

***Remylamyctes* (Chilopoda: Lithobiomorpha), a henicopid centipede from Madagascar and Réunion**

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Abstract

Restudy of the syntypes of *Remylamyctes straminea* Attems, 1951, from Madagascar and Réunion, indicates membership of this monotypic genus in the Henicopini rather than the Zygethobiini. The supposed restriction of spiracles to segments 5, 10 and 12 is in error; *R. straminea* has spiracles on segments 1, 3, 5, 8, 10, 12 and 14, as in all Henicopini. An alleged absence of distal spinose projections on any legs is also erroneous; the species has sclerotised, spine-like tibial projections as in all other Henicopidae. *Remylamyctes straminea* possess the apomorphic characters of *Lamyctes* Meinert, 1868, which includes other blind, parthenogenetic species, and the genus is accordingly placed in subjective synonymy with *Lamyctes*. *Lamyctes straminea* is identical with *L. coeculus* (Brölemann, 1889), a nearly cosmopolitan, synanthropic species, and is unlikely to be native to either Madagascar or Réunion.

Key words: Chilopoda, Lithobiomorpha, Henicopidae, *Remylamyctes straminea*, *Lamyctes coeculus*, Madagascar, Réunion

Introduction

The monotypic genus *Remylamyctes* Attems, 1951, was erected for *R. straminea* Attems, 1951, from several localities on Madagascar and two localities on Réunion. This species was described exclusively from females, and was thought to be a member of the Tribe Zygethobiini, which is represented in the United States and Canada (*Zygethobius* Chamberlin, 1903, *Buethobius* Chamberlin, 1911, and *Yobius* Chamberlin, 1945), Indonesia, Japan, Taiwan, Kirghizia (*Cermatobius* Haase, 1885), and western China (*Hedinobius* Verhoeff, 1934), but is not otherwise known from the Southern Hemisphere. Attems (1951) considered the American genus *Buethobius* to be closely related to *Remylamyctes*, though he did not indicate the basis for this view, nor was membership in Zygethobiini justified by any explicit character evidence. The most peculiar characters cited in the diagnosis of

Remylamyctes are the restriction of spiracles to only three segments (versus six segments in other Zygethobiini and seven segments in Henicopini) and an absence of distal spinose projections on the tibiae. All other species in the Henicopidae have these projections on at least legs 1–11. From its published account, *Remylamyctes* is morphologically and biogeographically anomalous.

Through the courtesy of Dr Verena Stagl (Naturhistorisches Museum Wien), the syntypes of *Remylamyctes straminea* were made available for study. Anomalous aspects of the original description are clarified, and the species is reassigned to the Henicopini rather than Zygethobiini. A synonymy with the nearly cosmopolitan, parthenogenetic species *Lamyctes coeculus* (Brölemann, 1889) is proposed.

Taxonomy

Lamyctes Meinert, 1868

- = *Lamyctinus* Silvestri, 1909
- = *Metalamyctes* Verhoeff, 1941
- = *Remylamyctes* Attems, 1951, **n. synonymy**

Type species: *Lamyctes fulvicornis* Meinert, 1868 [= *L. emarginatus* (Newport, 1844)].

Assigned species: See Edgecombe & Giribet (2003: 2–3) for complete list.

Discussion: Synonymy of *Remylamyctes* with *Lamyctes* is proposed herein based on restudy of the type species, *R. straminea*.

Some characters that Attems (1951) cited as diagnostic of *Remylamyctes* are descriptive errors. Most notably, the genus was said to have spiracles on only three segments, 5, 10 and 12, but the specimens consistently show the seven pairs of spiracles diagnostic of Henicopini (spiracles on segments 1, 3, 5, 8, 10, 12 and 14). Several specimens have spiracles on the supposed spiracle-free segments as prominent as those on segments 5, 10 and 12. A lack of distal spinose projections on any tibiae was cited as another diagnostic character of *Remylamyctes*. Attems' types demonstrate that *R. straminea* in fact has a slender, spine-like, sclerotised projection in the usual henicopid position on the tibiae of legs 1–11 (Fig. 23). The labral sidepiece was diagnosed and figured (Attems 1951: fig. 24) as having just a single spinule (the transverse seta that projects across the midpiece: Fig. 14); Attems (1951: 184) described the labral sidepieces with “pas d'autres poils”, alluding to the absence of a fringe of branching bristles that is seen in all other Lithobiomorpha. In fact, a fringe of branching bristles projects beyond the labral margin (Fig. 15).

Lamyctes straminea is typical of *Lamyctes* in its tergite shapes (all tergites lacking projections: Fig. 1), tarsal segmentation (tarsi of legs 1–12 undivided, those of legs 13–15 in two parts: Figs. 4–7), the narrow, curved dental margin of the maxillipede coxosternum (Fig. 12), and conical, seta-like pseudopodant in addition to two teeth on each dental

margin (Fig. 13). Structure of the pretarsal claws is identical to other *Lamyctes*, including such distinctive characters as a long posteroventral spine (Fig. 8) with a short subsidiary spine (Fig. 9), divergence of the accessory claws relative to the main claw (Fig. 11), and a lack of rimmed pores beneath the base of the accessory claws (see Edgecombe 2004a: figs. 3A, 7B for *L. coeculus*). The mandible possesses an autapomorphic character of *Lamyctes*, multifurcating, scale-like accessory denticles on the dorsal mandibular tooth (Figs. 18, 19). Mandibular fine structure is identical to that of *L. coeculus* (Brölemann, 1889) (Edgecombe et al. 2002: fig. 6D; Edgecombe 2004b: fig. 38E), including the number of aciculae and the form of the pinnules along their margins (Fig. 17), and the smooth, scale-like region between the accessory denticles and furry pad (Fig. 19). A lack of ocelli is likewise observed in *Lamyctes coeculus* and *L. hellyeri* Edgecombe & Giribet, 2003. These blind species of *Lamyctes* further resemble *L. straminea* in being parthenogenetic throughout most (*L. coeculus*) or all (single locality for *L. hellyeri*) of their geographic ranges.

The specific synonymy of *Lamyctes straminea* and *L. coeculus* is argued below. *Remylamyctes* falls into junior subjective synonymy with *Lamyctes*.

***Lamyctes coeculus* (Brölemann, 1889)**

Figs. 1–31

Lithobius coeculus Brölemann, 1889: 273.

Remylamyctes straminea (Attems, 1951): 184–186, figs. 24–32, **n. synonymy**

Lamyctes coeculus: Edgecombe & Giribet, 2003: 4 (with synonymy).

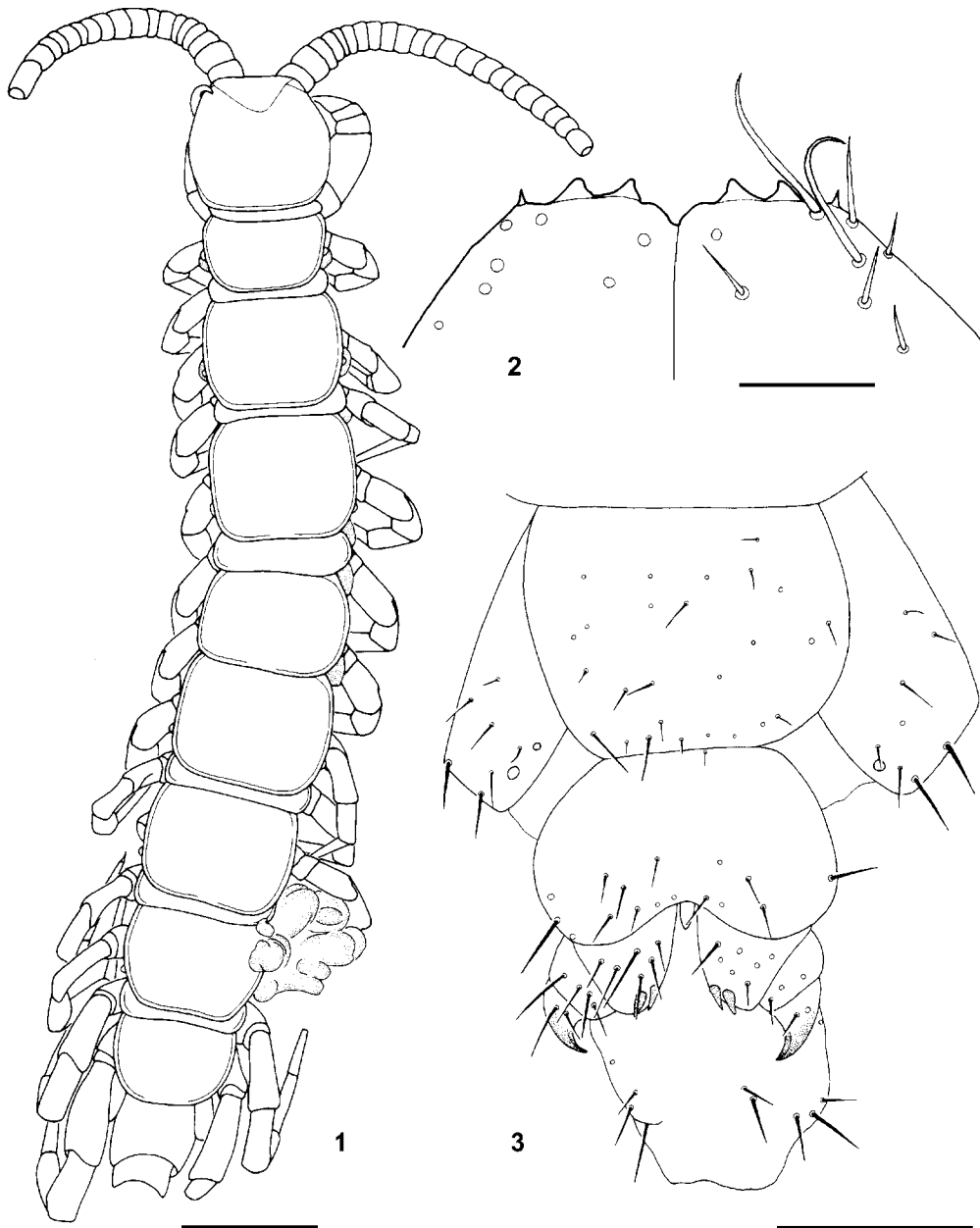
Material examined: Syntypes of *Remylamyctes straminea*, Naturhistorisches Museum Wien (NMW) 3919, all female, leg. P. Remy, 1947. Three slide mounted specimens (Madagascar: Tananarive, Fort Dauphin; Réunion); 9 tubes in alcohol: [Madagascar: Tananarive, 17.viii.1947, 1 specimen, head and posterior end on slide; Tananarive, 18.viii.1947, 1 specimen; Lac Djabalbe, 9.ix.1947, 1 specimen; Fort Dauphin, 29.x.1947, 2 specimens; Tananarive, Institut Pasteur, 22.xi.1947, 2 specimens; Tuléar, undated, 2 specimens. Réunion: St. Denis, rue Monthyon, 6–8.x.1947, 1 specimen; St. Denis, undated, 3 specimens; St. Gilles, 14.x.1947, 2 specimens].

Description: The following description is based on syntypes of *Remylamyctes straminea*.

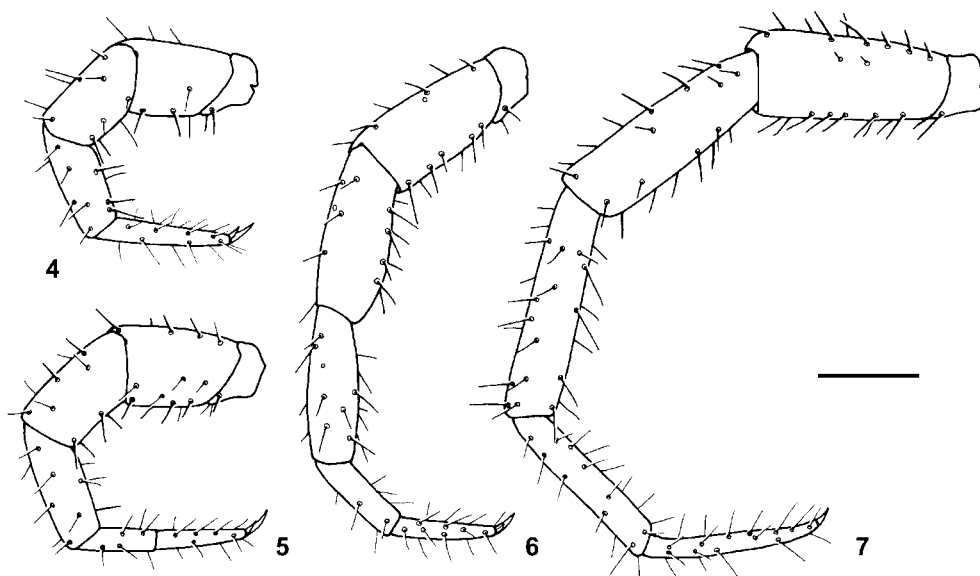
Maximum length of body (anterior margin of head shield to posterior end of telson) 5.4 mm; maximum length of head shield 0.65 mm. Head and tergites yellow or pale orange-brown; where yellow, increasingly orange on posterior segments; legs and antenna pale yellow.

Head shield as wide as T3, about 90% width of T8. Frontal margin with strong median notch. Region distal to antennocellar suture similarly pigmented and sclerotised as rest of head shield; ocellus absent. Border slightly wider posterolaterally than posteromedially.

Tömösváry organ large, more than one-third width of cephalic pleurite, longitudinally ovate, situated just in front of midlength of pleurite and slightly lateral to midwidth of pleurite (Fig. 29).



FIGURES 1–3. *Lamyctes coeculus* (Brölemann, 1889). Females, syntypes of *Remylamyctes straminea* (Attems, 1951), NMW 3919. 1, Lac Djabalbe, Madagascar, 9.ix.1947, scale 0.5 mm; 2–3, slide mount, Réunion; 2, dental margin of maxillipede coxosternum, scale 50 μ m; 3, terminal segments and gonopods, scale 50 μ m.



FIGURES 4–7. *Lamyctes coeculus* (Brölemann, 1889). Female, syntype of *Remylamyctes straminea* (Attems, 1951), NMW 3919, Tananarive, Madagascar, 18.viii.1947. 4, leg 12; 5, leg 13; 6, leg 14; 7, leg 15. Scale 0.2 mm.

Antenna with 17–24 articles (specimen with 17 articles on one side has at least 22 on the other), most commonly 24/24; basal two articles much larger than others; articles 3 and 4 frequently short, each pair of succeeding articles (5–6, 7–8, etc.) of similar proportions; distal articles mostly submoniliform (Fig. 26) except for elongate terminal article (Fig. 24). Proximal part of basal article with cluster of sensilla microtrichoidea on dorsal side. Trichoid sensilla arranged in two or three imprecisely aligned whorls on most articles (Figs. 26, 27); cluster of about 5 sensilla brachyconica at apex of terminal article, shorter than trichoid sensilla (Fig. 25); single clavate thin-walled basiconic sensillum on dorsal side of antenna at distal end of articles 5, 7, 9, 11, 13, 15, 19 (Fig. 28), 21 (Fig. 26) and 22, variably present on article 17; one similarly-sized thin-walled basiconic sensillum at about three-quarters length of distal article on its dorsal side (Figs. 24, 25).

Clypeus with single pair of setae in front of labrum. Transverse seta projects from pit in labral sidepiece towards midpiece (Fig. 14). Labral margin concave where small fringe of branching bristles projects beyond margin (Fig. 15).

Maxillipede coxosternum trapezoidal (Fig. 12), anterolateral margins nearly straight or converging slightly more strongly towards dental margin (Fig. 2). Dental margin weakly curved, with 2+2 large teeth; stout, spine-like pseudopodant at anterolateral corner, separated from outer tooth by equal distance to that between the two teeth (Fig. 13); median notch with rounded V-shape, moderately deep; weakly bulging shoulder between median notch and inner tooth. A few short setae and a pair of long setae on anterolateral part of coxosternum; one long seta based just behind dental margin between second tooth and pseudopodant (Figs. 2, 13). Pretarsal part of tarsungulum slightly longer than tarsal part.

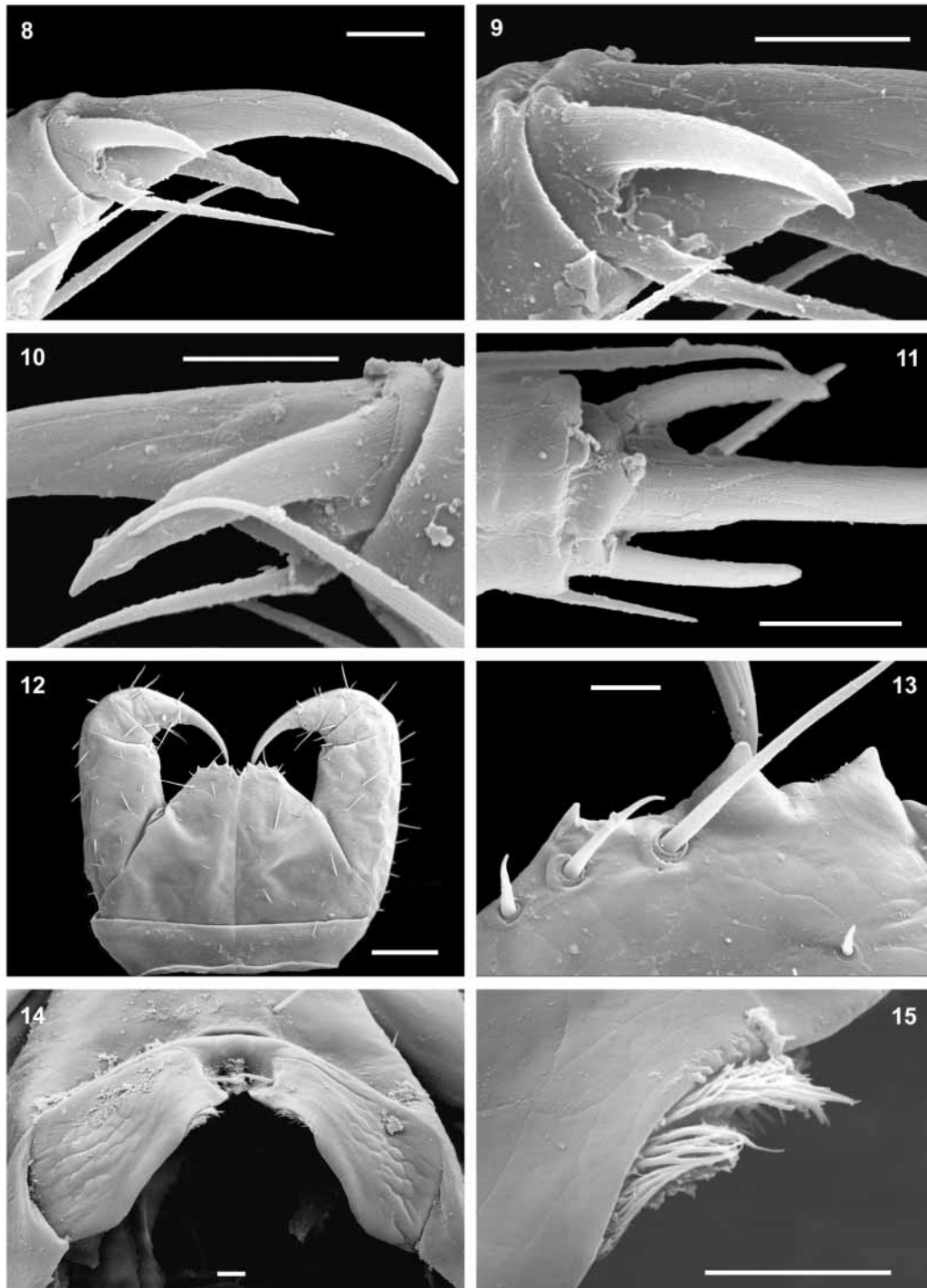


FIGURE 8–15. *Lamyctes coeculus* (Brölemann, 1889). Females, syntypes of *Remylamyctes straminea* (Attems, 1951), NMW 3919. Scales 10 μm except 12, 100 μm . 8–11, leg 14, St. Denis, Réunion. 8, posterior view of pretarsus; 9, posterior accessory claw and base of posteroventral spine; 10, anterior accessory claw; 11, dorsal view of proximal part of pretarsus. 12–15, rue Monthyon, St. Denis, Réunion. 12, maxillipedes; 13, dental margin of maxillipede coxosternum; 14, labrum; 15, bristles on labral sidepiece.

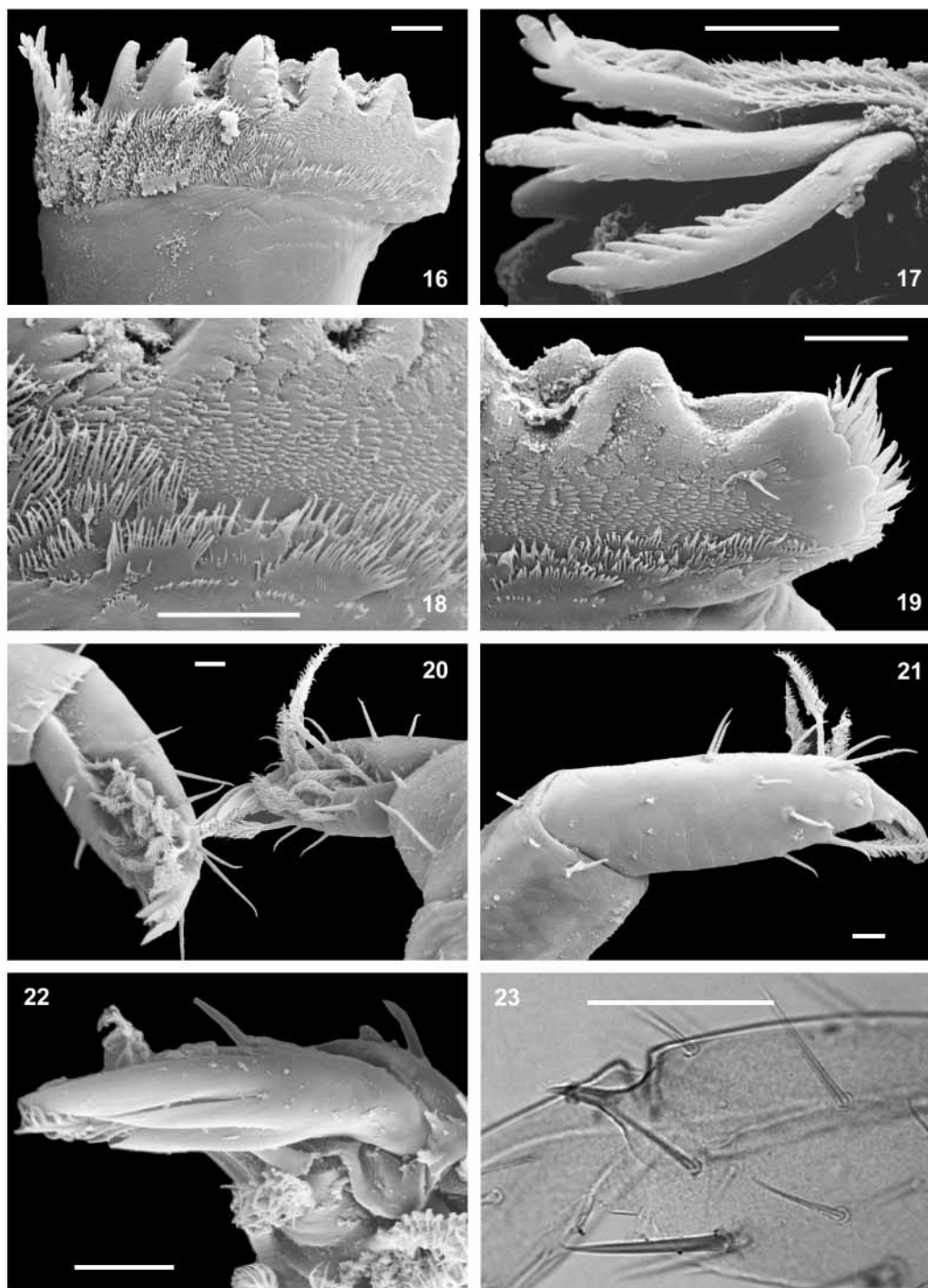


FIGURE 16–23. *Lamyctes coeculus* (Brölemann, 1889). Females, syntypes of *Remylamyctes straminea* (Attems, 1951), NMW 3919. Scales 10 μm except 23, 50 μm . 16–22, rue Monthyon, St. Denis, Réunion. 16, gnathal edge of mandible; 17, mandibular aciculae; 18, fringe of branching bristles and accessory denticles on mandibular teeth; 19, dorsal tooth on mandible and furry pad; 20, tarsi of second maxillae; 21, tarsus and claw of second maxilla; 22, claw of second maxilla; 23, Tananarive, Madagascar, distal part of tibia of leg 6, showing spinose projection.

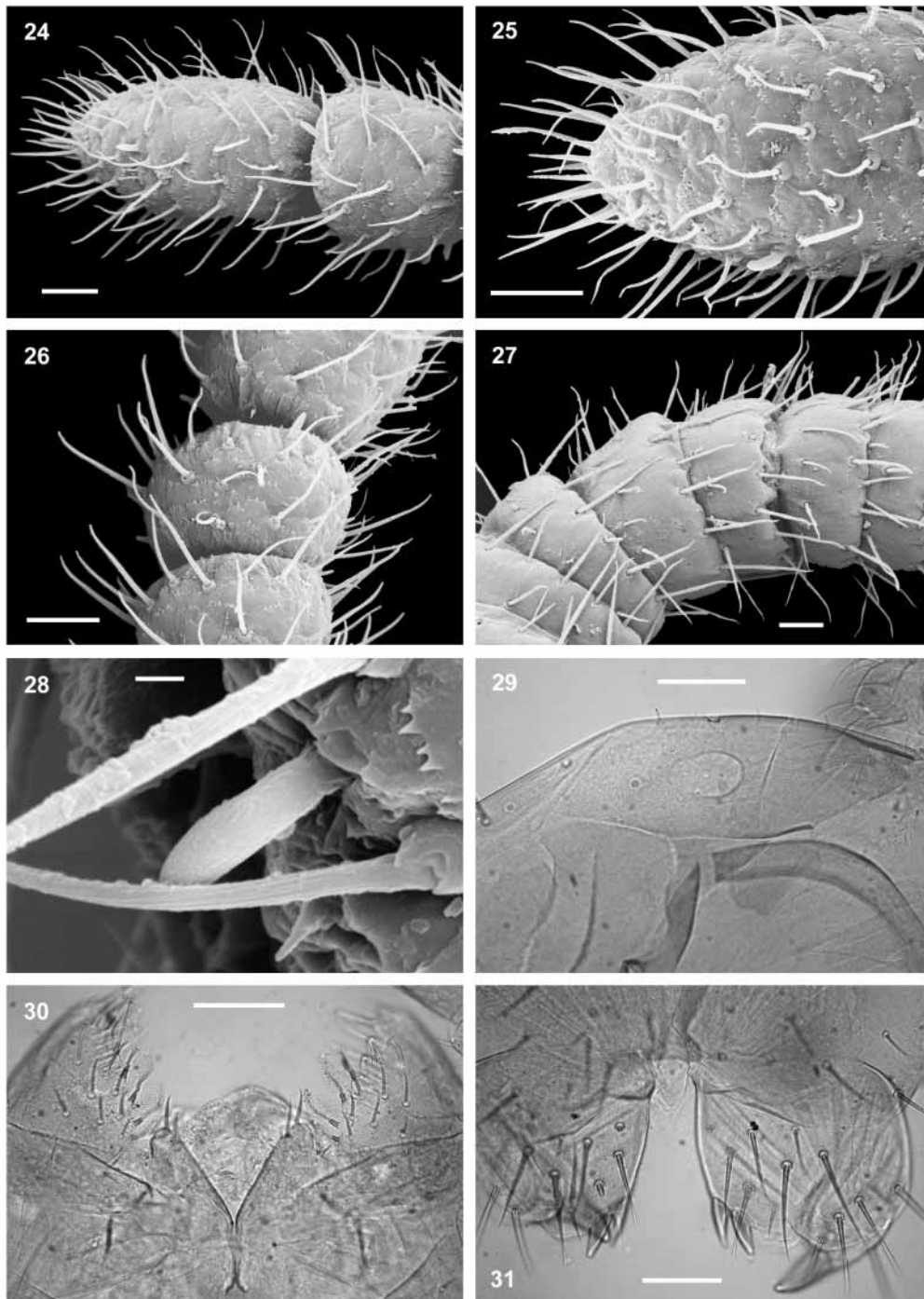


FIGURE 24–31. *Lamyctes coeculus* (Brölemann, 1889). Females, syntypes of *Remylamyctes straminea* (Attems, 1951), NMW 3919. 24–26, rue Monthyon, St. Denis, Réunion, scales 20 μm . 24, antennal articles 22 and 23, dorsal side; 25, antennal article 23; 26, antennal articles 20–22, dorsal side. 27, 28, Tananarive, Madagascar. 27, antennal articles 2–8, dorsal side, scale 20 μm ; 28, thin-walled basiconic sensillum at distal end of antennal article 19, scale 2 μm . 29–31, Tananarive, Madagascar, scales 50 μm . 29, cephalic pleurite with Tömösváry organ; 30, first maxillae; 31, gonopods.

Mandible with four paired teeth (Fig. 16). Four aciculae, each with up to eight large, rounded or weakly pointed pinnules on both margins (Fig. 17). Fringe of branching bristles skirts aciculae; ventral bristles with even, dense, spine-like branchings along entire length; abrupt transition to rows of flat, multifurcating scale-like bristles against second tooth; scale-like bristles arranged two- or three-deep, composed of up to 22 slender branches in a single row (Fig. 18). Grooved ridge bearing row of large, conical accessory denticles on three dorsal teeth; most accessory denticles in the form of flattened scales that bear several parallel, distally-blunt rods (Fig. 18). Smooth scale-like region separates denticle field from furry pad (Fig. 19). Furry pad composed of numerous simple bristles, a few multifurcating bristles.

First maxillary sternite small, triangular with concave lateral margins (Fig. 30). Coxal process fused to basal article of telopodite; two moderately large, simple setae and a small simple seta at apex of coxal process. Distal article of telopodite with paired rows of seven or eight plumose setae along inner margin, each with a simple seta near its base; three simple setae aligned just lateral to these rows, remainder of ventral surface of this article bearing only two or three small setae.

Second maxilla with anterior margin of coxa weakly to gently concave. Joint between trochanter and prefemur defined on inner part of telopodite. Inner face of tarsus with about ten plumose setae (Fig. 20), densely branching along their distal two-thirds (Fig. 21); outer face with simple setae concentrated on distal half (Fig. 21). Pretarsal claw composed of four or five digits of varied length and thickness (Fig. 22).

Tergites smooth; all posterior angles rounded, without projections (Fig. 1). Posterior margins of TT1, 3, 5, 7 and 8 faintly concave; TT10 and 12 gently concave; posterior margin of T14 nearly transverse or gently concave. Tergites of first genital segment and telson sclerotised similar to other trunk tergites. Several short, slender setae along lateral margins of tergites.

Spiracles on segments 1, 3, 5, 8, 10, 12 and 14.

Slender distal spinose projections on tibiae of legs 1–11 (Fig. 23), lacking on legs 12–15 (Figs. 4–7). Legs 12–15 with length ratios 1: 1.15: 1.5: 2.2. Leg 15 distitarsus about 95% length of basitarsus (Fig. 7); basitarsus about 80% length of tibia; tibia 4–4.5 times longer than maximal width, basitarsus 5–5.5 times, distarsus 8–8.5 times. Basitarsus very slightly shorter than distitarsus on leg 14 (Fig. 6). Most setae on legs fine, slender; a few slightly thickened setae on ventral side of prefemur and femur; a thickened seta at ventro-distal edge of femur and tibia on legs 1–12; tarsal setae uniformly fine on all legs. Anterior and posterior accessory claws each about 35% length of main claw, gently divergent (Fig. 11), gently curved, with closely-spaced linear ridges on their surface (Fig. 10). Main claw curved along its distal half, subdivided along its length into elongate scales with ornament of linear ridges similar to that on accessory claws (Fig. 9). Pores lacking beneath accessory claws. Posteroventral spine long, slender, about 55% length of main claw (Fig. 8); short subsidiary spine at upper margin of posteroventral spine (Fig. 9).

Coxal pores: round; 1,2,2,1/1,2,2,1 or 1,2,2,2/1,2,2,2.

Sternite of segment 15 fringed with up to nine short setae a short distance in front of posterior margin, numerous short setae scattered across rest of sternite except anterolaterally (Fig. 3). Sternite of first genital segment with setation confined to posteromedial part except for one or a few setae posterolaterally. Basal article of gonopod bearing up to eight scattered setae; second article with three or four setae aligned in a transverse band; third article with two setae (Figs. 3, 31). Pair of spurs on basal article slender, conical, equal in size. Claw simple.

Discussion: The types of *Lamyctes straminea* are identical with the widespread, usually parthenogenetic *L. coeculus* (Enghoff 1975; Edgecombe & Giribet 2003). Relative to other species of *Lamyctes*, noteworthy shared characters include a lack of ocelli, enlargement and posterior displacement of the Tömösváry organ (Fig. 29), a usual count of 24 antennal articles, identical maxillipede dentition including the size and structure of the pseudopododont (Edgecombe et al. 2002: Fig. 3K for *L. coeculus* from Australia), slender distal spinose projections on the tibiae of legs 1–11 (see Silvestri, 1909, fig. 19 for *L. coeculus* from Mexico), and the same coxal pore counts.

The synonymy of *Lamyctes straminea* adds Madagascar and Réunion to the distribution of *L. coeculus*, already known from tropical Africa (Enghoff 1975; Edgecombe & Giribet 2003) among many other occurrences (temperate and tropical North and South America, Cuba, Australia, Hawaii, Israel, the Canary Islands, European greenhouses). Given that the distribution of this species is probably largely synanthropic, its presence in Madagascar and Réunion, where no males are known, is likely to be due to introduction.

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References

- Attems, C. (1951) Myriapodes d'Afrique, de Madagascar et de la Réunion récoltés par le Pr. Paul Remy. *Mémoires de l'Institut Scientifique de Madagascar, Série A*, 5, 173–186.
- Brölemann, H. (1889) Contributions à la faune myriapodologique méditerranéenne. *Annales de la Société Linnéenne de Lyon*, 35, 273–284.
- Chamberlin, R.V. (1903) *Henicops*. *Entomological News*, 14, 335.
- Chamberlin, R.V. (1911) The Lithobiomorpha of the southeastern states. *Annals of the Entomological Society of America*, 4, 32–48.
- Chamberlin, R.V. (1945) A new henicopid centipede from Utah. *Entomological News*, 56, 153–154.

- Edgecombe, G.D. (2004a) Monophyly of Lithobiomorpha (Chilopoda): new characters from the pretarsal claws. *Insect Systematics and Evolution*, 35, 29–41.
- Edgecombe, G.D. (2004b) The henicopid centipede *Haasiella* (Chilopoda: Lithobiomorpha): new species from Australia, with a morphology-based phylogeny of Henicopidae. *Journal of Natural History*, 38, 37–76.
- Edgecombe, G.D. & Giribet, G. (2003) A new blind *Lamyctes* (Chilopoda: Lithobiomorpha) from Tasmania with an analysis of molecular sequence data for the *Lamyctes-Henicops* Group. *Zootaxa*, 152, 1–23.
- Edgecombe, G.D., Giribet, G. & Wheeler, W.C. (2002) Phylogeny of Henicopidae (Chilopoda: Lithobiomorpha): a combined analysis of morphology and five molecular loci. *Systematic Entomology*, 27, 31–64.
- Enghoff, H. (1975). Notes on *Lamyctes coeculus* (Brölemann), a cosmopolitan, parthenogenetic centipede (Chilopoda: Henicopidae). *Entomologica Scandinavica*, 6, 45–46.
- Haase, E. (1885) Zur Morphologie der Chilopoden. *Zoologischer Anzeiger*, 210, 1–4.
- Meinert, F. (1868) Danmarks scolopender og lithobier. *Naturhistorisk Tidsskrift*, 5, 241–268.
- Newport, G. (1844) A list of the species of Myriapoda, order Chilopoda, contained in the cabinets of the British Museum, with a synoptic description of forty-seven species. *Annals and Magazine of Natural History*, 13, 94–101.
- Silvestri, F. (1909) Contribuzioni alla conoscenza dei Chilopoda, III. Descrizione di alcuni generi e specie di Henicopidae. *Bollettino del Laboratorio di Zoologia Generale e Agraria, Portici*, 4, 38–50.
- Verhoeff, K.W. (1934). Schwedisch-chinesische wissenschaftliche Expedition nach den nordwestlichen Provinzen Chinas. *Arkiv för Zoologi*, 26A(10), 1–41.
- Verhoeff, K.W. (1941) Myriapoden der Insel Fernando Po. X. Beitrag zu den wissenschaftlichen Ergebnissen der Forschungsreise H. Eidmann nach Spanisch-Guinea 1939/40. *Zoologischer Anzeiger*, 136, 89–98.