

Some new passalid beetles (Insecta: Coleoptera: Passalidae) from Southeast Asia in the collection of the Naturhistorisches Museum Wien

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Abstract

Seven new passalid beetles belonging to the genus *Leptaulax* KAUP, 1871 are described from Southeast Asia: *Leptaulax crockerensis* sp.n. (Sabah, Borneo), *L. jeni* sp.n. (Sabah, Borneo), *L. laevis* sp.n. (North-Sumatra), *L. pacholatko* sp.n. (South-Vietnam), *L. schillhammeri* sp.n. (North-Sumatra), *L. schoedli* sp.n. (North-Sumatra), *L. strbai* sp.n. (Sabah, Borneo). A key to the species of the genus *Leptaulax* from the Greater Sunda is revised.

Key words: Insecta, Coleoptera, Passalidae, *Leptaulax*, key, new species, systematics, Vietnam, Malaysia, Indonesia, Borneo, Sumatra.

Zusammenfassung

Sieben neue Passalidenarten der Gattung *Leptaulax* KAUP, 1871 aus Südostasien werden beschrieben: *Leptaulax crockerensis* sp.n. (Sabah, Borneo), *L. jeni* sp.n. (Sabah, Borneo), *L. laevis* sp.n. (North-Sumatra), *L. pacholatko* sp.n. (South-Vietnam), *L. schillhammeri* sp.n. (North-Sumatra), *L. schoedli* sp.n. (North-Sumatra), *L. strbai* sp.n. (Sabah, Borneo). Ein Bestimmungsschlüssel zu den Arten der Gattung *Leptaulax* der Großen Sundainseln wird revidiert.

Introduction

In this paper, I describe seven new species of the genus *Leptaulax* KAUP, 1871 from Southeast Asia. All of the type material is in the collection of the Naturhistorisches Museum Wien. A key to the species of the genus *Leptaulax* KAUP, from the Greater Sunda is revised based on the material in the collections of Naturhistorisches Museum Wien and the author.

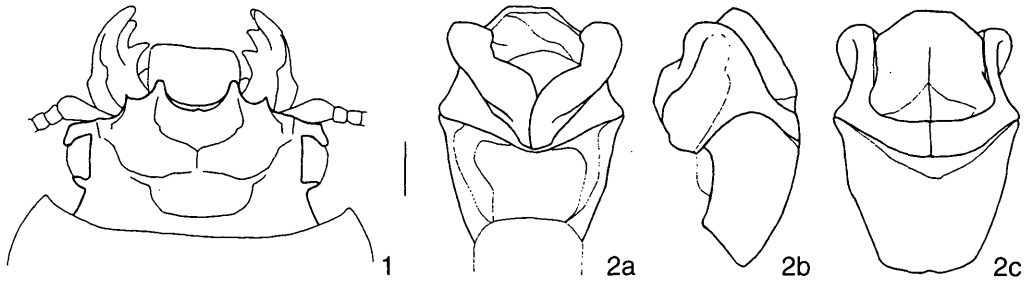
Leptaulax pacholatko sp.n. (Figs. 1 - 3)

Holotype ♂: Lang Bian, 12 km north from Dalat, Vietnam, 28. - 30.IV.1994, leg. Pacholatko & Dembicky;
paratypes: 3 ♀♀, same data as holotype.

Description: black, more or less reddish; rather flat.

Median anteriormost part of head before anterior edge slightly visible between the two inner tubercles in dorsal view; median tubercle at anterior margin of head small and acute; inner tubercle triangular, with apex rounded, larger than outer one, the distance between the two inner tubercles 2.0 times as great as that between inner and outer ones; outer tubercle sharp and acute, slightly externally produced; frontal ridge sharp, regu-

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Figs. 1 - 2: *Leptaulax pacholatkoii* sp.n., (1) head; (2) male genitalia, a, dorsal view, b, lateral view, c, ventral view (scale: 0.5 mm).

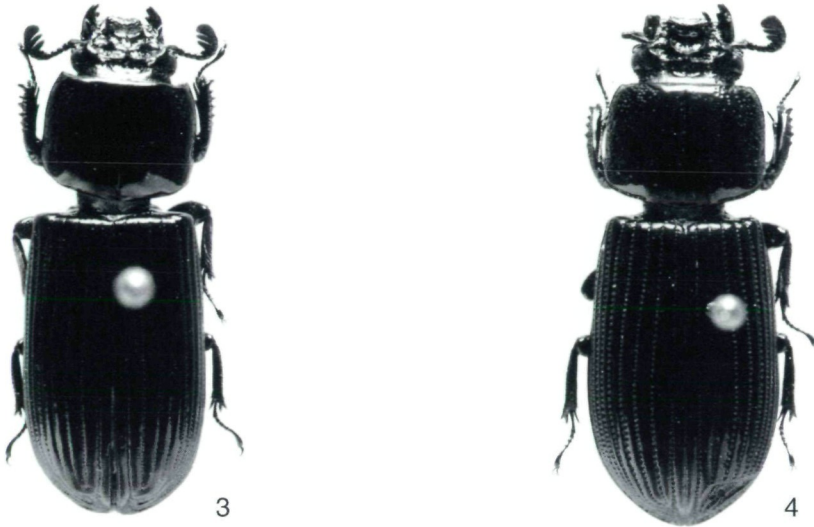
larly curved and extending to inner tubercle; parietal ridge extending to supraorbital one; supraorbital ridge joining supraoccipital one; frontal area naked, semicircular, wider than long ($L/W = 0.4$), covered with longitudinal punctures; depressed area smooth behind outer tubercles, rather densely covered with hair-bearing punctures before and behind parietal ridges; eye canthus shining, obtuse at anterior angle, with several seta-bearing punctures in male, lacking seta in female, longitudinal ridge fine; eye moderately large; hypostomal process smooth and shining, lacking longitudinal groove.

Antennal lamellae moderately long. Labrum with anterior border very slightly emarginate, sides parallel. Middle part of mentum with a few large punctures, anterior border slightly protrudent; lateral piece with scattered large seta-bearing punctures. Ligula with longitudinal keel, anterior border pointed at the middle; second segment of labial palpus somewhat longer than third one. Mandible very obtusely protrudent behind the middle on external side of ventral face; left upper tooth moderately raised, somewhat obtuse in anterior tip, horizontal behind the tip in lateral view; left anterior lower tooth sharp and simple, slightly larger than right one.

Pronotum slightly convex, naked and sparsely punctate behind anterior angles and around scars; anterior border slightly, but rather widely curved near anterior angles, anterior angle slightly acute, median groove distinct, anterior marginal groove short and fine, lateral marginal groove rather broad, with one or two rows of punctures; scar shallow, rather large, with punctures.

Elytra flat, slightly wider posteriad, hairy on vertical portion between suture and fifth groove, naked in front of shoulders; grooves narrower than the adjoining ribs, with round punctures, punctures in lateral grooves larger than those in dorsal ones.

Median keel of prosternum slightly convex, posterior plate of it almost smooth, slightly depressed and finely punctate along lateral and posterior borders. Mesosternum polished at the middle, finely rugose and mat along lateral borders; scar rather broad, inner wall about $2/5$ as long as lateral border of sternum. Central area of metasternum almost smooth, anterior depression longitudinal; lateral area sharply defined, rather narrow, shagreened and opaque; anterior intermediate area submat, posterior one shining, smooth in external half, punctate in internal half. Posterior border of fifth abdominal sternite strongly, widely and arcuately emarginate, so that fifth sternite longer in lateral portions; sixth (apical) one widely and finely punctate, but almost impunctate at both sides of the middle, smooth and slightly raised along posterior border, narrowly hairy at the



Figs. 3 - 4: *Leptaulax* spp., dorsal aspect, (3) *L. pacholatkoii* sp.n.; (4) *L. schoedli* sp.n.

middle of anterior margin in male, widely hairy at the middle in female. External face of middle and posterior tibiae smooth and shining except for seta-bearing punctures and spines.

Male genitalia as shown in Figure 2.

Length: 20.0 mm (male), 21.0 - 21.5 mm (female).

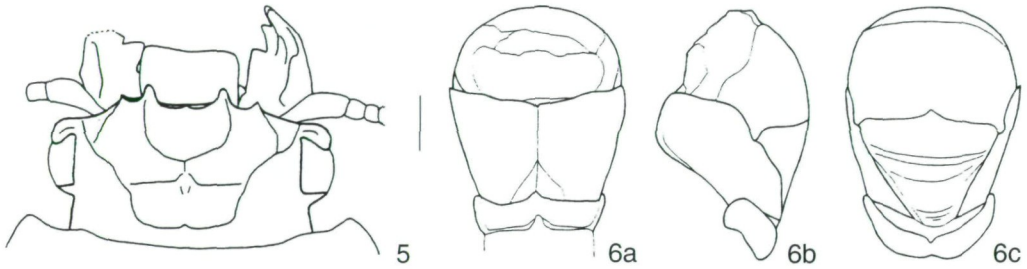
This new species resembles *L. bicolor* (F.), but is different from the latter by the following points: frontal area more distinctly transverse; pronotum sparsely punctate; distal abdominal sternite more or less hairy.

Leptaulax schoedli sp.n. (Figs. 4 - 6)

Holotype ♂: Lumban Julu, ca. 1200 m, Sumatera Utara, Indonesia, 18.II.1990, leg. Schödl.

Description: black and shining; somewhat convex.

Median anteriormost part of head before anterior edge slightly visible between the two inner tubercles in dorsal view; median tubercle at anterior margin of head obtuse; inner tubercle triangular, with apex rounded, larger than outer one, the distance between the two inner tubercles 2.3 times as great as that between inner and outer ones; outer tubercle sharp, acute, anteriorly produced; frontal ridge sharp, extending to inner tubercle; parietal ridge nearly straight, gradually becoming lower toward side, ending before supraorbital ridge; supraorbital ridge joining supraoccipital one; frontal area nearly semicircular, wider than long ($L/W = 0.6$), rounded posteriad, slightly convergent antieriad, with scattered punctures; depressed area rather sparsely punctate before parietal ridges, rather densely covered with hair-bearing punctures behind them; eye canthus shining, widely rounded at anterior angle, with a fine longitudinal ridge; eye moderately large; hypostomal process with a longitudinal groove, smooth and shining in margins, worn-looking in the groove.



Figs. 5 - 6: *Leptaulax schoedli* sp.n., (5) head; (6) male genitalia, a, dorsal view, b, lateral view, c, ventral view (scale: 0.5 mm).

Antennal lamellae short. Labrum with anterior border slightly emarginate. Middle part of mentum smooth, with anterior border distinctly protrudent; lateral piece rather densely covered with large seta-bearing punctures. Ligula with a fine keel at the middle; second segment of labial palpus as long as third one. Mandible very obtusely angulate before the middle on external side of ventral face; left upper tooth low, obtuse in anterior tip, slightly and gradually raised behind the tip; left anterior lower tooth large and simple.

Pronotum moderately convex, naked, rather densely punctate in lateral 2/5; anterior angle slightly protrudent, median groove distinct, lateral marginal groove broad, with two rows of punctures, scar small.

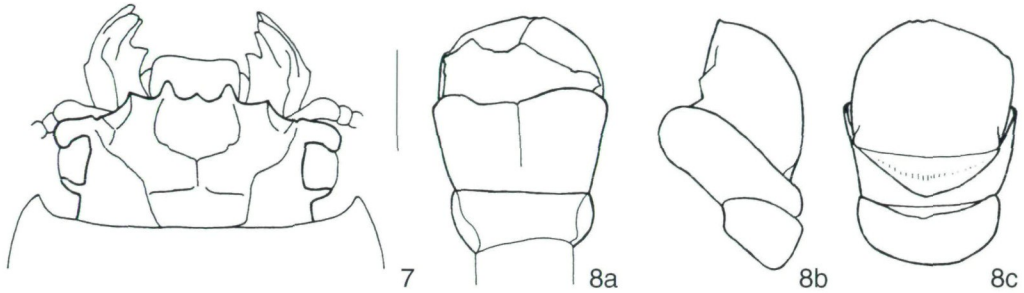
Elytra weakly convex, distinctly wider posteriad, hairy in front of shoulders; first to fourth grooves with small but distinct round punctures, fifth one with small transverse punctures, sixth to tenth ones wider than the adjoining ribs, with large transverse punctures.

Median keel of prosternum not flattened, posterior plate of it shagreened and mat, indistinctly marginate. Mesosternum almost polished, with confluent dents at the middle, widely shagreened and finely punctate in sides; scar not sharply defined, small and shallow, about 2/5 as long as lateral border of sternum. Central area of metasternum almost smooth, with an indistinct large reverse V-shaped depression behind the middle finely rugose, anterior depression longitudinal and finely rugose; lateral area sharply defined, narrow, shining and finely rugose; anterior intermediate area with scattered small seta-bearing punctures; posterior intermediate area with scattered large punctures. Posterior border of fourth abdominal sternite distinctly and angulately emarginate, so that fifth sternite longer at the middle; fifth abdominal sternite widely frosted-looking at the middle; sixth (apical) one finely and irregularly punctate in lateral 1/3, indistinctly frosted-looking at the middle, sharply marginate along posterior border. External face of middle and posterior tibiae smooth and shining except for seta-bearing punctures and spines.

Male genitalia as shown in Figure 6.

Length: 20 mm.

This new species resembles *L. punctatus* IWASE, 1995 from Sumatra in general appearance, but it is distinguished from the latter by the following points: head less densely punctate; eye canthus shining, whereas almost mat in *L. punctatus*. Further, the shape of male genitalia is quite different (cf. IWASE 1995).



Figs. 7 - 8: *Leptaulax schillhammeri* sp.n., (7) head; (8) male genitalia, a, dorsal view, b, lateral view, c, ventral view (scale: 0.5 mm).

Leptaulax schillhammeri sp.n. (Figs. 7 - 9)

Holotype ♂: Sibolangit, Sumatera Utara, Indonesia, 25.II.1990, leg. Schillhammer; **paratype**: 1 ♀, same data as holotype.

Description: black with ventral surface reddish, shining; slightly convex.

Median anteriormost part of head invisible in dorsal view; median tubercle at anterior margin of head obtuse; inner tubercle triangular, with apex rounded, larger than outer one, the distance between the two inner tubercles 1.5 - 1.7 times as great as that between inner and outer ones; outer tubercle sharp and acute; frontal ridge sharp, extending to inner tubercle; parietal ridge nearly straight, gradually decending toward side, ending before supraorbital ridge; supraorbital ridge indistinctly joining supraoccipital one; frontal area nearly circular, wider than long ($L/W = 0.6 - 0.7$), rounded posteriad, convergent anteriorad, naked, rather densely punctate; depressed area densely punctate before and behind parietal ridge, polished just before supraoccipital ridge, the punctures just before and behind parietal ridges bearing a hair; eye canthus opaque, widely rounded at anterior angle, with several seta-bearing punctures; eye rather small; hypostomal process shining and finely punctate, with a longitudinal groove.

Antennal lamellae moderately long. Labrum with anterior border slightly emarginate. Middle part of mentum with a few large punctures, anterior border distinctly protrudent; lateral piece with some large seta-bearing punctures. Ligula longitudinally costate at the middle, with anterior border pointed at the middle; second segment of labial palpus as long as third one. Mandible very obtusely protrudent at the middle on external side of ventral face; left upper tooth low, obtuse in anterior tip, slightly and gradually raised behind the tip; left anterior lower tooth larger than right one, simple.

Pronotum moderately convex, naked and densely punctate in lateral 2/5; anterior angle slightly but rather widely protrudent, median groove distinct, lateral marginal groove mat, broad and filled with punctures, scar small.

Elytra weakly convex, distinctly wider posteriad, almost naked; first to fourth grooves narrow, with small round punctures, fifth and sixth ones with transverse punctures, seventh to ninth ones worn-looking, wider than the adjoining ribs, with large transverse punctures, tenth one worn-looking, broad, with small punctures; sixth to tenth ribs costate.

Median keel of prosternum rather flattened, posterior plate of it shining. Mesosternum polished at the middle, shagreened and mat along lateral borders; scar broad and mat, inner wall about 1/3 as long as lateral border of sternum. Central area of metasternum shining, indistinctly rugose, with scattered large punctures, anterior depression shallow and longitudinal; lateral area not sharply defined, narrow, opaque and finely rugose; anterior and posterior intermediate areas densely covered with large punctures. Posterior border of fourth abdominal sternite distinctly and angulately emarginate, so that fifth sternite longer at the middle; third sternite widely and finely punctate in sides; fourth one widely and finely punctate along anterior border and in sides; fifth one widely punctate in sides, frosted-looking and sparsely punctate at the middle; sixth (apical) one widely punctate, with narrow frosted-looking and impunctate area at posterior middle, rather sharply marginate along posterior border. External face of middle and posterior tibiae worn-looking.

Male genitalia as shown in Figure 8.

Length: 13 mm.

This new species is easily distinguished from all known species of the genus *Leptaulax* by the combination of the following characters: body small; lateral grooves of elytra worn-looking; central area of metasternum punctate.

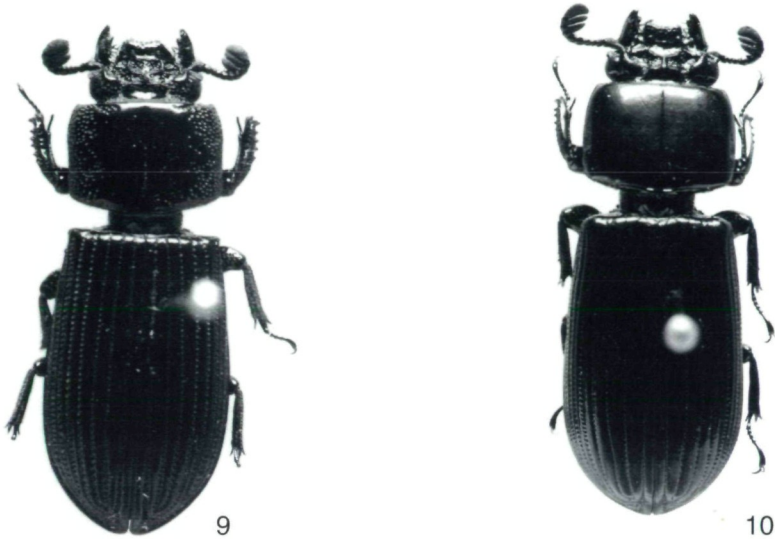
Leptaulax laevis sp.n. (Figs. 10 - 12)

Holotype ♂: Gunung Sibayak, Berastagi, Sumatera Utara, 20.II.1990, leg. Schödl; **paratypes**: 1 ♀, 2 exs., same data as holotype.

Description: black with ventral surface reddish, shining; rather flat.

Median anteriormost part of head before anterior edge invisible in dorsal view; median tubercle at anterior margin of head obtuse; inner tubercle triangular, with apex widely rounded, larger than outer one, the distance between the two inner tubercles 2.1 - 2.2 times as great as that between inner and outer ones; outer tubercle sharp and acute, somewhat externally produced; frontal ridge extending to near inner tubercle; parietal ridge short, abruptly ending in side; supraorbital ridge not joining supraoccipital one; frontal area nearly quadrangular, wider than long ($L/W = 0.5$), somewhat rounded posteriad, variable anteriad (slightly divergent, convergent or parallel), naked, with scattered large ocular punctures; depressed area naked, generally impunctate just behind outer tubercles, rather densely covered with large ocular punctures before parietal ridges, but impunctate behind parietal ridges; eye canthus shining, widely rounded at anterior angle, with an obtuse longitudinal ridge; eye moderately large; hypostomal process flat, smooth and shining.

Antennal lamellae fairly long. Labrum with anterior border slightly emarginate. Middle part of mentum smooth, with anterior border arcuately protrudent; lateral piece with scattered large seta-bearing punctures. Ligula longitudinally costate at the middle, with anterior border pointed at the middle; second segment of labial palpus larger than third one. Mandible rather sharply produced behind the middle on external side of ventral face; left upper tooth moderately raised, obtuse in anterior tip, distinctly convex behind the tip; left anterior lower tooth simple, larger than right one.



Figs. 9 - 10: *Leptaulax* spp., dorsal aspect, (9) *L. schillhammeri* sp.n.; (10) *L. laevis* sp.n.

Pronotum flat, naked, almost impunctate; anterior angle slightly protrudent or not, median groove distinct, lateral marginal groove narrow, with a row of small punctures, scar rather large, with punctures.

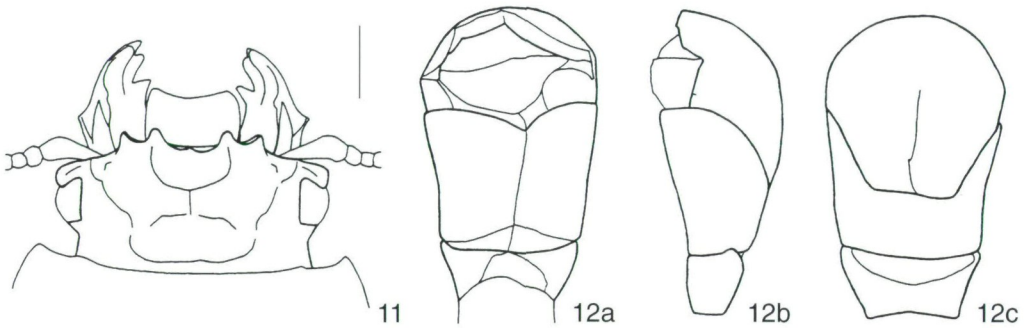
Elytra flat in dorsal face, distinctly wider posteriad, hairy in anterior vertical portion and in front of shoulders; dorsal and tenth grooves narrow, with small round punctures, sixth to ninth grooves as wide as the adjoining ribs, with large transverse punctures.

Median keel of prosternum flat and finely punctate, posterior plate of it smooth and shining. Mesosternum polished at the middle, shagreened and subopaque along lateral border; scar broad, shagreened in external half, finely punctate in internal half, inner wall about $2/5$ as long as lateral border of sternum. Central area of metasternum indistinctly rugose, anterior depression elliptical, large and shallow; lateral area distinctly defined, narrow, widest behind the middle, shining and finely rugose; anterior intermediate area rather densely covered with hair-bearing punctures, posterior one with scattered large punctures. Abdomen almost impunctate; posterior border of fourth abdominal sternite distinctly and angulately emarginate, so that fifth one longer at the middle; fourth, fifth and sixth (apical) ones indistinctly frosted-looking at the middle; sixth one with an indistinct marginal groove at the median $1/5$ to $1/3$ along posterior border. External face of middle and posterior tibiae smooth and shining except for seta-bearing punctures and spines.

Male genitalia as shown in Figure 12.

Length: 22-23 mm.

This new species resembles *L. fujiokae* IWASE, 1995 in the shape of the male genitalia, but is distinguished from the latter by the impunctate pronotum.



Figs. 11 - 12: *Leptaulax laevis* sp.n., (11) head; (12) male genitalia, a, dorsal view, b, lateral view, c, ventral view (scale: 0.5 mm).

Leptaulax jenisi sp.n. (Figs. 13 - 15)

Holotype ♂: Gunung Emas, Crocker Mountains, 50 km east from Kota Kinabalu, Sabah, Malaysia, 16. - 27.IV.1993, I. Jenis leg.; **paratypes**: 9 exs., same data as holotype; 1 ex., same locality as holotype, but 15. - 27.IV.1993, Jenis & Strba leg.; 1 ex., same data as holotype, but leg. Strba & Jenis.

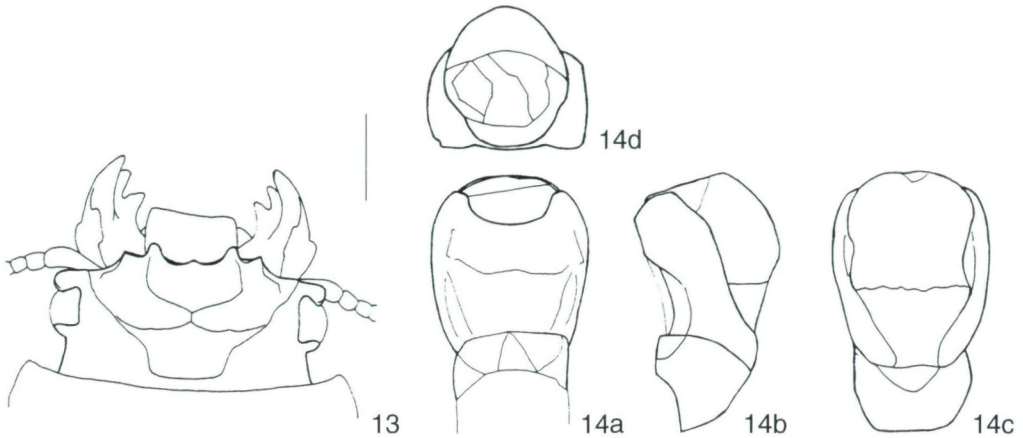
Black, with ventral surface more or less reddish, shining; dorsal face slightly convex.

Median anteriormost part of head before anterior edge slightly visible between the two inner tubercles in dorsal view; median tubercle at anterior margin of head small and rectangular; inner tubercle triangular, with apex widely rounded, larger than outer one, the distance between the two inner tubercles 2.2 - 3.0 times as great as that between inner and outer ones; outer tubercle sharp, rectangular or acute, somewhat externally produced; frontal ridge extending to inner tubercle; parietal ridge slightly but abruptly descending near the middle, extending to supraorbital ridge; supraoccipital ridge joining supraorbital one; frontal area transverse ($L/W = 0.5$), sparsely hairy; depressed area smooth just behind outer tubercles, rather sparsely covered with punctures before parietal ridges, several punctures of them bearing a hair, area behind parietal ridges with some hair-bearing punctures; eye canthus shining, rounded at anterior angle, lacking longitudinal ridge; eye moderately large; hypostomal process flat, almost smooth and shining.

Antennal lamellae rather long. Labrum with anterior border straight. Middle part of mentum smooth, with anterior border arcuate; lateral piece with scattered large seta-bearing punctures. Ligula without keel, anterior border slightly angulate at the middle; second segment of labial palpus somewhat shorter than third one. Mandible rectangularly produced at the middle on external side at ventral face; left upper tooth low, rectangular in anterior tip, gradually raised behind the tip; left anterior lower tooth simple, larger than right one.

Pronotum slightly convex, naked, rather sparsely punctate in lateral 1/4 to 1/3; anterior border straight, anterior angle not produced, median groove distinct, lateral marginal groove with one or two rows of punctures, scar shallow.

Elytra flat in dorsal face, wider posteriad, hairy in front of shoulders; grooves narrower than the adjoining ribs, with round punctures, which are larger and transverse in lateral grooves.



Figs. 13 - 14: *Leptaulax jeni* sp.n., (13) head; (14) male genitalia, a, dorsal view, b, lateral view, c, ventral view, d, caudal view (scale: 0.5 mm).

Median keel of prosternum narrow and flat, posterior plate of it finely rugose and weakly shining at the middle, smooth in margins. Mesosternum almost polished, generally with a few large punctures at the middle, worn-looking along lateral borders; scar broad and long, not sharply defined posteriad, shagreened and opaque in external half, finely rugose and shining in internal half, inner wall nearly straight, extending to near posterior border of sternum. Central area of metasternum with some large punctures at the middle, anterior depression distinct, finely rugose; lateral area sharply defined, narrow, shining and finely rugose; anterior intermediate areas finely rugose, posterior one with some large punctures along central area. Fourth abdominal sternite smooth at the middle, narrowly and finely punctate along anterior border and in sides; fifth one indistinctly frosted-looking at the middle; sixth (apical) one almost impunctate, indistinctly frosted-looking at the middle, slightly raised at median 1/2 along posterior border. External face of middle and posterior tibiae smooth and shining except for seta-bearing punctures and spines.

Male genitalia as shown in Figure 14.

Length: 18.0 - 18.5 mm.

This new species resembles *L. acutangularis* IWASE, but is distinguished from the latter by the hairy shoulders of the elytra.

Leptaulax crockerensis sp.n. (Figs. 16 - 18)

Holotype ♂: Gunung Emas, Crocker Mountains, Sabah, Malaysia, 16. - 27.IV.1993, leg. Jenis.

Description: dark reddish brown, with mesosternum, metasternum and abdomen yellowish dark brown (probably immature adult), shining; slightly convex.

Median anteriormost part of head before anterior edge invisible between the two inner tubercles in dorsal view; median tubercle at anterior margin of head nearly rectangular; inner tubercle triangular, with apex widely rounded, larger than outer one, the distance

between the two inner tubercles 2.8 times as great as that between inner and outer ones; outer tubercle sharp and acute, somewhat externally produced; frontal ridge regularly curved, extending to inner tubercle; parietal ridge slightly sinuate, extending to supra-orbital ridge; supraorbital ridge joining supraoccipital one; frontal area nearly semicircular, wider than long ($L/W = 0.6$), sparsely hairy; depressed area smooth behind outer tubercles, sparsely covered with hair-bearing punctures before and behind parietal ridges; eye canthus shining, rounded and somewhat protrudent upward at anterior angle; eye moderately large; hypostomal process flat, almost smooth and shining.

Antennal lamellae moderately long. Labrum with anterior border almost straight. Middle part of mentum smooth, with anterior border slightly arcuate; lateral piece with scattered large seta-bearing punctures. Ligula without keel, anterior border emarginate at the middle, not pointed; second segment of labial palpus as long as third one. Mandible rectangularly produced at the middle on external side at ventral face; left upper tooth low, rectangular in anterior tip, slightly ascending behind the tip, descending near base; left anterior lower tooth simple, larger than right one.

Pronotum slightly convex, naked, rather sparsely punctate in lateral 1/3; anterior angle narrowly but distinctly produced anteriorly, median groove distinct, lateral marginal groove narrow, with a row of punctures, scar rather deep.

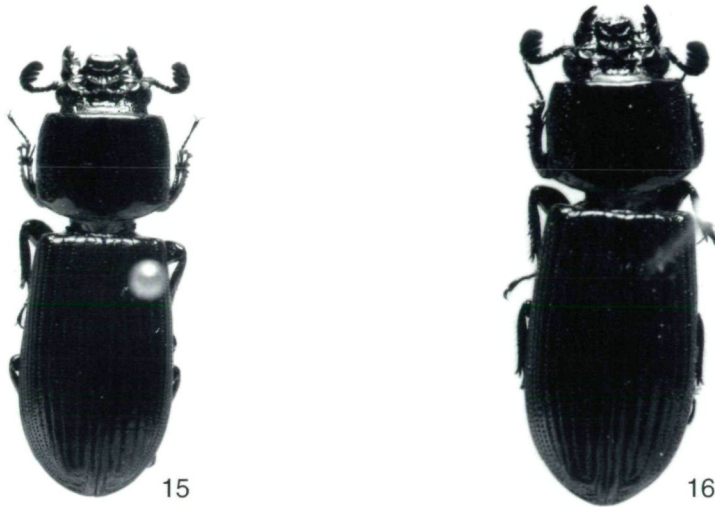
Elytra flat in dorsal face, distinctly wider posteriorly, almost naked; all grooves narrow, with round punctures, which are larger in lateral grooves.

Median keel of prosternum narrow and flat, posterior plate of it finely rugose and shining. Mesosternum almost polished, with one large puncture near the middle, shagreened and subopaque along lateral border; scar broad, not sharply defined posteriorly, inner wall nearly straight, about 1/3 as long as lateral border of sternum, shagreened in external half, finely rugose in internal half. Central area of metasternum indistinctly rugose, with one large puncture near middle, anterior depression small and triangular; lateral area sharply defined, narrow, but gradually widened posteriorly, shining and finely rugose; intermediate areas almost impunctate, posterior one defined from central area with several large dents. Abdomen almost impunctate; fifth and sixth (apical) sternites indistinctly frosted-looking in middle; posterior border of fourth one slightly emarginate, that of fifth one arcuately protrudent posteriorly, so that fifth sternite longer at the middle; sixth one feebly, narrowly but distinctly emarginate at the middle along posterior border, with a groove at the median 1/3 along posterior border indistinctly interrupted at the middle. Anterior femur lacking marginal groove at ventral face. External face of middle and posterior tibiae smooth and shining except for seta-bearing punctures and spines.

Male genitalia as shown in Figure 18.

Length: 13 mm.

This new species is distinguished from *L. parvus* IWASE, 1995 and the following new species, *L. strbai* sp.n. by the combination of characters: anterior angles of pronotum narrowly produced; all the grooves of elytra narrow; elytral shoulders naked; posterior plate of prosternum not strongly broad; abdomen almost impunctate. The new species is very closely allied to *L. acutangularis* IWASE, but is distinguished from the latter by the almost impunctate meso- and metasternum, whereas in *L. actangularis*, mesosternum and central area of metasternum are rather densely punctate.



Figs. 15 - 16: *Leptaulax* spp., dorsal aspect, (15) *L. jenisi* sp.n.; (16) *L. crockerensis* sp.n.

***Leptaulax strbai* sp.n. (Figs. 19 - 21)**

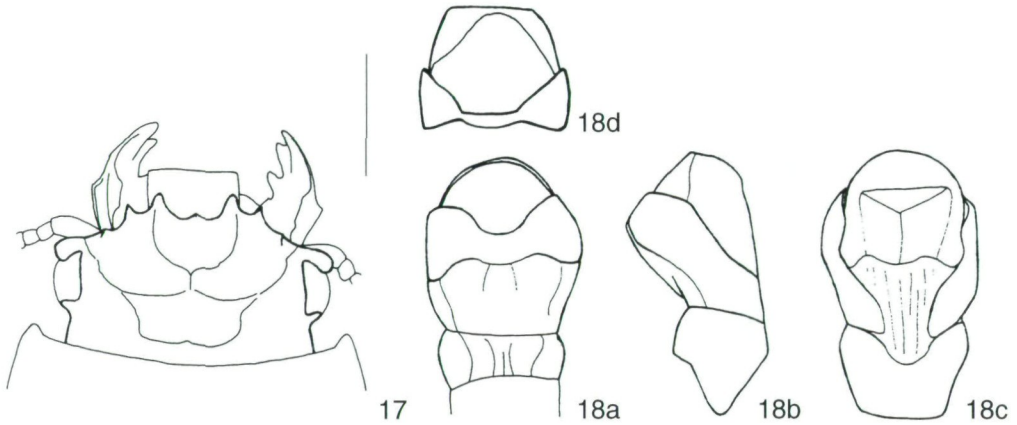
Holotype ♂: Gunung Emas, Crocker Mountains, Sabah, Malaysia, 16. - 27.IV.1993, leg. Strba & Jenis;
paratype: 1 ♂, same data as holotype.

Description: dark reddish brown, with head, sides of pronotum and ventral surface somewhat paler (probably immature adults), shining; flat.

Median anteriormost part of head before anterior edge invisible between the two inner tubercles in dorsal view; median tubercle at anterior margin of head small and obtuse; inner tubercle triangular, with apex rounded, somewhat larger than outer one, the distance between the two inner tubercles 2.4 times as great as that between inner and outer ones; outer tubercle sharp and acute, externally produced; frontal ridge extending to inner tubercle; parietal ridge extending to supraorbital ridge; supraorbital ridge joining supraoccipital one; frontal area nearly semicircular (holotype) or quadrangular (paratype), wider than long ($L/W = 0.5$), sparsely covered with hair-bearing punctures; depressed area smooth in anterior portion, sparsely covered with hair-bearing punctures before and behind parietal ridges; eye canthus shining, rounded at anterior angle, with a few setae; hypostomal process flat, smooth and shining.

Antennal lamellae fairly long. Labrum with anterior border straight. Middle part of mentum smooth, with anterior border protrudent; lateral piece with scattered large seta-bearing punctures. Ligula lacking longitudinal keel, with anterior border emarginate at the middle, not pointed; second segment of labial palpus shorter than third one. Mandible rather sharply produced at the middle on external side at ventral face; left upper tooth moderately raised, rectangular in anterior tip, almost horizontal behind anterior tip; left anterior lower tooth simple, larger than right one.

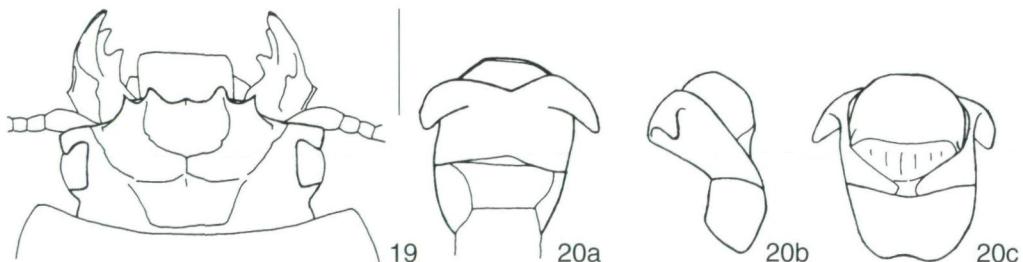
Pronotum flat, naked, sparsely punctate in lateral 1/3 and in scars; anterior angle slightly protrudent or not, median groove distinct, lateral marginal groove narrow, with a row of punctures, scar small and shallow.



Figs. 17 - 18: *Leptaulax crockerensis* sp.n., (17) head; (18) male genitalia, a, dorsal view, b, lateral view, c, ventral view (ventral face of median lobe accidentally depressed), d, caudal view (scale: 0.5 mm).

Elytra flat in dorsal face, wider posteriad, with a few hairs in front of shoulders; all the grooves narrower than the adjoining ribs, with small round punctures.

Median keel of prosternum rather flat, posterior plate of it transverse, finely rugose and shining at the middle, smooth along all borders. Mesosternum polished at the middle, shagreened and subopaque along lateral borders; scar broad, not sharply defined posteriad, inner wall of scar about 1/3 as long as lateral border of sternum. Central area of metasternum almost smooth, with an indistinct reverse V-shaped depression at the posterior middle finely rugose, and with a few large punctures, anterior depression shallow and triangular; lateral area sharply defined, narrow, gradually widened posteriad, shining and finely rugose; anterior intermediate area finely punctate, posterior one defined from central area with some dents, rather smooth, but with some punctures at the middle. Posterior borders of fourth and fifth abdominal sternites feebly emarginate; fifth and sixth (apical) sternites finely punctate along anterior border, indistinctly frosted-looking at the middle; sixth one feebly emarginate at the middle of posterior margin, with an indistinct marginal groove at the median 1/3, the groove interrupted at the middle. Anterior femur lacking marginal groove in ventral face. External face of middle and posterior tibiae smooth and shining except for seta-bearing punctures and spines.



Figs. 19 - 20: *Leptaulax strbai* sp.n., (19) head; (20) male genitalia, a, dorsal view, b, lateral view, c, ventral view, (scale: 0.5 mm).

Fig. 21: *Leptaulax strbai* sp.n., dorsal aspect.

Male genitalia as shown in Figure 20.

Length: 12.0 - 12.5 mm.

This new species is distinguished from *L. crockerensis* sp.n., described above, by the following points: anterior angles of pronotum not distinctly produced; elytra with several hairs in front of shoulders; shape of male genitalia quite different.

Key to species of *Leptaulax* from the Greater Sunda

(based on the material in the collection of the Naturhistorisches Museum Wien and the author)¹

- | | | |
|---|---|----------------------------|
| 1 | Hypostomal process with longitudinal groove generally rugose or shagreened, sub-opaque ² | 2 |
| - | Hypostomal process smooth, shining and flat, occasionally with shallow depression | 10 |
| 2 | Frontal area with several hairs; body length 25 mm; Sumatra | <i>immarginalis</i> IWASE |
| - | Frontal area naked, body length < 24 mm | 3 |
| 3 | Elytra in front of shoulders hairy | 4 |
| - | Elytral shoulders naked | 5 |
| 4 | Eye canthus almost mat; 20 - 22 mm; Sumatra | <i>punctatus</i> IWASE |
| - | Eye canthus shining; 20 mm; Sumatra | <i>schoedli</i> sp.n. |
| 5 | Metasternal central area with scattered large punctures | 6 |
| - | Metasternal central area without large punctures, in some cases finely punctate or rugose | 9 |
| 6 | Elytra almost shining except for bottoms of punctures | 7 |
| - | Elytra with three external grooves worn-looking, matt; 13 mm; Sumatra | <i>schillhammeri</i> sp.n. |

¹ This key is not inclusive of some available epithets which were sunk to synonyms of *L. bicolor*, *L. cyclo-taenius* and *L. dentatus* by GRAVELY (1914, 1918).

² The groove of the hypostomal process is rather shallow, and not opaque in *L. apicalis* IWASE and in some specimens of *L. dentatus* (F.). When the groove is indistinct, follow the key under 10.

- 7 Median tubercle of anterior margin of head acute, strongly produced as inner and outer ones; 13 mm; Borneo *kecil* IWASE
- Median tubercle of anterior margin of head obtuse, less strongly produced anteriorly than inner one 8
- 8 Punctures of three external grooves of elytra becoming smaller near apex; 18 - 20 mm; Borneo *sabahensis* IWASE
- Punctures of three external grooves large and transverse throughout; 14 - 18 mm; polytypic; Sumatra, Peninsular Malaysia, Natuna, Borneo *cyclotaenius* KUWERT
- 9 Head hairy behind parietal ridges; 16 - 17 mm; Borneo *dentifrons* IWASE
- Head naked behind parietal ridges; parietal ridge distinctly short; 23 mm; Peninsular Malaysia *apicalis* IWASE
- 10 Parietal ridge short, abruptly ending in side 11
- Parietal ridge gradually becoming lower, and more or less extending to supra-orbital ridge 16
- 11 Elytra with three or four external grooves worn-looking 15
- Elytra almost shining, or subopaque near apex 12
- 12 Elytral shoulders hairy 13
- Elytral shoulders hairless 14
- 13 Body larger (22 - 23 mm); sides of pronotum almost impunctate; Sumatra *laevis* sp.n.
- Body smaller (17 - 18 mm); sides of pronotum rather densely punctate; Sumatra, Borneo *fuijokae* IWASE
- 14 Posterior plate of prosternum smooth and shining; 22 - 30 mm; Java, Sumatra, Nias, Peninsular Malaysia, Borneo *dentatus* (F.)
- Posterior plate of prosternum shagreened and subopaque; 23 mm; Peninsular Malaysia *apicalis* IWASE
- 15 Integument of external face of middle tibia smooth and shining, with scattered hair-bearing punctures; abdomen almost impunctate; 19 - 21 mm; Sumatra *beccarii* KUWERT
- Integument of external face of middle tibia worn-looking; distal abdominal sternite finely and densely punctate; 16 - 17 mm; Sumatra, Peninsular Malaysia, Borneo *humerosus* KUWERT
- 16 Frontal area generally with 3 or more hairs 16
- Frontal area generally lacking hairs, occasionally with 1 or 2 hairs 24
- 17 Dorsal surface bicoloured, pronotum reddish brown or dark reddish brown 18
- Dorsal surface unicoloured 19
- 18 Elytra with basal 1/4 to 1/3 reddish brown as pronotum; elytral shoulders with hair tufts; 17 - 18 mm; Sumatra, Peninsular Malaysia *elegans* IWASE
- Elytra black; elytral shoulders naked; 18 mm; Borneo *undescribed* sp.
- 19 Elytral shoulders with hair tufts 20
- Elytral shoulders naked, occasionally with several hairs 21
- 20 Posterior plate of prosternum shagreened and opaque; eye small; 17 mm; Peninsular Malaysia *undescribed* sp.

- Posterior plate of prosternum finely rugose, shining; eyes moderately large; 17 - 20 mm; Borneo *jenisi* sp.n.
- 21 Body larger, 16 - 17 mm; mesosternum and metasternum rather densely punctate at the middle respectively; Borneo *acutangularis* IWASE
- Body smaller, 12 - 13 mm; mesosternum occasionally with a few to several large punctures 22
- 22 Metasternum and abdomen yellow brown to brown; sixth abdominal sternite rather widely punctate; external grooves of elytra wider than the adjoining ribs, punctures transversally oval; 12 mm; Borneo, Sumatra *parvus* IWASE
- Metasternum and abdomen dark reddish brown; sixth abdominal sternite almost impunctate; external grooves of elytra as wide as or narrower than the adjoining ribs 23
- 23 Anterior intermediate area almost polished; 13 mm; Borneo *crockerensis* sp.n.
- Anterior intermediate area finely punctate; 12 - 13 mm; Borneo *strbai* sp.n.
- 24 Abdomen with dense shallow punctures throughout; 12 - 14 mm; Sumatra, Peninsular Malaysia, Borneo *planus* (ILLIGER)
- Abdomen with basal three or four segments impunctate at middle 25
- 25 Elytral shoulders hairy; pronotum sparsely punctate; polytypic; 19 - 27 mm; Sumatra, Peninsular Malaysia, Borneo *barbicauda* ZANG (see IWASE 1996: 233)
- Elytral shoulders naked, occasionally with a few hairs 26
- 26 Eye distinctly small, less strongly protrudent externally than eye canthus 27
- Eye moderately or fairly large, generally more strongly protrudent externally than eye canthus 29
- 27 Frontal area nearly circular, rather long ($L/W = 0.75$), median tubercle of anterior margin of head very obtuse, but distinct; mesosternum finely punctate at the middle; metasternum with a short longitudinal groove at the posterior middle; median lobe of male genitalia simple; 15 mm; Borneo *circulus* IWASE
- Frontal area semicircular, distinctly transverse ($L/W = 0.5 - 0.6$), median tubercle acute; apical part of median lobe of male genitalia with a pair of large callosities, which are fused at their bases 28
- 28 Median anteriormost part of head before anterior margin of head invisible in dorsal view; parameres of male genitalia widely contact each other on ventral face; 17 mm; Sumatra *karoensis* IWASE
- Median anteriormost part of head before anterior margin of head visible in dorsal view; parameres very narrowly contact each other on ventral face; 18 mm; Peninsular Malaysia *datar* IWASE
- 29 Anterior marginal groove of pronotum short and fine, without distinct puncture; pronotum sparsely punctate on sides; punctures of elytral groove rounded; posterior plate of prosternum shining; metasternum with central area finely and longitudinally rugose, lateral area narrow and shining; distal abdominal sternite naked; anterior-most part and anterior angles of clypeus visible in dorsal view; integument of external face of middle tibia more or less shagreened; basal piece of male genitalia rather long, almost sclerous on ventral face; 16 mm; Peninsular Malaysia, Borneo *manis* IWASE

- Not as above 30
- 30 Integument of external face of middle and posterior tibiae smooth except for setiferous punctures; basal piece of male genitalia with membranous part comparatively narrow on ventral face; depressed area of head just behind outer tubercles generally without large puncture; 17 - 26 mm; Bali, Java, Sumatra, Simeulue; Peninsular Malaysia, Borneo **bicolor-complex**
- Integument of external face of middle and posterior tibiae not smooth throughout, at least partly shagreened, subopaque 31
- 31 Fifth abdominal sternite with posterior border strongly emarginate; sixth abdominal sternite densely hairy at the middle; posterior plate of prosternum shagreened and subopaque; lateral area narrow and subopaque; 18 - 19 mm; Borneo (Sarawak) ...
..... **sarawakus IWASE**
- Not as above 32
- 32 Head generally with several punctures just behind outer tubercles; sides of pronotum densely covered with large punctures; lateral area of metasternum narrow and subopaque; two distal abdominal sternites densely covered with fine punctures on sides, where is rather clearly defined from the median impunctate area; 16 - 18 mm; Sumatra, Tanah Mosa, Peninsular Malaysia, Borneo **malaccae KUWERT**
- Head generally without puncture just behind outer tubercles; sides of pronotum less densely punctate; lateral area rather broad and subopaque; fifth abdominal sternite densely punctate on sides, punctuation gradually become sparser towards the middle; 20 - 21 mm; Borneo (Sabah) **similis IWASE**

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