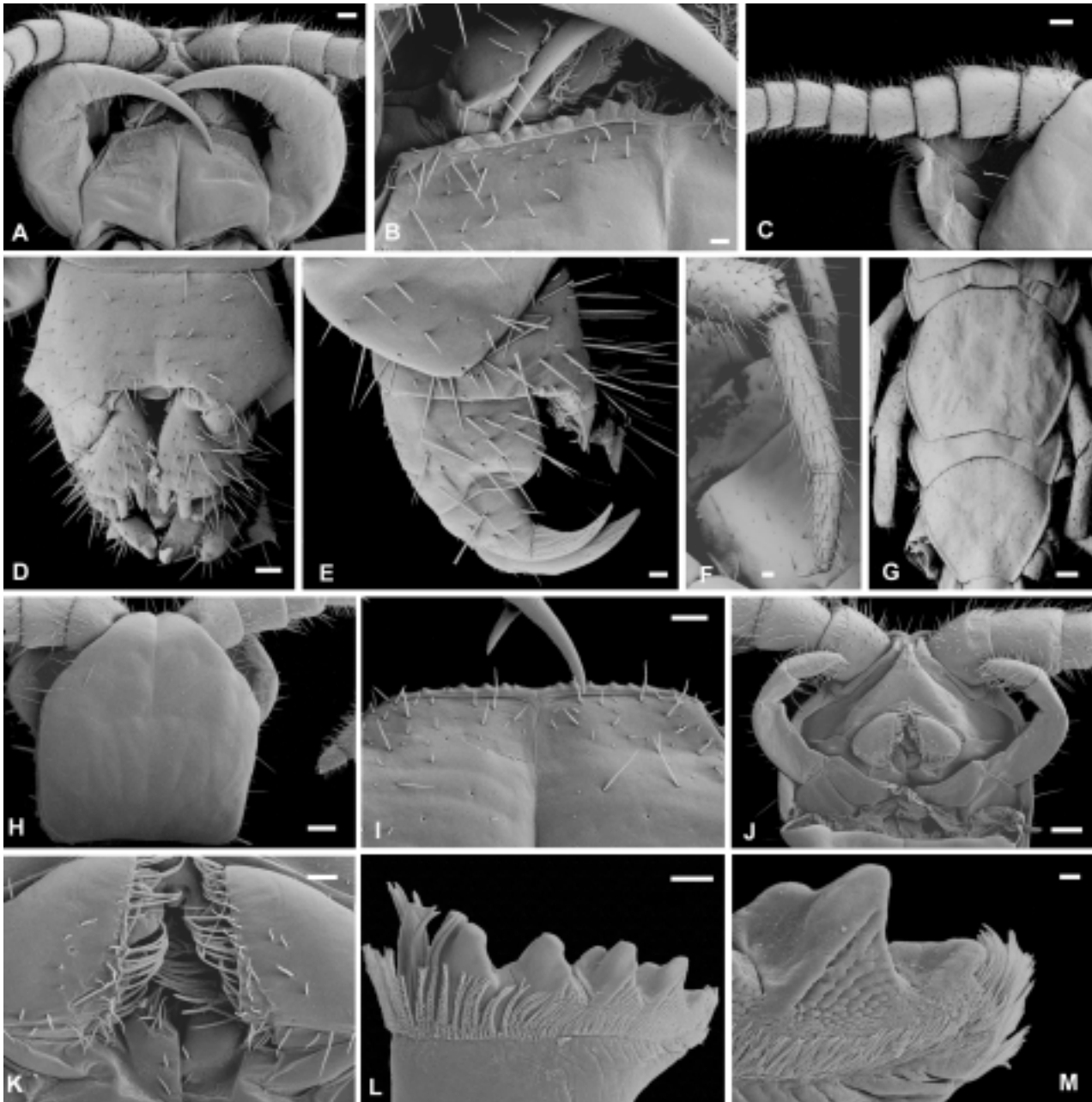


Figure 15. A–G, H–M?, *Paralamyctes (Thingathingia) grayi* n.sp. A–G, Mount Keira Fauna Reserve, NSW. A–E, ♀ AM KS 57913. A, ventral view of head, scale 200 µm; B, dental margin of maxillipede coxosternite, scale 50 µm; C, proximal part of antenna, scale 200 µm; D, sternite of first genital segment and gonopods, scale 100 µm; E, gonopods, scale 40 µm. F, ♂ AM KS 57914, tibia, tarsus and pretarsus of leg 1, scale 60 µm. G, ♂ AM KS 35858, tergites 10–14, scale 400 µm. H–M, ♀ AM KS 57940, Chichester SF, Barrington Tops, NSW. H, head shield, scale 200 µm; I, dental margin of maxillipede coxosternite, scale 100 µm; J, ventral view of head to show maxillae, scale 200 µm; K, telopods and coxal processes of first maxillae, scale 50 µm; L, gnathal lobe of mandible, scale 50 µm; M, accessory denticles and furry pad on mandible, scale 10 µm.

rounded, posterior borders weakly concave; TT1, 3 and 5 bordered posteriorly; lateral border of T7 gently convergent posteriorly, border incomplete posteriorly, posterior margin with pronounced embayment, transverse or slightly convex across medial quarter of width; TT8–14 bordered laterally; posterior margin of T8 gently concave, posterior angle rounded, TT10 and 12 more concave posteriorly, posterior angles form obtuse, sharp corners; TT9 and 11 embayed,

with transverse posteromedial third; posterior angle of T9 blunt, TT11 and 13 angular; lateral margin of T14 convex, posterior margin concave (Fig. 15G); tergite of intermediate segment elongate subhexagonal, slightly wider in females, posterior margin concave in both sexes; no tergites toothed at posterior angles. TT3, 5 and 7 with most abundant setae on anterior/anterolateral part, sparsely setose elsewhere except for numerous short setae along lateral borders

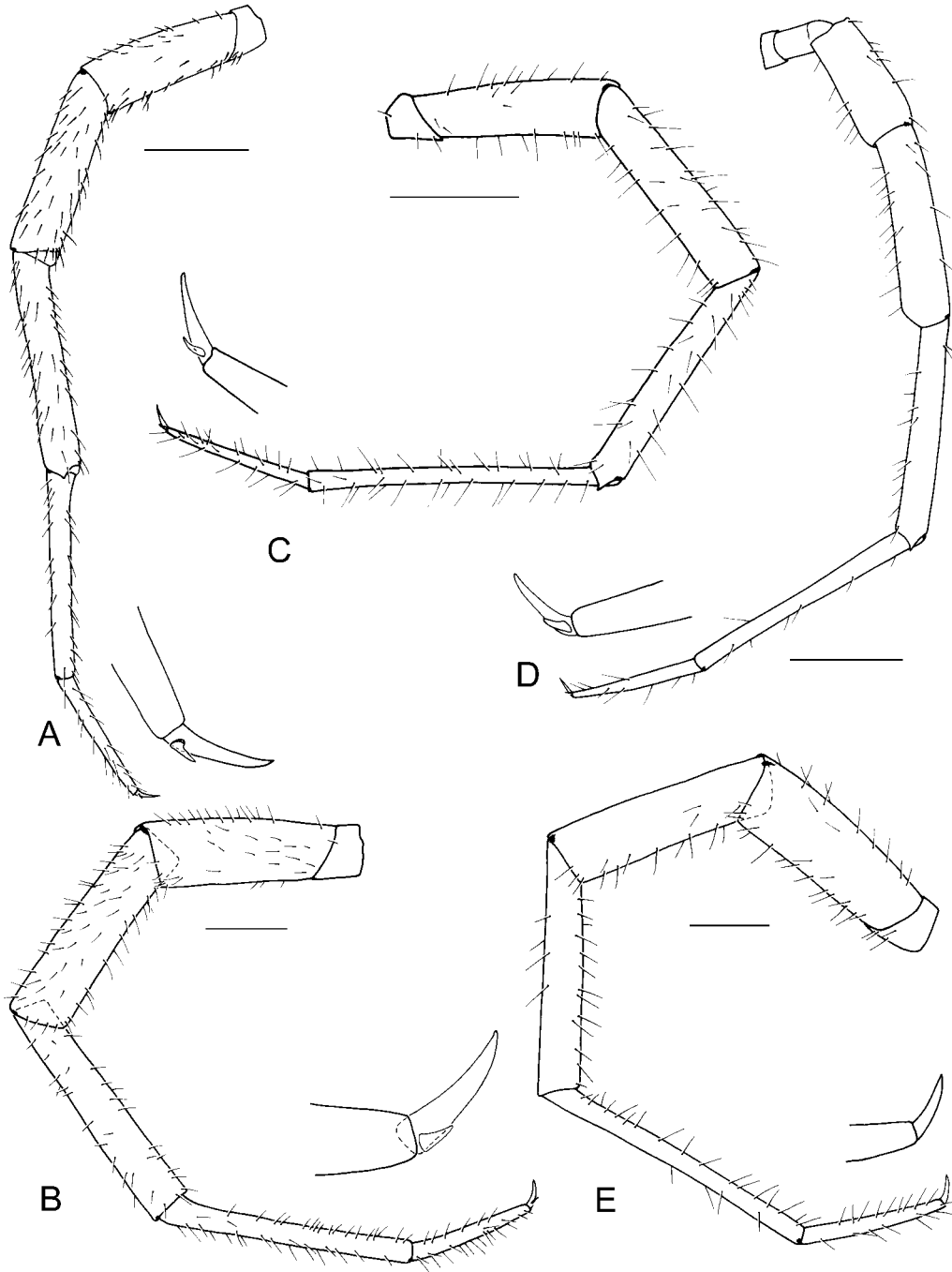


Figure 16. Anal legs of *Paralamyctes* (*Thingathingia*) and *P. (Nothofagobius)*, with details of pretarsi. A, *P. (Thingathingia) ?grayi* n.sp., ♀ AM KS 57937, Chichester SF, Barrington Tops, NSW. B, *P. (Thingathingia) grayi* n.sp., ♀ AM KS 41430, Mt Keira Fauna Reserve, NSW. C, *P. (Nothofagobius) mesibovi* n.sp., QVMAG 23/23009, holotype ♀, Wombat Hill, Waratah, Tasmania. D, *P. (Nothofagobius) cassisi* n.sp., ♂ QM S42670, Gibraltar Range NP, NSW. E, *P. (Nothofagobius) chilensis* (Gervais in Walckenaer & Gervais, 1847), ♀ ZMUC, Colonia Suiza, San Carlos de Bariloche, Argentina. Scales 1 mm except E, 0.5 mm.

(present on all tergites); setae more evenly scattered over surface of posterior long tergites (Fig. 15G).

Transverse seta projects medially from labral sidepiece. Labral margin with rounded shoulder beside midpiece, with marked break in curvature where dense fringe of branching bristles overhangs margin (Fig. 13G,J); bristles generally branch as uneven, elongate bifurcations along nearly their entire length (Fig. 13K).

Dental margin of maxillipede coxosternite broad, each half approximately straight, gently sloping backwards laterally, set off by transverse furrow (Fig. 15B); teeth small, blunt, 6–10 teeth per margin, most commonly 7, in Mt Keira sample; 7–12 teeth per margin, most commonly 9, in Mt Wilson sample; median notch in coxosternite shallow or lacking; maximum length of coxosternite 60% of its maximum width (Fig. 15A); setae concentrated on anterior/

anterolateral part of coxosternite, longer anterolaterally. Duct of poison gland short, extending to anterior one-third of tibia, tubular. Tarsungulum long, slender (Fig. 15A). Setae on forcipule concentrated on inner part of trochanteroprefemur, femur and tibia and scattered over tarsal part of tarsungulum.

Mandible: Trunk with single fissure defining lamina condylifera. Four paired teeth (Fig. 13C), small, unpaired fifth tooth dorsally on one side. Outer fringe of bifid bristles skirts aciculae, evenly shortening dorsally to a narrow band, with branches along entire length of each bristle (Fig. 13D). 12–15 curved aciculae, all lacking marginal branchings (Fig. 13F). Accessory denticle field delimited by strong groove on two or three dorsal teeth; largest denticles tubercle-like, grading into rod-shaped scales then small elongate scales near fringe of branching bristles. Furry pad strongly differentiated from accessory denticles / gnathal lobe, developed as an isolated cluster of bristles with a few short branchings (Fig. 13E).

First maxilla: Bell-shaped sternite of typical size for genus, anterolateral margins against narrow unsclerotised strip on inner edge of coxa, sternite and coxa separated by strong suture just in front of posterior margin of maxilla (Fig. 14B,E,G). Coxal process with blunt, transverse tip bearing dense cluster of 14–25 simple, ridged setae (Fig. 14H); cluster of about seven tiny, barb-like basiconic sensilla between coxal process and telopod (Fig. 14I). Distal article of telopod with two rows of long, plumose setae along inner margin (Fig. 14C); branches developed along distal half of these setae (Fig. 14K); numerous relatively short, simple setae on inner half of distal article, longer simple setae on lateral part, separated by a non-setose patch (Fig. 14C).

Second maxilla: Sternite small, trapezoidal, fused with coxae (Fig. 14D,E). Short setae along anterior part of coxa relatively weakly developed (Fig. 14F). Tarsus bearing straight, ridged setae on outer surface, many plumose setae on inner surface (Fig. 13L); branches on plumose setae mostly along less than half of length (Figs. 13M, 14L). Claw composed of four or five digits, with median digit enlarged (Fig. 14L).

Strong, sharp distal spinose projection on tibiae of legs 1–14. Femur and femur with rather evenly scattered setae on anterior and posterior faces as well as dorsally, setae longest against ventral prefemoral recess; fringe of numerous setae encircling distal margin of femur; tibial setae mostly shorter, of varied thickness, slightly thicker seta at ventrodorsal end of tibia; tarsal setae fine, of varied length, aligned as two rows on ventral margin without precise pairing of larger setae. Articulation between tarsomeres relatively strong on anterior legs (Fig. 15F), indistinct along a narrow extent on dorsal edge, typically preserved with substantial flexure. Distitarsus 50 to nearly 60% length of basitarsus on anal leg; anal leg basitarsus 9–10 times longer than broad (Fig. 16B). Pretarsal claws relatively long, curved; pair of accessory claws symmetrical, 25–30% length of main claw (Fig. 16B).

Longitudinal median furrow confined to anterior part of sternite, not extending past anterior third even in posteriormost sternites. Sternites sparsely setose, most consistent setae in a transverse band across anterior third and along anterolateral and posterolateral margins. Posterior margins of sternites usually convex.

Coxal pores: 5–8 pores (most commonly 6 or 7) on each of legs 12–15; most coxal pores ovate, in larger specimens some pores slightly constricted medially or figure eight-shaped; coxal pore field in deep groove, separated from anteroventral face of coxa by sharp fold (Fig. 12B,C).

Male (Fig. 12C): Sternite of segment 15 transverse or gently convex posteriorly, with rounded posterolateral corners. Sternite of first genital segment bearing numerous short setae scattered on posterior two-thirds, more abundant along posterior edge, with well-defined transverse row of setae just in front of posterior margin; sternite undivided medially. Gonopod of three articles and tapering, seta-like (exceptionally bifurcate) terminal process, the three articles bearing 5–7, 4–5, and 4–8 short setae (proximally to distally); setae on proximal two articles in a transverse row; terminal process short, about as long as third article of gonopod, with numerous slender barb-like projections concentrated in a narrow band along one side (Fig. 14M). Penis a small, conical projection, extending about as far back as articulation between first and second articles of gonopod.

Female (Fig. 12B): Sternite of segment 15 transverse posteromedially. Tergite of first genital segment and telson strongly sclerotised, telson typically with a lightly sclerotised band medially, scattered with short setae. Sternite of first genital segment large, with posterior margin concave between condyles at which gonopods articulate (Fig. 15D); short, rounded medial bulge variably developed in this concavity; nearly entire surface of sternite bearing abundant, short setae. First article of gonopod bearing two bullet-shaped spurs, the inner spur slightly smaller; gonopods bearing many short setae, including a few on third article. Claw undivided (Fig. 15E), with numerous elongate ridges externally and internally.

Discussion. The most distinctive characters of this species are the abundance of small, blunt teeth on the maxilliped coxosternite, the weakly convex ocellus (flattened in *P. hornerae*; more domed in *P. validus*), small penis, short terminal process on the male gonopod, and the deep grooves in which the coxal pores are set.

The only consistent difference that has been detected between specimens from the Illawara region (Mt Keira and Mt Barrengarry) and those from the Blue Mountains (Mt Wilson and Boyd Plateau) is the yellow-brown colour of the preserved specimens from the Blue Mountains, versus orange-brown for the Illawara specimens. Blue Mountains specimens have a higher modal number of teeth on the maxilliped coxosternite (nine teeth is most common versus seven in the Illawara material), though the observed range overlaps completely.

Specimens of *Paralamyctes* (*Thingathinga*) from the Barrington Tops share several distinctive (derived) characters with typical *P. grayi*, notably the abundant small teeth on the maxilliped coxosternite (6–10 in Barrington Tops specimens; Fig. 15I), the strong embayment of the posterior margin of the seventh tergite, and the weakly convex ocellus (Fig. 15H). However, the embedding of the coxal pores in a groove that is observed in other parts of the species' range is inconsistently developed in specimens from the Barrington Tops. The only Barrington Tops specimen with the anal leg preserved displays a distal

spinose projection on the tibia (Fig. 16A), a feature otherwise unrecorded in *P. grayi* (Fig. 16B), and both males from the Barrington Tops have fewer coxal pores than any specimens from the Blue Mountains, Illawara or Budawang Range (3455/4554 and 3444/2444). It is likely that the Barrington Tops material represents a distinct species closely related to *P. grayi*, but the few available specimens do not permit confident diagnosis, particularly given the limited data on the anal leg. The description of *P. grayi* above excludes the Barrington Tops specimens.

Among previously described species, most closely allied to *Paralamyctes (Thingathinga) grayi* is *P. validus* Archer, 1917, a widespread species in New Zealand (ranging from the Waitakere Ranges and islands off Auckland on North Island to Queenstown on South Island). With *P. grayi*, *P. validus* shares coxal pores that are set in deep grooves, largely concealed by the anteroventral face of the coxa, and a proliferation of small teeth on the dental margin of the maxillipede coxosternite. Compared to *P. validus*, *P. grayi* has stronger articulations between tarsomeres (Fig. 15F), blunter teeth on the maxillipede dental margin (Fig. 15B), a narrower dorsal section of the fringe of branching bristles on the mandible (Fig. 13E), and a distinctive embayment of the margin of tergite 7 (Fig. 12A).

The morphology and distribution of basiconic sensilla on the antenna described for *P. (T.) grayi* and *P. (P.) monteithi* (Fig. 8) are identical with those in *Lithobius* (Rilling, 1968: fig. 36C,D; Lewis, 1981: fig. 88). Such similarity between Hemicopidae and Lithobiidae suggests that details of these sensilla may provide synapomorphies for Lithobiomorpha (e.g., discrete clusters of thick- and thin-walled basiconic sensilla at the anterior margin of the antennal articles).

***Paralamyctes (Thingathinga) hornerae* n.sp.**

Figs. 17, 18

Etymology. For B. Elizabeth Horner, who sponsored the description of this species.

Diagnosis. *Paralamyctes (Thingathinga)* with 20–22 antennal articles; ocellus flattened; dental margin of maxillipede coxosternite nearly transverse, lacking median notch, with 6–8 small teeth on each side; few (4–6) setae on tip of coxal process of first maxilla; faint trace of articulation defining tarsomeres on legs 1–12.

Type material. HOLOTYPE AM KS 57941, ♂ (Fig. 17A,C), bottom end of Cliffs Trail, about 3.8 km NE of Oxley Rd, Styx River SF, NSW, 30°33'S 152°21'E, 1180 m, MRG and GC, Feb 4–Apr 9 1993, pitfall. PARATYPES: AM KS 57942 (Fig. 17B), 57943 (Fig. 18), 2 ♀ ♀, from type locality, same collection.

Description. Length up to 17 mm; length of head shield up to 1.4 mm. Tergites (of specimens in 70% ethanol) yellowish brown or mauve, darker posteriorly; antennae and maxillipedes yellow; prefemur to tibia mauve, particularly on posterior legs of trunk; tarsi yellow.

21/22 and 21/20 antennomeres in specimens with

complete antennae; basal two articles stout, with long setae, rest of antenna with uniform dense, shorter setae, longer setae encircling distal end of each article; many articles not substantially longer than wide, even in distal part of antenna. Median furrow deep to transverse suture. Ocellus indicated by faint convexity and subdued pigmentation, margins obscure. Tömösváry organ at anterolateral edge of cephalic pleurite, moderately large (size, position and shape as for *P. grayi*).

Tergites smooth; shapes, proportions and borders (Fig. 17A) as described for *P. grayi*.

Labral margin transverse adjacent to midpiece, then abruptly flexed backward where fringe of bristles overhangs margin (Fig. 18C); bristles irregularly pectinate (Fig. 18J), branching along entire fringe.

Dental margin of maxillipede nearly transverse, each half faintly convex forwards, bearing 6–8 small, blunt teeth, median notch absent (Fig. 18E); dental margin delimited by pronounced transverse furrow; coxosternite broadly trapezoidal, maximum length 60% of maximum width (Fig. 18D); anterolateral corner of coxosternite bearing a few long setae, shorter setae on anteromedial part; median suture shallowed anteriorly; tarsungulum relatively long and slender.

Mandible: Four paired teeth (Fig. 18A). Outer fringe of pectinate bristles with short branches along entire length of each bristle (Fig. 18B); eight simple, sickle-shaped aciculae lacking marginal pinnules (Fig. 18K); furry pad composed of dense seta-like processes that bifurcate or trifurcate near their tips.

First maxilla: Sternite triangular, size and sutures as in *P. grayi* (Fig. 18F). Coxal process with cluster of 4–6 simple setae clustered at tip, one strong seta towards base (Fig. 18G). Distal article of telopod with evenly scattered simple setae, pairs of plumose setae aligned on inner margin.

Second maxilla as described for *P. grayi*; pretarsus of five digits (Fig. 18H).

Distal spinose projection on tibia of legs 1–14; anal leg unknown. Tarsi 1–12 entirely unflexed, faint trace of articulation at 55–60% of length. Setae on legs as in similar sized specimens of *P. grayi* except for slightly finer tibial setae (Fig. 18L); tarsal setae uniformly fine. Pretarsal claws relatively long, curved; pair of accessory claws symmetrical, about 40% length of main claw (Fig. 18M).

Longitudinal median furrow extends to midlength of posterior sternites.

Coxal pores on legs 12–15 round, 2344/2444 in male, 3455/4555 and 3445/3555 in females; pore rows in shallow grooves.

Male (Fig. 17C): Short setae evenly scattered on sternite of first genital segment. Three setae encircling distal end of first segment of gonopod; one seta on second article; third article slightly elongated, bearing a few setae; terminal process long, flagelliform. Penis small, conical, about as long as first article of gonopod.

Female (Fig. 17B): Two spurs on basal article of gonopod; spurs bullet-shaped, pointed, dorsal surface concave; inner spur smaller than outer one (Fig. 18I); third article of gonopod lacking setae.

Discussion. *Paralamyctes hornerae* differs from all congeneric species in having only faint tarsal articulations on legs 1–12. These articulations do not demonstrate any

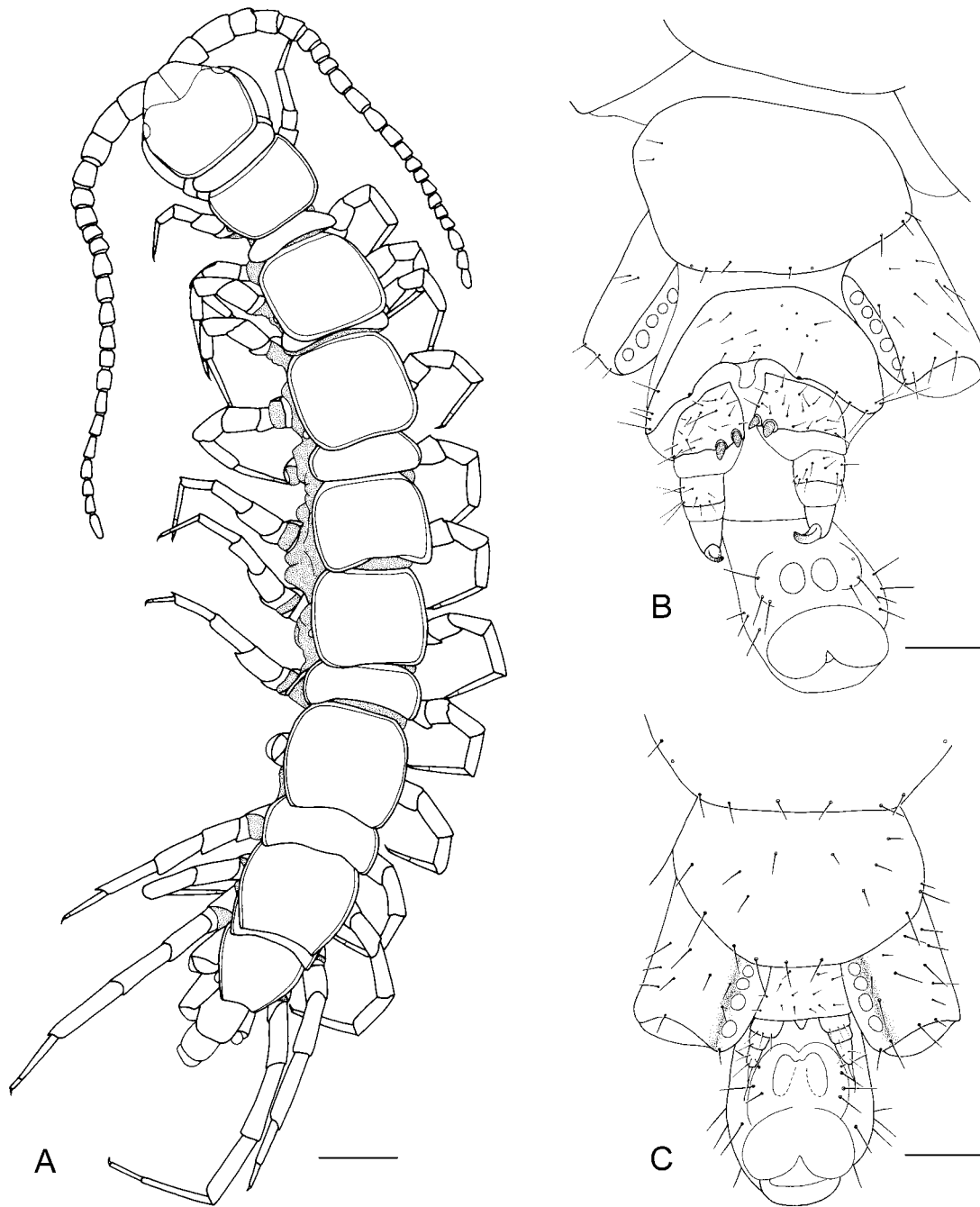


Figure 17. *Paralamyctes (Thingathinga) hornerae* n.sp. Cliffs Trail, Styx River SF, NSW. A.C, holotype ♂ AM KS 57941; C, terminal segments and gonopods; scales 1 mm, 0.25 mm. B, paratype ♀ AM KS 57942, terminal segments and gonopods; scale 0.25 mm.

flexure and are evidently non-functional. A possible relationship to *Haasiella* could be considered based on the weak tarsal jointing, though in *Haasiella* the tarsus is entirely unjointed. Also suggestive of *Haasiella* is the transverse dental margin of the maxillipede (Fig. 18E) (more curved in most other henicopines). However, the shape of the coxosternite differs markedly from New Zealand species of *Haasiella*. The overall proportions are considerably broader, and it lacks the prominently narrowed extension that bears the teeth in the New Zealand species. As well, a

median notch is lacking (present in New Zealand species). In each of these respects *P. hornerae* resembles species of *Paralamyctes (Thingathinga)*. A transverse, unnotched margin of the maxillipede is similarly developed in *P. (Thingathinga)* from the Barrington Tops (Fig. 15I). Membership in *Thingathinga* is indicated by the aciculae of the mandible being simple (Fig. 18K), rather than bipinnulate. The simple aciculae are not widely distributed in the Henicopinae, but are shared with *P. grayi* and *P. validus*. In *Haasiella trailli* the aciculae are bipinnulate

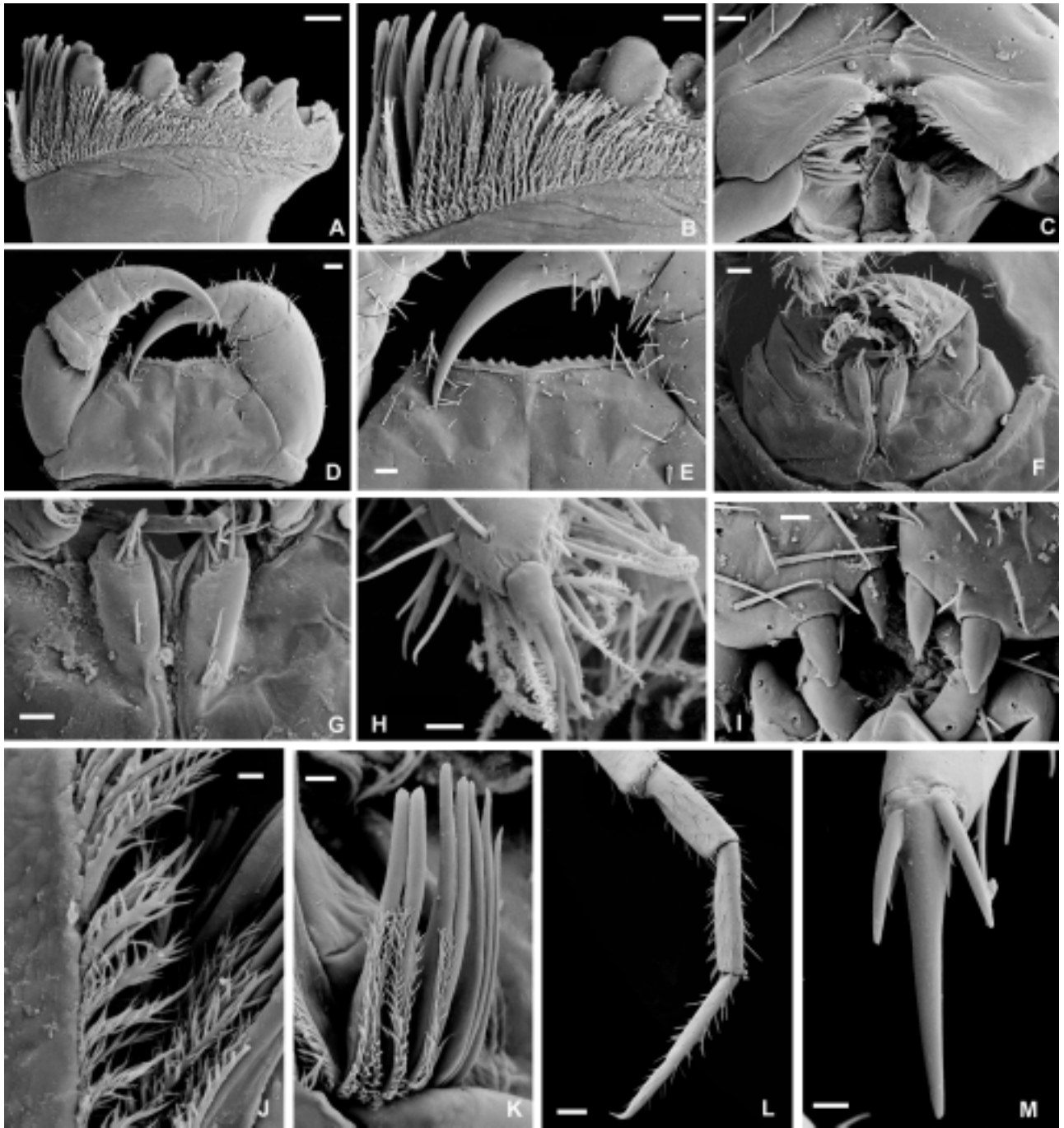


Figure 18. *Paralamyctes (Thingathinga) hornerae* n.sp. Paratype ♀ AM KS 57943, Cliffs Trail, Styx River SF, NSW. Scanning electron micrographs. A,B, gnathal lobe of mandible, scales 30 µm, 20 µm; C, labrum and right mandible, scale 50 µm; D,E, maxillipede and detail of dental margin, scales 100 µm, 60 µm; F,G, first maxilla and detail of coxal processes, scales 50 µm, 30 µm; H, tarsus and claw of second maxilla, scale 20 µm; I, spurs on female gonopod, scale 30 µm; J, branching bristles on labral margin, scale 5 µm; K, mandibular aciculae, scale 10 µm; L, posterior view of leg 12, scale 200 µm; M, pretarsus of leg 13, scale 20 µm.

(Edgecombe *et al.*, 2001: fig 5B), and they are likewise bipinnulate (with short barbs) in Tasmanian *Haasiella* (see below). The weakly tapering coxal process of the first maxilla in *P. hornerae*, with its concentration of setae on the blunt tip (Fig. 18G), is typical of *P. (Thingathinga)*.

The flattened eye of *P. hornerae* resembles the condition in other New South Wales species of *Paralamyctes*

(*Thingathinga*), such as the Barrington Tops material assigned to *P. (T.) grayi*. However, also closely comparable in having a flattened eye is an undescribed species from Tasmania (*Wailamyctes* sp. of Mesibov, 1986) that is resolved as sister to New Zealand species of *Haasiella* (Edgecombe *et al.*, 2001: figs. 15, 16). Maxillipede morphology is similar between the Tasmanian species and

P. hornerae, notably in the proportions of the coxosternite. The Tasmanian species resembles New Zealand *Haasiella* in having the tarsi of legs 1–12 fully fused, without the feeble joint that is present in *P. hornerae*, as well as in having the median furrow of the head shield extended behind the transverse suture. Archey (1937) cited the posterior extension of the median furrow as a diagnostic character of *Haasiella* (= *Wailamyctes*).

Paralamyctes (*Thingathinga*) species from New South Wales (*P. grayi* and *P. hornerae*) are united by an apparent synapomorphy in the shape of tergite 7. In both species, T7 is strongly embayed, a transverse posteromedial sector being flanked by curved posterolateral sectors, with a flange-like ventral expansion along the median embayment. Another character that may prove to be of value for grouping the New South Wales species of *P. (Thingathinga)* is the size of the penis, though this is affected by the extent of its retraction above the sternite. In both *P. (T.) grayi* and *P. (T.) hornerae*, the penis is comparatively small (about the length of the first article of the gonopod). Australian species belonging to *P. (Paralamyctes)* and *P. (Nothofagobius)* have relatively larger penes (Figs. 4C, 19C), as does *P. (Thingathinga) validus* (Archey, 1937: pl. 21, fig. 4). The larger penis appears to be the plesiomorphic state for *Paralamyctes* (see Attems, 1928: text-fig. 14 for *Lamyctes*).

Paralamyctes (Nothofagobius) n.subgen.

Etymology. Compounding *Nothofagus* and the common lithobiomorph suffix—*obius*, for the trans-Antarctic distribution of this clade and occurrence of species in *Nothofagus* forest.

Type species. *Paralamyctes (Nothofagobius) cassis* n.sp.

Diagnosis. *Paralamyctes* with small T1, distinctly narrower than head and T3; maxillipede coxosternite with narrow, curved dental margin bearing 4 or 5 large teeth; tarsi slender, relatively sparsely setose; sternite of first genital segment of male with posterior margin convex between gonopods; basal article of female gonopod extended as a short process.

Assigned species. *Henicops chilensis* Gervais in Walckenaer & Gervais, 1847; *Paralamyctes (Nothofagobius) mesibovi* n.sp.

Distribution. Chile and Argentina (northern Patagonia), Tasmania, northern New South Wales.

Discussion. A female gonopod bearing three spurs is synapomorphic for *Paralamyctes cassis* from northern New South Wales and *P. mesibovi* from Tasmania (rather than the plesiomorphic condition of two spurs seen in all congeners, as well as most other henicopid genera). In both species the basal article of the gonopod is extended as a process. The only other species showing a similar (though shorter) extension of the gonopod is *P. chilensis* (Gervais) from Patagonian Chile/Argentina (Fig. 24B), and this character is interpreted as a synapomorphy. A particularly narrow anterior part of the trunk (i.e., body narrowed across a small T1) is also shared by *P. cassis*, *P. mesibovi* and *P. chilensis*. The homology can be described by T1 being

distinctly narrower than the head and T3 in these three species, versus T1 nearly equally wide as the head and T3 in other species of *Paralamyctes* and in relevant outgroups (e.g., *Lamyctes*, *Lamyctinus*, *Lamyctopristus* and *Henicops*). A relative elongation of the tarsi in *P. (Nothofagobius)* (compare Figs. 16C–E with Figs. 9, 16A,B) may be expressed in terms of the proportions of the anal leg basitarsus. In *P. (Nothofagobius)*, the basitarsus is 12–17 times longer than its proximal width, versus a length 9–11 times width in *P. (Paralamyctes)* and *P. (Thingathinga)*.

Paralamyctes chilensis also resembles the Australian *P. mesibovi* and *P. cassis* in having the posterior margin of the first genital sternite of the male convex between the gonopods, versus approximately transverse in other *Paralamyctes*. This posterior bulge in the sternite may account for the concealment of the penis in specimens of *P. mesibovi* (Fig. 22C) and *P. chilensis* (Fig. 24C), the penis presumed to be retracted above the sternite.

Paralamyctes (Nothofagobius) cassis n.sp.

Figs. 16D, 19, 20, 21A–H

Etymology. For Gerasimos Cassis, Australian Museum, whose 1993 survey uncovered this species, and who accompanied me in the hunt for *Paralamyctes* in Queensland and Western Australia.

Diagnosis. *Paralamyctes (Nothofagobius)* with 24–29 antennal articles; cephalic pleurite short; dental margin of maxillipede coxosternite bearing four (exceptionally five) robust teeth; trunk tergites gently wrinkled; three spurs on female gonopod, set on moderately long projection; terminal process on male gonopod as long as rest of gonopod.

Type material. HOLOTYPE QM S42670, ♂ (Fig. 19A), Gibraltar Range NP, NSW, 10 km W of northern park headquarters, 29°32'45"S 152°14'22"E, 990 m, GBM, 1980–1981, pitfall, rainforest. PARATYPES: QM S42671 1♂, QM S48111 1♂ (Fig. 19C), from type locality, collection details as for holotype.

Other material. Northern NSW pitfall collections, MRG and GC, 4 Feb–9 Apr 1993: AM KS 57944, 1♀ (Fig. 19B), AM KS 57945, 4♂♂, 2♀♀, Dorrigo NP, Wonga Walk, about 600 m N of Tristania Falls, 30°22'S 152°44'E, 730 m; AM KS 57946, 1♀ (Figs. 20, 21A–H), AM KS 57947, 5♂♂, 2♀♀, Dorrigo NP, Wonga Walk, about 200 m SW of Hardwood Lookout, 30°22'S 152°44'E, 630 m; AM KS 57948, 1♀, Styx River SF, bottom end of Cliffs Trail, about 1.3 km from Oxley Rd, 30°33'S 152°20'E, 1080 m; AM KS 57949, 1♀, Mount Hyland Nature Reserve, 1.9 km along Chaelundi Rd from Big Bull Creek Rd, 30°08'S 152°26'E, 1160 m; AM KS 57950, 2♂♂, Marengo SF, Big Bull Creek, 2.7 km NE along Foamy Creek Rd from Chaelundi Rd, 30°07'S 152°25'E, 920 m; AM KS 57951, 1♂, Marengo SF, Opossum Creek, upstream of Foamy Creek Rd, 30°06'S 152°25'E, 830 m; AM KS 57952, 1♂, Washpool NP, track off Cedar Trail, 29°28'S 152°20'E, 950 m; AM KS 57953, 1♂, Washpool NP, Cedar Creek, Cedar Trail, 920 m; AM KS 57954, 1♂, Boorook SF, 1 km E of main road, 28°49'S 152°11'E, 900 m. ANIC, 1♂, Richmond Range SF, NSW, 28°48'S 152°59'E, ca 600 m, T. Weir and A. Calder, 13–14 Feb 1983; QM S42666, 1♀, Dorrigo NP, NSW, Never Never, 700 m, GBM, 1980–1981, pitfall, rainforest; QM S42668, 1♂, New England NP, NSW, 200 m from Tom's Cabin towards summit, 30°29'48"S 152°23'48"E, 1300 m, GBM, 1980–1981, pitfall,

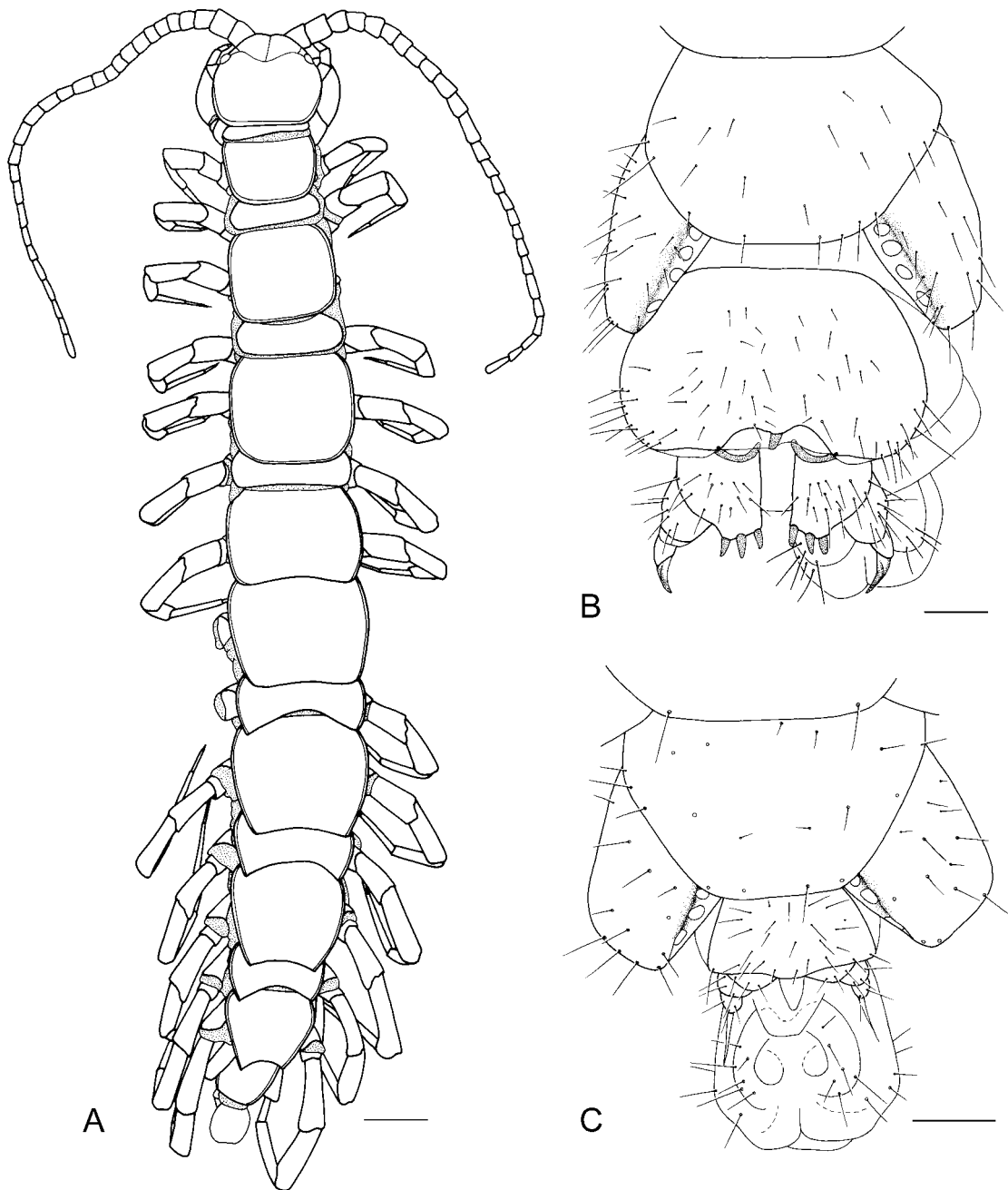


Figure 19. *Paralamyctes (Nothofagobius) cassisi* n.sp. A, holotype ♂ QM S42670, Gibraltar Range NP, NSW; scale 1 mm. B, ♀ AM KS 57944, Dorrigo NP, Wonga Walk, terminal segments and gonopods; scale 0.25 mm. C, paratype ♂ QM S42811, Gibraltar Range NP, terminal segments and gonopods; scale 0.25 mm.

Nothofagus rainforest; QM S42672, S 42673, 2♂♂, Poverty Point, SE of Tenterfield, NSW, 29°06'S 152°19'E, 1160 m, GBM, 1978–1979, pitfall, rainforest; QM S42674, 1♂, Poverty Point, NSW, GBM, 22 Feb 1979.

Description. Length up to 20 mm; length of head shield up to 1.8 mm. Colour known only from specimens preserved in 70% ethanol: head red-brown, trunk usually lighter yellow-brown, often with purplish tinge; maxillipede pale orange, with brownish coxosternite; sternites and coxae light brown, darker in posterior segments; prefemur, femur and tibia may be purplish, tarsi and distal part of antennae yellow.

Head shield smooth. Frontal margin with strong median notch; posterior margin of head shield weakly concave. Median furrow deep to transverse suture. Antennae extending back to TT5–7 (Fig. 19A); 24–29 antennal articles, basal two moderately larger than succeeding articles; most of articles 3–9 of about equal length and width, distal articles substantially longer than wide; setation fine, dense from third article, mix of short and moderately long setae. Ocellus strongly bulging. Tömösváry organ moderately large, ovate, at anterolateral corner of cephalic pleurite (Fig. 20L); openings of gland ducts marked by pores

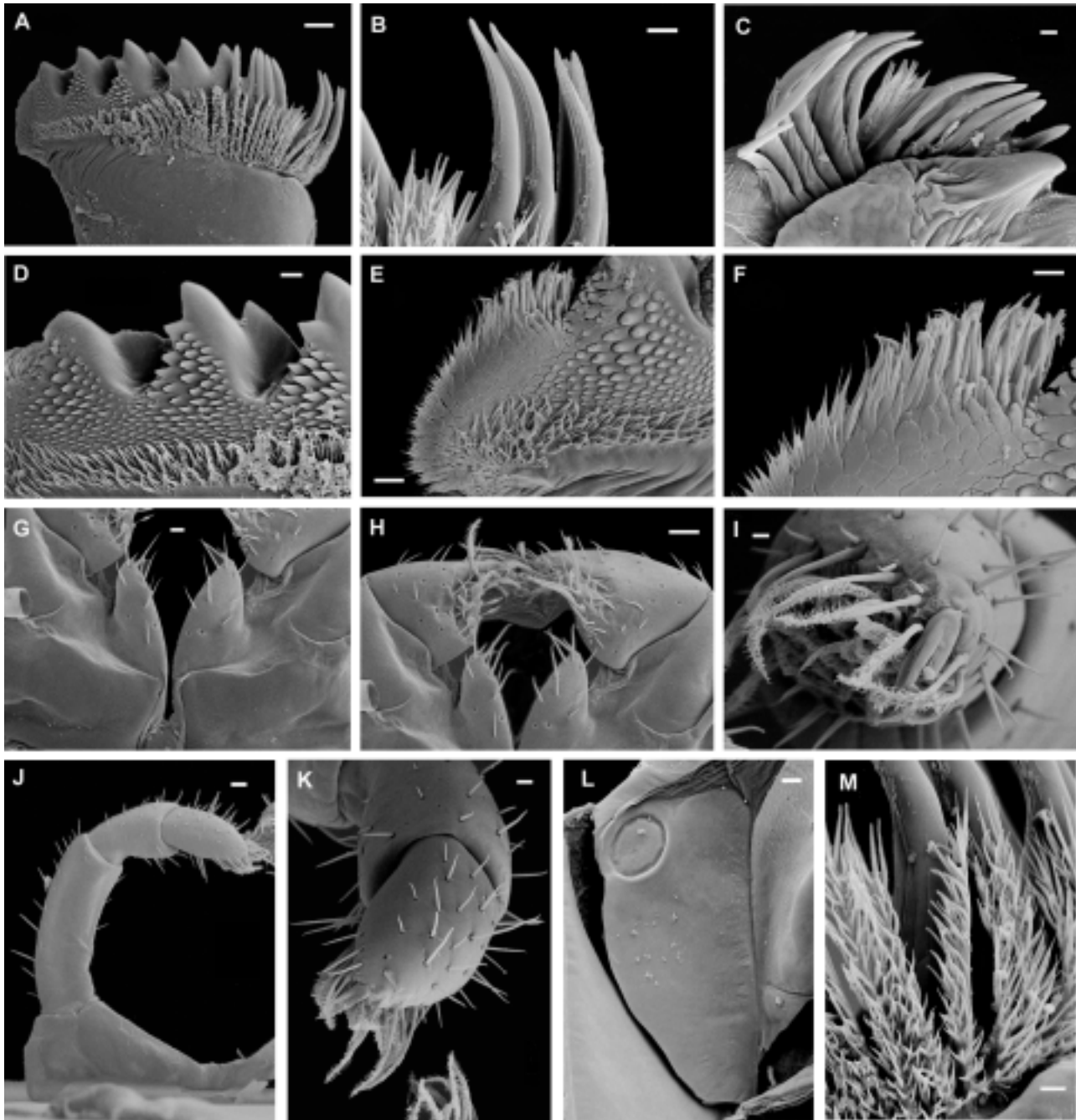


Figure 20. *Paralamyctes (Nothofagobius) cassisi* n.sp. ♀ AM KS 57946, Wonga Walk, Dorrigo NP, NSW. Scanning electron micrographs. A, gnathal lobe of mandible, scale 30 μm ; B,C, mandibular aciculae viewed externally and internally, scales 10 μm ; D, mandibular teeth, scale 10 μm ; E,F, furry pad on mandible, scales 10 μm , 5 μm ; G,H, first maxillae, scales 20 μm , 50 μm ; I, tarsus and claw of second maxilla, scale 10 μm ; J, second maxilla, scale 60 μm ; K, distal part of telopod of second maxilla, scale 20 μm ; L, cephalic pleurite with Tömösváry organ, scale 20 μm ; M, fringe of branching bristles skirting mandibular aciculae, scale 5 μm .

scattered around outer groove of Tömösváry organ. Pleurite relatively short, length slightly more than twice width. Main setae on head shield consist of two pairs on frontal margin, a pair at anterior end of ocellus, one seta beneath rear edge of ocellus, a few on posterolateral border.

Posteromedial part of clypeus with usual transverse row of four setae (Fig. 21A). Seta projecting transversely from labral side piece. Inner margin of labrum gently concave

backwards between midpiece and termination of bristle fringe, without a marked inflection or shoulder; bristles overhanging margin moderately long (Fig. 21B), branching into several rami a short distance outside labral margin, these rami often bifid (Fig. 21C).

Trunk tergites wrinkled with short, linear ridges and grooves having weak relief. T1 trapeziform, considerably smaller than T3, distinctly narrower than head shield (Fig.

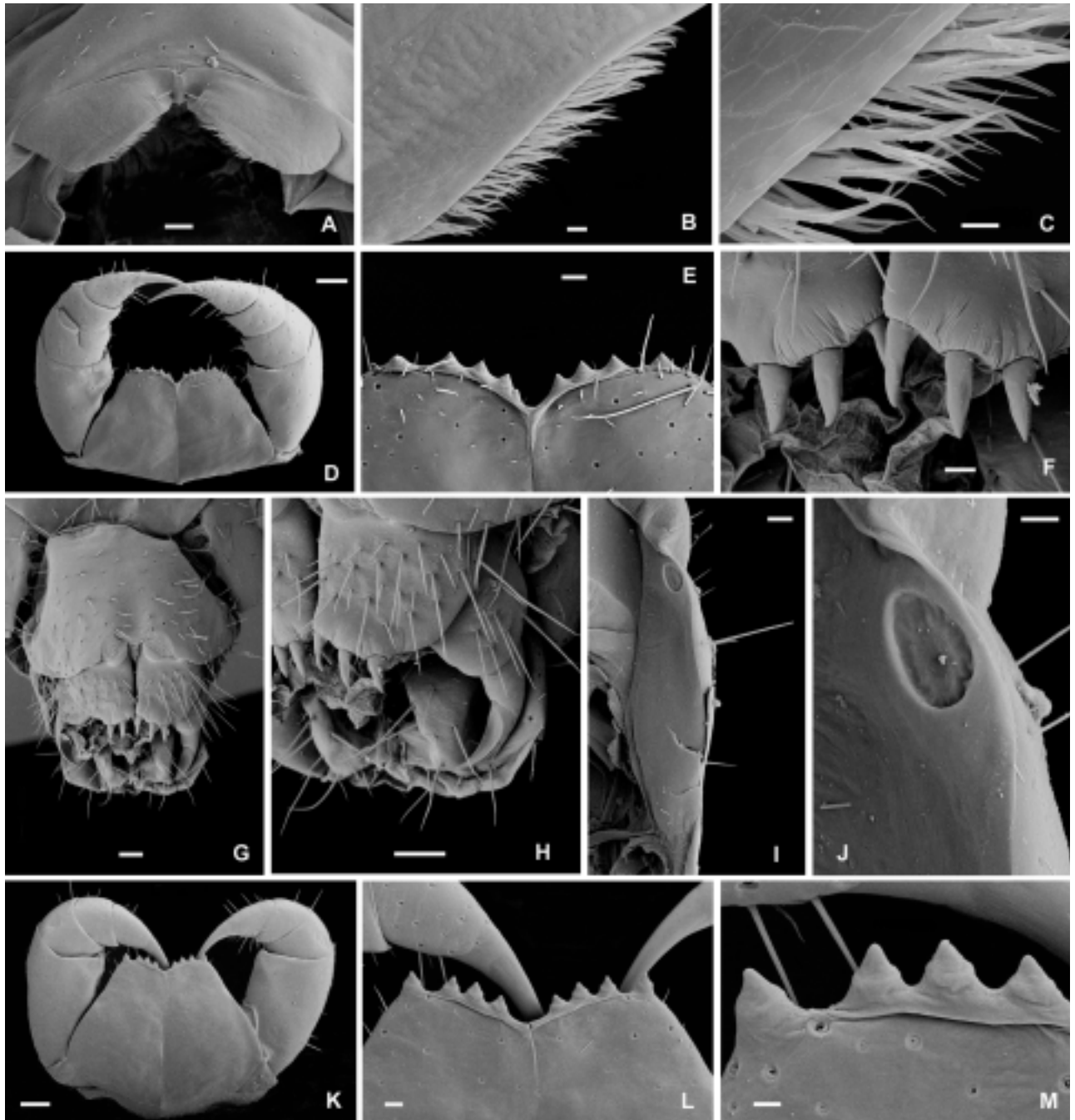


Figure 21. A–H, *Paralamyctes (Nothofagobius) cassisi* n.sp. ♀ AM KS 57946, Wonga Walk, Dorrigo NP, NSW. A–C, labrum, with details of branching bristles on margin, scales 50 μ m, 10 μ m, 5 μ m; D, E, maxillipede and detail of dental margin, scales 200 μ m, 50 μ m; F–H, gonopod, showing detail of spurs, ventral view and ventrolateral view, scales 30 μ m, 100 μ m, 100 μ m. I–M, *Paralamyctes (Nothofagobius) mesibovi* n.sp. Paratype ♀ QVMAG 23/23010, Wombat Hill, Waratah, Tasmania. I, cephalic pleurite, scale 50 μ m; J, Tömösváry organ, scale 20 μ m; K–M, maxillipede and details of dental margin, scales 200 μ m, 40 μ m, 20 μ m.

19A), about two-thirds width of widest tergite (T8), posterior angles strongly rounded and posterior margin transverse medially or convex; lateral borders parallel in TT3 and 5, posterior angles rounded, posterior borders nearly transverse; TT1, 3 and 5 bordered posteriorly; TT7–14 bordered laterally; lateral borders of T7–T14 convex; posterior margins of TT7–8 gently concave, T7 more so, posterior angles rounded; TT10, 12 and 14 progressively

more concave posteriorly; posterior angle of T10 an obtuse corner, T12 angular, T14 sharply angular but without a tooth-like extension; posterior margins of TT9, 11 and 13 deeply concave, posterior angles sharp, not toothed. Setae on long tergites in anterior part of trunk sparse, mostly confined to an anterior band and on/against lateral border; setae evenly scattered over surface of posterior tergites, including a row along posterior margin on TT7–14.

Dental margin of maxillipede coxosternite convex, sloping posteromedially, with moderately deep median notch (Fig. 21E); teeth robust, most specimens having 4+4 teeth, a few having 4+5 (with small inner tooth); width across dental margin half maximum width of coxosternite; setae scattered on anterior and medial part of coxosternite. Tarsungulum relatively small, tarsal and pretarsal sections equal in length (Fig. 21D).

Mandible: Four paired teeth (Fig. 20A), three ventral tooth pairs bearing a third, triangular cusp on outer edge of larger tooth; three dorsal teeth with abundant, scale-like, triangular accessory denticles (Fig. 20D); accessory denticle field without grooves on teeth, continuous between teeth. Fringe of branching bristles with branches along entire length of each narrow-based bristle (Fig. 20M); fringe evenly narrowing dorsally, evenly grading into multifurcating scales on dorsal part of mandible (Fig. 20E). 10–11 simple, curved aciculae, lacking marginal branchings (Fig. 20B,C); basal part of aciculae with suture-like striations, distal half with a few strong linear ridges, well developed on inner surface of aciculae. Band of polygonal scales between accessory denticles and furry pad (Fig. 20E); furry pad composed of short, terminally-branching bristles that grade into multifurcating scales (Fig. 20F).

First maxilla: Bell-shaped sternite distinctly set off from coxa by sutures at posterolateral margin. Coxal process conical, bearing 8–9 simple setae on tip and scattered along medial edge, without significant clustering at tip (Fig. 20G); three additional setae more posteriorly; cluster of tiny, barb-like basiconic sensilla between coxal process and telopod. Distal article of telopod with two rows of long, plumose setae along inner margin; branches developed along distal half of these setae; rest of distal article evenly scattered with numerous simple setae, slightly shorter than those on coxal process (Fig. 20H).

Second maxilla (Fig. 20I–K) as described above for *P. (Paralamyctes) monteithi* (no differences in proportions, setal patterns or structure, or pretarsus form observed).

Strong, sharp distal spinose projections on tibia of legs 1–15. Prefemur, femur and tibia fairly evenly scattered with distinctly pigmented (orange-brown) setae of varied length, at most moderately long; several setae encircling distal margin of femur; tarsal setae more uniformly slender; weak development of two rows of setae ventrally along tarsus, without pairing on each side of leg. Articulation between tarsomeres relatively weak on anterior legs, continuous dorsally, anterior tarsi usually preserved unflexed. Distitarsus about 50% length of basitarsus on anal leg; anal leg basitarsus about 12 times longer than broad (Fig. 16D). Pretarsal claws relatively long, gently curved; pair of accessory claws symmetrical, 30% length of main claw (Fig. 16D).

Sternites with longitudinal median furrow not well defined on anterior segments, usually lightly impressed on anterior third of sternite from mid trunk, not significantly developed behind midlength on posterior segments. Posterior margins of most sternites convex, subtransverse on posterior few segments in both sexes. Sternal setation consists of a few fairly long setae on anterolateral and posterolateral margins, transverse band at about one-quarter length of sternite; sternal setae of equivalent diameter to largest setae on legs.

Coxal pores on legs 12–15. Coxal pore field set off from anteroventral face of coxa by curved edge, without fold or groove. Pores usually round, some slightly ovoid (Fig. 19B,C); most females with 4444/4444 coxal pores, one with 4333/3333; most males with 3333/3333 pores, sometimes one or a few coxae with two pores.

Male (Fig. 19C): Tergite of intermediate segment broadly barrel-shaped, with transverse posterior margin, relatively narrower than in female; other tergites without sexual dimorphism. Sternite of first genital segment undivided, setae evenly scattered, with a transverse row just in front of posterior margin; margin convex backwards between gonopods. Gonopod of three articles and tapering, needle-like terminal process, the first two articles each bearing three or four relatively long setae, those on first article in a transverse row, third article bearing two or three setae; terminal process as long as rest of gonopod. Penis a prominent cone.

Female (Fig. 19B): Tergite of intermediate segment with more concave posterior margin than in male. Tergites of first genital segment and telson fairly well sclerotised, though much less so than other tergites; first genital tergite bearing several setae along its posterolateral margin; telson tergite with numerous slender setae posterolaterally. Sternite of first genital segment equal in width to S15; margin concave between gonopod condyles, with rounded posteromedial bulge; most of sternite bearing moderately dense, short setae (Fig. 21G), several longer setae at posterolateral margin; first article of gonopod bearing three or four pointed spurs (five specimens with 3+3 spurs, one with 3+4), all about equal in size, curved such that tip points dorsally (Fig. 21F,H); many fairly long setae on first article, about seven similarly long setae on second article (Fig. 21H); third article lacking setae.

Discussion. Close affinity to the Tasmanian *P. mesibovi* n.sp. is most obviously indicated by female gonopod morphology. Distinction between the two species is addressed under *P. mesibovi*.

Paralamyctes (Nothofagobius) mesibovi n.sp.

Figs. 16C, 21I–M, 22, 23

Etymology. For Robert Mesibov, guru of Tasmanian myriapodology, who discovered this species.

Diagnosis. *Paralamyctes (Nothofagobius)* with narrow dental margin of maxillipede coxosternite bearing four teeth; simple aciculae on mandible; distal spinose projection on tibia of legs 14 and 15; first article of female gonopod with three spurs (all shared with *P. cassisi*). Nearly all antennal articles substantially longer than wide; cephalic pleurite elongate; posterior margin of tergite 7 relatively deeply sinuate; female gonopod spurs on a long, slender projection.

Type material. HOLOTYPE Queen Victoria Museum and Art Gallery (QVMAG) 23/23009, ♀ (Figs. 16C, 22A), Wombat Hill, Waratah, Tasmania, CQ 702 064, 41°29'00"S 145°26'42"E, 680 m, R. Mesibov, 19 Sep 1990. PARATYPES: QVMAG 23/41725, 1 ♀ (Fig. 22B), from type locality; collection details as for holotype; QVMAG 23/23010, 1 ♀ (Figs. 21I–M, 23), Wombat Hill, Waratah, CQ 704 066 (ca. 250 m from type locality), 41°28'53"S 145°26'51"E, R. Mesibov, 30 Sep 1990.

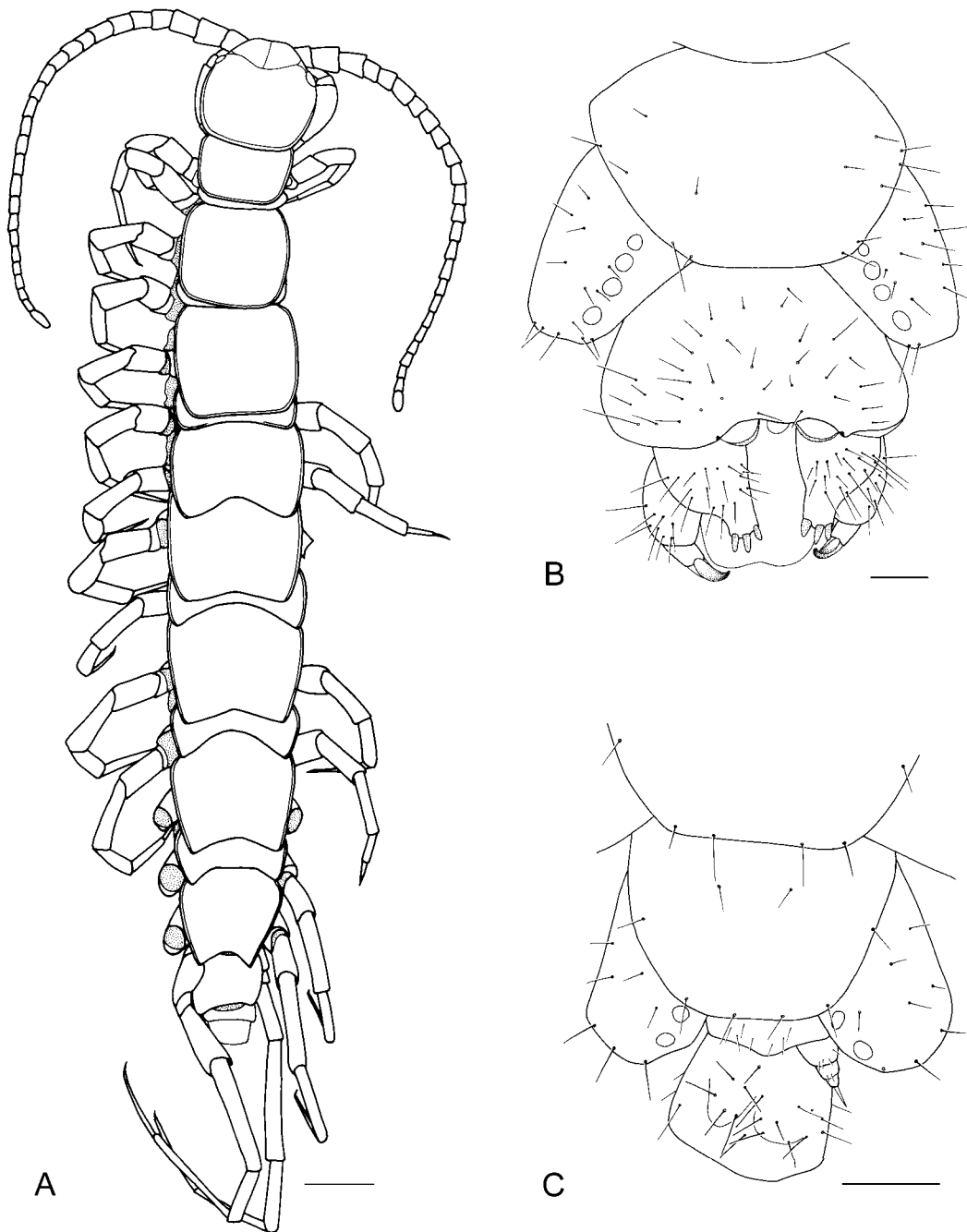


Figure 22. *Paralamyctes (Nothofagobius) mesibovi* n.sp. A, holotype ♀ QVMAG 23/23009, Wombat Hill, Waratah, Tasmania; scale 1 mm. B, paratype ♀ QVMAG 23/41725, Wombat Hill, Waratah, Tasmania, terminal segments and gonopods; scale 0.25 mm. C, ♂ QVMAG 23/11817, Western Creek, Tasmania, terminal segments and gonopods; scale 0.25 mm.

Other material. QVMAG 23/11817 1♂ (Fig. 22C), Western Creek, Tasmania, DP 581 848, 41°41'14"S 146°29'47"E, 1150 m, R. Mesibov, 8 Aug 1993; QVMAG 23/21593, 1♀, Simons Rd, Tasmania, EQ 435 212, 41°21'33"S 147°31'12"E, 800 m, P. Greenslade, 8 Mar 1989; QVMAG 23/21594, 1♀, Mt Michael, Tasmania, EQ 845 406, 41°10'53"S 148°00'26"E, 740 m, H. Mitchell, 29 Nov 1989; QVMAG 23/41377, 1♂ (DNA voucher specimen), Coldstream River, Tasmania, CQ 768027, 600 m, 41°31'03"S 145°31'24"E, R. Mesibov, 9 Mar 2000.

Description. Because this species is identical in most respects to *P. cassisi*, described in full above, only features of potentially diagnostic value and standard meristic characters are described here, as well as colour for a specimen in near absolute ethanol (these data lacking for *P. cassisi*).

Length of head shield up to 1.7 mm. Head and tergites orange, with red-brown mottled network concentrated in longitudinal median band and near borders; antennae deep

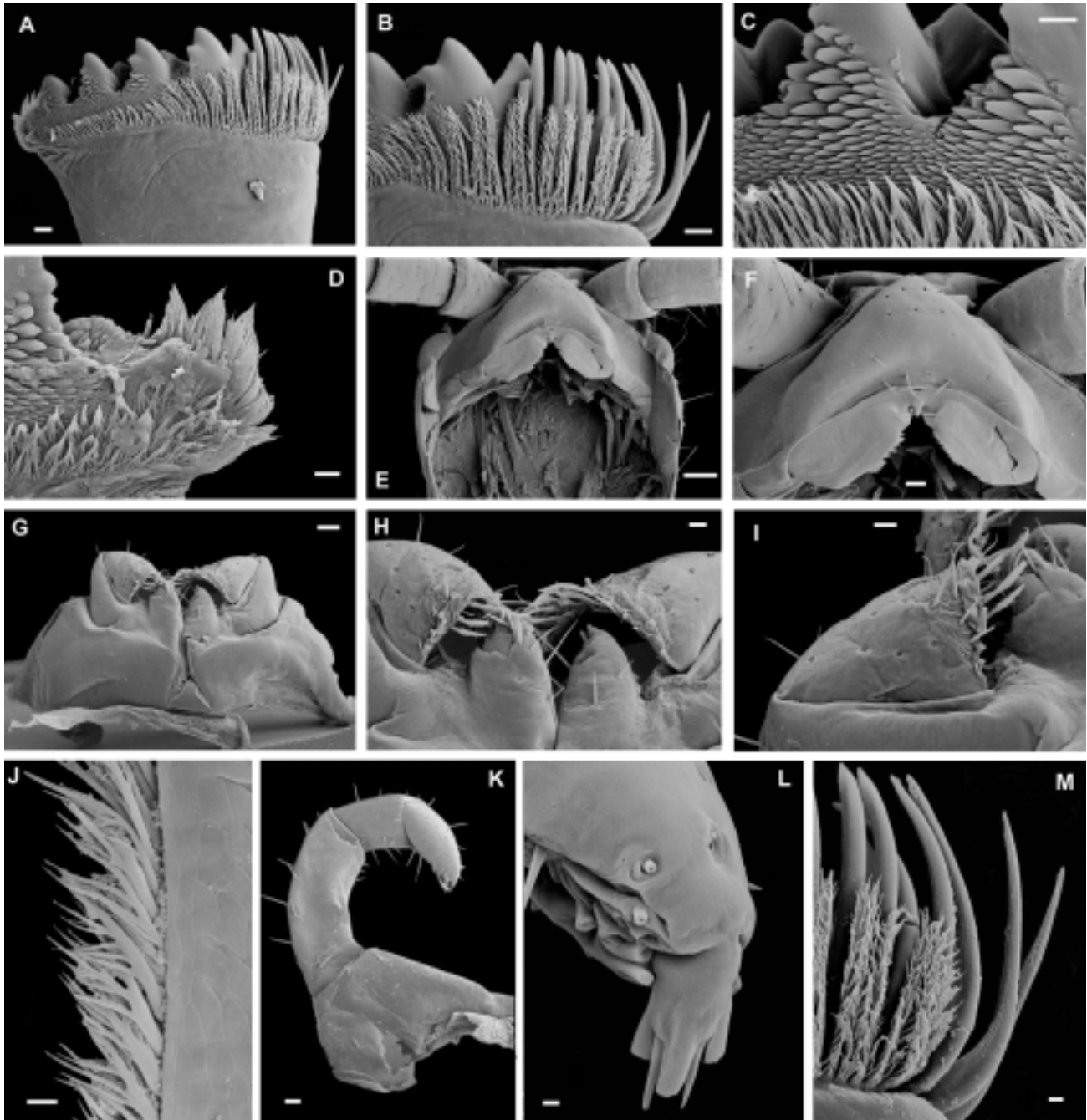


Figure 23. *Paralamyctes (Nothofagobius) mesibovi* n.sp. Paratype ♀ QVMAG 23/23010, Wombat Hill, Waratah, Tasmania. Scanning electron micrographs. A, gnathal lobe of mandible, scale 20 μ m; B,M, mandibular aciculae and fringe of branching bristles, scales 20 μ m, 5 μ m; C, accessory denticles on mandibular teeth, scale 10 μ m; D, furry pad on mandible, scale 10 μ m; E,F, ventral view of head, showing clypeus and labrum, scales 200 μ m, 60 μ m; G, first maxillae, scale 60 μ m; H,I, coxal processes and distal segments of telopod of first maxillae, scales 20 μ m; J, branching bristles on labral margin, scale 5 μ m; K, second maxilla, scale 60 μ m; L, tarsus and claw of second maxilla, scale 5 μ m.

orange; maxillipede pale orange; sternites yellow, without significant purple/chestnut mottling; tarsi of similar pale orange/yellow colour to proximal part of leg. 25–28 antennal articles, all but one or two articles substantially longer than wide. Eye strongly domed, white. Cephalic pleurite elongate, of typical size and shape for genus (Figs. 21I, 23E). Anal leg basitarsus 13–17 times longer than broad (Fig. 16C). Four coxal pores on legs 13–15 in females, two

to five on leg 12; large male with three coxal pores on each of legs 12–15. Penis apparently concealed above sternite of first genital segment in both known males. Terminal process on male gonopod equal in length to second and third articles of gonopod (Fig. 22C). Female gonopods as for *P. cassisi* except for longer spur-bearing process on first article (Fig. 22B).

Discussion. The morphology of the female gonopods is particularly distinctive in *P. mesibovi*, it and *P. cassisi* n.sp. being the only *Paralamyctes* with three (rather than the plesiomorphic two) spurs. In both species the spurs are based on a longer projection than is developed in *P. (N.) chilensis*, this peculiar character certainly being a synapomorphy. These species are similar in several other characters that are rarely developed or unique within *Paralamyctes*. Probable synapomorphies include: four large teeth on the maxillipede coxosternite (Fig. 21L,M); a relatively short fringe of labral bristles, with the bristles branching into several rami (Figs. 21C, 23J) rather than having many branches arising as pectinations from a main shaft (Figs. 11D, 13K, 18J); a continuous field of accessory denticles on the mandible, with the denticles being a distinctive triangular shape (Figs. 20D, 23C); simple, non-pinnulate aciculae on the mandible, with a few strong lineations on the sides of the aciculae (Figs. 20B, 23M) and; a distal spinose projection present on the tibia of leg 15.

Distinction between the Tasmanian and northern New South Wales taxa can, in fact, be made based on only a few characters. *Paralamyctes mesibovi* is distinguished by its more elongate cephalic pleurite (Fig. 20L versus Fig. 21I), more embayed posterior margin of tergite 7 (Fig. 19A versus Fig. 22A) and by the longer, more slender projection of the first article of the female gonopod (Figs. 19B, 21G,H versus Fig. 22B). The pleurite of *P. mesibovi* is identical to that of most other species of *Paralamyctes*, and certainly represents the plesiomorphic state relative to the peculiarly shortened pleurite of *P. (N.) cassisi*. The Tömösváry organ is of the same absolute size in the two species, but it occupies a larger area of the pleurite in *P. (N.) cassisi*. *Paralamyctes (N.) mesibovi* has fewer short antennal articles, only a few articles being of subequal length and width versus several in *P. (N.) cassisi*. The two species also appear to differ with respect to the length of the terminal process on the male gonopod (Fig. 19C versus Fig. 22C), but since only one gonopod is known from a relatively small male of *P. mesibovi* (the gonopods being unexposed on the second, larger male QVMAG 23/41377), the significance of this difference should not be overstated. *Paralamyctes cassisi* has a relatively longer terminal process than any other Australian *Paralamyctes*, whereas the terminal process of *P. mesibovi* is considerably shorter (compare Figs. 19C, 22C).

As noted above, the affinities of *P. mesibovi* and *P. cassisi* appear to be with *P. chilensis* from southern Chile and Argentina (see treatment of that species below). *Paralamyctes mesibovi* and *P. cassisi* are both distinguished from *P. chilensis* by their longer antennae, with a larger number of articles (usually 19 in *P. chilensis*), a larger Tömösváry organ, the absence of a groove delimiting the accessory denticle field on the mandible (Figs. 20D, 23C versus Fig. 25H), simple (Figs. 20A–C, 23M) versus bipinnulate (Fig. 25I,K) aciculae, a typically higher coxal pore count, presence of a distal spinose projection on the tibia of the anal leg, and a longer spur-bearing process on the female gonopod.

Based on the distribution of the *P. mesibovi/P. cassisi* clade in Tasmania and northern New South Wales, a predicted occurrence of the group might be in *Nothofagus* forests in southern Victoria. A comprehensive sampling of *Nothofagus* forests in the Otway Range, Strezlecki Range,

and Victorian Central Highlands by the Museum of Victoria has not yet uncovered any *Paralamyctes* (examination of this collection by the author in February 2000).

***Paralamyctes (Nothofagobius) chilensis*
(Gervais in Walckenaer & Gervais, 1847)**

Figs. 16E, 24, 25

Henicops chilensis Gervais in Walckenaer & Gervais, 1847: 239.
Henicops chilien.—Gay, 1849: 65, fig. 6a,b.
Henicops chilensis.—Silvestri, 1899: 242.
Paralamyctes chilensis.—Silvestri, 1905: 749.
Paralamyctes chilensis.—Attems, 1928: 67.
Paralamyctes chilensis.—Archev, 1937: 81, 82.
Paralamyctes chilensis.—Chamberlin, 1955: 54.

Type material. Syntypes have not been identified; Gervais (1847) had access to two specimens, collected by M. Claude Gay from an unspecified locality in Chile. Two specimens (♂ and ♀: BMNH [E] 200408 Chilo.1910-.6.17.39) from Patagonia in the Natural History Museum, London, were labelled as probable syntypes by R.E. Crabill. This determination is unlikely because antennal segmentation of one specimen disagrees substantially with the original description of the species, and the specimens are labelled as part of the Silvestri collection, dated 1900. The types have not been identified in the Muséum national d'Histoire naturelle, Paris (J.-J. Geoffroy, pers. comm. 2000).

Material examined. TMAG COLLECTION BY R. MESIBOV, 1983—CHILE, Xth region: 1 ♀, Proyecto Polincay sawmill complex, under bark of fallen *Drimys winteri* along road to sawmill, ca. 20 km NE of Puerto Montt, 13 May 1983; juvenile, Proyecto Polincay, lightly cut-over *Nothofagus dombeyi/Saxegothea conspicua* forest above sawmill, ca. 20 km NE of Puerto Montt, 10 May 1983; 2 ♀ ♀ (Fig. 24A,B), 1 ♂, Correntoso, under bark of fallen trees in heavily cut-over forest S of park office (Parque Alerce Andino), 5 Jun 1983; 2 ♀ ♀, Lago San Antonio, Isla Chiloé, under bark of fallen tree near creek in forest owned by I. Martini of Quellón, 9 Jun 1983; 2 ♂ ♂ (Figs. 24C, 25), Lenca, under bark on track, cut-over rainforest ca. 3 and 5 km E of sawmill, 14 Jun 1983; 1 ♂ and 1 ♀, Maullín, lightly cut-over ñadi forest ca. 7 km along road to Carelmapú, 15 Jun 1983. ZMUC COLLECTION—CHILE: 1 ♀, Osorno 53: Parque Nacional Puyehue, Anticura, 300 m, Misión Científica Danesa, 7–8 Mar 1979; 2 ♀ ♀, Osorno 37: Parque Nacional Puyehue, Antillanca, 1100–1300 m, Nielsen and Karsbolt, 14 Nov 1981. ARGENTINA: 1 ♀ (Fig. 16E), Rio Negro 7: S.C. de Bariloche, Colonia Suiza, 810 m, Misión Científica Danesa, 22 Nov 1978; sex undet., Neuquen 18: Lago Tromen, Rodeo Grande, 900 m, Misión Científica Danesa, 12 Mar 1979.

Diagnosis. *Paralamyctes (Nothofagobius)* with relatively short antenna of 17–21 (usually 19) articles; Tömösváry organ relatively small; 4 or 5 teeth on dental margin of maxillipede coxosternite; short, sharp pinnules on both sides of mandibular aciculae; distal spinose projection on tibia of legs 1–14; two or three coxal pores on legs 12–15 in both sexes, fourth pore small when present; two spurs on female gonopod set on short process.

Discussion. *Paralamyctes (Nothofagobius) chilensis* is poorly known from published accounts, and previous attempts to decipher its morphology are in part contra-

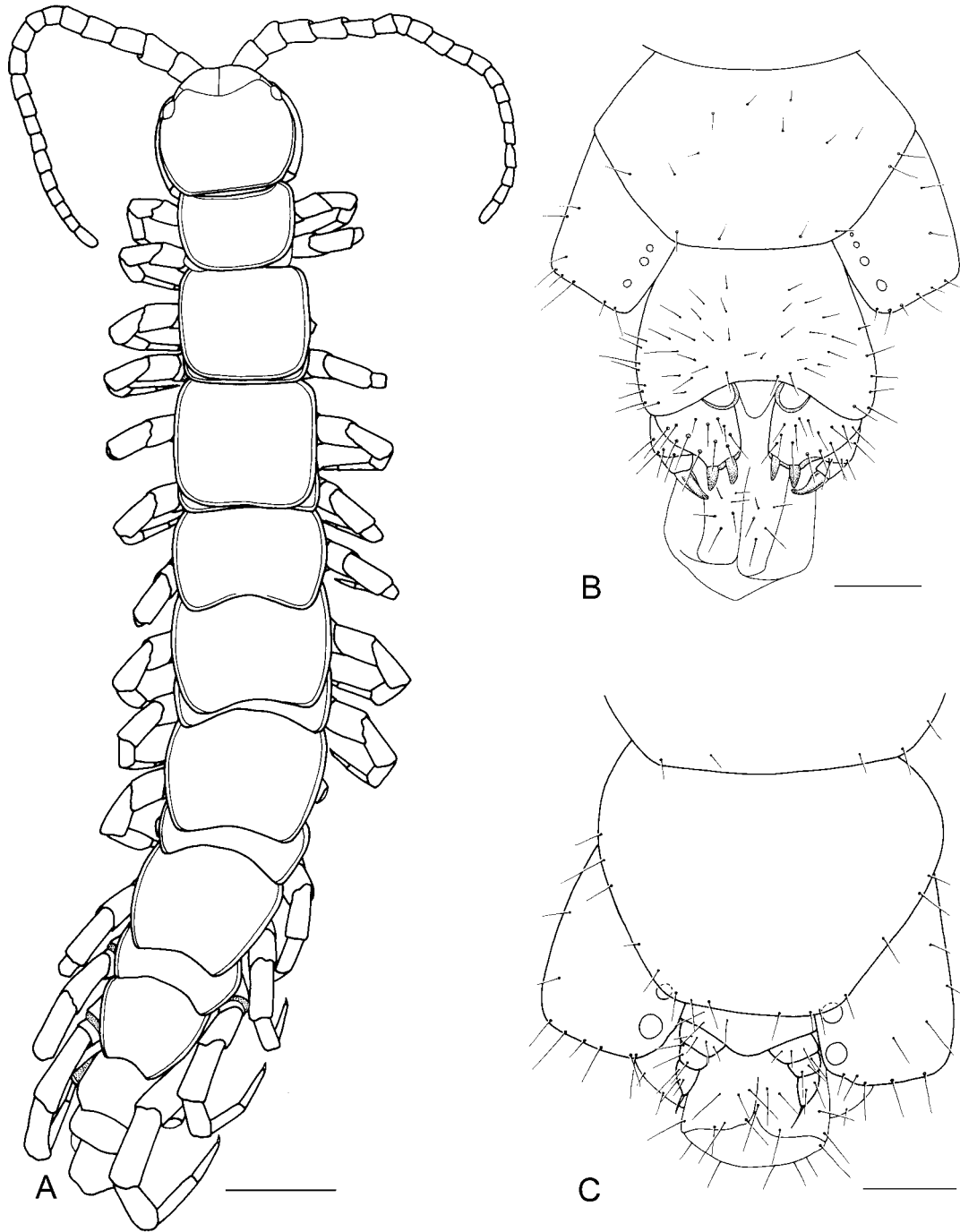


Figure 24. *Paralamyctes (Nothofagobius) chilensis* (Gervais in Walckenaer & Gervais, 1847). A,B, ♀ TMAG, Correntoso, Parque Alerce Andino, Xth Region, Chile; B, terminal segments and gonopods; scales 1 mm, 0.25 mm. C, ♂ TMAG, Lenca, Xth Region, Chile, terminal segments and gonopods; scale 0.25 mm.

dictory. The description by Gervais (1847) notes few potentially diagnostic attributes, many characters being general for hemicopids. Gervais described 17 antennal articles, whereas the illustration of a specimen in Gay (1849) depicted 17 articles on one antenna and 18 on the other. Following a description by Silvestri (1905), Attems (1928) listed purportedly diagnostic characters that disagree with the description and illustrations by Gervais and Gay (i.e., posterior margin of T7 with a deep angular notch, the angles toothed; antenna 19 jointed).

The only locality data published for *Paralamyctes chilensis* are Silvestri's (1905) record of it at San Vicente (Talcahuano). A single species of *Paralamyctes (Nothofagobius)* is the only hemicopid represented in collections made by R. Mesibov from near Puerto Montt and Maullín and on Isla Chiloé in the Xth region of Chile (see list of sites in "Material examined"); this material is conspecific with the BMNH specimens cited under "Type material", and the same species occurs in adjacent parts of the Argentinian Lake District (Fig. 16E). Most specimens have 19 antennal articles, thus matching

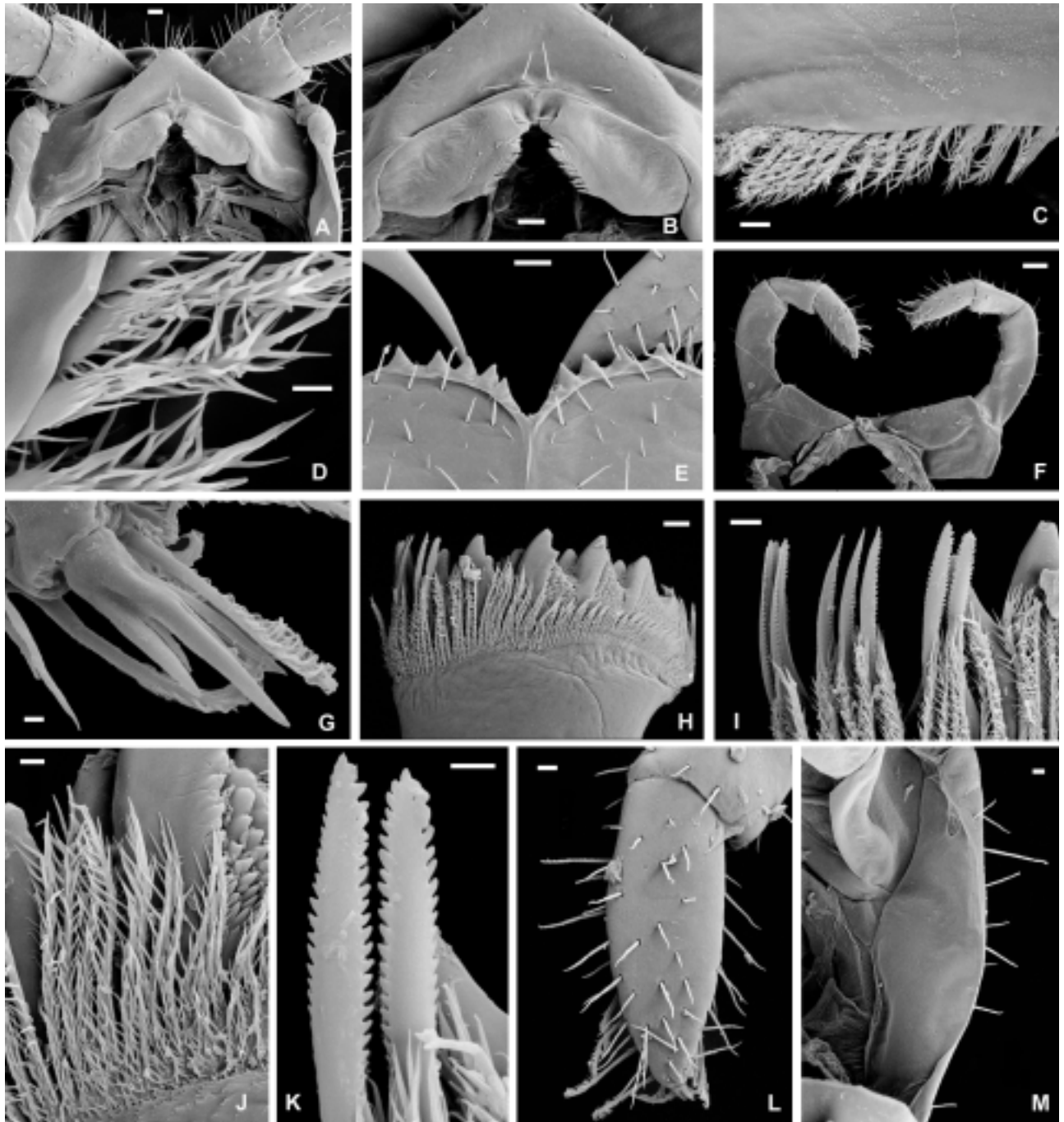


Figure 25. *Paralamyctes (Nothofagobius) chilensis* (Gervais in Walckenaer & Gervais, 1847). ♂ TMAG, Lenca, Xth Region, Chile. Scanning electron micrographs. A,B, ventral views of head, showing clypeus and labrum, scales 50 μ m; C,D, branching bristles on labral margin, scales 10 μ m, 5 μ m; E, dental margin of maxillipede coxosternite, scale 50 μ m; F, second maxillae, scale 100 μ m; G, claw of second maxilla, scale 5 μ m; H, gnathal lobe of mandible, scale 20 μ m. I,K, mandibular aciculae, scales 10 μ m, 5 μ m; J, fringe of branching bristles on mandible, scale 5 μ m; L, tarsus and claw of second maxilla, scale 20 μ m; M, cephalic pleurite, scale 20 μ m.

Silvestri's (1905) description, though the margins of T7 are untoothed and usually not deeply notched (Fig. 24A). Only one specimen (ZMUC: San Carlos de Bariloche, Argentina) has a subangular notch in the posterior margin of T7. The only specimen with more than with more than 19 antennal articles is one of the two identified by Crabill as probable syntypes; it has 21/19 articles. Silvestri (1905) cited 5+5

coxosternal teeth on the maxillipede in *P. chilensis*; specimens examined in this study have 4+4 or 5+5 teeth occurring in about equal frequency (Fig. 25E). Because a single species of *Paralamyctes* is present in the examined Patagonian collections, I consider it likely that this species is *P. chilensis*, though the vagaries of prior taxonomic treatments do not make this certain. Regardless of

nomenclatural ambiguities, the species documented here confirms the presence of *Paralamyctes* in Patagonia.

Paralamyctes (Haasiella) Pocock, 1901

= *Wailamyctes* Archey, 1917

Type species. *Henicops insularis* Haase, 1887 (= *Wailamyctes munroi* Archey, 1923).

Diagnosis. *Paralamyctes* with median furrow on head shield extending behind transverse suture; mandibular aciculae bipinnulate; tarsi of legs 1–12 fused into single article.

Assigned species. *Wailamyctes halli* Archey, 1917; *Wailamyctes trailli* Archey, 1917; undescribed species from Tasmania (*Wailamyctes* sp. of Mesibov, 1986).

Distribution. New Zealand (South Island, Stewart Island, Auckland Islands, Campbell Island), Tasmania.

Discussion. Pocock (1901) erected *Haasiella* for the aberrant *Henicops insularis* Haase, 1887, from the Auckland Islands. Johns (1964) indicated that a subsequently-named Auckland Islands species, *Wailamyctes munroi* Archey, 1923, is a subjective synonym of *H. insularis*, the holotype of which merely has unregenerated anal legs. With this synonymy, *Wailamyctes* Archey, 1917, which had served (e.g., Archey, 1937) to group the New Zealand clade composed of *H. insularis* (= *W. munroi*), *H. trailli* (Archey, 1917), and *H. halli* (Archey, 1917), is recognized as *Haasiella*. *Haasiella* is employed as a subordinate taxon (subgenus) within *Paralamyctes* because its removal renders *Paralamyctes* paraphyletic; molecular sequence data indicate a particularly close relationship between *P. (Haasiella)* and *P. (Thingathinga)* (Edgecombe *et al.*, 2001). Description of the only known Australian member of *P. (Haasiella)*, the Tasmanian species identified by Mesibov (1986), is in preparation.

Key to Australian genera of Lithobiomorpha and species of *Paralamyctes*

To assist in the identification of species described in this work and place these species in the context of Lithobiomorpha known from Australia, the following key is offered. Characters are specific to taxa occurring in Australia (i.e., large genera like the introduced *Lithobius* may deviate from certain of these characters in other regions).

- 1 Cluster of ocelli. Pleurite of maxillipede segment interrupted ventromedially, not forming a band between maxillipede coxosternite and sternite of first pedigerous segment. Tibia lacking distal spinose projection. One or more articulated spurs at distal ends of at least a few podomeres on all legs. Female gonopod with dorsal and ventral denticle on each side of main claw. Male gonopod small, single segmented. Anal pores absent except in larva and early post-larval stages 2 (*Lithobiidae*)
- Ocellus single or absent. Pleurite of maxillipede segment continuous ventromedially, forming a band between maxillipede coxosternite and sternite of first pedigerous segment. Distal spinose projection on tibia of at least legs 1–11. No articulated spurs at distal ends of podomeres. Female gonopod simple, lacking denticles against main claw. Male gonopod flagelliform, composed of three articles and seta-like terminal process. Anal pores present in adult 3 (*Henicopidae*)
- 2 23 or more antennal articles. Outer tooth on maxillipede coxosternite of similar size to inner tooth/teeth, more anteriorly placed than inner tooth/teeth. Porodont at outer edge of maxillipede tooth row or between teeth on outer part of row. Tergites smooth or gently wrinkled *Lithobius*
- 17–22 (overwhelmingly 20) antennal articles. Outer tooth on maxillipede coxosternite smaller and more posteriorly placed than inner teeth. Porodont among the maxillipede teeth on inner half of tooth row, typically between second and third teeth (as numbered from medial to lateral). Tergites with pronounced longitudinal wrinkling *Australobius*

- 3 14–17 antennal articles. Spiracle absent on first pedigerous segment. Coxal pores lacking on legs 12–13. Coxa of leg 15 with long, lobate process ending in a spine. Prefemur of leg 15 with a single ventral spur 4 (*Anopsobiinae*)
- 18 or more antennal articles. Spiracle present on first pedigerous segment. Coxal pores present on legs 12–15. Coxa of leg 15 lacking distal spinose process. Prefemur of leg 15 lacking a ventral spur 5 (*Henicopinae*: *Henicopini*)
- 4 Spiracle present on segment 8 *Anopsobius*
- Spiracle absent on segment 8 *Dichelobius*
- 5 Median furrow absent or confined to anterior part of head shield. Small, triangular sternite on first maxilla. First genital sternite of male divided longitudinally 6
- Median furrow on head shield deep, continuous to transverse suture. Large, bell-shaped sternite on first maxilla. First genital sternite of male undivided 8 (*Paralamyctes*)
- 6 All tergites with rounded posterior angles. Tarsi of legs 1–12 unjointed, tarsi of legs 13–15 bipartite. Distal spinose projection absent on tibia of legs 13–14 7
- Several tergites with projections on posterior angles. Tarsi of legs 1–12 bipartite or tripartite, tarsi of legs 13–15 at least tripartite. Distal spinose projection present on tibia of legs 13–14 *Henicops*
- 7 Ocellus absent. Most antennal articles evenly short *Lamyctinus*
- Ocellus present. Antennal article length uneven, with short, paired articles interspersed between groups of longer ones *Lamyctes*
- 8 Tarsi of legs 1–12 unjointed. Median furrow on head shield extends behind transverse suture. Aciculae on mandible bipinnulate *Paralamyctes (Haasiella)*
- Tarsi of legs 1–12 bipartite. Median furrow on head shield terminates at transverse suture. Aciculae on mandible simple or with pinnules along dorsal side only (not bipinnulate) 9
- 9 Tergite 1 markedly narrower than head shield. Basal article of female gonopod extended as a process bearing three spurs .. 10 (*Paralamyctes (Nothofagobius)*)
- Tergite 1 of similar width to head shield. Basal article of female gonopod not extended, bearing two spurs 11
- 10 Several antennal articles as wide as long. Posterior margin of tergite 7 gently concave. Spur-bearing process on female gonopod moderately long *P. (Nothofagobius) cassisi*
- Nearly all antennal articles substantially longer than wide. Posterior margin of tergite 7 deeply sinuate. Spur-bearing process on female gonopod long, slender *P. (Nothofagobius) mesibovi*
- 11 Maxillipede tarsungulum relatively short, with pretarsal part equal in length to tarsal part. Teeth on maxillipede coxosternite large, pointed *P. (Paralamyctes) neverneverensis*
- Maxillipede tarsungulum long, slender, with pretarsal part substantially longer than tarsal part. Teeth on maxillipede coxosternite small, blunt 12

- 12 All antennal articles longer than wide. Ocellus bulging. Tömösváry organ on margin of head, with cephalic pleurite constricted behind organ. Aciculae of mandible with pinnules along dorsal side. Posterior margin of tergite 7 with shallow median embayment *P. (Paralamyctes) monteithi*
- Some antennal articles as wide as long. Ocellus gently convex or flattened. Tömösváry organ on surface of cephalic pleurite. Aciculae of mandible simple, lacking pinnules. Posterior of margin of T7 with strong, medially-transverse embayment 13
- 13 Ocellus gently convex. Dental margin of maxillipede gently sloping backwards laterally. Strong joints between tarsomeres on legs 1–12 *P. (Thingathinga) grayi*
- Ocellus flattened. Dental margin of maxillipede nearly transverse. Faint trace of joints between tarsomeres on legs 1–12 *P. (Thingathinga) hornerae*

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