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ARTICLE *in* ZOOTAXA · NOVEMBER 2015

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## Revision of the genus *Procoryphaeus* Mazur, 1984 (Coleoptera: Histeridae: Histerinae: Exosternini)

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### Abstract

The genus *Procoryphaeus* Mazur, 1984 is revised herein. It contains three species: *Procoryphaeus violaceus* (Lewis, 1905) from Thailand: Tenasserim Mountains; Malaysia: Borneo: Sabah; Indonesia: Java, Sumatra and Papua, *Procoryphaeus pilosus* (Lewis, 1893) from Tanimbar Island, Indonesia and *Procoryphaeus wallacei* (Marseul, 1864) from Indonesia: Papua. All type specimens are figured, and male genitalia of *P. violaceus* are drawn. Lectotypes of *Pachycraerus* (*Coryphaeus*) *wallacei* Marseul, 1864, *Coryphaeus violaceus* Lewis, 1905 and *Coryphaeus pilosus* Lewis, 1893 are designated. The exact identities of *P. violaceus* and *P. wallacei* species remain unclear since they are morphologically very similar and both respective type specimens are females. A key to species is given.

**Key words:** Coleoptera, Histeridae, Histerinae, Exosternini, *Procoryphaeus*, Oriental region, revision

### Introduction

The genus *Procoryphaeus* Mazur, 1984, is a member of one of the largest subgroups of the beetle family Histeridae, the tribe Exosternini containing 47 genera and nearly 800 described species worldwide, with most species known from the Neotropical and Afrotropical regions (Caterino & Tishechkin 2015). In the Oriental region, the Exosternini contain 19 genera (Mazur 2011). *Procoryphaeus* was established by Mazur (1984) as a replacement name for Marseul's *Coryphaeus*, which became a junior homonym of *Coryphaeus* of Gistel (1848). Marseul's type species of the newly established taxon *Coryphaeus*, which he then regarded as a mere subgenus of the genus *Pachycraerus* Marseul, 1853 was *Pachycraerus* (*Coryphaeus*) *wallacei* collected presumably by Wallace himself in Dorey [=Manokwari], today's Indonesian province of Papua. Lewis (1893) described another species, *Coryphaeus pilosus* of this peculiar genus from Tanimbar Island, Indonesia. The same author (Lewis 1905) added another species, *Coryphaeus violaceus* from the Malaysian province of Sabah, collected at Kina Balu Mountain. Almost nothing is known on the biology of these rarely collected beetles, and all type specimens are female which further blurs the picture of exact taxonomic assignment. In recent years, only one specimen (again a female) was collected by flight intercept trapping in western Thailand by a Japanese entomologist S. Nomura, significantly expanding the distributional range of *Procoryphaeus*. The aim of this paper is to revise the genus and supplement the work with colour images as well as genitalia drawings of (rarely available) male genitalia.

### Material and methods

All dry-mounted specimens were relaxed in warm water for several hours. After removal from original cards, the beetles were side-mounted on triangular points and examined under Nikon 102 binocular microscope with diffuse light. Male genitalia were first incubated in 10% KOH solution for about 15 minutes, cleared in 80% alcohol and placed in lactic acid with fuchsine, incubated at 60 °C for another two hours, and subsequently transferred into 1:1 mixture of glacial acetic acid and methyl salicylate, heated at 60 °C for 15 minutes and cleared in xylene. Genitalia

were then observed in  $\alpha$ -terpineol in a small dish. Digital photographs of male genitalia were taken using a Nikon 4500 Coolpix camera and edited in Adobe Photoshop CS5. Based on the photographs or direct observations, the genitalia were drawn using a light-box Hakuba klv-7000. All specimens were measured with an ocular micrometer. Body part terminology follows that of [Kanaar \(1997\)](#) and [Caterino & Tishechkin \(2013\)](#).

The following acronyms of museum collections are used throughout the text:

MNHN Muséum National d'Histoire Naturelle, Paris, France (A. Taghavian);  
ZMHUB Zoologisch Museum für Naturkunde, Humboldt-Universität, Berlin, Germany (B. Jaeger);  
NHM National History Museum, London, UK (R. Booth);  
NSMT National Science Museum, Tokyo, Japan (S. Nomura).

**Abbreviations.** The following abbreviations of morphological measurements follow [Ôhara \(1994\)](#) and are used throughout the text:

APW width between anterior angles of pronotum  
EL length of elytron along elytral suture  
EW maximum width between outer margins of elytra  
PEL length between anterior angles of pronotum and apices of elytra  
PPW width between posterior angles of pronotum.

## Taxonomy

### *Procoryphaeus* Mazur, 1984

*Coryphaeus* Marseul, 1864—preoccupied name by Gistel, 1848: 117. Synonymized by Mazur, 1984: 275. Type species: *Pachycraerus (Coryphaeus) wallacei* Marseul, 1864: 311, by monotypy. *Procoryphaeus*: Mazur (1984): 275; Mazur (1997): 41; Mazur (2011): 38.

**Diagnosis.** Rather large Exosternine Histeridae beetles, with blue to light green metallic bodies, cuticle occasionally dark, but always with metallic lustre. At least pleura and sterna covered with tiny dense setae, in the case of one species, *P. pilosus*, the entire body surface setose. Frons with deep depression on postero-median area; fronto-clypeal depression present. Pronotal disc laterally with dense foveolate-variolate confluent punctures; apical angles always impunctate; pre-scutellar area with variously prominent tiny tubercle. Elytra with 3-5 complete discal striae, sutural stria in most cases absent or indiscernible. Prosternum with index finger-like groove between lateral prosternal stria and prosternal keel; between lateral pronotal stria and pronotal keel another carinate stria present delimiting the prosternal keel. Mesoventricle rather small; metaventricle almost glabrous; procoxae massive; tibiae flattened and slightly dilated. Tenth tergite small and thin, keel like; basal piece of aedeagus about twice as long as its tegmen.

**Biology.** Unknown. A specimen from Thailand was collected using flight intercept trap.

**Distribution.** This genus includes three described species: *Procoryphaeus wallacei* (Marseul, 1864) described from Dorey [=Manokwari] (Indonesia: Papua); *Procoryphaeus violaceus* (Lewis, 1905) described from Mount Kina Balu, Borneo, Malaysia, occurring also in Indonesia (Java, Sumatra and Papua) and Thailand (Tenasserim Mountains); and *Procoryphaeus pilosus* (Lewis, 1893) known only from the Tanimbar Island, Indonesia.

### Key to the species of the genus *Procoryphaeus* Mazur, 1984

- 1 (2) Cuticle wholly covered with dense amber pilosity (Fig. 18); frontal stria interrupted, supra-orbital stria vague (absent) (Fig. 20) ..... *Procoryphaeus pilosus* (Lewis, 1893).
- 2 (1) At least pronotum and elytra not covered with dense amber pilosity (Figs. 1, 5); frontal stria, although obscured by fronto-clypeal depression, usually not interrupted, supra-orbital stria well marked, carinate (Fig. 3) ..... 3

- 3 (4) Elytra (Fig. 1) with 4 (almost) complete well-impressed discal striae; sutural stria distinct on its apical half .....*Procoryphaeus wallacei* (Marseul, 1864).  
 4 (3) Elytra (Fig. 4) with 3 (almost) complete well-impressed discal striae; sutural stria indistinct. ....*Procoryphaeus violaceus* (Lewis, 1905).

***Procoryphaeus wallacei* (Marseul, 1864)**

(Figs. 1–4)

*Pachycraerus wallacei* Marseul, 1864: 311

*Coryphaeus wallacei*: Lewis (1905): 347

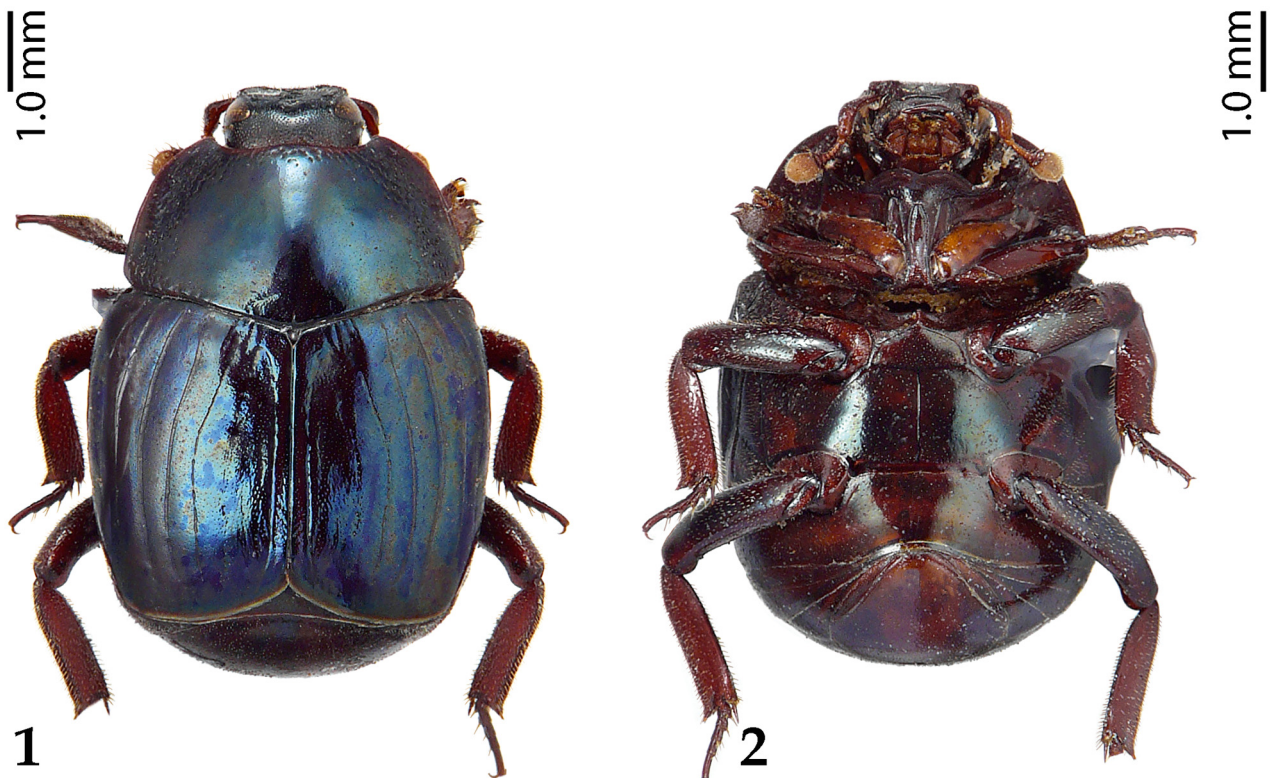
*Procoryphaeus wallacei*: Mazur (1984): 275; Mazur (1997): 41; Mazur (2011): 38.

**Type locality.** Dorey [=Manokwari], Indonesia: Papua.

**Type material examined.** *Pachycraerus wallacei*: Lectotype (present designation), ♀, side-mounted on a triangular mounting point, right protarsus and four segments of left metatarsus broken off, with the following labels: “♀” (printed); followed by: “Coryphaeus / Wallacei / Dorey / Wall [illegible, presumably meaning ‘Wallace’]” (yellow, round label of Marseul, written); followed by: “Dor. / 260” (round label, written); followed by: “Coryphaeus / Wallacei / Dorey” (written); followed by: “MUSEUM PARIS / COLL / DE MARSEUL 1890” (printed); followed by: “TYPE” (red-written label, printed); followed by: “Pachycraerus / (Coryphaeus) / wallacei Marseul, 1863 / LECTOTYPE / Designated by T. / Lackner, 2015” (red label, written) (MNHN). This species was described based on unknown number of specimens and the lectotype designation fixes the identity of the species.

**Additional material examined.** None.

**Diagnosis.** This species is delimited from all other species of the genus by almost complete fourth discal stria and the presence of sutural stria of elytra.



**FIGURE 1.** *Procoryphaeus wallacei* (Marseul, 1864) habitus, dorsal view.

**FIGURE 2.** ditto, ventral view.



**FIGURE 3.** *Procoryphaeus wallacei* (Marseul, 1864) head, dorsal view.

**FIGURE 4.** *Procoryphaeus wallacei* (Marseul, 1864) prosternum, mesoventrite + metaventrite.

**Re-description of the holotype.** PEL: 4.50 mm; APW: 1.90 mm; PPW: 3.70 mm; EW: 4.00 mm; EL: 3.00 mm. Body (Figs. 1–2) castaneous with blue metallic lustre, feebly convex dorsally, venter light brown, non-metallic, legs, antennae and mouthparts castaneous; antennal club densely covered with yellow tiny setae, yellowish-brown. All femora and tibiae covered with tiny dense pilosity; similar pilosity present also on lateral side of all pleura and sterna.

Frons (Fig. 3) postero-medially with deep depression; occipital stria absent, frontal stria vaguely inwardly arcuate, feebly carinate, uninterrupted; supraorbital stria carinate. Disc of frons with tiny, rather dense punctuation, punctures separated by about their own diameter. Clypeus large, sub-rectangular, depressed. Antennal scape massive, approximately as large as antennal funicle; antennal club ovoid, densely tomentose. Labrum large, punctuated, sub-trapezoidal; mandibles stout, punctuate. Eyes large, bulky. Pronotum transverse, anterior insertion for head deep, pronotal margin slightly elevated, marginal stria complete, thin. Lateral side of pronotum with variolate confluent punctuation, forming a narrow such band also along anterior pronotal margin, between this punctuate band and lateral pronotal margin a thin glabrous to semi-glabrous band present. Rest of pronotum covered with regular very fine punctuation, punctures separated by several times their own diameter. Pronotal hypomerone with several rows of dense microscopic setae, intermingled with scattered punctuation. Pre-scutellar area with vague tiny tubercle; scutellum tiny, but visible.

Elytra widest approximately behind humeri, elytral epipleura with scattered microscopic punctuation, marginal elytral stria carinate, stopping short of elytral apex. Apical elytral stria vaguely marked, almost indiscernible, but probably present; marginal epipleural stria carinate on basal third, next impressed deeply into cuticle and evanescent. Outer subhumeral stria present as a short fragment on basal elytral third; between it and marginal elytral stria a row of punctures present. Inner subhumeral stria joined with humeral elytral stria creating thus a complimentary dorsal elytral stria running parallel to first dorsal elytral, but somewhat shortened apically. Elytra with four sinuate impunctate and slightly carinate discal striae, almost of the same length, stopping short of elytral apex; first stria somewhat shorter than the rest. Faint traces of intermittent fifth discal stria present; its base with a ‘hooked’ appendix, surface around it distinctly depressed; sutural elytral stria basally faintly connected to the ‘hooked’ appendix of faint fifth discal elytral, becoming clearly impressed approximately on elytral half, stopping short of elytral apex. Entire elytral disc with fine punctuation; punctures becoming denser and larger towards elytral suture, separated by about twice to several times their own diameter.

Propygidium very large, almost as wide as long, covered with alutaceous microsculpture and scattered fine punctures becoming denser apically; pygidium much smaller than propygidium, sub-triangular, convex, covered with scattered fine punctuation, punctures separated by about twice to several times their own diameter.

Prosternal lobe (Fig. 4) bisinuate, anterior margin inwardly arcuate medially, marginal stria of prosternal lobe complete, well-impressed, disc of prosternal lobe covered with punctuation; punctures separated by several times their diameter. Prosternal keel almost even, slightly concave on its basal half, covered with scattered fine punctures; carinal prosternal striae straight and running parallel between procoxae, thence slightly diverging, converging and united apically. Surface between prosternal keel and well-impressed, carinate and sub-parallel lateral prosternal striae distinctly depressed, creating a curious ‘index finger-like’ depression. Prosternal keel laterally delimited by a definite stria situated between keel and lateral prosternal striae. Mesoventrite (Fig. 4) rather small, transverse, anterior margin with anterior projection; marginal mesoventral stria complete; disc of mesoventrite with scattered microscopic punctuation; meso-metaventral suture well-visible, straight; meso-metaventral sutural stria absent. Metaventrite (Fig. 4) almost even, covered with scattered microscopic punctuation more prominent along slight antero-median depression; lateral disc of metaventrite with sparse foveolate punctures separated by several times their diameter intermingled with much denser finer setigerous punctuation and alutaceous microsculpture. Metepisternum with dense fine punctuation; punctures separated by about their own diameter. Lateral metaventral stria sub-carinate, outwardly arcuate, reaching approximately 2/3 of metaventral length apically.

First visible abdominal ventrite slightly depressed on its basal half, apical half slightly convex, surface with scattered microscopic punctuation. Outer stria of first abdominal ventrite vaguely marked on its basal half, almost indiscernible, next evanescent.

Legs. All coxae rather large, procoxae massive, transverse; all femora sub-globular, covered with dense microscopic amber setae; all tibiae flattened and slightly dilated, covered with similar setae to that of femora; protibia on outer margin apically with a tiny denticle followed by two widely-spaced triangular teeth topped by

denticle; protibial groove very deep and prominent; protibial spur large, stout, growing from near tarsal insertion supplemented by another much smaller spur growing out directly from anterior protibial margin. Meso- and metatibiae on outer margin without teeth or denticles, except for two tiny denticles placed on top of a small triangular tooth at apex; both meso- and metatibial spurs well developed.

Male unavailable.

**Remarks.** This description is based on the female holotype, for two reasons: 1) absence of male terminalia that would better delimit the species' unity, and 2) presence of four discal as well as sutural striae on the elytra. This last character is not present in any of the remaining examined specimens, even from the island of New Guinea. It is possible that the holotype specimen is simply an aberrant one and that the prevailing form is with three well-marked discal and wanting (or vague) sutural stria on the elytra. I am hesitant to ascribe the specimens without sutural stria and wanting (intermittent, indiscernible or vague) fourth discal elytral stria to this species, and prefer to list them under the species *P. violaceus*. Other morphological characters show little or no variation and without examining male genitalia (since there are no males in the type series) between New Guinean and other (Java, Borneo, Thai etc.) populations the species delimitations are unclear. I prefer to opt for the more conservative approach and keep the species separated. For the above-mentioned reasons the following two species are provided only with the diagnostic descriptions providing characters that differ from the holotype of *P. wallacei*.

***Procoryphaeus violaceus* (Lewis, 1905)**

(Figs. 5–8)

*Coryphaeus violaceus* Lewis, 1905: 347

*Procoryphaeus violaceus*: Mazur (1984): 275; Mazur (1997): 41; Mazur (2011): 38.



**FIGURE 5.** *Procoryphaeus violaceus* (Lewis, 1905) habitus, dorsal view.

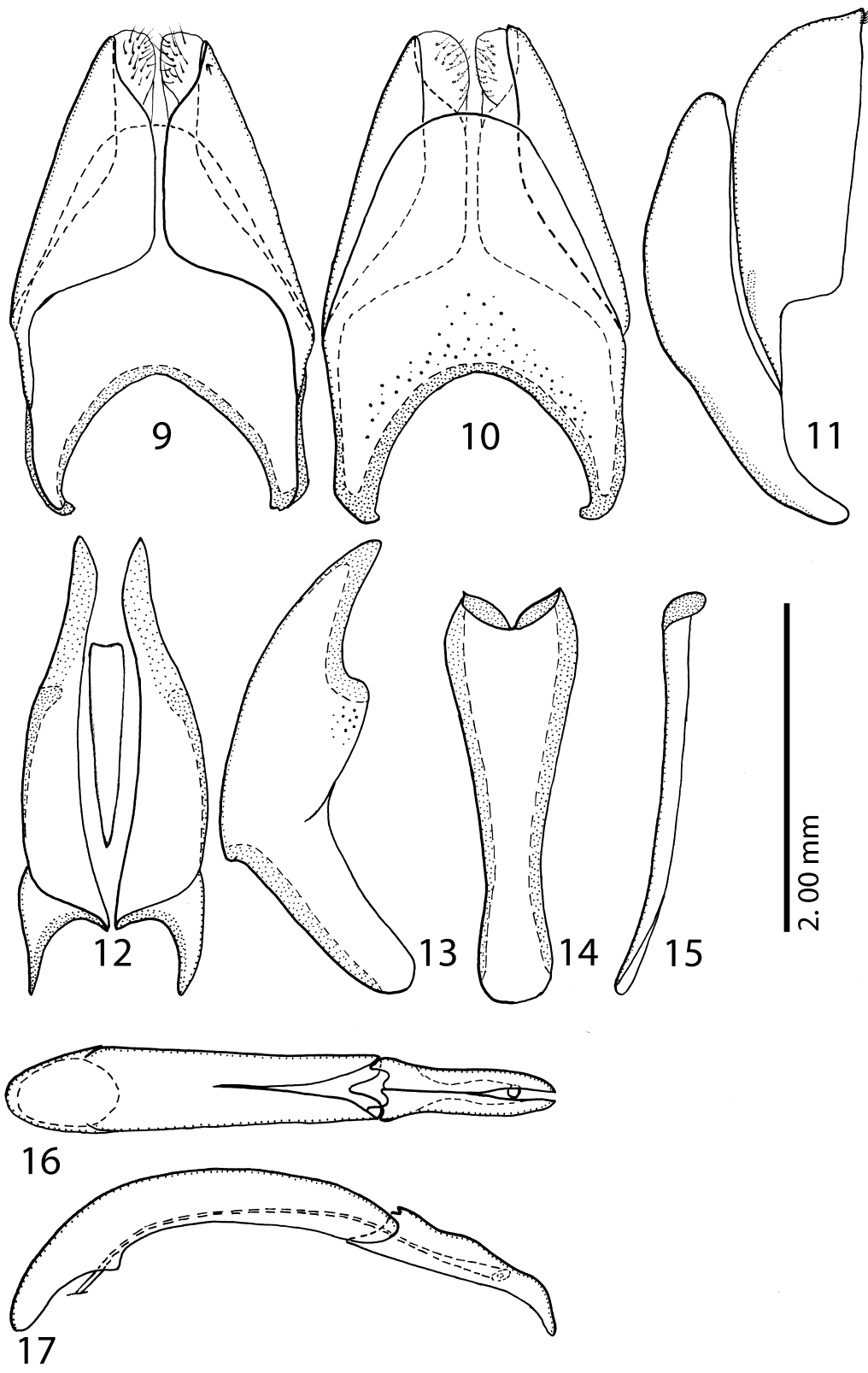
**FIGURE 6.** ditto, ventral view.



**FIGURE 7.** *Procoryphaeus violaceus* (Lewis, 1905) head, dorsal view.

**FIGURE 8.** *Procoryphaeus violaceus* (Lewis, 1905) prosternum, mesoventrite + metaventricle.





**FIGURE 9.** *Procoryphaeus violaceus* (Lewis, 1905) eighth sternite + tergite, ventral view. **FIGURE 10.** ditto, dorsal view. **FIGURE 11.** ditto, lateral view. **FIGURE 12.** *Procoryphaeus violaceus* (Lewis, 1905) ninth + tenth tergite, dorsal view. **FIGURE 13.** ditto, lateral view. **FIGURE 14.** *Procoryphaeus violaceus* (Lewis, 1905) spiculum gastrale, ventral view. **FIGURE 15.** ditto, lateral view. **FIGURE 16.** *Procoryphaeus violaceus* (Lewis, 1905) aedeagus, dorsal view. **FIGURE 17.** ditto, lateral view.

**Type locality.** Mountain Kina Balu, Borneo, Sabah, Malaysia.

**Type material examined.** *Coryphaeus violaceus*: Lectotype (present designation), ♀, mounted at the tip of triangular mounting card, with the following labels: “♀” (printed); followed by: “Kinabalu, / Borneo, 1500m / H. Rolle, Berlin SW11” (printed); followed by: “Coryphaeus / violaceus / Type Lewis” (written); followed by: “Type” (red-margined round label); followed by: “G. Lewis Coll. / B.M. 1926-369”; followed by: “Coryphaeus / violaceus / Lewis, 1905 / LECTOTYPE / Des. T. Lackner 2015” (NHM). This species was described based on the unknown number of specimens and the lectotype designation fixes its identity.

**Additional material examined.** INDONESIA: Java. 1 ♀, Depok, Nierstrasz, 1899 (MNHN); 1 ♀, idem, but ZMHUB; 2 ♀♀, Java, without further data (ZMHUB); 1 ♀, Semarang, Drescher 1908 (ZMHUB). Sumatra. 1 ♂, Padang, 1890, E. Modigliani (ZMHUB). Papua: 1 ♀, Nouvelle Guinée, coll. v. de Poll (MNHN); Uncertain province. 1 ♀, Holland—Indien [=presumably Indonesia] (MNHN). THAILAND: Tenasserim. 1 ♀, 15 km pt. Kaeng-Krachan NP, 11.–14.v.2009, S. Nomura, FIT (NG-5) (NSMT). UNKNOWN LOCALITIES: 1 ♀, no locality (ZMHUB); 1 ♂, no locality (NHM).

**Diagnostic description.** PEL: 4.20–5.00 mm; APW: 1.50–2.00 mm; PPW: 3.50–3.70 mm; EW: 3.80–4.00 mm; EL: 2.80–3.00 mm. Specimens lumped under this species always have only three dorsal elytral striae complete and lack a well-impressed sutural elytral stria (Figs. 5–6). These characters were given by Lewis (1905) in his differential diagnosis distinguishing this species from the preceding one. The sutural elytral stria is in some specimens vaguely impressed or intermittent, but never as clearly impressed as in *P. wallacei*. The rest of the morphological characters show little difference between this and the preceding species, and without available male genitalia it is difficult to more clearly distinguish the two species. The colour of holotype is violet-blue, but in other specimens it can be substantially darker, almost black and with only very faint metallic lustre. The fourth discal elytral stria is punctuate and more prominent in the type female than in the rest of the specimens; apparently this character varies individually since there are cases where it is almost completely absent and almost untraceable to cases where it can be discerned. Between fourth discal and sutural striae, usually punctuate traces resembling the fifth stria can be observed in some specimens. Male genitalia (Figs. 9–17); based on a male from Padang, Sumatra): eighth sternite (Figs. 9–10) apically with velum (=apical guide of eighth sternite of Caterino & Tishechkin 2013), divided medially; eighth tergite apically outwardly emarginated, basal emargination of eighth sternite deep, eighth tergite on apical half with pores and pseudopores; eighth sternite and tergite not connected. Ninth tergite (Fig. 12) medially completely divided, strongly sclerotized laterally; tenth tergite small and slender, keel-like; spiculum gastrale (Figs. 14–15): apical flange (‘head’) inwardly arcuate, ‘stem’ gradually dilated apically, base outwardly arcuate. Aedeagus (Figs. 16–17): basal piece (phallobase) approximately twice as long as tegmen, longitudinally divided on its apical third, phallobase curved ventrad; parameres of tegmen separated on their approximate apical half; gonopore of median lobe inserted inside tegmen, apex of aedeagus curved ventrad.

**Remarks.** As noted with the preceding species, it is possible that the two species are actually conspecific and the type specimen of *P. wallacei* is an aberrant individual with five complete discal and well-marked sutural elytral striae. The colour in this species is variable among individuals from different localities as is the density of elytral punctuation and indeed the coarseness of the punctures of antero-lateral pronotal band. The only available male specimen, whose genitalia are illustrated here, is from Sumatra; I have seen another male specimen, however, without known locality.

### ***Procoryphaeus pilosus* (Lewis, 1893)**

(Figs. 18–21)

*Coryphaeus pilosus* Lewis, 1893: 423.

*Procoryphaeus pilosus*: Mazur (1984): 275; Mazur (1997): 41; Mazur (2011): 38.

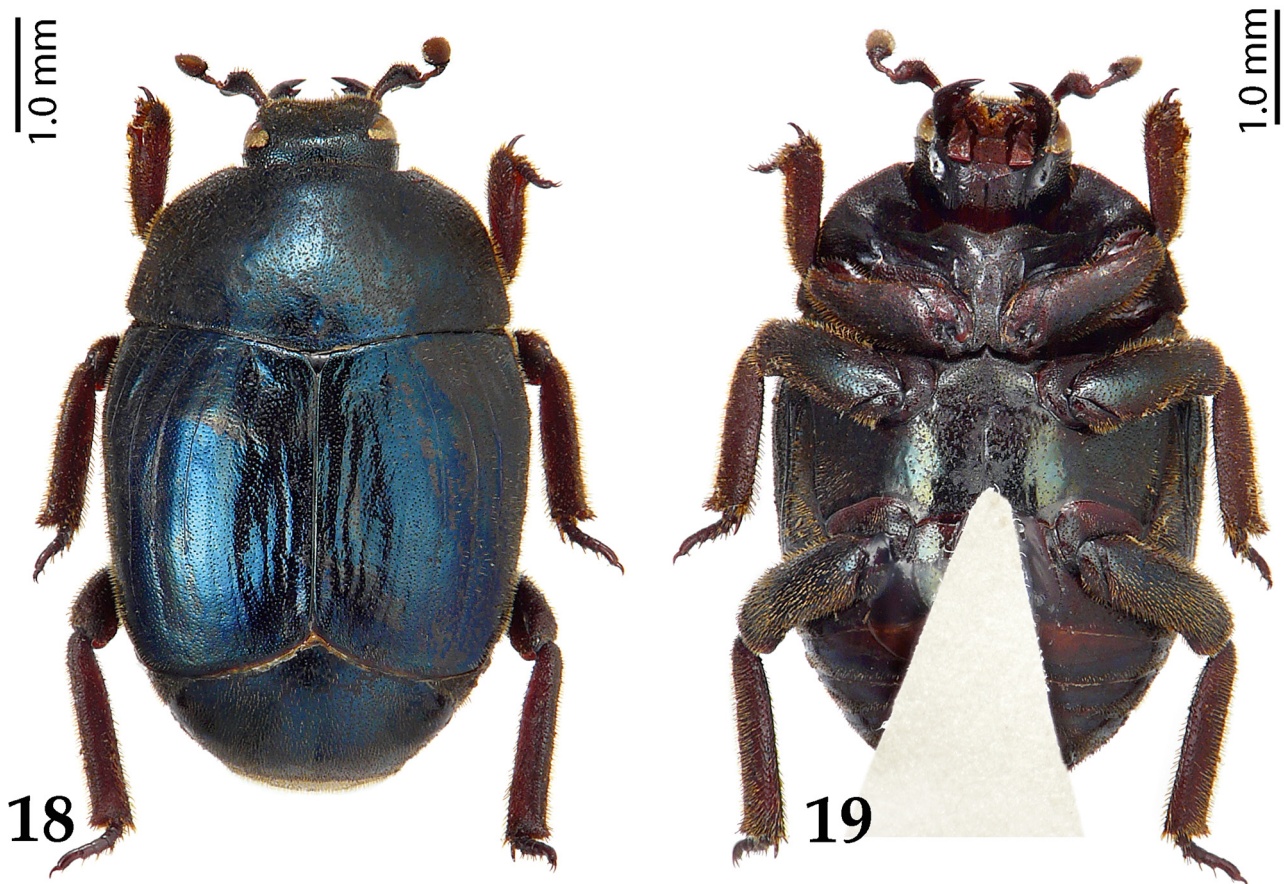
**Type locality.** Tanimbar Island, Indonesia.

**Type material examined.** *Coryphaeus pilosus*: Lectotype (present designation), ♀, mounted at the tip of a mounting card, left protarsus missing, with the following labels: “♀” (printed); followed by: “Tenimber / Doherty / 30.12. 92” (written); followed by: “Type” (red-margined round printed label); followed by: “G. Lewis Coll. / B.M. 1926-369”; followed by: “Coryphaeus / pilosus / Type Lewis” (written); followed by: “Coryphaeus / pilosus /

Lewis, 1893 / Des. T. Lackner 2015 / LECTOTYPE” (red label, written) (NHM). This species was described based on the unknown number of specimens and the lectotype designation fixes its identity.

**Additional material examined.** None.

**Diagnostic description.** Most readily recognizable species; PEL: 5.10 mm; APW: 2.00 mm; PPW: 4.20 mm; EW: 4.60 mm; EL: 3.20 mm. Entire body (Figs 18–19), including appendages covered with very dense short amber setae, resembling a kiwi fruit; elytra much more densely punctate than the two preceding species, punctures separated by their own to less than their own diameter. Inwardly curved frontal stria (Fig. 20) intermittent; supraorbital stria vague (absent?). Variolate punctures of lateral pronotal band distinctly less coarse and dense than with the preceding two species; tiny tubercle of the pre-scutellar area of pronotum more prominent than in the preceding two species. Outer subhumeral stria very vague; joined humeral and inner subhumeral striae surpassing elytral half apically, shorter than in the rest of congeners. Only first discal elytral stria complete, second and third shortened apically; fourth, fifth discal elytral as well as sutural striae lacking; a longitudinal groove resembling a stria present near elytral suture. Apical elytral stria absent. Propygidium and pygidium much more densely punctate than in the preceding species, punctuation even, punctures small and dense separated by about their own diameter. Prosternum (Fig. 21) densely punctate; carinal prosternal striae vaguely joined anteriorly. Mesoventrite (Fig. 21) much more densely punctate than the preceding two species, punctures separated by about their own diameter; punctures present also on basal half of metaventrite. Male unavailable.



**FIGURE 18.** *Procoryphaeus pilosus* (Lewis, 1893) habitus, dorsal view.  
**FIGURE 19.** ditto, ventral view.



**FIGURE 20.** *Procoryphaeus pilosus* (Lewis, 1893) head, dorsal view.

**FIGURE 21.** *Procoryphaeus pilosus* (Lewis, 1893) prosternum, mesoventrite + metaventrite.

## Acknowledgements

Curators of the aforementioned museums are being thanked for their help with the specimens. This research received support from the SYNTHESYS Project <http://www.synthesys.info/>, which is financed by the European Community Research Infrastructure Action under the FP7 Integrating Activities Program and was also partially supported by the grant of the Ministry of Agriculture of the Czech Republic, NAZV, KUS, n. QJ 1330233. I thank F. Slamka (Bratislava, Slovakia) for the colour photographs. Two anonymous reviewers as well as editor for Histeroidea are being thanked for their input that improved the quality of this publication.

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