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A contribution to the knowledge of *Pachyprotaetia* Mikšič, 1965 (Coleoptera: Scarabaeidae: Cetoniinae)

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Abstract. Some of the species in the subgenus *Pachyprotaetia* Mikšič, 1965, with brushes of long and dense setation on the inner sides of the metatibiae are studied. Two species groups are established to accomodate the following species: *mixta* species group for: *Pachyprotaetia cambodia* Jákl, 2020, *Pachyprotaetia crassipes* (Wallace, 1867), *Pachyprotaetia engganica* Jákl, 2011, *Pachyprotaetia medvedevi* Mikšič, 1965, *Pachyprotaetia mentawaica* Jákl, 2011, *Pachyprotaetia meridiovietnamica* sp. nov., *Pachyprotaetia mixta* (Weber, 1801) and *Pachyprotaetia peterjacki* Legrand & Chew Kea Foo, 2010 and *ciliata* species group for: *Pachyprotaetia ciliata* (Olivier, 1785), *Pachyprotaetia hamidi* Jákl, 2008 and *Pachyprotaetia simuk* sp. nov. Characters for separation of both species groups are given. The newly described species are compared with their congeners and their differential diagnoses are given. Males (if already known) of all species are pictured, including their parameres. *Protaetia kraatzi* Schoch, 1898 is withdrawn from synonymy with *Protaetia mixta* (Weber, 1801) and considered here as a valid species endemic to Nias Island, and a redescription of both sexes is given. The year of description of *Cetonia ciliata* Olivier, 1789 is corrected and briefly discussed. Keys for all species of the two newly established species groups in the subgenus *Pachyprotaetia* Mikšič, 1965 are provided. Distribution of some species is updated and several new records are given. Taxonomical differences between species with and without metatibial brushes of setation and their distribution areal are briefly discussed.

INTRODUCTION

The subgenus *Pachyprotaetia* was established by Mikšič (1965a). As a type species, the author originally designated *Cetonia mixta* Weber, 1801. Diagnosis of the subgenus was provided by the author in the same year (1965b), when he revised the subgenus and added one new species. This revision became the part of *Pachyprotaetia* Mikšič, 1965 study in the author's monograph about *Protaetia* Burmeister, 1842 (1987) with three novelties, two described by Ruter (1978), one by Mikšič himself (1980).

During the last four decades the subgenus was studied by the following authors: Antoine (1991, 1992), Krajčík (1998, 2007), Jákl (2008, 2011, 2020) and Legrand & Chew Kea Foo (2010). Both sexes of most species were pictured in the iconographic work of Sakai & Nagai (1998).

The species in two newly proposed species groups differ from the rest of continental species by smaller size, tiny mesometasternal process, simply developed male parameres and mainly by presence of dense and long setation on the inner sides of the metatibia.

Species of *mixta* group differ from all species of *ciliata* group by triangularly shaped apex of mesometasternal process, which is semicircularly shaped in species of *ciliata* group;

by dorsum completely covered with basic tomentum and very abundant patches of ornament, species of *ciliata* usually with reduced dorsal ornament and general appearance somewhat opaque or slightly shining; aedeagi of males with both parameral rims, but with very reduced or completely missing outer rim in *ciliata* group.

This study concentrates on species from both newly proposed species groups, species with long and dense setation of inner part of metatibiae. Characters shared by species of this group have a small to medium body size, a rather short and wide body, an opaque appearance, males with elevated and incised or bilobed apex of clypeus, coloration brownish to blackish to dark green with numerous patches of ochre to beige ornament, mesometasternal process very small and short with triangularly or semicircularly developed apex, both body sides setose, male parameres short, wide and simply developed.

Distribution area of species from the *ciliata* group is typical Indomalayan, currently two known and one newly described species are known from Kalimantan, Sumatra, Java, Bali, Enggano and Simuk Islands (Indonesia) and also from Borneo and the Malayan Peninsula (Malaysia). Distribution of the *mixta* species group is larger, encompassing approximately same area as in *ciliata* species group, but stretching farther to the north, to Cambodia and the southern part of Vietnam.

MATERIAL AND METHODS

The following codens of institutional and private collections are used in the text:

BMNH The Natural History Museum, London, U.K.;
KSCP Kaoru Sakai, private collection, Tokyo, Japan;
MNHN Muséum National d'Histoire naturelle, Paris, France;
NMPC National Museum, Praha, Czech Republic;
PLCP Jean-Philippe Legrand, private collection, Dammarie sur Loing, France;
RMNH Rijksmuseum van Natuurlijke Historie, Leiden, Netherlands;
SJCP Stanislav Jákl, private collection, Praha, Czech Republic;
SMTD Staatliches Museum fur Tierkunde, Dresden, Germany;
ZMHB Museum fur Naturkunde der Humboldt-Universitat, Berlin, Germany;
ZMUC Zoological Museum, University of Kobenhavn, Denmark.

Specimens of newly described species are provided with red or yellow printed labels, red for HOLOTYPUS, yellow for PARATYPUS. Each holotype or paratype label is provided with sex symbol, number of paratype (in paratype label) and words St. Jákl det. Label data are cited for the material examined, individual labels are indicated by a double slash (//), individual lines of every label by a single slash (/).

TAXONOMY

Protaetia (*Pachyprotaetia*) Mikšič, 1965

Protaetia (*Pachyprotaetia*) Mikšič, 1965a : 83 (original description), : 83 (subgeneric key); Mikšič 1965b: 575 (revision); Mikšič 1980: 368 (Malay Peninsula); Mikšič 1987: 520 (monograph), : 15, 17, 20 (subgeneric key); Krajčík 1998: 42 (catalogue); Sakai & Nagai 1998: 284 (iconography); Legrand & Chew Kea Foo 2010: 32

(Cetoniidae of Sabah); Jákl 2011: 535 (Islands W of Sumatra); Bezděk in Löbl I. & Löbl D. 2016: 381 (catalogue); Jákl 2020: 24 (Protaetia of Indochina).

Type species: *Cetonia mixta* Weber, 1801 (by original designation).

Key to *Pachyprotaetia* species groups, species with brushes of setation on inner parts of meso- and metatibiae.

1(2) Smaller to medium species with body size 14.0-16.0 mm. Dorsal colour dark, usually black, dark brown to brownish, rarely brown/greenish. All species with cover of basic tomentum. All species with very abundant maculation in elytra. Colour of ornament brownish to ochre or beige. All species with tiny narrow mesometasternal process. Protibia of males usually bidentate, in females usually tridentate. Male parameres short and wide. Species from Indonesian Great Sundas, Malayan Peninsula, Cambodia and south Vietnam .... *Pachyprotaetia mixta* species group

2(1) Medium sized species with body size 15.5-18.5 mm. Dorsal colour yellowish, reddish to light brown, green to dark green to plum brown. Two species with, one species without basic tomentum. Maculation of elytra in all three species not very abundant. Colour of dorsal ornament beige to whitish. All species with medially large mesometasternal process. Protibia of male usually bidentate, in females usually tridentate. Male parameres rather narrow, simple, elongated. Species from Indonesian Great Sundas (Kalimantan/Borneo, Sumatra, Java, Bali, Enggano and Simuk Islands). ..... *Pachyprotaetia ciliata* species group

***Pachyprotaetia mixta* species group**

Key to species:

1(16) Elytra with numerous tiny or moderately sized patches of ornament.

2(13) Sutural ridge of elytra drawn out over the apex of elytron.

3(4) Dorsum bicolored, pronotum, scutellum and anterior half of elytral disc redish, reminder of elytra dark brownish. Male parameres narrowing to apex. Malaysia: Sabah Mountain Range. .... *Protaetia* (*Pachyprotaetia*) *peterjacki* Legrand & Chew Kea Foo, 2010

4(3) Elytra and pronotum unicolored or nearly unicolored. Male parameres narrowning to apex or running in parallel.

5(6) Dorsal side black with brownish to ochre redish ornament. Very rarely dorsal coloration dark green or dark brown. Protibia of males tridentate. Male parameres slightly emarginated in middle length. Width of inner and outer rim in apex of male paramere approximately same. Indonesia: Sumatra, Belitung, Java, Bawean and Kalimantan; Malaysia: Malayan Peninsula and Borneo .... *Protaetia* (*Pachyprotaetia*) *mixta* (Weber, 1801)

6(5) Elytra brownish, brownish/olive or chestnut brown with ochre to beige or whitish ornament. Very rarely dorsal coloration dark. Protibia of males bidentate or tridentate. Male parameres differently structured, usually without emargination in middle length or inner and outer rims differently developed.

7(8) Male parameres narrowing to apex. Protibia in both sexes tridentate. Pronotal sides with three larger patches of ornament. Indonesia: Sumatra, Kalimantan; Malaysia: Borneo..... ..... *Protaetia* (*Pachyprotaetia*) *medvedevi* Mikšič, 1965

8(7) Male parameres more or less paralelly running. Protibia in males bidentate or tridentate.

9(10) Larger species with body size 16-17 mm, protibia of males bidentate. Ventral side purpureously shining. Sides of clypeus running in parallel in approximately ¾ of length. Cambodia. .... *Protaetia* (*Pachyprotaetia*) *cambodia* Jákl, 2020

10(9) Slightly smaller species 14.5-16.0 mm. Protibia of males bidentate or tridentate. Coloration of ventrum dark green to live to dark brownish or blackish, purpureous lustre absent.

11(12) Apex of mesometasternal process triangularly shaped. Male protibia tridentate. Apical margin of clypeus in males straight. Male parameres short and wide. Indonesia: Nias Island. *Protaetia* (*Pachyprotaetia*) *kraatzi* Schoch, 1898

12(11) Apex of mesometasternal process obtusely rounded. Protibia of males bidentate. Males with apical margin of clypeus slightly emarginated. Male parameres elongated. Indonesia: Mentawai Archipelago: Siberut Island ..... *Protaetia* (*Pachyprotaetia*) *mentawaica* Jákl, 2011

13(2) Sutural ridge of elytra simple, not drawn out over elytral apex.

14(15) Apical margin of clypeus in males slightly emarginated. Apex of mesometasternal process very obtusely rounded. Pronotal and elytral ornament composed from dozens of tiny patches of light ornament. Indonesia: Enggano Island ..... *Protaetia* (*Pachyprotaetia*) *engganica* Jákl, 2011

15(14) Apical margin of clypeus deeply incised. Apex of mesometasternal process more or less triangularly shaped. Pronotal and elytral ornament very reduced to five larger maculae at each side and several yellowish maculae in elytral sides and elytral apex. southermost part of Vietnam: Binh Thuán Province .... *Protaetia* (*Pachyprotaetia*) *meridiovietnamica* sp. nov.

16(1) Elytra with large ochre macula in its apex. Dorsal coloration completely black. Malaysia: Penang Island and Perak State ..... *Protaetia* (*Pachyprotaetia*) *crassipes* (Wallace, 1867)

Note. *Protaetia* (*Pachyprotaetia*) *strigicollis* (Kraatz, 1885) not included in key. The species was described based on one female and with high probability is conspecific with *Protaetia* (*Pachyprotaetia*) *mixta* Weber, 1801.

Protaetia (*Pachyprotaetia*) *cambodia* Jákl, 2020
(Figs. 1-5)

Protaetia (*Pachyprotaetia*) *cambodia* Jákl, 2020: 28, figs. 15a-15e (original description).

Type locality. Cambodia, Kirirom National Park, 780 m alt., 11°21‘23‘‘N 104°04‘38‘‘E.

Type material. Holotype (♂), Paratype No.1 ♂, No.2 ♀, (SJCP).

Additional material examined. None.

Distribution. Cambodia.

Protaetia (*Pachyprotaetia*) *crassipes* (Wallace, 1867)

Cetonia crassipes Wallace, 1867: 97 (original description); Wallace 1868: 586 (catalogue).
Protaetia crassipes (Wallace): Mohnike 1871: 80; Schenkling 1921: 255 (catalogue).
Protaetia (*Pachyprotaetia*) *crassipes* (Wallace): Mikšič 1965: 581 (revision), : 577 (key); Mikšič 1987: 532 (monograph), : 523 (key); Krajčík 1998: 42 (catalogue); Sakai & Nagai 1998: 284, Pl. 91, Fig. 1005 - female (Cameron Highlands) [iconography]; Devecis 2004: 13 (mention).

Type locality. “Penang“ (=Malaysia, Malayan Peninsula, Penang).

Type material. Holotype (♀), (RMNH).

Additional material examined. Beside holotype specimen (RMNH), I only checked second female pictured in Sakai & Nagai, 1998 coming from Perak. Male of this rare species stays officially unknown.

Distribution. Malaysia: Penang and Perak States in continental part of Malay Peninsula.

Figs. 1-5. *Protaetia* (*Pachyprotaetia*) *cambodia* Jákl, 2020: 1- habitus, dorsal aspect; 2- habitus, ventral aspect; 3- habitus, lateral aspect; 4- aedeagus; 5- aedeagus, lateral aspect.

***Protaetia* (*Pachyprotaetia*) *engganica* Jákl, 2011**
(Figs. 6-10)

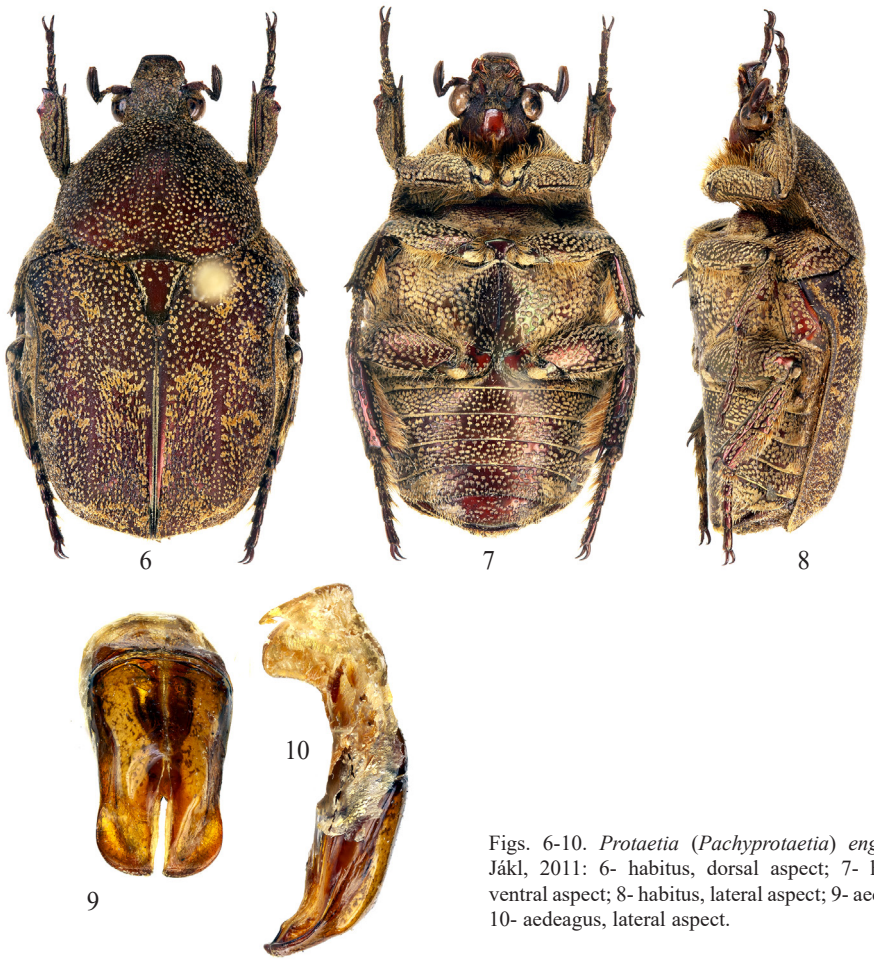
Protaetia (*Pachyprotaetia*) *engganica* Jákl, 2011: 540, figs. 3a-3e (original description).

Type locality. Indonesia, Bengkulu Province, Enggano Island.

Type material. Holotype (♂), (NMPC).

Additional material examined. None.

Distribution. Indonesia: Enggano Island.



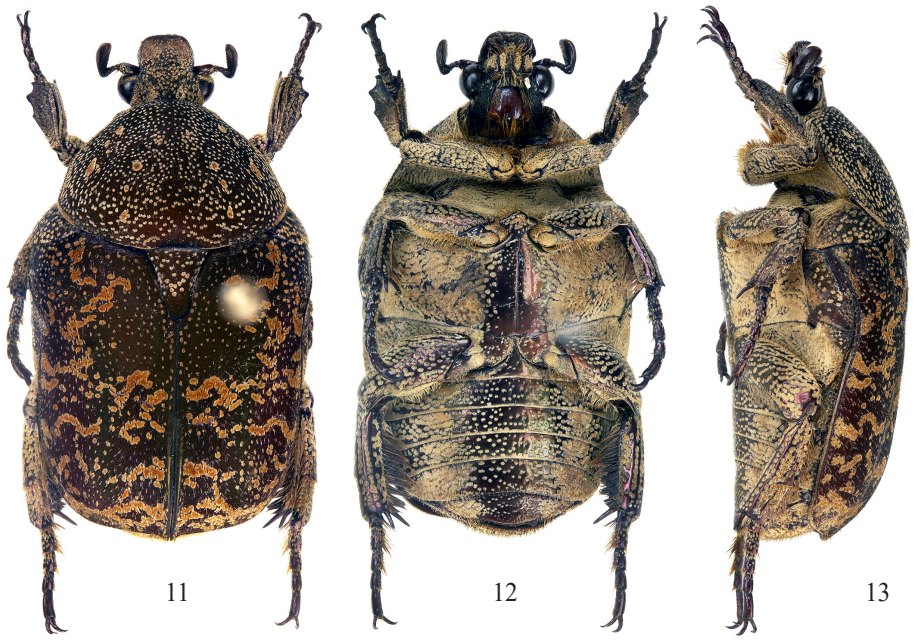
Figs. 6-10. *Protaetia* (*Pachyprotaetia*) *engganica* Jákl, 2011: 6- habitus, dorsal aspect; 7- habitus, ventral aspect; 8- habitus, lateral aspect; 9- aedeagus; 10- aedeagus, lateral aspect.

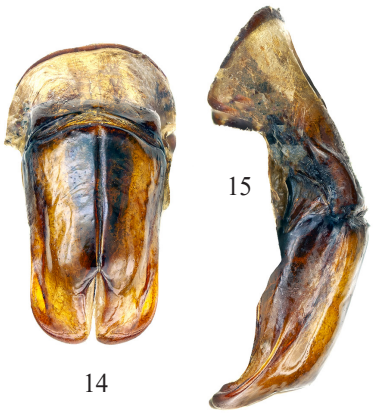
Protaetia (*Pachyprotaetia*) *kraatzi* Schoch, 1898 valid species
(Figs. 11-15)

Protaetia kraatzi Schoch, 1898: 71 (original description); Schenkling 1921: 258 (catalogue).

Type locality. „Nias“ (= Indonesia, North Sumatra Province, Nias Island).

Type material. It is unclear how many specimens and which sex Schoch used for his description. Author was not able to trace type (s). According to Mikšič (1987: 531), Schoch examined only females, but he designated specimens as males. Schenkling (1921: 258) incorrectly listed that species is coming from Sumatra. Mikšič (1987) examined also some additional specimens of both sexes from Nias Island, but he treated them as conspecific with *Protaetia mixta* Weber, 1801.





Figs. 11-15. *Protaetia* (*Pachyprotaetia*) *kraatzi* Schoch, 1898: 11- habitus, dorsal aspect; 12- habitus, ventral aspect; 13- habitus, lateral aspect; 14- aedeagus; 15- aedeagus, lateral aspect.

Additional material examined: 1 ♂, (SJCP) labelled: Indonesia / NIAS ISL. / 11.1992; 1 ♂, (SJCP) labelled: Indonesia / Nias Island / I. 1996 / native collectors; 1 ♀, (SJCP) labelled: Indonesia, N. Sumatra prov. / NIAS ISLAND, 2.1995 / local collectors.

Redescription of male. Body size 15.5-16.0 mm (excluding pygidium). Light brown with olive tinge to dark brown, with ochre to light brownish ornament.

Head. Brownish to dark brown. Punctation raher dense, circularly shaped punctures mostly with ochre to beige ornament and approximately same density in both sides. Frons gradually narrowing, posterior half of clypeus running nearly in parallel, in anterior half

clypeus gradually narrowing to its apex. Apex of clypeus vertically elevated, apical margin straight. Antennae brownish, pedicel longer than club. Scape setose.

Pronotum. Coloration brownish/olive to dark brown. Punctation regularly distributed, most with diameters larger than interspaces. Most of punctures with cover of ochre to beige ornament. Sides with seven larger beige maculae. Posterolateral angles broadly rounded, in front of anterolateral margins with emargination. Posterior half of sides with low and obtuse border. Pronotal setation not developed.

Scutellum. Coloration brownish, triangularly shaped with rounded apex. Anterior two-thirds with punctures filled with beige ornament, posterior third impunctate and immaculate.

Elytra. Coloration light brownish with ochre ornament or chestnut darker brown with beige ornament. Green tinge also present. Elytral ornament very abundant, excepting only anterior half of disc. Elytral disc only with punctures filled with ornament. Whole elytral reminder with irregularly shaped maculae or transversally running bands of ornament. Whitish setation present throughout total length, in posterior half longer and denser. Subhumeral emargination shallow, both elytral calli obtusely developed. Apical half of disc with rather sparse longitudinally running short striolae and few horseshoe-shaped punctures. Sutural ridge medially elevated in apical third to half and slightly drawn out over apex of elytron.

Pygidium. Dark brown to nearly black. Shortly developed wrinkles running transversally throughout total length. Large part covered with ochre to beige ornament. Setation short, but dense, present throughout total length.

Ventrum. Coloration dark green to nearly black, basic tomentum absent, especially in abdomen with metallic reflection. Broad abdominal sides, large part of sides of metasternum and entire prosternum with cover of ochre ornament. Metasternal and abdominal discs with circularly shape punctures, filled with ornament. Sides of abdomen and metasternum with light setation. Mesometasternal process small and short, its apex tringularly shaped. Irregularly running furrow of mesometasternal apex with cover of ochre ornament and setae.

Legs. Whole legs brownish, tibiae with metallic to purpureous lustre. Both sides of femora and tibiae with rich cover of ornament and setae. Protibia short, wide, tridentate.

Genitalia. Short and broad, inner parameral rim reaching apex (Figs. 14-15).

Sexual dimorphism. Length of single female available for study is 16.8 mm (excluding pygidium). Very untypically ventral and dorsal punctation and ochre ornament less sparse than in males. Apex of clypeus very shortly elevated, its apical margin broadly rounded. Protibia slightly wider and more robust, tridenatate as in males, but posterior tooth larger than in males. Ventrum metallic, purpureously shining. Anal ventrite with dense punctation, much denser than in males. In contrast reminder of abdomen and metasternum with sparse punctation, distinctly sparser than in males. Ventral, whitish setation shorter and sparser than in males.

Differential diagnosis. *Protaetia* (*Pachyprotaetia*) *kraatzi* Schoch, 1898 is close to *Protaetia* (*Pachyprotaetia*) *mentawaica* Jákl, 2011. It differs from it by posterior half of clypeus which is running in parallel, but rounded in *P. mentawaica* Jákl; by tridentate protibia of males,

which are bidentate in *P. mentawaica*; by triangularly developed apex of mesometasternal process, which is obtusely rounded in *P. mentawaica* Jákl and by the structure of male parameres , which are distinctly shorter and wider in *P. kraatzi* Schoch, 1898 than in *P. mentawaica* Jákl, 2011 (Figs. 21-25). From more dissimilar *Protaetia mixta* (Weber, 1801) *Protaetia kraatzi* Schoch differs in differently and more sparsely distributed dorsal and ventral ornament; differently shaped apex of clypeus mainly in males; lighter brownish dorsal coloration, which is usually black in *P. mixta* Weber and different structure of male parameres, which are shorter, wider and with differently structured inner rims (Figs. 31-35).

Distribution. Indonesia: Nias Island.

***Protaetia* (*Pachyprotaetia*) *medvedevi* Mikšič, 1965**
(Figs. 16-20)

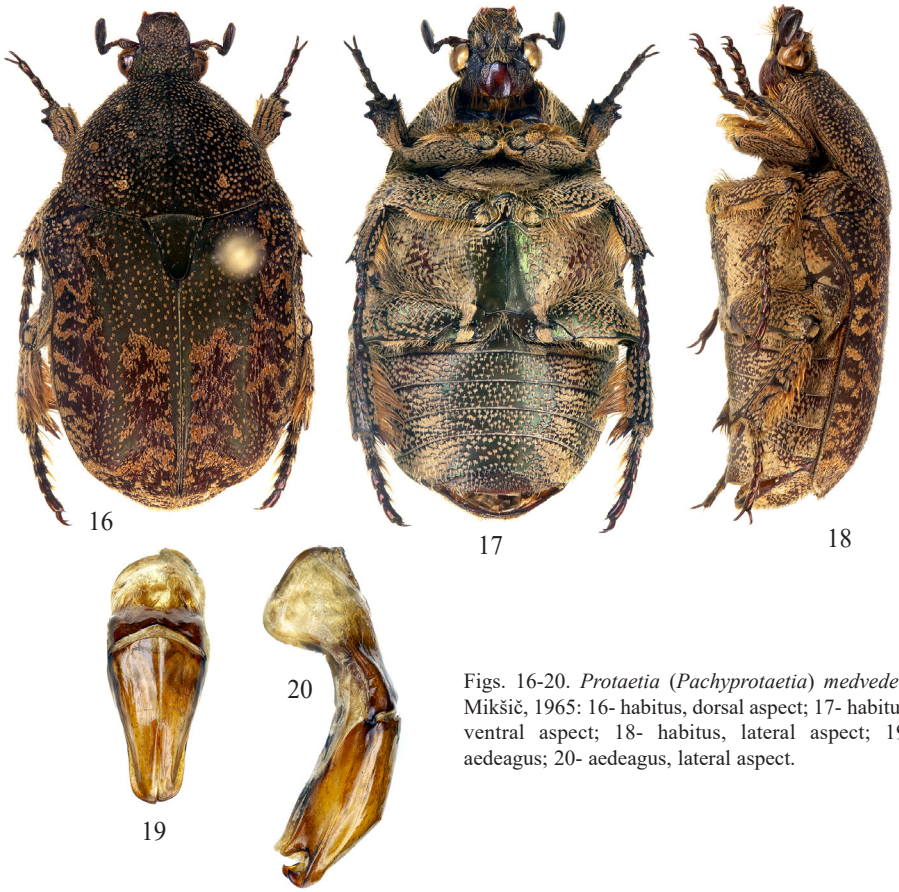
Protaetia (*Pachyprotaetia*) *medvedevi* Mikšič, 1965: 585, figs. 4-5 (original description), : 577 (key); Mikšič 1980: 369 (key); Mikšič 1987: 532, figs. 144, 148 (monograph, male parameres), : 523 (key); Krajčík 1998: 42 (catalogue); Sakai & Nagai 1998: 285, Pl. 92, Figs. 1007-1 male (Borneo, Sabah), 1007-2 female (Borneo, Sabah) [iconography]; Legrand & Chew Kea Foo 2010: 33, figs. 48-49 (male parameres), photo 80 - habitus male, photo 81 - habitus female [Cetoniidae of Sabah].

Type locality. „Sumatra" (= Indonesia, Sumatra Island).

Type material. Holotype (♂), (RMNH), Allotype (♀), (ZMHB), Paratype (1 ♀), (SMTD).

Additional material examined: 2 ♂♂, (SJCP) labelled: Indonesia, W. Sumatra / HARAU valley, 400-600 m / 20 km N of Payakumbuh / St. Jákl lgt, 5. 2007; 1 ♂, (SJCP) labelled: Indonesia, West Sumatra / HARAU valley, 5.2006 / 20 km N of Payakumbuh / St. Jákl lgt, 400-600 m; 2 ♂♂, (SJCP) labelled: W. Indonesia / W. Sumatra prov. 400 m / Harau canyon env. / 6. 1994 / native collectors leg; 1 ♂, (SJCP) labelled: Indonesia, West Sumatra / HARAU VALLEY, 500-800 m / cca 20 km N of Payakumbuh / 7.2003, St. Jákl lgt; 1 ♂, 2 ♀♀, (SJCP) labelled: I.-W.Sumatra 600 m / Payakumbuh, 6.-10.1. / Harau vill. env. / St. Jakl lgt, 1991; 1 ♂, (SJCP) labelled: Indonesia, West Sumatra / MT. SANGGUL, 1000-1300 m / Landai vill. env., cca 30 km N / of Payakumbuh, St. Jakl lgt; 1 ♂, (SJCP) labelled: INDONESIA, West Sumatra Pr. / HARAU VALLEY, 400-800 m / Harau vill. env., ca 25 km n of / PayakumbuhXII. 2006, Jákl leg; 1 ♂, (SJCP) labelled: Indonesia, West Sumatra / HARAU VALLEY, 600 m / cca 20 km N of Payakumbuh / VIII. 2008, St. Jákl lgt.

Distribution. Indonesia: Sumatra, Kalimantan; Malaysia: Borneo.



Figs. 16-20. *Protaetia* (*Pachyprotaetia*) *medvedevi* Mikšič, 1965: 16- habitus, dorsal aspect; 17- habitus, ventral aspect; 18- habitus, lateral aspect; 19- aedeagus; 20- aedeagus, lateral aspect.

***Protaetia* (*Pachyprotaetia*) *mentawaica* Jákl, 2011**
(Figs. 21-25)

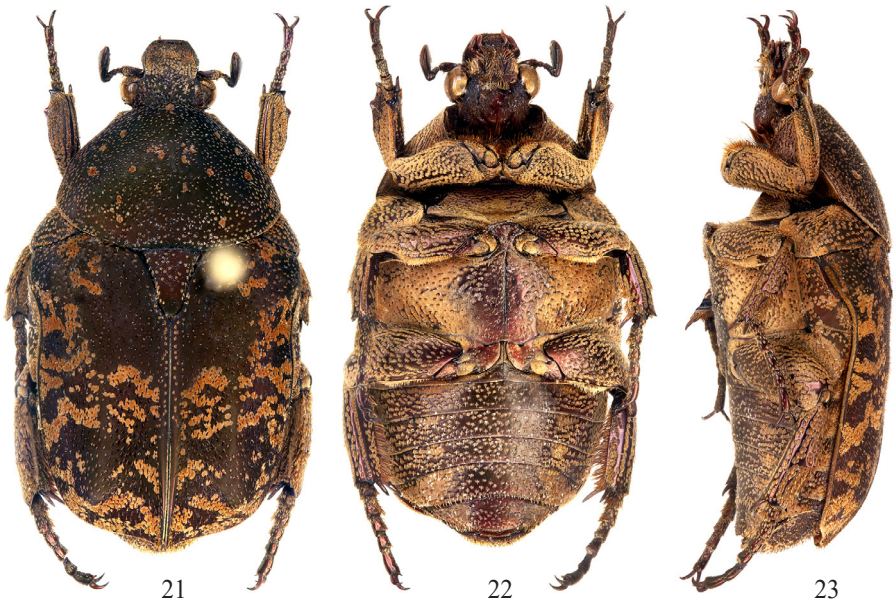
Protaetia (*Pachyprotaetia*) *mentawaica* Jákl, 2011: 538, figs. 2a-2e (original description).

Type locality. Indonesia, West Sumatra Province, Mentawai Archipelago, north part of Siberut Island, environs of Bojakan village, 150 m.

Type material. Holotype (♂), (NMPC), Paratype (4 ♂♂, 5 ♀♀), (SJCP), (1 ♂, 1 ♀), (KSCP).

Additional material examined. None.

Distribution. Indonesia: Mentawai Islands, Siberut Island.



Figs. 21-25. *Protaetia* (*Pachyprotaetia*) *mentawaica* Jákl, 2011: 21- habitus, dorsal aspect; 22- habitus, ventral aspect; 23- habitus, lateral aspect; 24- aedeagus; 25- aedeagus, lateral aspect.

***Protaetia* (*Pachyprotaetia*) *meridiovietnamica* sp. nov.**
(Figs. 26-33)

Type locality. Vietnam, Binh Thuán Province, Dong Tién.

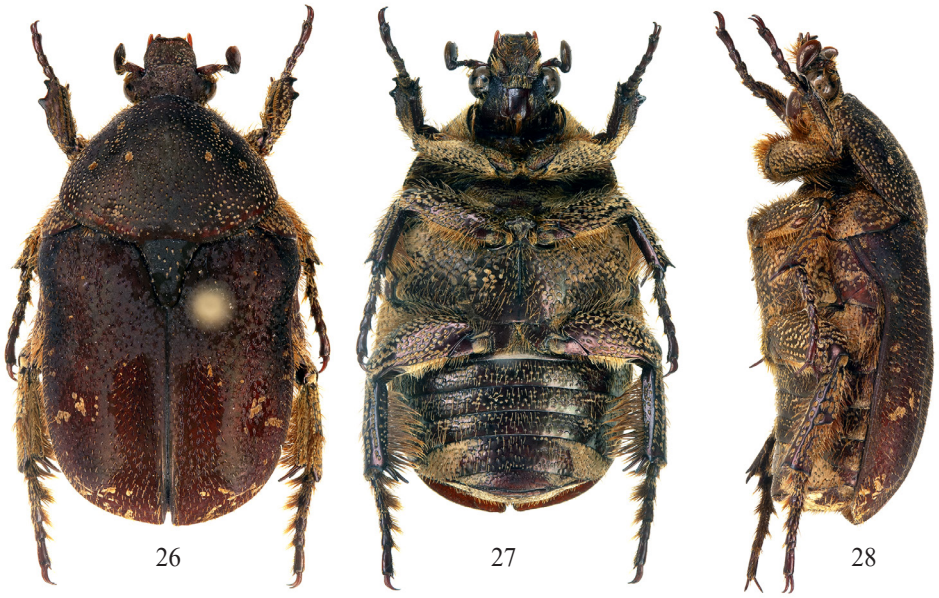
Type material. Holotype (♂), (SJCP) labelled: VIETNAM / Dong Tién, V. 2019 / Binh Thuán / local collector leg. Paratype: (No.1 ♀), (SJCP) labelled: same as holotype.

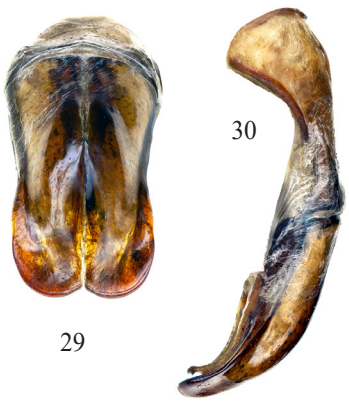
Description of holotype. Chestnut brown, setose, ochre dorsal ornament reduced. Small size 14.5 mm (excluding pygidium).

Head. Dark brown, opaque. Punctures very large, but extremely shallow, diameters much larger than interspaces. Setation yellowish, rather sparse, moderately long, present mainly

in frons and posterior half of clypeus. Clypeal sides running approximately in parallel in posterior half, then rather sharply narrowing to apex. Apex of clypeus vertically elevated, distinctly bilobed. Antennae lighter brown, especially coloration of antennal club, which is slightly shorter than stalk.

Pronotum. Dark chestnut brown, pronotal base distinctly lighter. Punctation dense on pronotal sides, here with diameters of punctures approximately same as interspaces, mostly with ochre ornament. In remainder of pronotum punctation finer, sparser, specially in disc much reduced. Punctures in pronotal disc and base bearing setae, but not filled with ornament. Larger ochre maculae reduced to four spots at each pronotal side. Anterior sides of pronotum with long and dense brown setation, remainder of pronotum with yellowish setae similar as setation in head.





Figs. 26-30. *Protaetia* (*Pachyprotaetia*) *meridiovietnamica* sp. nov.: 26- habitus, dorsal aspect; 27- habitus, ventral aspect; 28- habitus, lateral aspect; 29- aedeagus; 30- aedeagus, lateral aspect.

Figs. 31-33. *Protaetia* (*Pachyprotaetia*) *meridiovietnamica* sp. nov. (female): 31- habitus, dorsal aspect; 32- habitus, ventral aspect; 33- habitus, lateral aspect;

Scutellum. Dark brown, triangularly developed. Nearly impunctate and completely immaculate.

Elytra. Chestnut brown, with reduced ochre ornament. Punctation moderately developed, mostly composed from horse- shoe shaped and more simple, wavy shaped punctures. Horseshoe-shaped punctation mostly on lateral ridge and sides, also in elytral apex. More simple developed punctures present mainly in elytral disc. Yellowish setation dense and rather long, in apical half slightly longer. Ochre ornament reduced, present in sides and elytral apex. Subhumeral emargination shallow, both elytral calli rather obtuse. Sutural ridge completely flat throughout total length, its apex not protruding over elytral apex.

Pygidium. Reddish brown, with shallow and rather sparse striolation. Setation rather sparse. Large part of disc and base with cover of ochre ornament.

Ventrum. Coloration dark brown, in some parts nearly black. Excepting abdominal and metasternal discs and mentum, with cover of ochre tomentum. Abdominal punctation dense, horseshoe-shaped, most of punctures bearing yellowish setae. Metasternum more or less with striolation, punctation in metasternal plate finer. Large part of metepimeron and mesepimeron with mixture of horseshoe-shaped and more simple puncation and with cover of ochre tomentum. Mesometasternal process tiny, in front of its apex with rather indistinctly developed transversally running furrow bearing setae. Yellowish, dense and rather long setation present throughout total length of ventrum, excepting anal ventrite.

Legs. All femora brownish, wrinkled and covered with rather long setae running throughout total length, most of wrinkles with ochre ornament. Protibia short, bidentate. Metatibia with carina in middle length laterally. Meso- and metatibia with long and dense

yellowish setation. All tibiae with cover of ornament, richer in inner sides. Tarsi short, brownish. Meso- and specially metatarsi in inner sides with dense setation.

Genitalia. Parameres with emargination approximately in middle length. Separation between inner and outer rims rather distinct. Inner rims ending in front of apex (Figs. 29-30).

Sexual dimorphism. Size of single female available for study 15.4 mm (excluding pygidium). It differs from holotype male in following aspects: protibia shorter and more robust, tridentate, posterior tooth obtuse; apex of clypeus broadly rounded, not bilobed as in male, only very shortly and obtusely elevated; density of dorsal punctation approximately same as in male, but all punctures deeper with longer setae; ventral setation longer and denser, specially in mesometasternal process; setation of femora and tibiae denser and longer; anal segment setose.

Differential diagnosis. *Pachyprotaetia meridiovietnamica* new species is unique among other species in following characters: dorsal ochre ornament very reduced, specially in elytra; sutural ridge completely flat throughout total length and the apex of suture not drawn out over the apex of elytra; male with deeply incised apex of clypeus; apex of mesometasternal process not typically triangularly developed, but nearly rounded; inner rim of male paramere not reaching apex. Absence of protruding sutural ridge, this character is shared only with *Pachyprotaetia engganica* Jákl, 2011 but coloration in species from Enggano island reddish to light brown, dorsal and ventral ornament composed from hundreds of tiny circularly shaped maculae; mesometasternal process in species from Enggano glabrous and shining; apex of clypeus only indistinctly emarginated, not deeply incised.

Etymology. The name meridiovietnamica refers to type locality placed in the far south of Vietnam.

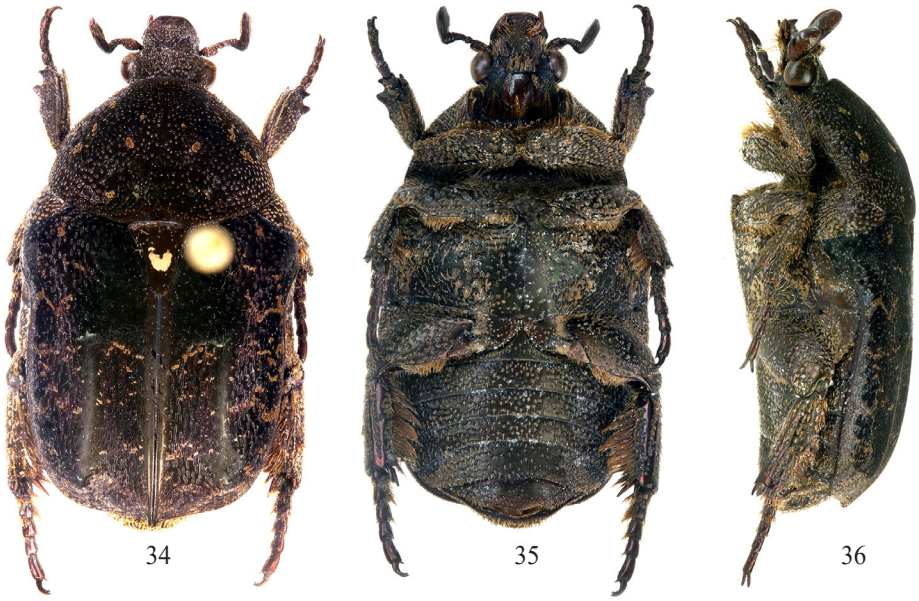
Distribution. South Vietnam: Binh Thuán Province.

***Protaetia* (*Pachyprotaetia*) *mixta* (Weber, 1801)**
(Figs. 34-38)

Cetonia mixta Weber, 1801: 69 (original description); Fabricius 1801: 152, tab.II.; Wallace 1868: 587 (catalogue); Kraatz 1885: 245, tab.I., Fig. 8 (Cetoniidae of Sumatra).
Protaetia mixta (Weber): Burmeister 1842: 482 (monograph); Mohnike 1871: 79; Schoch 1898: 70.
Protaetia (*Pachyprotaetia*) *mixta* (Weber): Mikšič 1965b: 582, figs.2-3 (revision), : 577 (key); Mikšič 1980: 371 (Malayan Peninsula), : 369 (key); Mikšič 1987: 529, figs. 143, 145 (monograph), : 523 (key); Krajčík 1998: 42 (catalogue); Sakai & Nagai 1998: 284, Pl. 92, Figs. 1006-1 male (W. Kalimantan, Mt. Bawang), 1006-2 male (Nias I.), 1006-3 female (W. Sumatra) [iconography]; Legrand & Chew Kea Foo 2010: 32, figs. 46-47 (male parameres), photo 78 male, 79 female [Cetoniidae of Sabah].

Type locality. „E Sumatra“ (= Indonesia, East Sumatra).

Type material. Holotype in ZMUC.



Figs. 34-38. *Protaetia* (*Pachyprotaetia*) *mixta* (Weber, 1801): 34- habitus, dorsal aspect; 35- habitus, ventral aspect; 36- habitus, lateral aspect; 37- aedeagus; 38- aedeagus, lateral aspect.

Additional material examined: 10 ♂♂, 5 ♀♀, (SJCP) labelled: Indonesia, West Sumatra / HARAU VALLEY, 500-800 m / cca 20 km N of Payakumbuh / 7.2003, St. Jákl lgt; 1 ♂, 1 ♀, (SJCP) labelled: Indonesia, W.Sumatra prov. / SOLOK ENV., 6.1995 / local collectors; 2 ♂♂, 2 ♀♀, (SJCP) labelled: W-Sumatra, 3.-4.1991 / Singgalang Mt. / 1200-1800 m; 1 ♀, (SJCP) labelled: Indonesia, West Sumatra / MT. SINGGALANG, 7.2003 / ANNAI VALLEY NAT. RES., env. / St. Jákl lgt, 400-750 m; 1 ♀, (SJCP) labelled: Indonesia, Bawean Isl. / N of Madura Isl., 10.2006 / local collectors; 3 ♂♂, 1 ♀, (SJCP) labelled: INDONESIA, SW Kalimantan / MT. BAWANG, 1000-1500 m / Singkawang Reg., Madi vill. / env., VI. 2018 / local collector leg; 1 ♀, (SJCP) labelled: INDONESIA, BELITUNG / ISL., E of SE Sumatra / V.2005 / local collector leg; 1 ♂, 1 ♀, (SJCP) labelled: Malaysia, PERAK, Cameron / Highlands, BATU env. / 500-700 m alt., V.2003 / local collector lgt; 1 ♀, (SJCP) labelled: MALAYSIA, KELANTAN / 30 km S of Jeli / Gunung Jual, 800 m / Kampong Timor / 10.IV.-6.V.2018/ Petr Čechovský lgt.

Distribution. Indonesia: Sumatra, Kalimantan, Java, Bawean and Belitung Islands (new record); Malaysia: Malayan Peninsula and Borneo Island.

Protaetia (*Pachyprotaetia*) *peterjacki* Legrand & Chew Kea Foo, 2010
(Figs. 39-43)

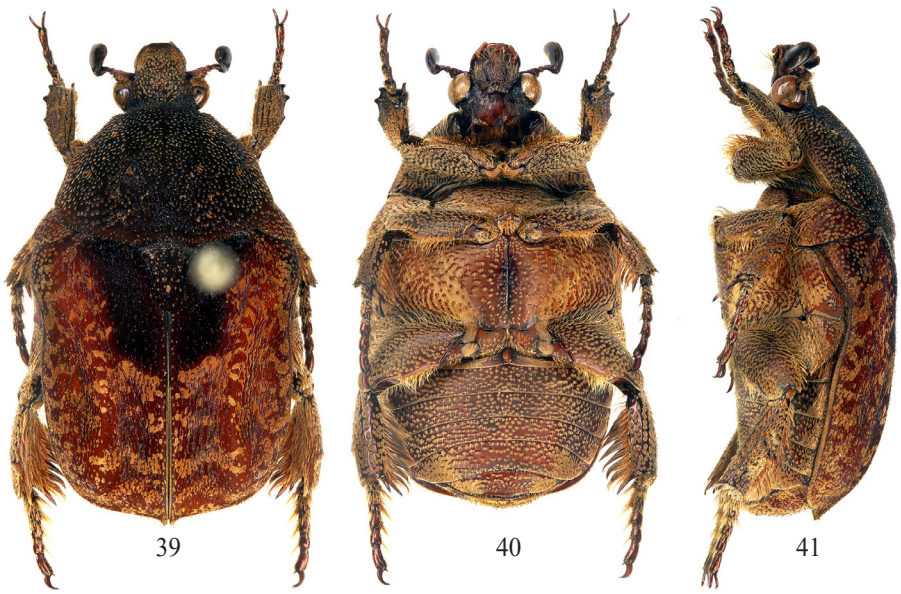
Protaetia (*Pachyprotaetia*) *peterjacki* Legrand & Chew Kea Foo, 2010: 33, figs. 50-51, photo 82-male, 83-female (original description).

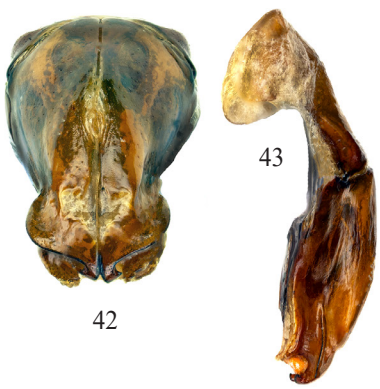
Type locality. „Malaisie Orientale, Sabah, mont Trus Madi“ (= East Malaysia, Sabah, Mt. Trus Madi).

Type material. Holotype (♂), (PLCP), Paratypes (7 ♂♂, 1 ♀), (PLCP), Paratype (1 ♂), (SJCP).

Additional material examined: 1 ♂, (SJCP) labelled: Crocker Range / Sabah, N Borneo / E. Malaysia / VI. 2002; 1 ♂, (SJCP) labelled: Trus Madi, 1000 m / N Borneo, E. Malaysia / 1.-15.IV.2005 / M. Sawai leg.

Distribution. MALAYSIA: Sabah Mountain Range.





Figs. 39-43. *Protaetia* (*Pachyprotaetia*) *peterjacki* Legrand & Chew Kea Foo, 2010: 39- habitus, dorsal aspect; 40- habitus, ventral aspect; 41- habitus, lateral aspect;42- aedeagus; 43- aedeagus, lateral aspect.

Pachyprotaetia ciliata species group

Key to species:

1(4) Species with opaque appearance, basic tomentum in pronotum and elytra present, usually with cover throughout total length. Dorsal punctation fine and sparse, specially in pronotum. Mesometasternal process without tubercle in its apex.

2(3) Males with apical margin of clypeus emarginated or slightly incised. Body size 16.0-18.5 mm. Apex of mesometasternal process wider than long. Punctation of anal ventrite not very dense and deep, especially in males. Dorsal coloration yellow to brownish, sometimes reddish with green tinge. Indonesia: Sumatra, Kalimantan, Java, Bali; Malaysia: Borneo..... *Protaetia* (*Pachyprotaetia*) *ciliata* (Olivier, 1785)

3(2) Males with apical margin of clypeus deeply incised. Largest species in group, body size 17.5-18.5 mm. Width and length of apex of mesometastrnal process equal. Punctation of anal ventrite dense and deep, specially in females. Dorsal coloration dark, usually dark green pronotum and dark chestnut brown elytra. Indonesia: Batu Archipelago: Simuk Island..... *Protaetia* (*Pachyprotaetia*) *simuk* sp. nov.

4(1) Shining green species, with brownish tinge. Basic tomentum absent in both body sides. Dorsal punctation rugose, specially in pronotum, diameters of punctures moderately large and rather deep. Mesometasternal proces with rather large, glabrous tubercle placed on disc of its apex. Indonesia: Enggano Island..... ..... *Protaetia* (*Pachyprotaetia*) *hamidi* Jákl, 2008

Protaetia (*Pachyprotaetia*) *ciliata* (Olivier, 1789)

(Figs. 44-48)

Cetonia ciliata Olivier, 1789: 90, tab.12, Fig. 112 (original description); Weber 1801: 70; Illiger 1802: 209; Schonherr 1817: 136.
Protaetia ciliata (Olivier): Burmeister 1842: 488 (monograph); Mohnike 1871: 80; Schoch 1895: 117; Schenkling 1921: 254 (catalogue).
Protaetia (*Pachyprotaetia*) *ciliata* (Olivier): Mikšič 1965: 578, Fig.1 (revision), : 576 (key); Mikšič 1980: 369 (key); Mikšič 1987: 534, fig. 146 (monograph), : 523 (key); Krajčík 1998: 42 (catalogue); Sakai & Nagai 1998: 285, Pl. 92, Figs. 1007-1 male (East Java), : 1007-2 female (East Java) [iconography]; Legrand & Chew Kea Foo 2010: 32, photo 76 male, photo 77 female (Cetoniidae of Sabah).
Cetonia lunulata Fabricius, 1801: 152; Burmeister 1842: 488 (=*P. ciliata* Olivier).
Type locality. ,‘‘Sumatra‘‘ (= Indonesia, Sumatra Island). Type material. Not traced.
Cetonia germar Gory & Percheron, 1833: 202, tab.36, fig.5 (original description).
Cetonia porcina Wallace, 1867: XCVII (original description); Kraatz 1885: 15.
Protaetia porcina (Wallace): Mohnike 1871: 80; Schenkling 1921: 254 (= *P. ciliata* Olivier).
Type locality. ‘‘Java‘‘ (= Indonesia, Java Island). Type material. (BMNH).

Type locality. Not presented in original description.

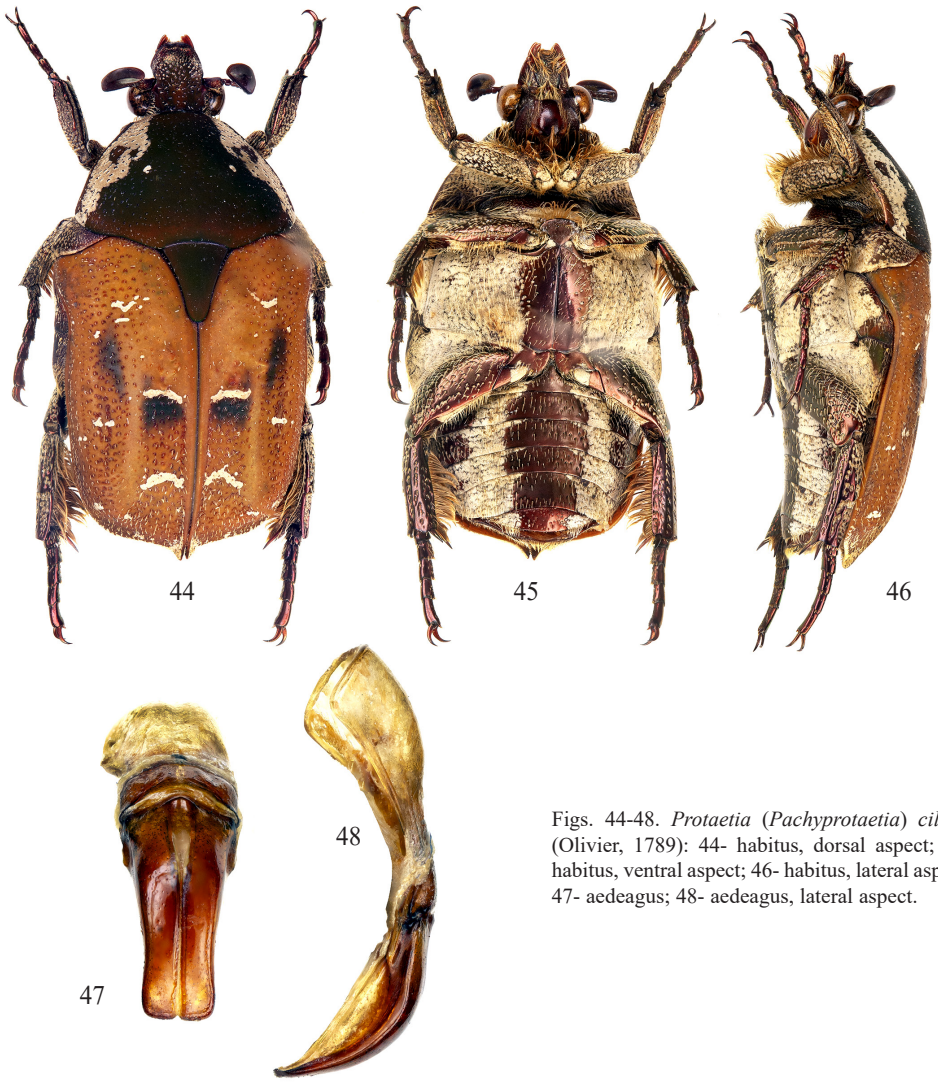
Type material. According to Olivier (1789) specimen (s) he used for description originated from M. Gevers collection. Type not traced.

Additional material examined: 2 ♂♂, (SJCP) labelled: Indonesia, E. Java prov. / Meru-Betiri N.P., Sukamade env. / 12.1996, St. Jákl lgt, 1-300 m; 1 ♂, (SJCP) labelled: INDONESIA, East Java Pr. / MERU-BETIRI N.P., 10 m/ Sukamade v.env. / 2.III.1997, St. Jákl leg; 2 ♂♂, 3 ♀♀, (SJCP) labelled: Indonesia, East Java Prov. / ARGOPURO MTS., 1200 m / BERMI VILL. env. / 8.2004, local collectors lgt; 1 ♂, (SJCP) labelled: INDONESIA, West Java / Prov., Cianjur reg. / SUKANEGARA env. / 18.-21.III.2007, 1050 m / St. Jákl leg; 4 ♂♂, 3 ♀♀, (SJCP) labelled: Indonesia, BALI ISL. / TAMBLINGAN LAKES, 1200 m / cca 20 km NW of Bedugul / 11. 2004, St. Jákl lgt.; 4 ♂♂, 1 ♀, (SJCP) labelled: Indonesia, BALI ISL., 600 m / cca 10 km N of NEGARA / 11. 2005, local collectors lgt; 2 ♂♂, (SJCP) labelled: INDONESIA, 6.1999 / West Sumatra prov. / Mt. Talang / 1400-1600 m alt. / native collectors lgt; 1 ♀, (SJCP) labelled: Indonesia / W. Sumatra prov. / Mt. Kerinci, 6.95 / native collectors; 1 ♀, (SJCP)

labelled: INDONESIA / W. Sumatra/ Padang Panjang env. / 5.1995 / native collectors; 1 ♂, (SJCP) labelled: I.-W. Sumatra, 1991 / Pangalan, 4.-10.2. / St. Jakl lgt, 1300 m; 1 ♂, 1 ♀, (SJCP) labelled: Indonesia, E Kalimantan / MT. BAKAYAN / VII. 2009 / local collector lgt.

Distribution. Indonesia: Kalimantan, Sumatra, Nias, Java and Bali Islands (new record); Malaysia: Borneo.

Note. The year of description is 1789, not 1785. Before Schenkling's catalogue (1921) most authors incorrectly cited the year when Olivier described this species.



Figs. 44-48. *Protaetia* (*Pachyprotaetia*) *ciliata* (Olivier, 1789): 44- habitus, dorsal aspect; 45- habitus, ventral aspect; 46- habitus, lateral aspect; 47- aedeagus; 48- aedeagus, lateral aspect.

Protaetia (*Pachyprotaetia*) *hamidi* Jákl, 2008
(Figs. 49-53)

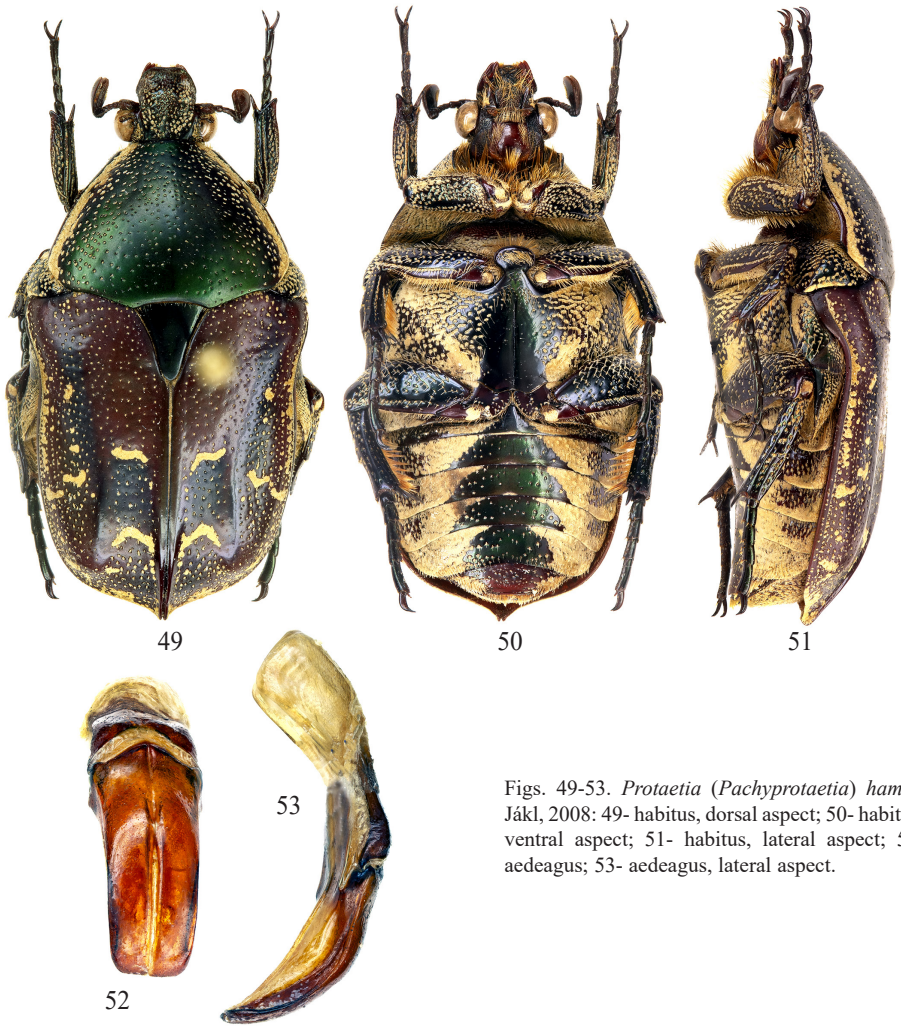
Protaetia (*Pachyprotaetia*) *hamidi* Jákl, 2008: 107, figs. 14-18 (original description).

Type locality. Indonesia, Enggano Island, cca 120 km W of South Sumatra.

Type material. Holotype (♂), (SJCP), Paratype (2 ♂♂, 6 ♀♀), (SJCP), (2 ♀♀), (KSCP).

Additional material examined. None.

Distribution. Indonesia: Enggano Island.



Figs. 49-53. *Protaetia* (*Pachyprotaetia*) *hamidi* Jákl, 2008: 49- habitus, dorsal aspect; 50- habitus, ventral aspect; 51- habitus, lateral aspect; 52- aedeagus; 53- aedeagus, lateral aspect.

Protaetia (*Pachyprotaetia*) *simuk* sp. nov.
(Figs. 54-61)

Type locality. Indonesia, West Sumatra Province, Batu Archipelago, Simuk Island.

Type material. Holotype (♂), (SJCP) labelled: Simuk Is. / Batu Iss. / W. Sumatra / SEP. 1989. Paratype: (Nos. 1-2 ♂♂), (KSCP), (Nos. 3-4 ♀♀), (KSCP), (No.5 ♂, No.6 ♀), (SJCP) labelled: same as holotype.

Description of holotype. Head, pronotum and scutellum dark green, elytra plum/brownish. Pronotum with lateral vitta at sides and one pair of minute maculae, ornament in elytra more abundant. Dorsum with cover of basic tomentum, rather opaque appearance. Body size 17.00 mm (excluding pygidium).


54

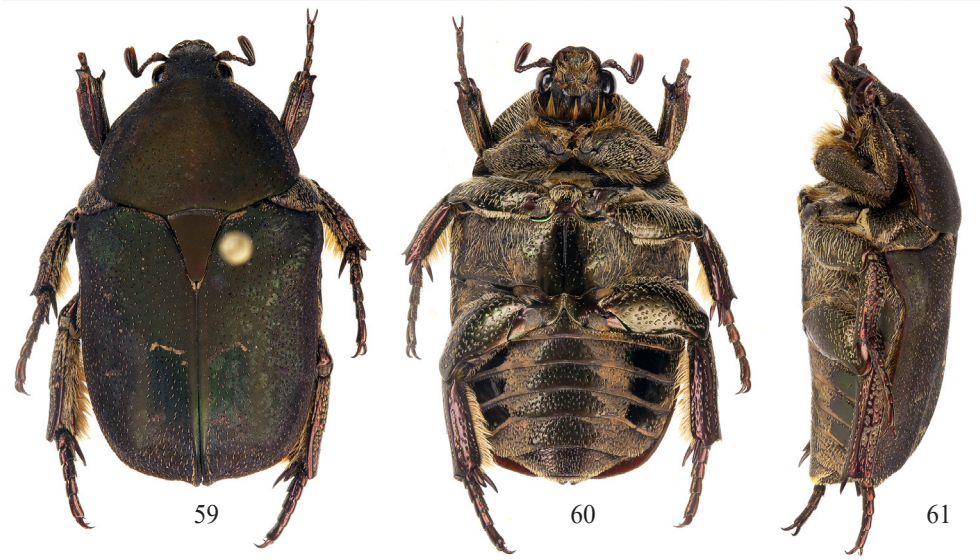

55


56


57


58

Figs. 54-58. *Protaetia* (*Pachyprotaetia*) *simuk* sp. nov.: 54- habitus, dorsal aspect; 55- habitus, ventral aspect; 56- habitus, lateral aspect; 57- aedeagus; 58- aedeagus, lateral aspect.



Figs. 59-61. *Protaetia* (*Pachyprotaetia*) *simuk* sp. nov. (female): 59- habitus, dorsal aspect; 60- habitus, ventral aspect; 61- habitus, lateral aspect;

Head. Dark green, sides of clypeus rounded. Circularly shaped punctures present mainly in disc of frons and especially disc of clypeus, sides with much sparser punctation. Setation yellow, short, present mainly in frons. Apex of clypeus vertically elevated, its apical margin deeply incised. Antennae brownish, stalk longer than club. Scape with setation.

Pronotum. Dark green with cover of basic tomentum, opaque. Pronotal base with plum/brown tinge. Rather broad, beige vitta running beside lateral margins throuthout total length of pronotal sides. Pronotal disc with one pair of minute maculae. Punctation very fine and sparse composed from simple, fine and semicircularly shaped, tiny punctures. Pronotal setation absent. Sides with low and rather obtuse border.

Scutellum. Triangularly shaped, its apex rather sharp. Immaculate, nearly impunctate, setation absent.

Elytra. Coloration plum/brownish, part of impression in elytral disc blackened. Small, irregularly shaped patches of whitish ornament present in both elytral halves, but in apical half more abundant. Apical margin of each elytron with whitish ornament. Elytral punctures slightly more abundant than in disc. Subscutellar part of elytra nearly impunctate, reminder with small and not very dense horseshoe-shaped punctures, punctation beside lateral margins more simple. Yellowish setae present throughout total length, but in apex approximately twice longer and denser. Sutural ridge elevated in its apical third, its termination sharp, distinctly drawn out over the apex of elytra. Impression in disc moderately deep, subhumeral emargination medially sharp.

Pygidium. Brownish, wrinkled. Yellow setation short, present throughout total length. Larger part with cover of light ornament.

Ventrum. Dark green, broad sides of abdomen and metasternum with cover of light ornament and white setae. Metasternal setation much longer than setation covering abdominal sides. Also most parts of prosternum covered with light ornament and setae. Meso- and metepimeron dark green, larger parts with cover of ornament and setation. Abdominal and metasternal discs with fine and simple punctation. Mesometasternal process triangularly shaped, its apex obtusely rounded, shortly in front of apex with transversally running furrow bearing setae.

Legs. Femora, tibiae and tarsi green. Femora and tibiae deeple punctured, in some parts wrinkled, bearing light ornament and setae. Protibia unidentate. Meso- and specially metatibia with distinctly developed carina laterally in posterior half.

Genitalia. Simple, parallel, slightly elongated (Figs. 57-58).

Variability. Size range 17.0-18.2 mm (excluding pygidium). Excepting small differences in composition of white ornament and size, in all other aspects all males available for the study are very similar each to other.

Sexual dimorphism. Body size 17.4-17.6 mm (excluding pygidium). Apex of clypeus only shortly and not vertically elevated, its apical margin broadly rounded, mildly emarginated in middle length. Abdomen arched, anal ventrite with dense and deep punctation, also other ventrites with much denser and deeper punctation than in males. Protibia bidentate, shorter and wider. In other aspects similar to males.

Differential diagnosis. The newly described species differs from the other two representatives of the *Pachyprotaetia ciliata* species group, respectively from *Pachyprotaetia ciliata* (Olivier, 1785) and *Pachyprotaetia hamidi* Jákl, 2008 in following characters: I. by largest avarage size in group, size of its congeners can also reach 18 mm, but usually 16-18 mm; II. Apex of clypeus in newly described species deeply incised, in both congeners nearly straight or emarginated in middle length; III. Abdomen sharply constricted in new species, but more flat in both congeners; IV. Male parameres running in parallel in *Pachyprotaetia simuk* new species, but narrowing to apex in *Pachyprotaetia hamidi* Jákl, 2008 and with emargination in front of parameral apex in *Pachyprotaetia ciliata* Olivier, 1785.

Etymology. Named after Simuk Island, type locality of newly described species.

Distribution. Indonesia: Batu Archipelago: Simuk Island.

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