

# DRYOPIDAE:

## I. *Stenomystax*, a new aquatic genus

### (Coleoptera)

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#### Abstract

A new aquatic genus, *Stenomystax* (Coleoptera: Dryopidae), and 12 new species are described: *S. convexus* from Malaysia (Borneo: Sarawak), *S. depressus* from Malaysia (Borneo: Sabah, Sarawak) and Indonesia (Borneo: Kalimantan), *S. gracilis* from Malaysia (Borneo: Sabah, Sarawak), *S. inopinatus* from Indonesia (Bali, Lombok), *S. jengi* from China (Taiwan), *S. kubani* from Thailand and Laos, *S. minutus* from Indonesia (Sumatra), *S. montanus* from Malaysia (Borneo: Sabah), *S. saetosus* from China (Hainan), *S. similis* from Indonesia (Sumatra), *S. splendidus* from the Philippines (Palawan) and *S. sumatranus* from Indonesia (Sumatra). Two species groups are established for these 12 species. *Elmomorphellus* CHŪJŌ & SATŌ, 1964 is synonymized with *Elmomorphus* SHARP, 1888.

**Key words:** Coleoptera, Dryopidae, taxonomy, *Stenomystax*, *Elmomorphellus*, *Elmomorphus*, South-east Asia.

#### Introduction

Dryopidae represent a relatively small family of nearly world-wide distribution, comprised of 32 genera and about 260 species (KODADA & JÄCH 2003). The Asian fauna includes 11 genera, of which four, *Geoparnus* BESUCHET, *Monstrosostea* KODADA & BOUKAL, *Sostea* PASCOE, and *Spalacosostea* KODADA, are strictly terrestrial (KODADA & BOUKAL 2000). The remaining seven genera (*Ceradryops* HINTON, *Dryops* OLIVIER, *Elmomorphus* SHARP, *Helichus* GERMAR, *Pachyparnus* FAIRMAIRE, *Parahelichus* BOLLOW and *Praehelichus* BOLLOW) more or less are associated strongly with riparian, hygropetric or aquatic habitats. Numerous species of these genera can be regarded as "true water beetles" (sensu JÄCH 1998).

Thorough taxonomic revisions have not been published yet for any of the aquatic Asian genera. Furthermore, the generic concepts of *Elmomorphus*, *Helichus*, *Pachyparnus*, *Parahelichus*, and *Praehelichus* are not understood satisfactorily yet.

However, in the course of a cladistic analysis of the world genera of Dryopidae (KODADA et al., in prep.) a new aquatic Asian genus was detected, which is described thoroughly below. In addition, a new synonymy is established formally.

#### Material and methods

Specimens prepared for morphological study were cleared in lactic acid and washed in distilled water, subsequently disarticulated and studied under an Amplival microscope as temporary glycerine slides at magnifications up to 400 times. Dry preparations of other specimens were

studied using a Wild M3Z stereomicroscope with diffuse lighting at magnifications up to 100 times. Drawings were made by using a drawing tube.

For the scanning electron microscopy, specimens were dehydrated in graded ethanol series and air-dried from absolute ethanol, mounted on stubs with Tempfix, sputter coated with gold and then viewed in Jeol 840 A (at 25 kv) and in a Hitachi S800 (at 15 kv).

Metric characters were measured using a Wild M3Z stereomicroscope with ocular grid; ratios of genitalia were measured in lateral view (Figs. 93, 123).

Terminology of thoracic ventrites follows LAWRENCE et al. (1999), terminology of metathoracic wings that of KUKALOVÁ-PECK & LAWRENCE (1993).

### Acronyms & CWBS localities:

|      |                                                                                           |
|------|-------------------------------------------------------------------------------------------|
| APW  | anterior pronotal width                                                                   |
| CASS | Chinese Academy of Sciences, Institute of Applied Ecology, Shenyang                       |
| CKB  | collection of Ján Kodada, Bratislava                                                      |
| CWBS | China Water Beetle Survey                                                                 |
| EL   | elytral length along suture between anterior margin of scutellum and elytral apices       |
| EW   | elytral width, maximum width combined                                                     |
| HW   | head width with eyes                                                                      |
| ID   | interocular distance                                                                      |
| MPL  | median length of pronotum                                                                 |
| NMO  | Natural History Museum, Osaka                                                             |
| NMW  | Naturhistorisches Museum Wien                                                             |
| M    | mean value $\pm$ standard deviation (calculated if four or more specimens were available) |
| PPW  | posterior pronotal width                                                                  |
| TL   | distance between anterior margin of pronotum and elytral apex                             |

CWBS loc. 193: **Hainan Province**; Qiongzong County; Wuzhi Shan (= Five Finger Mountain) Resort, ca. 2 km from Wuzhi Shan Village, ca. 30 km E Maoyang Town; small stream, ca. 2 - 3 m wide, shaded, flowing through degraded primary forest, below Wuzhi Shan Resort, ca. 600 m a.s.l.; 17./18.I.1996; leg. M.A. Jäch, L. Ji & M. Wang (see JÄCH & Ji 1998: Fig. 3).

CWBS loc. 198: **Hainan Province**; Qiongzong County; 3 km NE Maoyang; Wuzhi Shan River, ca. 30 m wide, slowly flowing through wide, deforested valley, only few riffles, banks with sand, grass and mud, ca. 100 m a.s.l.; 19.I.1996; leg. M.A. Jäch, L. Ji & M. Wang.

CWBS loc. 199: **Hainan Province**; Tongza City Region; ca. 2 km S Mao'an; river, ca. 5 m wide, banks with shrubs, grass, sand, mud, rock pools and seepage water, ca. 250 m a.s.l.; 20.I.1996; leg. M.A. Jäch, L. Ji & M. Wang.

CWBS loc. 214: **Hainan Province**; Wanning County; ca. 15 km SW Dongxing Town, ca. 1 km W Jianfeng Village; small stream, ca. 1 - 2 m wide, probably a tributary of CWBS loc. 215, meandering, water turbid, flowing through cultivated land (rubber plantations, bamboo groves, villages, etc.), ca. 70 m a.s.l.; 25.I.1996; leg. M.A. Jäch, L. Ji & M. Wang.

CWBS loc. 215: **Hainan Province**; Wanning County; ca. 500 m W CWBS loc. 214; river, ca. 5 m wide, with sand and gravel, flowing through cultivated land, ca. 70 m a.s.l.; 25.I.1996; leg. M.A. Jäch, L. Ji & M. Wang.

CWBS loc. 216: **Hainan Province**; Wanning County; ca. 8 - 10 km W Dongxing Town; meandering river, crossing the Dongxing - Jianfeng road three times, ca. 3 - 6 m wide, slightly turbid, with sand and gravel, flowing through cultivated land (rubber plantations, village gardens, rice fields, bamboo groves), probably being the lower course of CWBS loc. 215; ca. 70 m a.s.l.; 26.I.1996; leg. M.A. Jäch, L. Ji & M. Wang (see JÄCH & Ji 1998: Fig. 11).

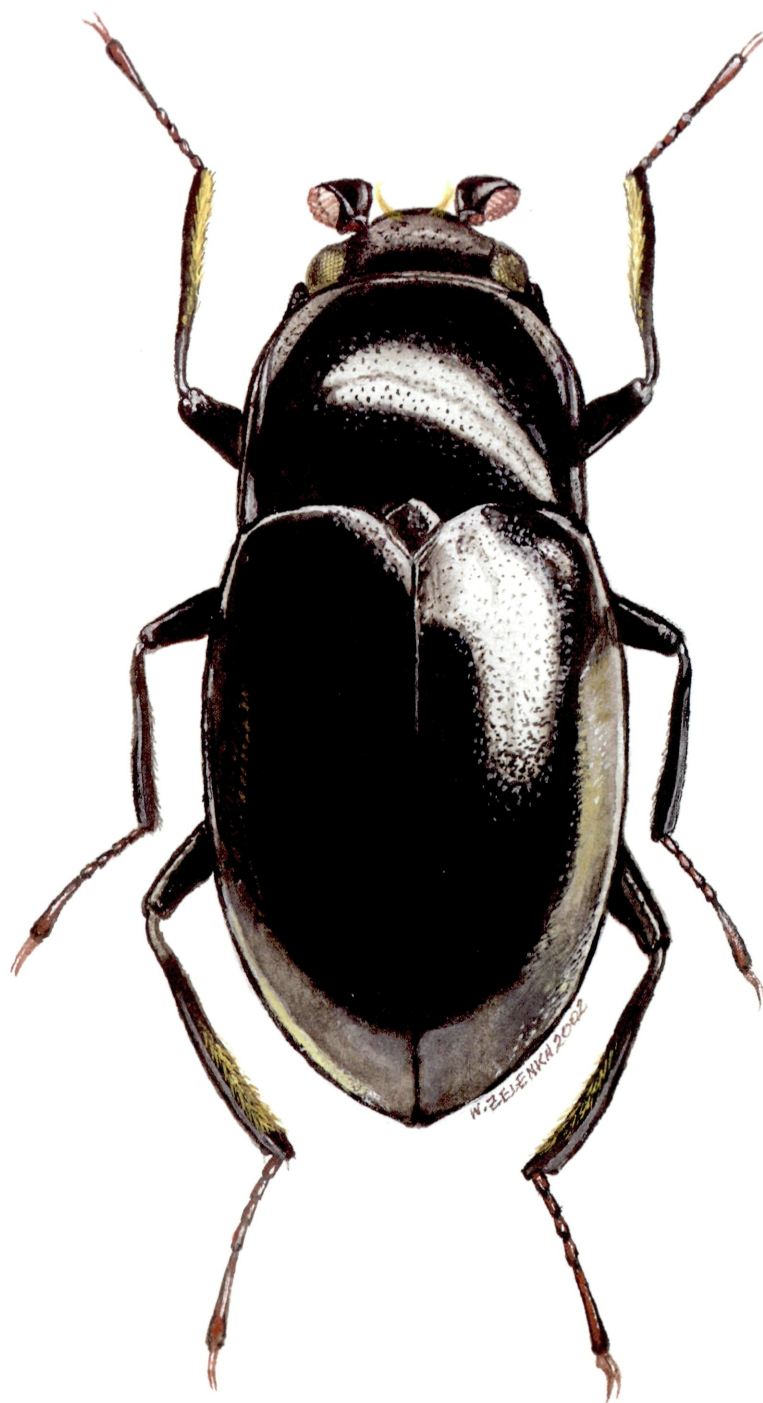


Fig. 1: Habitus of *Stenomystax depressus* sp.n., ♂, TL = 4.0 mm (© copyright NMW).

### *Stenomystax* gen.n.

**Type species:** *Stenomystax depressus* sp.n.

**Diagnosis:** 2.0 – 5.2 mm (TL), outline moderately oval and wide to moderately elongate; pronotum and elytra convex dorsally, shining, subglabrous, with plastron bands laterally; antennae short, eight- to ten-segmented, pedicel large, greatly concealing remaining antennomeres; elytral striae absent; males with pair of tufts of long setae on labrum, prosternum and metaventricle; mesofemur without row of stout long setae; ventrite 5 with plastron.

**Description:** Habitus (Fig. 1). Body heavily sclerotized and compact; outline moderately oval to moderately elongate; convex dorsally. Length (TL): 2.0 – 5.2 mm, width (EW): 1.0 – 2.5 mm. Colour black, except reddish-brown antennal clubs, mouthparts and tarsi.

Dorsal surface punctate, shining, subglabrous; punctures vary in size and density, setigerous; setae recumbent and either moderately long or short; few long thin hair-like setae<sup>1</sup> near eyes and in some specimens also on cranium, pronotum and elytra. Plastron structures consisting of fine thin dense setae (Fig. 33) and of stronger longer setae (Fig. 31); setae yellowish in cleaned specimens. Fine, thin plastron setae on genae, lateral portions of pronotum and elytra, hypomera, prosternum, metaventricle, epipleura, and at least partly on all ventrites. Longer plastron setae confined to mesepisterna, metepisterna and anterolateral portions of metaventricle.

Head (Figs. 2, 3) large, arched dorsally and laterally, flattened ventrally, hypognathous, without temples; wider than long; strongly retracted into prothorax; transverse occipital ridge absent; frontoclypeal suture absent. Eyes large, protuberant, strongly faceted; interfacetal setae stout and numerous (*S. saetosus* species group, Figs. 41, 42) or scattered, fine and hardly discernible (*S. depressus* species group, Fig. 4). Ocelli absent. Antennal insertion exposed from above, widely separated; subantennal groove reaching about middle of eye. Gula short, strongly transverse, not on same plane with mentum and submentum; gular sutures straight or arched, convergent anteriorly; submentum transverse, subequal in length with gular region, well set off by sutures anteriorly and posteriorly. Cervical sclerites large and strong. Antenna (Fig. 5) pectinate, short, posteriorly reaching about middle of eye; eight, nine or ten-segmented. Scape short, exposed portion slightly enlarged. Pedicel longer than scape, strongly expanded and flattened dorsoventrally (Fig. 8), nearly as large as remaining segments combined, concealing antennal club from above; posterolateral angle acute, produced; surface with hair-like sensilla dorsally: few, moderately long ones and numerous short ones. Antennomere 3 shorter than second, simple, not produced anteriorly, with few hair-like sensilla. Antennomeres 4 – 8/9/10 forming a loose club (Fig. 6); each segment distinctly wider than long, produced anteriorly, reticulate; antennomere 4 widest; remaining antennomeres becoming gradually narrower toward antennal apex. Club with several types of hair-like, peg-like and branched sensilla; sensilla not intermixed with dense hydrofuge pubescence; greatest number of different sensilla on anteromedian extension of segments. Labrum short, wider than long, partly concealed by clypeus, more strongly sclerotized on anterior 0.6; anterior margin more or less emarginate, anterolateral angles rounded; surface with numerous setae anteriorly and in males with two tufts of long, erect, dense setae near middle (Figs. 9, 10). Epipharynx more strongly sclerotized on large anterolateral areas; lateral tormal processes short to moderately long, bent ventro-mesally; posteromedian process absent. Mandibles (Figs. 11, 12) strongly sclerotized, slightly longer than wide, flattened dorsoventrally; slightly asymmetrical at molar regions. Apex strongly, gradually curved mesad, with four teeth (Fig. 13); incisor edge sharp. Dorsal face with group of hair-like setae near margin, ventral face with row of hair-like setae near apex; oblique suture not reaching margin; lateral face concave along basal portion, reticulate and setose; mola large. Prostheca (Fig. 14) with

<sup>1</sup> Long setae were found in a few specimens examined, in many specimens these setae were broken or missing.

strongly sclerotized longitudinal area near outer margin; apical portion with numerous short stout spines; mesal portion less sclerotized, with dense thin setae. Cardo, palpifer, basi- and mediostipes sparsely setose ventrally (Fig. 15). Exposed portion of cardo small, semicircular, concealed dorsal portion long; basistipes triangular; mediostipes trapezoidal, subequal in length with basistipes. Palpifer slightly larger than basistipes, dorsal face smooth; lateral (exposed) face concave, setose, dorsal edge projecting laterad, forming lamina. Galea (Figs. 16 - 18) flattened, two-segmented; basigalea short; distigalea longer than basigalea, as wide as exposed portion of cardo, anterior margin arcuate, anterolateral angles rounded, anterior portion with rows of dense, apically curved setae, dorsal face with several long hair-like setae. Lacinia about as long as galea, narrower than terminal palpomere; outer margin arcuate; mesal margin sinuate, with fringe of strong setae. Maxillary palpus (Fig. 17) four-segmented, slightly shorter than maxilla, reticulate. Palpomere 1 short, with a few short hair-like sensilla; palpomere 2 longer, bent, more or less expanded distally, with a few hair-like sensilla; palpomere 3 distinctly shorter and narrower than preceding segment, with a few long conspicuous hair-like sensilla distally. Terminal palpomere longer than preceding segments combined, more or less fusiform, well sclerotized, with apical, basal and lateral sensory fields; basal field with strong bent, apically rounded, peg-like sensilla (Fig. 21); lateral sensory field (Fig. 19) in sharply delimited elongate depression, with short stout, apically widened sensilla with complex apices (Fig. 20); terminal sensory field with mainly different types of peg-like sensilla and few rounded pores (?sensilla). Mentum (Fig. 22) flat, strongly transverse, with hair-like setae; sides strongly converging anteriorly; posterior angles broadly rounded; anterior angles protruding and acute; anterior margin straight; mental apodemes about as long as midlength of mentum; palpifers partly concealed by mentum, strongly sclerotized, fused mesally. Labial palpus (Fig. 24) three-segmented, shorter than maxillary palpus, reticulate; palpomere 1 short, distally with a few hair-like sensilla; palpomere 2 longer, with short and long hair-like sensilla around distal margin. Palpomere 3 longer and wider than preceding segment; apex truncate, with sensory field similar to that on maxillary palpus (Fig. 23); basal sensory field with a few peg-like, apically rounded sensilla and few thin short hair-like sensilla; surface with a few scattered round pores (?sensilla). Ligula as wide as mentum; mesal portion strongly sclerotized, with a few long hair-like setae; lateral portions moderately projecting, hyaline, with angles rounded, densely set with short setae; anterior portion hyaline with rows of numerous dense, stout setae.

Thorax: Pronotum (Fig. 25) wider than long; disc moderately to strongly convex, without gibbosities, carinae or furrows; sides moderately to strongly arcuate, slightly explanate and carinate, simple not crenulate; posterior angles almost rectangular, moderately acute; anterior angles acute, protruding; posterior margin trisinate, smooth; prescutellar foveae absent. Hypomeron broadest posteriorly, narrowed in anterior third; along anterior third separated from prosternum by gap; distinct postcoxal projection absent; fine longitudinal line present near mesal margin. Prosternum (Fig. 26) in front of coxae longer than prosternal process, strongly concealing head in repose, anterolateral angles rounded. Prosternal process (Fig. 27) wide, strongly overlapping mesoventrite, fitting into cavity of mesoventrite; sides more or less raised, with two tufts of setae in males; apex moderately protruding and moderately emarginate or truncate (in all species discernible only when prosterno-mesoventral fitting open; if fitting closed, apex concealed by mesoventrite). Procoxae transverse, subcylindrical, countersunk; procoxal cavities open posteriorly, widely separated mesally; exposed portion of trochantin small. Mesoventrite (Fig. 29) short; paired procoxal rest present, strongly oblique. Anterior portion of mesepisternum transverse, short, nearly vertical, concealed; exposed, posterior portion of mesepisternum large, with anterior margin produced; mesepimeron not visible in ventral view; cavity for reception of prosternal process deep, with sides raised. Mesocoxal cavities subcircular, transversally oriented. Mesocoxae subglobular, without projection near attachment of trochanter, widely separated mesally; exposed portion of mesotrochantin small. Scutellum (Fig. 28) large,

broadly rounded and abruptly elevated. Mesoventral and metaventral processes solidly fused. Metaventricle distinctly longer than prosternum in front of coxae, with two tufts of setae in males (Fig. 30); without grooves or depressions for reception of femur and tibia; discrimen long and fine; mesal posterior tubercle or short keel in some males of *Stenomystax saetosus* species group; transverse groove very fine, concealed by plastron (discernible mainly in cleared specimens); anterior edge of metaventricle without transverse carina between mesocoxal cavities, antero-lateral portions raised or flat; metepisternum wide and long. Metacoxal cavities large, transverse, oblique, not meeting elytra. Metacoxae separated by suture from metaventricle, posteriorly excavate for reception of femora; moderately widely separated mesally. Metanotum well sclerotized and divided into distinct sclerites. Elytra more or less obovate, convex dorsally (Fig. 32); lateral margin slightly explanate, moderately produced anteriorly; anterior margin smooth; elytral apices more or less acute, meeting at suture; elytra punctate, punctures more or less irregularly spaced, puncture rows or striae absent; shoulders inconspicuous; sutural margin deflected toward apex; epipleura (Fig. 32) widest basally, inflected at level of metacoxa and near apex, with mesal margin produced posteriorly (interlocking with abdomen), partly concealed by lateral margin of ventrites 3 – 5, very tightly fitted to abdomen; ventral surface (Fig. 34) with ellipsoidal basolateral patch of binding spicules (Figs. 35, 36) and with short, posteriorly pointed setae apicolaterally, lateral groove effaced anteriorly of middle. Hind wings (Fig. 65) well-developed, about 2.5 times as long as wide; surface with densely arranged microtrichia; pigmentation and venation vary within species (very distinct in *S. depressus* species group, weak and reduced in *S. saetosus* species group). Radial bar strong; radio-medial loop and radial cross vein r4 distinct; radial cell incomplete; medial fleck absent; media posterior MP<sub>1+2</sub> strong, distinct; medial spur short, not reaching wing margin; first cubito-anal cell elongate. Second cubito-anal cell short, wide and very distinct (*S. depressus* species group); elongated, feebly bordered and not completely closed proximally, or entirely absent (*S. saetosus* species group); medial field with four free veins nearly reaching margin (medial spur not included); anal field with single vein; apical field with or without pigmented stripes. Legs (Fig. 37) slightly longer than elytra, without swimming hairs; trochanters large, femoral attachment oblique. Femora slightly excavate for reception of tibiae, moderately widened, widest near middle, with scattered fine punctation; mesofemora without row of conspicuous strong setae on posterior face. Tibiae slightly longer than femora; mesotibia slightly shorter than protibia, metatibia longer than protibia; each tibia weakly curved, narrow, with various specialized setae along anterior (protibia) or posterior face (meso- and metatibia respectively) and with numerous short setae on remaining parts; tibial spurs short. Tarsi (Fig. 38) five-segmented, about half as long as tibiae or longer, with few short strong setae ventrally and longer setae mainly dorsally and laterally. Claws usually robust and simple; protarsal claws more or less sexually dimorphic (differing in form and inclination, e.g. Figs. 68, 69); empodium squamiform, bifid apically, and with two long setae laterally.

Abdomen with five ventrites (Fig. 40), separated from each other by sutures; first two ventrites connate; ventrite 1 without lateral depression for reception of femora and tibiae; abdominal intercoxal process rounded; ventrite 5 rounded posteriorly or more or less excised in females, without distinct setal tufts. Laterosternites highest and widest on anterior portion of ventrite 1, high on ventrites 2 and 3, lower on ventrites 4 and 5, flanked by lateral projections on all ventrites. Spiracles in pleural membrane on segments I – VII, spiracles of segment VIII absent. Tergites 1 – 6 sclerotized on entire area; tergite 7 sclerotized mainly anteriorly; tergite 8 sclerotized on lateral portions; posterior margin of tergites 6 – 7 with fringe of long hair-like setae. Tergal wing-folding spicules short and slender, concentrated mainly on tergites 6 and 7; mesal spicules on tergite 6 directed posteriad, lateral spicules directed laterad; spicules on tergite 7 present on mesal portion, directed posteriad; spicules on tergites 1 – 5 sparser and thinner, oriented mainly laterad, present anteriorly and posteriorly. Segments VIII and IX sexually

dimorphic. Males segment VIII: sternite (Fig. 66) emarginate posteriorly, distinctly shorter than ventrite 5, with short median symmetrical process anteriorly; tergite more strongly sclerotized laterally than mesally, widely rounded posteriorly. Female segment VIII: sternite (Fig. 67) posteriorly sub-triangular, sclerotized laterally, with median process nearly as long as abdomen; tergite similar to that of male. Male sternite 9 (Fig. 88) with anterior median process nearly as long as ventrites 3 – 5 combined, process widened anteriorly, rounded; female sternite 9 forming part of ovipositor. Aedeagus (Fig. 93) of trilobate type; phallobasis long to very long, more or less tubular, with basal orifice asymmetrical, large; parameres individually articulated with phallobasis, short to moderately long, more or less bent; penis (Fig. 94) narrow, symmetrical; ventral membranous sac with or without sclerotized fibula. Ovipositor (Fig. 123) nearly as long as abdomen or slightly longer, strongly sclerotized; composed of two proximal valvifers and two distal coxites; valvifers wide long and flattened, medially fused; coxites flattened, plate-like, vertical; left and right coxite slightly asymmetrical, shorter than valvifers, without styli, narrowed posteriorly, lancet-like, dorsal edge smooth. Vulva between base of coxites; bursa copulatrix tubular, with or without sclerotized spinules and one or several flat larger sclerites; spermatheca membranous, with large accessory gland.

**Sexual dimorphism:** Females generally larger, lacking tufts of setae on labrum, prosternum and metaventrite, differing more or less in shape and excision of apex of ventrite 5. Females in some species differs also in extent of prosternal plastron (Figs. 63, 64). Males of some species possess a posteromedian tubercle or a short keel on metaventrite and widened protarsal claws (Fig. 39); in some species anterior margin of male frontoclypeus strongly arcuate.

**Distribution:** The genus is known only from Southeast Asia, including southeastern China (Fig. 133).

**Comparative notes:** *Stenos* (Greek, στενός): narrow, thin; *mystax* (Greek, μύσταξ): beard, moustache. Named in reference to the tufts of long setae found on the male labrum.

**Comparative notes:** Among all aquatic dryopid genera, *Stenomystax* is characterized by the combination of the following features: (1) plastron dorsally confined to lateral portions of pronotum and elytra; (2) pedicel strongly enlarged, concealing antennal club almost entirely; (3) pronotum without sublateral step-like sulcus; (4) mesofemur without row of strong setae on posterior face; (5) elytra without rows of punctures; (6) all ventrites with plastron.

*Stenomystax* is similar to *Elmomorphus*. Certain species of the latter genus resemble *Stenomystax* in the body form, in the subglabrous shiny dorsal surface, and in the distribution of the plastron. However, *Elmomorphus* can be distinguished from *Stenomystax* by the following characters: (1) pedicel small, never greatly enlarged; (2) antenna with dense hydrofuge pubescence; (3) terminal palpomere of maxillary palpus with lateral sensory field not placed in sharply delimited depression; (4) mesofemur with a row of long strong setae.

Probably, *Stenomystax* must be placed near *Elmomorphus* phylogenetically. However, synapomorphies of *Stenomystax* + *Elmomorphus* are difficult to define as long as *Elmomorphus* has not been revised thoroughly. The greatly enlarged pedicel and the impressed sensory field of the maxillary palpus can be regarded as autapomorphies of *Stenomystax*; the mesofemoral row of long strong setae is a possible autapomorphy of *Elmomorphus*.

### *Stenomystax depressus* species group

**Members:** *Stenomystax convexus*, *S. depressus*, *S. montanus*, *S. splendidus* and *S. sumatranus*.

**Diagnosis:** Members of the *Stenomystax depressus* species group are characterized by: (1) large size (TL: 3.5 – 5.2 mm); (2) eyes with scattered fine and hardly discernible interfacetal setae; (3) second cubito-anal cell closed, distinct; (4) bursa copulatrix simple, without sclerotized spinules.

### *Stenomystax depressus* sp.n.

**Type locality.** River Sabalangan, about 25 km SE Sapulut, Sabah, Malaysia. At the type locality, River Sabalangan is about 4 – 7 m wide and about 0.3 – 0.7 m deep, flowing through primary lowland forest, partly shaded, ca. 300 m a.s.l. The substrate consists of gravel, sand and small stones, and accumulated decaying leaves and submerged roots near the banks; river margins with large trees. All specimens were collected on submerged roots or submerged dead wood.

**Type material:** **Holotype** ♂ (NMW): "Malaysia, Sabah, Sabalagan river in primary forest ca. 25 km SE Sapulut, 26. 06. 1998, J. Kodada & F. Čiampor Lgt.". **Paratypes:** 16 ♂♂, 15 ♀♀ (CKB, NMW): same data as holotype; 3 ♂♂, 17 ♀♀ (CKB, NMW): "Malaysia, Sabah, ca. 25 km SE Sapulut, Sabalangan riv. in primary forest, 21. 5. 2001, J.F. Kočiam lgt.", 11 ♂♂, 5 ♀♀ (CKB, NMW): "Malaysia, Sabah, ca. 25 km SE Sapulut, Batu Pungul env., small stream near Batu Tinahas, 23. 5. 2001, J. F. Kočiam lgt."; 13 ♂♂, 5 ♀♀ (CKB, NMW): "Malaysia, Sabah, ca. 25 km SE Sapulut, Batu Pungul env., Sapulut river, 24. 5. 2001"; 4 ♀♀ (CKB, NMW): "Malaysia, Sabah, ca. 5 km S Sapulut, Saliku riv. in primary forest, ca. 600m a.s.l., 16. 5. 2001, J.F. Kočiam lgt."; 6 ♂♂ (CKB, NMW): "Malaysia, Sabah, ca. 30 km SE Sapulut, Tatalikon riv. in very dense primary forest, 22. 5. 2001, J. F. Kočiam lgt."; 7 ♂♂, 4 ♀♀ (CKB, NMW): "Malaysia, SABAH, Kuamut river env. Near Kampung Pisang Pisang, 3.-4. VII. 1996, 14a, shaded stream in primary forest with submerged wood"; 5 ♂♂, 1 ♀ (CKB, NMW): "Malaysia, Sabah, Tawau Hills Park, Tawau river in primary forest, 7. – 10. 06. 1998, J. Kodada & F. Čiampor Lgt."; 1 ♀ (CKB): "Malaysia, Sabah, ca. 25 km SE Sapulut, Batu Pungul env., small stream near Batu Tinahas, 23. 5. 2001, J. F. Kočiam lgt."; 1 ♀ (CKB): "Malaysia, SABAH, Crocker Range, Bingkor env., Taman Bandukan, 6.-7.VII. 1996, 10 b, shaded stream 1.5-3.0 wide in primary forest"; 1 ♀ (NMW): "E-MALAYSIA: Sabah Danum Valley, 12. 2. Sapat Kalisan, 1997 leg. H. Zettl (15)"; 2 ♂♂, 2 ♀♀ (CKB): "Malaysia, Sabah, Tenom env., Sapong waterfall, 19.VI.1998, J. Kodada & F. Čiampor leg."; 1 ♀ (NMW): "INDONESIA: E – Kalimantan Apokayan, Sungai Barang Lahut Wai, 850m 1. 1. 1998 P. Mazzoldi (17) "; 1 ♀ (NMW): "INDONESIA: E – Kalimantan Apokayan, Lidung Payau 720m, 30. 12. 1997 leg. P. Mazzoldi (12)"; 3 ♂♂, 2 ♀♀ (CKB, NMW): "SARAWAK (Borneo), ca 40 km SE KAPIT 03. 1994, J. Kodada leg."; 1 ♂, 2 ♀♀ (NMW): "MALAYSIA, Sarawak Mulu NP 3. 3. 1993 leg. M. Jäch (19)"; 1 ♂ (NMW): "MALAYSIA, Sarawak Mulu NP, Long Iman 4. 3. 1993 leg. M. Jäch (20)".

**Diagnosis:** Within the *Stenomystax depressus* species group *S. depressus* is externally very similar to *S. montanus* and *S. convexus*. The differences between these species are discussed below. *Stenomystax sumatranus* differs in: (1) metaventral process lacking anterolateral depressions; (2) pronotum less convex and longer with punctuation denser; (3) punctuation of prosternal process and of metaventral disc sparser and finer; (4) elytra longer and more elongate; (5) male protarsal claws wider and more strongly arcuate; (6) aedeagus longer. *Stenomystax splendidus* differs in: (1) pronotum and elytra less convex; (2) body form narrower and more elongate; (3) metaventral process nearly flat; (4) protarsal claws not widened in males; (5) aedeagus shorter; (6) ovipositor shorter.

**Description:** Habitus (Figs. 1, 47). Length (TL) in ♀♀: 3.9 – 4.7 mm ( $M = 4.32 \pm 0.21$ ), in ♂♂: 3.5 – 4.1 mm ( $M = 3.85 \pm 0.15$ ); maximum width (EW) in ♀♀: 1.9 – 2.3 mm ( $M = 2.12 \pm 0.10$ ), in ♂♂: 1.7 – 2.0 mm ( $M = 1.91 \pm 0.07$ ). Exposed portion of labrum strongly transverse, anterior margin moderately emarginate mesally, anterolateral angles rounded. Cranium punctate irregularly, some punctures as large as facets but usually smaller; interstices very small or at most three times one diameter of puncture, usually smaller laterally than mesally, most specimens with small impunctate mesal area; surface setose, longest hair-like setae near eyes; frontoclypeal margin moderately arcuate (Figs. 2, 3); eyes with few fine interfacetal setae (Fig. 4); ID in ♀♀: 0.58 – 0.71 mm ( $M = 0.64 \pm 0.03$ ), in ♂♂: 0.52 – 0.62 mm ( $M = 0.58 \pm 0.02$ );

HW in ♀♀: 0.96 – 1.18 mm ( $M = 1.06 \pm 0.05$ ), in ♂♂: 0.89 – 1.02 mm ( $M = 0.95 \pm 0.13$ ); antennae (Figs. 5 – 7) nine- or ten-segmented (terminal segment divided in some specimens). Maxillary palpus (Figs. 15, 17, 19 – 21) with palpomere 2 moderately long and moderately widened; terminal palpomere with lateral sensory field moderately wide, elongate and lying approximately between posterior and anterior fifth. Pronotum (Fig. 25) moderately convex dorsally, wider than long; sides slightly carinate, gradually converging anteriorly, straight at posterior half, arcuate at anterior half or arcuate along entire length; pronotal punctures similar to those on head, separated by distance of 1 – 3 puncture diameters, interstices shiny; lateral plastron bands anteriorly nearly as wide as vertical diameter of eye, strongly narrowed posteriorly, slightly surpassing middle; anterior angles acute, protruding, about half as long as longitudinal length of eye; MPL in ♀♀: 1.0 – 1.3 mm ( $M = 1.12 \pm 0.06$ ), in ♂♂: 0.9 – 1.1 mm ( $M = 1.02 \pm 0.06$ ); APW in ♀♀: 1.0 – 1.3 mm ( $M = 1.15 \pm 0.05$ ), in ♂♂: 1.0 – 1.1 mm ( $M = 1.06 \pm 0.05$ ); PPW in ♀♀: 1.6 – 1.9 mm ( $M = 1.72 \pm 0.08$ ), in ♂♂: 1.4 – 1.7 mm ( $M = 1.56 \pm 0.06$ ). Prosternum (Fig. 26) in front of coxae with plastron, punctate, about 1.3 times as long as prosternal process. Prosternal process (Fig. 27) without plastron, punctation similar to that of head; subequal in width with ID, sides arcuate, feebly and widely raised anteriorly; mesal portion flat, or moderately convex (usually more strongly in females); posterior margin moderately protruding, apex wide and emarginate. Hypomeron widest at posterior 0.3, there about 0.6 times as wide as prosternal process. Metaventral process (Fig. 29) wide, anterolateral portions with deep depressions (Fig. 59); metaventral disc flat in males, flat or weakly convex in females, punctation similar to that of prosternal process; covered with plastron except narrow mesal portion (most of specimens with plastron rubbed off and therefore only setal sockets discernible, thus surface appearing micropunctate); discrimen usually very fine. Elytra convex dorsally; posterior two thirds gradually deflected toward apices (lateral view); widest usually near middle, occasionally near anterior third, then arcuately narrowed posteriorly (dorsal view); punctures slightly smaller than those on pronotal disc, with short setae; width of interstices varies from 1 – 3 puncture diameters; punctures placed in weakly impressed and irregular meshes; shoulders absent; lateral plastron bands widest near posterior third, where they are about 0.5 times as wide as greatest width of elytron, gradually narrowed posteriorly and anteriorly, reaching mesocoxal middle anteriorly (lateral view); EW in ♀♀: 1.9 – 2.3 mm ( $M = 2.12 \pm 0.1$ ), in ♂♂: 1.7 – 2.0 mm ( $M = 1.91 \pm 0.07$ ); EL: in ♀♀: 2.9 – 3.5 mm ( $M = 3.17 \pm 0.15$ ), in ♂♂: 2.5 – 3.1 mm ( $M = 2.84 \pm 0.13$ ). Scutellum narrower than half of ID, as long as wide, or slightly wider than long; sides arcuate; surface irregularly punctate. Protibia slightly longer than MPL; tarsi about 0.6 times as long as tibiae, terminal tarsomere slightly shorter than combined lengths of tarsomeres 1 – 4. Ventrite 5 with posterior margin weakly rounded; sternite 8 of male and female as in Figs. 66, 67. Sternite 9 of male with anterior medial process moderately wide (Fig. 88). Aedeagus (Fig. 93) 1.66 – 1.78 mm long; phallobasis robust, subcylindrical, 1.45 – 1.62 times as long as parameres, wider basally than apically (lateral view). Parameres moderately long, widest near base, gradually curved ventrad and gradually narrowed toward apices, latter narrowly rounded (lateral view). Penis (Fig. 94) shorter than parameres, widest basally, gradually narrowed apically; apex narrow, acute (ventral view). Membranous ventral sac with fine longitudinal furrows; fibula narrow, not reaching middle of penis. Ovipositor (Fig. 123) slightly longer than abdomen; valvifer about 2.1 times as long as coxite; bursa copulatrix without sclerotized spinules.

**Sexual dimorphism:** Females generally larger than males, without setal tufts on prosternal process and metaventrite, and without long setae on labrum. Protarsal claws widened in males (Figs. 39, 68), narrower and more curved in females (Fig. 69).

**Distribution:** Borneo. Widely distributed in unpolluted lowland rivers and creeks of primary forests in Sabah and Sarawak (Malaysia), collected also in Kalimantan, Indonesia (Fig. 133).

**Etymology:** Latin: *depressus* (depressed); named in reference to the lateral depressions on the metaventral process.

***Stenomystax convexus* sp.n.**

**Type locality.** Unnamed stream, about 25 km east of Kapit (Sarawak, Malaysia), flowing through remnants of primary lowland forest, ca. 3 – 5 m wide, about 0.5 – 1.3 m deep and strongly shaded. Substrate consisting of gravel, small rocks and some submerged branches; margins with submerged roots; shores with large trees. All specimens were collected on submerged roots or dead wood.

**Type material:** **Holotype** ♂ (NMW): "SARAWAK (Borneo) ca. 25 km E KAPIT III. 1994, Kodada leg.". **Paratypes:** 9 ♂♂, 14 ♀♀ (CKB, NMW): same data as holotype; 7 ♂♂, 4 ♀♀ (CKB, NMW): "SARAWAK (Borneo) ca. 15 km E KAPIT III. 1994, Kodada leg."; 6 ♂♂, 7 ♀♀ (CKB, NMW): "SARAWAK (Borneo) ca. 40 km SE KAPIT 03. 1994, J. Kodada leg.".

**Diagnosis:** Within the *Stenomystax depressus* species group *S. convexus* is characterized by the strongly convex pronotum, partly rugose elytra and by the shape and size of the male genitalia. From *S. depressus* it differs in: (1) pronotum more strongly convex; (2) elytra rugose posteriorly and laterally, surface sculpture strongly impressed; (3) aedeagus longer, parameres usually less distinctly curved. From *S. montanus* it differs in the three characters listed above, and, in addition, in the presence of anterolateral depressions on the metaventral process. For characters distinguishing *S. depressus* from *S. sumatranus* and *S. splendidus* see below.

**Description:** Habitus (Fig. 48). Length (TL) in ♀♀: 4.1 – 5.2 mm ( $M = 4.53 \pm 0.24$ ), in ♂♂: 3.8 – 4.4 mm ( $M = 4.15 \pm 0.14$ ); maximum width (EW) in ♀♀: 2.1 – 2.6 mm ( $M = 2.33 \pm 0.11$ ), in ♂♂: 2.0 – 2.3 mm ( $M = 2.15 \pm 0.08$ ). Cranial punctures usually slightly smaller than facets, intermixed with a few coarser punctures; punctures nearly confluent to separated by distance of three puncture diameters; most of specimens with small impunctate mesal area; ID in ♀♀: 0.71 – 0.88 mm ( $M = 0.76 \pm 0.04$ ), in ♂♂: 0.59 – 0.71 mm ( $M = 0.68 \pm 0.03$ ); HW in ♀♀: 1.06 – 1.35 mm ( $M = 1.19 \pm 0.07$ ), in ♂♂: 1.00 – 1.16 mm ( $M = 1.10 \pm 0.04$ ); antennae ten-segmented. Lateral sensory field on terminal palpomere moderately wide, elongate, lying between posterior and anterior fifth. Pronotum strongly convex dorsally, wider than long; anterolateral angles strongly deflected; sides gradually arcuately converging anteriorly; punctures smaller than facets, rather dense, usually separated by slightly more than a facet diameter, sparser and smaller posteriorly; lateral plastron band anteriorly as wide as vertical diameter of eye, narrowed posteriorly, effaced near middle; MPL in ♀♀: 1.2 – 1.5 mm ( $M = 1.38 \pm 0.07$ ), in ♂♂: 1.2 – 1.4 mm ( $M = 1.29 \pm 0.06$ ); APW in ♀♀: 1.1 – 1.4 mm ( $M = 1.26 \pm 0.07$ ), in ♂♂: 1.1 – 1.2 mm ( $M = 1.17 \pm 0.04$ ); PPW in ♀♀: 1.8 – 2.3 mm ( $M = 2.02 \pm 0.11$ ), in ♂♂: 1.7 – 2.0 mm ( $M = 1.83 \pm 0.07$ ). Prosternal process sparsely punctate, interstices usually 1.5 times as wide as facet; sides moderately arcuate or nearly straight, moderately and widely raised anteriorly, with plastron setae in females; mesal portion flat or weakly convex (usually more strongly convex in females). Metaventral process with anterolateral portions deeply depressed, depressions gradually effaced mesally, almost reaching midline; metaventral disc flat mesally; metaventricle with plastron except of narrow anterior and mesal portion (some specimens with plastron rubbed off); discrimen very faint. Elytra convex dorsally; posterior two thirds arcuately deflected toward apices (lateral view); widest usually near anterior 0.2, occasionally near midlength, then more or less strongly arcuately narrowed posteriorly (dorsal view); punctures slightly smaller than those on pronotal disc; length of interstices varies from one to two facet diameters; punctures placed in irregular meshes, usually weakly impressed anteriorly, more impressed and subdivided by fine furrows posteriorly and laterally, elytral surface appears rugose; shoulders absent; lateral plastron widest near posterior third, there slightly narrower than half of greatest width of elytron

(lateral view); EW in ♀♀: 2.1 – 2.6 mm ( $M = 2.33 \pm 0.11$ ), in ♂♂: 2.0 – 2.3 mm ( $M = 2.15 \pm 0.08$ ); EL: in ♀♀: 2.9 – 3.7 mm ( $M = 3.18 \pm 0.18$ ), in ♂♂: 2.7 – 3.0 mm ( $M = 2.86 \pm 0.09$ ). Scutellum narrower than half of ID, wider than long, sides arcuate, surface irregularly punctate. Protibia slightly shorter than MPL; tarsi ca. 0.6 times as long as tibia, terminal tarsomere as long as combined lengths of tarsomeres 1 – 3. Anterior medial process of male sternite 9 moderately wide (Fig. 89). Aedeagus (Fig. 95) 1.82 – 2.00 mm long; phallobasis 1.52 – 1.75 times as long as parameres (lateral view). Parameres moderately and gradually curved ventrad and gradually narrowed toward apices, latter narrowly rounded (lateral view). Penis (Fig. 96) shorter than parameres, widest basally, gradually narrowed apically; apex narrow, acute (ventral view). Membranous ventral sac with fine longitudinal furrows; fibula narrow, reaching middle of penis. Ovipositor (Fig. 124) slightly longer than abdomen, valvifer about twice as long as coxite, dorso-mesal sclerotized process of coxite usually moderately curved, occasionally nearly straight.

**Sexual dimorphism:** Females generally larger than males, lacking setal tufts on prosternal process and metaventricle, as well as long setae on labrum. Protarsal claws widened in males (Fig. 70), narrower and more distinctly curved in females (Fig. 71).

**Distribution:** Borneo. Known only from a few unpolluted shaded lowland streams flowing through primary forests in the environment of Kapit, Sarawak, Malaysia (Fig. 133).

**Etymology:** From Latin *convexus* (convex), named in reference to the strongly convex pronotum.

### *Stenomystax montanus* sp.n.

**Type locality.** Unnamed creek near Kalang Waterfall, Tenom environment, Sabah, Malaysia. Creek about 0.5 – 1.5 m wide, about 0.1 – 0.3 m deep, strongly shaded, flowing through primary forest. Substrate consisting of small rocks, coarse gravel, submerged branches, and submerged roots. All specimens were collected from submerged roots or dead wood.

**Type material:** **Holotype** ♂ (NMW): "Malaysia, Sabah, Crocker Range, Tenom env., Kalang Waterfall, 16.-18.V. 1998, J. Kodada & F. Ćiampor lgt.". **Paratypes:** 19 ♂♂, 20 ♀♀ (CKB, NMW): same data as holotype; 3 ♂♂, 7 ♀♀ (CKB, NMW): "Malaysia, Sabah, Crocker Range, Tenom env., Kalang Waterfall, 28.V. 2001, J. Kodada & F. Ćiampor lgt."; 1 ♂, 3 ♀♀ (CKB): "Malaysia, SABAH, Crocker Range, Bingkor env., Taman Bandukan, 6.-7.VII. 1996, 10 b, shaded stream 1.5-3.0 wide in primary forest"; 1 ♂, 2 ♀♀ (CKB): "Malaysia, Sabah, Crocker Range, Tenom env., Sinagang riv., ca. 1000m a.s.l., 27. 5. 2001, J.F. Koĉiam lgt."; 1 ♂, 1 ♀ (CKB): "Malaysia, Sabah, Kuamut river env. near Kampung Pisang Pisang, 3. – 4. VII. 1996, 14a, shaded stream in primary forest with submerged wood"; 5 ♂♂, 3 ♀♀ (CKB, NMW): "Malaysia, Sabah, ca. 25 km SE Sapulut, Batu Punggul env., small stream near Batu Tinahas, 23. 5. 2001, J.F. Koĉiam lgt.".

**Diagnosis:** Within the *Stenomystax depressus* species group *S. montanus* is most similar to *S. depressus* and *S. convexus*, from which it differs in the following features: (1) antero-laterally undeprressed metaventral process; (2) area without plastron on metaventral disc wide, interstices of larger punctures without micropunctuation; (3) fibula shorter. From *S. convexus* it differs also in the following characters: (1) aedeagus shorter; (2) pronotum moderately convex; (3) elytra not rugose. Differences to *S. sumatranus* and *S. splendidus* are listed in the respective species.

**Description:** Habitus (Fig. 49). Length (TL) in ♀♀: 4.1 – 4.7 mm ( $M = 4.36 \pm 0.14$ ), in ♂♂: 3.4 – 4.0 mm ( $M = 3.76 \pm 0.17$ ); maximum width (EW) in ♀♀: 2.1 – 2.4 mm ( $M = 2.25 \pm 0.09$ ), in ♂♂: 1.7 – 2.1 mm ( $M = 2.00 \pm 0.10$ ). Cranium with numerous punctures, latter slightly smaller than facets, and with a few coarser punctures; coarse punctures scattered and situated usually laterally; punctures nearly confluent or separated by distances of up to three puncture diameters; most specimens with small impunctate mesal area; ID in ♀♀: 0.68 – 0.76 mm ( $M = 0.71 \pm 0.03$ ), in ♂♂: 0.56 – 0.68 mm ( $M = 0.62 \pm 0.03$ ); HW in ♀♀: 1.06 – 1.21 mm ( $M = 1.12 \pm 0.04$ ), in ♂♂: 0.93 – 1.09 mm ( $M = 1.01 \pm 0.04$ ); antennae nine- or ten-segmented. Lateral sensory field

on terminal palpomere moderately wide, elongate and lying between posterior and anterior 0.2. Pronotum moderately convex dorsally, wider than long; anterolateral angles strongly deflected; sides gradually converging anteriorly, straight in posterior half, arcuate in anterior half; punctures slightly smaller than facets, usually separated by a more than a facet diameter, posterior punctures distinctly smaller; lateral plastron bands anteriorly as wide as vertical diameter of eye, strongly narrowed posteriorly, slightly surpassing middle; MPL in ♀♀: 1.1 – 1.3 mm ( $M = 1.19 \pm 0.05$ ), in ♂♂: 0.9 – 1.2 mm ( $M = 1.08 \pm 0.06$ ); APW in ♀♀: 1.1 – 1.3 mm ( $M = 1.21 \pm 0.06$ ), in ♂♂: 1.0 – 1.2 mm ( $M = 1.07 \pm 0.05$ ); PPW in ♀♀: 1.8 – 2.1 mm ( $M = 1.91 \pm 0.08$ ), in ♂♂: 1.5 – 1.9 mm ( $M = 1.70 \pm 0.10$ ). Prosternal process irregularly punctate, interstices shiny, up to three times as wide as one facet diameter; sides moderately arcuate or nearly straight, moderately and widely raised anteriorly, in females with plastron setae anteriorly; mesal portion flat, or weakly convex (usually more strongly convex in females). Metaventral process without anterolateral depressions; metaventral disc flat or weakly concave in males, flat or weakly convex in females; mesal area without plastron wide; punctation of surface similar to that on prosternal process, interstices lacking micropunctuation, punctures irregularly connected by numerous shallow longitudinal or transverse furrows (visible in indirect lighting); discrimen weakly impressed at anterior third and distinctly impressed at posterior two thirds. Elytra convex dorsally; posterior two thirds arcuately deflected toward apices (lateral view); widest usually near anterior 0.2, then gradually arcuately narrowed posteriorly (dorsal view); punctures slightly smaller than those on pronotal disc; interstices as long as one to two facet diameters; meshes irregular, usually weakly impressed anteriorly and not always closed, more impressed and smaller posteriorly; shoulders absent; lateral plastron widest near posterior 0.3, where it is slightly narrower than 0.5 of greatest width of elytron (lateral view); (EW) in ♀♀: 2.1 – 2.4 mm ( $M = 2.25 \pm 0.09$ ), in ♂♂: 1.7 – 2.1 mm ( $M = 2.00 \pm 0.10$ ); EL: in ♀♀: 3.0 – 3.4 mm ( $M = 3.17 \pm 0.11$ ), in ♂♂: 2.4 – 2.9 mm ( $M = 2.67 \pm 0.13$ ). Scutellum wider than long, as wide as half of ID or slightly wider, sides arcuate, surface irregularly punctate. Protibia subequal in length with MPL; tarsi ca. 0.7 times as long as tibia, terminal tarsomere as long as combined lengths of tarsomeres 1 – 3. Anterior mesal process of male sternite 9 moderately wide (Fig. 90). Aedeagus (Fig. 97) 1.54 – 1.72 mm long; phallobasis 1.51 – 1.63 times as long as parameres (lateral view). Parameres moderately and gradually curved ventrad and gradually narrowed apicad, apices narrowly rounded (lateral view). Penis (Fig. 98) shorter than parameres, widest basally, gradually narrowed apically; apex narrow and acute (ventral view). Membranous ventral sac with few fine longitudinal furrows; fibula narrow, not reaching midlength of penis. Ovipositor (Fig. 125) slightly longer than abdomen, valvifer more or less twice as long as coxite; latter with dorsomesal sclerotized process weakly curved or nearly straight.

**Sexual dimorphism:** Females generally larger than males, lacking setal tufts on prosternal process and metaventrite, as well as long setae on labrum. Protarsal claws widened in males (Fig. 72), narrower and more curved in females (Fig. 73). Apex of ventrite 5 with lateral margins more deflexed and more excised in females than in males.

**Distribution:** Borneo. Recorded from a few unpolluted cold shaded small mountain streams, flowing through primary forests in Sabah (Fig. 133).

**Etymology:** From Latin, *montanus* (pertaining to mountains); named in reference to the fact that this species prefers cool water at higher altitudes.

### *Stenomystax splendidus* sp.n.

**Type locality.** Puerto Princesa environment, Palawan Island, southern Philippines. Precise locality data are not available, because all specimens were collected at light.

**Type material:** Holotype ♂ (NMW): "PHILIPPINES, II. 1979 PALAWAN ISL., 300-500m Puerto Princesa env. local collector lgt.". **Paratypes:** 2 ♂♂, 7 ♀♀ (CKB, NMW): same label data as holotype.

**Diagnosis:** Generally, *S. splendidus* is characterized within the *S. depressus* species group by elongate body form and small size as well as by shape and size of genitalia and by simple protarsal male claws. *Stenomystax montanus* differs in the following characters: (1) pronotum and elytra more convex; (2) body wider and less elongate; (3) protarsal claws widened in males; (5) aedeagus longer; (6) ovipositor longer. *Stenomystax convexus* differs in: (1) pronotum and elytra strongly convex; (2) wide body; (3) metaventral process laterally depressed; (4) protarsal claws widened in males; (5) longer aedeagus. *Stenomystax sumatranus* differs in: (1) pronotum less convex and longer with denser punctation; (2) elytra widest anteriorly; (3) male protarsal claws strongly widened; (4) form and size of male genitalia. Differences to *S. depressus* are listed above (see under *S. depressus*).

**Description:** Habitus (Fig. 50). Length (TL) in ♀♀: 3.9 – 4.3 mm ( $M = 4.11 \pm 0.13$ ), in ♂♂: 3.5 – 3.7 mm; maximum width (EW) in ♀♀: 1.8 – 1.9 mm ( $M = 1.86 \pm 0.06$ ), in ♂♂: 1.6 – 1.7 mm. Cranial punctures usually smaller than facets, rarely as large as facets; interstices variable, smaller than puncture or as long as three puncture diameters; punctures more densely set laterally, setose; few long hair-like setae near eyes; frontoclypeal margin moderately arcuate; ID in ♀♀: 0.55 – 0.65 mm ( $M = 0.61 \pm 0.03$ ), in ♂♂: 0.55 mm (invariant); HW in ♀♀: 0.96 – 1.05 mm ( $M = 1.01 \pm 0.04$ ), in ♂♂: 0.89 – 0.93 mm; antennae ten-segmented. Terminal palpomere of maxillary palpus with lateral sensory field moderately wide, elongate, lying approximately between posterior and anterior 0.2. Pronotum moderately convex dorsally, widest at posterior third or posteriorly; anterolateral angles strongly deflected; sides weakly carinate, gradually converging anteriorly from widest point; punctation similar to that on head, punctures smaller posteriorly, interstices vary from one to three puncture diameters; lateral plastron bands narrow, weakly surpassing middle; anterior angles about 0.5 times as long as longitudinal length of eye; MPL in ♀♀: 1.0 – 1.1 mm ( $M = 1.09 \pm 0.03$ ), in ♂♂: 0.9 – 1.0 mm; APW in ♀♀: 1.0 – 1.1 mm ( $M = 1.09 \pm 0.04$ ), in ♂♂: 0.9 – 1.0 mm; PPW in ♀♀: 1.3 – 1.6 mm ( $M = 1.53 \pm 0.06$ ), in ♂♂: 1.3 – 1.4 mm. Prosternum in front of coxae with plastron, about 1.5 times as long as prosternal process. Prosternal process (Fig. 60) anterolaterally covered with plastron, sparsely and finely punctate, slightly narrower than ID, subparallel-sided, slightly and widely raised anteriorly; mesal portion flat, or moderately convex; apex moderately protruding, wide and emarginate. Hypomeron widest at posterior third, where it is about 0.6 times as wide as prosternal process. Metaventral process wide, anterolateral portions flat or very weakly depressed; metaventral disc flat, punctation similar to that of prosternal process; mesal portion without plastron; plastron area wider in females; discrimen fine, long. Elytra moderately convex dorsally; posterior two thirds weakly and gradually deflected posteriorly (lateral view); widest near middle, moderately arcuately narrowed posteriorly and weakly arcuately narrowed anteriorly (dorsal view); punctures slightly smaller than those on pronotal disc, with short setae; length of interstices varies from one to three puncture diameters; punctures placed in weakly impressed and irregular meshes; plastron widest near posterior 0.2, where it is about half as wide as greatest width of elytron (lateral view), gradually narrowed posteriorly and anteriorly, not reaching anterior margin; EW in ♀♀: 1.8 – 1.9 mm ( $M = 1.86 \pm 0.06$ ), in ♂♂: 1.6 – 1.7 mm; EL: in ♀♀ 2.9 – 3.1 mm ( $M = 3.02 \pm 0.10$ ), in ♂♂: 2.5 – 2.7 mm. Scutellum as long as wide, narrower than half of ID; sides arcuate; surface irregularly punctate. Protibia slightly longer than MPL; tarsi reaching about 0.6 of tibial length, terminal tarsomere slightly shorter than combined lengths of preceding tarsomeres; protarsal claws similar in both sexes, those of males slightly shorter and less distinctly curved (Figs. 74, 75). Male sternite 9 with anterior medial process narrow (Fig. 91). Aedeagus (Fig. 99) about 1.52 mm long; phallobasis robust, subcylindrical, about 1.8 times as long as parameres, wider basally than apically (lateral view). Parameres moderately long, widest near base, gradually curved ventrad and gradually narrowed toward apices, apices narrowly

rounded (lateral view). Penis (Fig. 100) shorter than parameres, widest basally, gradually narrowed apically; apex narrow, acute (ventral view). Membranous ventral sac with fine longitudinal furrows; fibula narrow, not reaching middle of penis. Ovipositor (Fig. 126) slightly longer than combined lengths of ventrites 2 – 5; valvifer about 1.8 times as long as coxite; bursa copulatrix without sclerotized spinules.

**Sexual dimorphism:** Females generally larger than males, lacking setal tufts on prosternal process and metaventrite, as well as long setae on labrum. Apex of ventrite 5 with lateral margins more deflexed in female than in male.

**Distribution:** Known only from Palawan Island, Philippines (Fig. 133).

**Etymology:** From Latin, *splendidus* (shiny). Named in reference to the shiny dorsal surface.

### *Stenomystax sumatranus* sp.n.

**Type locality.** Forest stream near Bukit Lawang, northern Sumatra, Indonesia.

**Type material:** Holotype ♂ (NMW): "N – SUMATRA, 1990 (20) Bukit Lawang leg. Jäch, 26. – 27. 2.".

**Diagnosis:** Within the *Stenomystax depressus* species group *S. sumatranus* is characterized by the weakly convex, long, densely punctate pronotum, by the elytra widest anteriorly as well as by the form and size of the aedeagus. *Stenomystax montanus* differs in the following characters: (1) pronotum more convex and shorter, punctuation sparser; (2) punctuation on prosternal process and metaventral disc denser; (3) elytra shorter and less elongate; (4) aedeagus shorter. *Stenomystax convexus* differs in the following characters: (1) pronotum and elytra strongly convex; (2) body wider, less elongate; (3) metaventrite with lateral depressions; (4) elytra rugose posteriorly and laterally. Differences to *S. depressus* and *S. splendidus* are discussed above.

**Description:** Habitus (Fig. 51). Length: 4.5 mm (TL); maximum width: 2.1 mm (EW). Cranial punctures slightly smaller than facets, denser laterally, length of interstices varies from one to two puncture diameters; frontoclypeal margin straight; ID: 0.62 mm; HW: 1.5 mm; antennae nine-segmented; terminal palpomere of maxillary palpus with lateral sensory field moderately wide, elongate, situated between anterior 0.2 and posterior 0.3 of palpus. Pronotum weakly convex dorsally, more declivous anteriorly than posteriorly, wider than long; sides distinctly carinate and gradually converging anteriorly along entire length, straight at posterior half and weakly arcuate at anterior half; punctures nearly as large as facets, separated by 0.5 – 2.0 puncture diameter, denser and larger mesally than laterally and posteriorly, interstices shiny; lateral plastron bands very narrow, effaced near posterior third; anterior angles acute, strongly protruding, about as long as longitudinal length of eye; MPL: 1.1 mm; APW: 1.2 mm; PPW: 1.8 mm. Prosternum finely punctate, about 1.5 times as long as prosternal process, covered with plastron in front of coxae. Prosternal process slightly wider than ID, lacking plastron, surface finely sparsely punctate; sides straight, moderately diverging posteriorly, feebly and widely raised; apex moderately protruding, wide and emarginate. Hypomeron widest at posterior third, where it is 0.6 times as wide as prosternal process. Metaventral process wide, without lateral depressions, anteromesal margin flat; metaventral disc weakly concave, lacking plastron, finely sparsely punctate; discrimen very fine. Elytra moderately convex dorsally; widest near anterior fifth, then arcuately narrowed posteriorly (dorsal view); posterior half gradually deflected toward apices (lateral view); punctures smaller than those on pronotal disc, with short setae; length of interstices varies from one to three puncture diameters, interstices with some longer setae; punctures placed in weakly impressed and rather irregular meshes; lateral plastron widest near posterior third, where it is 0.5 times as wide as greatest width of elytron, gradually narrowed posteriorly and anteriorly, effaced near anterior margin (lateral view); EW: 2.1 mm; EL: 3.3 mm. Scutellum wider than long, ca. 0.6 times as wide as ID; sides arcuate; surface finely, nearly

regularly punctate, convex. Protibia slightly shorter than MPL; tarsi slightly more than 0.5 times as long as tibia; terminal tarsomere more or less as long as preceding tarsomeres together; protarsal claws strongly widened (Fig. 76). Intercoxal abdominal process wide, sub-triangular, sides arcuate, apex rounded. Sternite 9 of male with anterior medial process narrow (Fig. 92). Aedeagus (Fig. 101) 1.84 mm long; phallobasis robust, subcylindrical, nearly straight, about 1.5 times as long as parameres, wider basally than apically (lateral view). Parameres moderately long, widest near base, gradually curved ventrad and gradually narrowed toward apices, which are narrowly rounded (lateral view). Penis (Fig. 102) shorter than parameres, widest basally, gradually narrowed apically; apex narrow, acute (ventral view). Membranous ventral sac finely longitudinally grooved; fibula narrow, not reaching middle of penis (ventral view).

**Sexual dimorphism:** Females unknown.

**Distribution:** Known only from Sumatra Island, Indonesia (Fig. 133).

**Etymology:** Named in reference to its distribution.

### *Stenomystax saetosus* species group

**Members.** *Stenomystax gracilis*, *S. inopinatus*, *S. jengi*, *S. kubani*, *S. minutus*, *S. saetosus*, and *S. similis*.

**Diagnosis:** Species of the *Stenomystax saetosus* group are characterized by the following features: (1) small size (TL: 2.0 – 3.5 mm); (2) eyes with numerous, distinct interfacetal setae; (3) second cubito-anal cell open, indistinct; (4) bursa copulatrix with numerous sclerotized spinules.

### *Stenomystax saetosus* sp.n.

**Type locality.** Small stream, ca. 2 - 3 m wide, shaded, flowing through degraded primary forest, below Wuzhi Shan Resort, ca. 600 m a.s.l.; ca. 30 km E Maoyang Town, ca. 2 km from Wuzhi Shan Village, Wuzhi Shan [= Five Finger Mountain] Resort; Quingzhong County; Hainan Province; China. [CWBS loc. 193].

**Type material:** **Holotype** ♂ (CASS): "CHINA: Hainan (193) 30km E Maoyang, 600m Wuzhi Shan Resort, 1996 17./18.1., Ji & Wang". **Paratypes:** 8 ♂♂, 5 ♀♀ (CASS, CKB, NMW): same data as holotype; 2 ♂♂, 5 ♀♀ (NMW): "CHINA: Hainan (193) 30km E Maoyang, 600m Wuzhi Shan Resort, 1996 17./18.1., leg. Jäch"; 2 ♂♂, 1 ♀ (NMW): "CHINA: Hainan (198) 3km NE Maoyang Wuzhi Shan Riv., 100m 19.1.1996, leg. Jäch"; 2 ♀♀ (NMW): "CHINA: Hainan (198) 3km NE Maoyang Wuzhi Shan Riv., 100m 19.1.1996, Ji & Wang"; 1 ♂ (NMW): "CHINA: Hainan (199) 2km S Mao'an 250m, 20.1.1996 leg. Jäch"; 2 ♀♀ (NMW): "CHINA: Hainan (199) 2km S Mao'an 250m, 20.1.1996 leg. Ji & Wang"; 1 ♂ (NMW): "CHINA: Hainan (214) 15km SW Dongxing 1 km W Jianfeng, 70m 25.1.1996, Ji & Wang"; 4 ♂♂, 3 ♀♀ (NMW): "CHINA: Hainan (215) 15km SW Dongxing 1,5 km W Jianfeng, 70m 25.1.1996, leg. Jäch"; 1 ♀ (NMW): "CHINA: Hainan (215) 15km SW Dongxing 1,5 km W Jianfeng, 70m 25.1.1996, Ji & Wang"; 2 ♀♀ (NMW): "CHINA: Hainan (216) 8-10km W Dongxing 70m, 26.1.1996, leg. Jäch".

**Diagnosis:** Within the *Stenomystax saetosus* species group *S. saetosus* is characterized by the wide lateral plastron bands on pronotum and elytra, and by the extremely long phallobasis and the short parameres. *Stenomystax jengi* differs in the following characters: (1) larger size; (2) antennae eight-segmented; (3) dorsal plastron bands on pronotum and elytra narrower; (4) pronotum more deflected anterolaterally; (5) elytral punctation denser and coarser; (6) aedeagus with parameres longer and phallobasis shorter; (7) ratio of valvifer length / coxite length.

**Description:** Habitus (Fig. 52). Length (TL) in ♀♀: 2.7 – 3.1 mm ( $M = 2.84 \pm 0.07$ ), in ♂♂: 2.5 – 2.7 mm ( $M = 2.64 \pm 0.06$ ); maximum width (EW) in ♀♀: 1.3 – 1.5 mm ( $M = 1.40 \pm 0.06$ ), in ♂♂: 1.2 – 1.4 mm ( $M = 1.28 \pm 0.04$ ). Exposed portion of labrum strongly transverse, anterior

margin moderately emarginate mesally, anterolateral angles rounded. Cranial punctures slightly smaller or subequal to facet diameter, irregularly spaced; interstices varying from very small to about two puncture diameters, setose, longest hair-like setae near eyes; frontoclypeal margin moderately arcuate; eyes with numerous short interfacetal setae, ID in ♀♀: 0.46 – 0.55 mm ( $M = 0.51 \pm 0.02$ ), in ♂♂: 0.43 – 0.52 mm ( $M = 0.47 \pm 0.02$ ); HW in ♀♀: 0.68 – 0.83 mm ( $M = 0.72 \pm 0.04$ ), in ♂♂: 0.65 – 0.71 mm ( $M = 0.68 \pm 0.01$ ); antennae nine-segmented. Terminal palpomere of maxillary palpus with lateral sensory field narrow, elongate and confined to anterior third of palpus. Pronotum moderately convex dorsally, wider than long; sides slightly carinate, subparallel in posterior third, arcuately and gradually convergent in anterior 0.6; pronotal punctures nearly as large as facets, separated by one to three puncture diameters, interstices shiny; plastron setae forming two lateral bands, latter widest anteriorly, where each is nearly 0.3 times as wide as APW, gradually narrowed posteriorly, where they are ca. 0.5 times as wide as anteriorly; anterior angles protruding, about half as long as longitudinal length of eye; MPL in ♀♀: 0.7 – 0.8 mm ( $M = 0.74 \pm 0.04$ ), in ♂♂: 0.6 – 0.7 mm ( $M = 0.69 \pm 0.03$ ); APW in ♀♀: 0.7 – 0.9 mm ( $M = 0.81 \pm 0.03$ ), in ♂♂: 0.7 – 0.8 mm ( $M = 0.73 \pm 0.03$ ); PPW in ♀♀: 0.9 – 1.2 mm ( $M = 1.09 \pm 0.05$ ), in ♂♂: 0.9 – 1.1 mm ( $M = 1.0 \pm 0.02$ ). Prosternum (Fig. 61) entirely covered with plastron, punctate; punctures more regularly arranged than those on dorsal surface; prosternum in front of coxae slightly longer than prosternal process; prosternal process slightly narrower than ID, sides arcuate, feebly and widely raised, apex moderately protruding, wide and nearly truncate. Hypomerion widest at posterior third, where it is about 0.3 times as wide as prosternal process. Punctuation of metaventrite similar to that of prosternum. Metaventral process wide, sides raised anterolaterally, produced posteriorly, keel-like; anterolateral depressions deep, anteromesal margin flat; metaventral disc flat to feebly convex; discrimen very fine; plastron absent on narrow mesal portion. Elytra moderately convex dorsally; punctuation similar to that of pronotum, punctures placed in weakly impressed meshes; in some specimens interstices with few long thin hair-like setae; greatest width near middle; sides gradually narrowed anteriorly and more strongly narrowed posteriorly; lateral plastron bands wide, widest at posterior third, where they are about 0.5 times as wide as maximum width of elytron, slightly narrower anteriorly and posteriorly, reaching anterior margin (lateral view); EW in ♀♀: 1.3 – 1.5 mm ( $M = 1.40 \pm 0.06$ ), in ♂♂: 1.2 – 1.4 mm ( $M = 1.28 \pm 0.04$ ); EL: in ♀♀: 2.0 – 2.3 mm ( $M = 2.11 \pm 0.08$ ), in ♂♂: 1.8 – 2.0 mm ( $M = 1.92 \pm 0.06$ ). Scutellum wider than long, about 0.5 times as wide as ID; sides arcuate; surface finely, nearly regularly punctate. Protibia subequal in length with MPL; tarsi about 0.6 times as long as tibia, terminal tarsomere approximately as long as combined lengths of three preceding tarsomeres; protarsal claws slightly widened in males, narrower and slightly longer in females. Ventrite 5 about as long as ventrites 2 – 4 together, posterior margin narrowly excised in females. Sternite 9 of males with anterior medial process wide (Fig. 103). Aedeagus (Fig. 109) 1.40 – 1.50 mm long; phallobasis robust, subcylindrical, moderately curved, 2.8 – 3.0 times as long as parameres, wider basally than apically (lateral view). Parameres very short, widest near base, gradually curved ventrad and gradually narrowed toward apices, which are narrowly rounded (lateral view). Penis (Fig. 116) shorter than parameres, widest basally, gradually narrowing apically; apex narrow, rounded (ventral view). Membranous ventral sac with fine longitudinal furrows; fibula narrow, not reaching middle of penis. Ovipositor (Fig. 127) slightly longer than abdomen; valvifer about 2.4 times as long as coxite; bursa copulatrix with numerous short dense sclerotized spinules.

**Sexual dimorphism:** Females generally larger than males, lacking setal tufts on prosternal process and metaventrite, as well as long setae on labrum. Protarsal claws slightly widened in males (Fig. 77), narrower in females (Fig. 78). Apex of ventrite 5 slightly excised in females.

**Distribution:** Known only from Hainan Island, southeastern China (Fig. 133).

**Etymology:** From Latin, *saetosus* (haired, setose), named in reference to the densely setose ventral surface.

***Stenomystax gracilis* sp.n.**

**Type locality.** Unnamed creek near Kalang Waterfall (Tenom environment, Sabah, Malaysia), about 0.5 – 1.5 m wide, about 0.1 – 0.3 m deep, cold, flowing through primary forest, strongly shaded. Substrate consisting of small rocks and coarse gravel, few submerged branches and submerged roots. Most of the specimens were collected from submerged roots or dead wood, a few specimens were taken from small stones.

**Type material:** **Holotype** ♂ (NMW): "Malaysia, Sabah, Crocker Range, Tenom env., Kalang Waterfall env. 18.VI.1998, J. Kodada & F. Čiampor lgt.". **Paratypes:** 26 ♂♂, 30 ♀♀ (CKB, NMW): same data as holotype; 18 ♂♂, 18 ♀♀ (CKB, NMW): "Malaysia, Sabah, Crocker Range, Tenom env., Kalang waterfall, 28.V.2001, J. Kodada & F. Čiampor lgt."; 2 ♂♂, 1 ♀ (CKB): "Malaysia, SABAH, Crocker Range, Bingkor env., Taman Bandukan, 6.-7.VII.1996, 10 a, river ca 10 m wide, flowing through degraded primary forest"; 5 ♂♂, 11 ♀♀ (CKB, NMW): "Malaysia, SABAH, Crocker Range, Bingkor env., Taman Bandukan, 6. - 7. VII. 1996, 10 b shaded stream 1.5-3.0 m wide in primary forest"; 1 ♀ (CKB): "Malaysia, Sabah, Crocker Range, Moyog env., around km 20 of road Kota Kinabalu Tambunan, 15.VI.1996, 1a"; 27 ♀♀ (CKB, NMW): "Malaysia, Sabah, ca. 25 km SE Sapulut, Batu Punggul env., Sapulut river, 24. V. 2001, J.F. Kočiam lgt."; 8 ♀♀ (CKB): "Malaysia, Sabah, ca. 25 km SE Sapulut, Batu Punggul env., Sapulut river, 24. V. 2001"; 1 ♀ (CKB): "Malaysia, Sabah, Batu Punggul Resort env., 24.VI. - 1.VII.1996, 11b, shaded stream 1.5-2.0 m wide, flowing through dense primary forest"; 1 ♂ (CKB): "Malaysia, Sabah, Gn. Antulai, ca 5 km S Sapulut, 2.VII.1996 13 a, river about 7m wide, flowing through secondary forest"; 17 ♀♀ (CKB, NMW): "Malaysia, Sabah, ca. 30 km SE Sapulut, Tatalikon riv., in very dense primary forest, 22. 5. 2001, J.F. Kočiam lgt."; 1 ♂, 33 ♀♀ (CKB, NMW): "Malaysia, Sabah, Sabalangan river in primary forest ca. 25 km SE Sapulut, 26. 06. 1998, J. Kodada & F. Čiampor Lgt."; 23 ♀♀ (CKB, NMW): "Malaysia, Sabah, ca. 25 km SE Sapulut, Sabalangan riv. in primary forest, 21. 5. 2001, J.F. Kočiam lgt."; 12 ♀♀ (CKB): "Malaysia, Sabah, ca. 25 km SE Sapulut, Batu Punggul env., small stream near Batu Tinahas, 23. 5. 2001, J.F. Kočiam lgt."; 1 ♀ (CKB): "Malaysia, Sabah, ca. 7 km S Sapulut, Saupi river, 17.V. 2001, J.F. Kočiam lgt."; 2 ♂♂, 3 ♀♀ (CKB): "Malaysia, Sabah, ca. 5 km S Sapulut, Saliku river, 16.V. 2001, J.F. Kočiam lgt."; 13 ♀♀ (CKB): "Malaysia, Sabah, ca. 5 km S Sapulut, Saliku riv. in primary forest, ca. 600m a.s.l., 16.V. 2001, J.F. Kočiam lgt."; 2 ♀♀ (CKB): "Malaysia, SABAH, Kuamut river env. near Kampung Pisang Pisang (ca 106 km of Sapulut), 3.-4. VII. 1996, 14 a"; 3 ♂♂ (CKB): "Malaysia, Sabah, Tawau Hills Park, Tawau river in primary forest, 7. - 10. 06. 1998, J. Kodada & F. Čiampor Lgt."; 1 ♀ (NMW): "E-MALAYSIA: Sabah Danum Valley, 2.-13.2. Palum Tambun, 1997 leg. H. Zettler (2)"; 1 ♀ (CKB): "SARAWAK (Borneo), ca. 40 km SE Kapit, 3. 1994, leg. J. Kodada"; 1 ♂, 2 ♀♀ (NMW): "MAL., Sarawak 1993 80 km S Kuching, 18. 2. Kampung Ana Rais leg. M. Jäch (4)"; 1 ♂, 1 ♀ (NMW): "MAL., Sarawak 1993 40 km S Kuching, 17. 2. Baan Gong Sikog Wasserf. leg. M. Jäch (3)"; 2 ♂♂, 7 ♀♀ (NMW): "MAL., Sarawak 1993 Kelabit IHL, Umg. Bario 26. 2., 1000 m, leg. M. Jäch (14)"; 2 ♂♂, 6 ♀♀ (NMW): "MAL., Sarawak 1993 Kelabit IHL, Umg. Bario 28. 2., 1000 – 1200m, leg. M. Jäch (16)"; 3 ♂♂, 2 ♀♀ (NMW): "MAL., Sarawak 1993 Kelabit IHL, 6 km E Bario Pa Ukat, 1. 3., ca. 1000m, leg. M. Jäch (17)".

**Diagnosis:** *Stenomystax gracilis* is characterized by very small size, extent of plastron as well as by form and size of male genitalia. The most similar species is *S. similis* from Sumatra, which differs in the following characters: (1) penis subparallel-sided in basal half; (2) fibula absent; (3) prosternal process and mesal portion of male prosternum with plastron. *Stenomystax inopinatus* differs in the following features: (1) larger size; (2) anterolateral interstices between cranial punctures shagreened; (3) lateral plastron bands on pronotum and elytra wider; (4) male prosternum nearly entirely covered with plastron; (5) aedeagus longer; (6) penis subparallel-sided in basal half. *Stenomystax kubani* differs in the following features: (1) body form wider and more convex; (2) male prosternum nearly entirely covered with plastron; (3) lateral margins of metaventral process raised, not produced posteriorly; (4) all ventrites clothed by plastron entirely; (5) aedeagus longer; (6) fibula absent; (7) bursa copulatrix without flat sclerites.

**Description:** Habitus (Fig. 53). Length (TL) in ♀♀: 2.3 – 2.8 mm ( $M = 2.56 \pm 0.14$ ), in ♂♂: 2.0 – 2.4 mm ( $M = 2.18 \pm 0.11$ ); maximum width (EW) in ♀♀: 1.1 – 1.4 mm ( $M = 1.28 \pm 0.14$ ), in ♂♂: 1.0 – 1.2 mm ( $M = 1.08 \pm 0.05$ ). Cranial punctures nearly as large as facets, irregularly

spaced, interstices smaller than puncture or at most two times as wide as one puncture diameter, small mesal area usually impunctate; frontoclypeal margin strongly arcuate; ID in ♀♀: 0.44 – 0.50 mm ( $M = 0.47 \pm 0.02$ ), in ♂♂: 0.38 – 0.47 mm ( $M = 0.43 \pm 0.02$ ); HW in ♀♀: 0.68 – 0.75 mm ( $M = 0.70 \pm 0.02$ ), in ♂♂: 0.57 – 0.66 mm ( $M = 0.62 \pm 0.02$ ); antennae nine-segmented. Terminal palpomere with lateral sensory field very narrow, confined to ca. anterior third of palpus (Fig. 43). Pronotum moderately convex dorsally, wider than long, widest near posterior third; sides carinate, arcuate and gradually converging anteriorly; pronotal punctures nearly as large as facets, separated by ca. one to three puncture diameters, interstices shiny; lateral plastron bands (Fig. 46) anteriorly as wide as vertical diameter of eye, narrowed posteriorly and reaching pronotal midlength; anterior angles acute, about half as long as longitudinal length of eye; MPL in ♀♀: 0.6 – 0.7 mm ( $M = 0.67 \pm 0.04$ ), in ♂♂: 0.5 – 0.6 mm ( $M = 0.58 \pm 0.03$ ); APW in ♀♀: 0.7 – 0.8 mm ( $M = 0.75 \pm 0.03$ ), in ♂♂: 0.6 – 0.7 mm ( $M = 0.68 \pm 0.03$ ); PPW in ♀♀: 0.9 – 1.1 mm ( $M = 1.00 \pm 0.05$ ), in ♂♂: 0.8 – 0.9 mm ( $M = 0.85 \pm 0.05$ ). Prosternum (Fig. 44) weakly deflected anteriorly, nearly flat mesally; anterior margin straight; wide mesal portion lacking plastron along entire length, punctate; punctures similar to those on head, interstices 0.5 – 2.0 times as wide as facet, shiny; prosternum in front of coxae slightly longer than prosternal process; prosternal process slightly narrower than ID, sides straight, moderately and widely raised, bordered by longitudinal depression mesally, apex moderately protruding, wide and truncate. Hypomeron widest at posterior third, where it is about 0.6 times as wide as prosternal process. Punctuation of metaventrite similar to that of prosternal process. Metaventral process wide, depressed anterolaterally; lateral margins raised, keel-like, produced posteriorly, reaching middle of metaventrite (Fig. 45); metaventral disc lacking plastron, flat; discrimen fine; males with short posteromesal keel. Elytra moderately convex dorsally; punctuation similar to that of pronotum but punctures often less coarse, placed in some specimens in weakly impressed incomplete meshes near suture; greatest width near middle or posterior of middle; sides gradually narrowed anteriorly and more strongly narrowed posteriorly; lateral plastron widest at posterior 0.25, where it is as wide as 0.4 times maximum width of elytron, weakly narrowed anteriorly, effaced near posterior margin of mesocoxa (lateral view); EW in ♀♀: 1.1 – 1.4 mm ( $M = 1.28 \pm 0.06$ ), in ♂♂: 1.0 – 1.2 mm ( $M = 1.08 \pm 0.05$ ); EL: in ♀♀: 1.7 – 2.0 mm ( $M = 1.89 \pm 0.10$ ), in ♂♂: 1.5 – 1.8 mm ( $M = 1.61 \pm 0.09$ ). Scutellum about half as wide as ID, wider than long; sides arcuate; surface finely punctate. Protibia subequal in length with MPL; tarsi about 0.6 times as long as tibia, terminal tarsomere as long as tarsomeres 2 – 4 together; protarsal claws weakly widened and more strongly curved in males, narrower and less curved in females (Figs. 79, 80). Ventrite 5 shorter than combined lengths of ventrites 2 – 4, apex excised in females; abdominal intercoxal process and mesal portion of ventrites 2 and 3 lacking plastron. Sternite 9 of male (Fig. 104) with anterior medial process moderately wide. Aedeagus 1.02 – 1.29 mm long; phallobasis (Fig. 110) robust, moderately curved, 2.1 – 2.2 times as long as parameres, widest near middle. Parameres short, widest near base, curved ventrad near apex, apices narrowly rounded (lateral view). Penis (Fig. 117) shorter than parameres, subparallel-sided in basal 0.4 of penis length, gradually narrowed apically; apex narrow, rounded (ventral view). Membranous ventral sac with fine longitudinal furrows; fibula narrow and short, weakly developed, not reaching middle of penis. Ovipositor (Fig. 128) moderately longer than abdomen; valvifer ca. 2.1 times as long as coxite; bursa copulatrix with numerous short dense sclerotized spinules and a few flat sclerites.

**Sexual dimorphism:** Females generally larger than males, lacking setal tufts on prosternal process and metaventrite, as well as long setae on labrum, metaventrite without short posteromesal keel. Male protarsal claws more strongly curved and weakly widened. Apex of ventrite 5 excised in females, rounded in males.

**Distribution:** Borneo. Widely distributed in Sabah and Sarawak, Malaysia (Fig. 133).

**Etymology:** From Latin, *gracilis* (gracile); named in reference to the slender (gracile) males.

***Stenomystax inopinatus* sp.n.**

**Type locality.** Forest stream between Ubud and Tegallalang, Bali, Indonesia.

**Type material:** Holotype ♂ (NMW): "INDONESIEN 1992 Bali (3), Ubud-Tegallalang leg. Jäch 11./12.IV.".

**Paratypes:** 1 ♂ (NMW): same data as holotype; 1 ♂, 2 ♀♀ (NMW): "LOMBOK 7.2. Tetebatu (22) leg. Jäch 1988".

**Diagnosis:** Within the *Stenomystax saetosus* species group *S. inopinatus* is characterized by its size, extent of plastron, form and size of genitalia. Externally, *S. inopinatus* is very similar to *S. similis*, from which it can be distinguished by the following characters: (1) larger size; (2) anterolateral interstices of cranial punctures shagreened; (3) lateral plastron on pronotum and elytra wider; (4) aedeagus longer. *Stenomystax kubani* can be distinguished by the following features: (1) body wider, shorter; (2) interstices of cranial punctures shiny; (3) lateral plastron bands of elytra and pronotum narrower; (4) lateral margins of metaventral process raised, but not produced posteriorly; (5) all ventrites entirely covered with plastron vestiture; (5) parameres wider and less curved; (6) bursa copulatrix without flat sclerites.

**Description:** Habitus (Fig. 54). Length (TL) in ♀♀: 2.9 – 3.2 mm, in ♂♂: 2.8 – 3.0 mm; maximum width (EW) in ♀♀: 1.4 – 1.5 mm, in ♂♂: 1.3 – 1.4 mm. Cranial punctures nearly as large as facets; interstices shagreened posteriorly of antennal insertion, as wide as puncture diameter or smaller; small mesal area impunctate; frontoclypeal margin strongly arcuate in males, nearly straight in females; ID in ♀♀: 0.56 – 0.59 mm, in ♂♂: 0.53 – 0.56 mm; HW in ♀♀: 0.81 – 0.88 mm, in ♂♂: 0.76 – 0.81 mm; antennae nine-segmented. Terminal palpomere of maxillary palpus with lateral sensory field narrow, slightly surpassing anterior third of palpus. Pronotum convex dorsally, wider than long, widest posterior of middle; sides carinate, moderately arcuate and moderately converging anteriorly and posteriorly; pronotal punctures nearly as large as facets, separated by distance of 0.5 – 1.5 puncture diameters, interstices shiny; lateral plastron bands anteriorly distinctly wider than vertical diameter of eye, narrowed posteriorly and reaching nearly posterior angles; anterior angles acute, slightly longer or as long as half of longitudinal length of eye; MPL in ♀♀: 0.8 – 0.9 mm, in ♂♂: 0.7 – 0.8 mm; APW in ♀♀: 0.8 – 0.9 mm, in ♂♂: 0.8 – 0.9 mm; PPW in ♀♀: 1.1 – 1.2 mm, in ♂♂: 1.0 – 1.1 mm. Prosternum nearly flat mesally, anterior margin straight; males lack plastron only on narrow anteromesal portion, entire mesal surface densely punctate, interstices micropunctate and as long as one puncture diameter or smaller; females lack plastron on mesal portion along entire prosternal length, portion without plastron narrower than prosternal process, punctate, interstices shiny; prosternum in front of coxae slightly longer than prosternal process. Prosternal process weakly narrower than ID, sides straight, feebly raised, bordered by shallow longitudinal depression mesally, apex slightly protruding, wide and rounded. Hypomeron widest at posterior third, where it is about 0.6 times as wide as prosternal process. Metaventrite more sparsely and finely punctate than prosternal process. Metaventral process wide, anterolaterally depressed; lateral margins raised, in males produced posteriorly, keel-like (keels reaching setal tufts); metaventral disc lacking plastron, flat; discrimen fine; males with short posteromesal keel. Elytra moderately convex dorsally; widest between anterior fourth and middle; punctation similar to that of pronotum, but punctures slightly smaller, placed in weakly impressed, incomplete meshes near suture; sides gradually narrowed anteriorly and more strongly narrowed posteriorly; lateral plastron widest at posterior 0.2, where it reaches nearly 0.6 of greatest width of elytron, slightly narrowed anteriorly, effaced near anterior margin of mesocoxa (lateral view); EW in ♀♀: 1.4 – 1.5 mm, in ♂♂: 1.3 – 1.4 mm; EL: in ♀♀: 2.1 – 2.4 mm, in ♂♂: 2.1 – 2.2 mm. Scutellum wider than long, narrower than half of ID; sides arcuate; surface finely punctate. Protibia slightly longer than MPL; tarsi about 0.6 times as long as tibia, terminal tarsomere more or less as long as tarsomeres 2 – 4 together;

protarsal claws similar in both sexes (Figs. 81, 82). Ventrite 5 shorter than combined lengths of ventrites 2 – 4, apex excised in females; abdominal intercoxal process and mesal portion of ventrites 2 and 3 lacking plastron. Sternite 9 of male (Fig. 105) with anterior medial process wide. Aedeagus 1.54 – 1.62 mm long; phallobasis robust, moderately curved, 2.1 – 2.2 times as long as parameres, widest near middle (Fig. 111). Parameres short, widest near base, curved ventrad near apex; apices narrowly rounded (lateral view). Penis (Fig. 118) shorter than parameres, subparallel-sided in basal half of length of penis, gradually narrowed apically; apex narrow, rounded (ventral view). Membranous ventral sac with fine longitudinal furrows; fibula absent. Ovipositor (Fig. 129) slightly longer than abdomen; valvifer about two times as long as coxite; bursa copulatrix with numerous larger and densely sclerotized spinules and a few flat sclerites.

**Sexual dimorphism:** Females (1) larger; (2) anterior margin of frontoclypeus weakly arcuate; (3) prosternal process and mesal portion of prosternum without plastron setae; (3) setal tufts on labrum, prosternal process and metaventrite absent; (4) metaventrite without short posteromesal keel; (5) apex of ventrite 5 excised.

**Distribution:** Known from Bali and Lombok, Indonesia (Fig. 133).

**Etymology:** From Latin, *inopinatus* (unexpected); named in reference to the unexpected occurrence east of the Wallace Line.

### *Stenomystax jengi* sp.n.

**Type locality.** Taipei Hsien Pinglin, Taiwan.

**Type material:** Holotype ♂ (NMW): "TAIWAN 25.3.1991 Taipei Hsien Pinglin / 70 leg. M.L.Jang [= Jeng]".  
**Paratypes:** 1 ♀ (NMW): same data as holotype; 1 ♀ (NMW): "Taiwan Taipei County Pinglin 20. VI. 1987 K.-C. WONG leg."; 1 ♀ (NMW): "Taiwan Taipei County Pinglin 20.VI.1987 K.-C. WONG leg."; 1 ♀ (NMW): "Taiwan Taipei County Pinglin 21.VI.1988 K.-C. Wong leg."; 1 ♀ (NMW): "Taiwan Taipei County Pinglin 25.V.1989 M.-L. JENG leg."; 1 ♀ (NMW): "Taiwan Taipei County Pinglin 17.I.1990 K.-C. WONG leg.". The holotype lacks legs, antennae, parts of genital segments and anterior portion of membranous sac of aedeagus.

**Diagnosis:** Recognized by large size, convex body, extent of plastron, form and size of aedeagus. *Stenomystax gracilis*, *S. inopinatus* and *S. similis* differ in the following characters: (1) smaller size; (2) lateral plastron bands of pronotum and elytra narrower; (3) prosternum in females lacking plastron mesally; (3) ventrites 1 – 3 mesally without plastron; (4) ventrite 5 in females excised; (5) bursa copulatrix with flat sclerites. *Stenomystax jengi* differs from *S. kubani* in: (1) larger size; (2) plastron bands of pronotum and elytra wider; (3) lateral margins of metaventral process raised, produced posteriorly; (4) mesal portion of metaventrite without plastron narrower; (5) parameres less curved. Differences to *S. saetosus* are listed above.

**Description:** Habitus (Fig. 55). Length (TL) in ♀ ♀: 3.4 – 3.5 mm ( $M = 3.47 \pm 0.02$ ), in ♂: 3.2 mm; maximum width (EW) in ♀ ♀: 1.5 – 1.6 mm ( $M = 1.60 \pm 0.05$ ), in ♂: 1.4 mm. Cranial punctures smaller than facets; interstices small or up to two times as long as one puncture diameter, usually smaller posteriorly; frontoclypeal margin weakly arcuate; ID in ♀ ♀: 0.62 – 0.65 mm ( $M = 0.62 \pm 0.01$ ), in ♂: 0.56 mm; HW in ♀ ♀: 0.83 – 0.86 mm ( $M = 0.85 \pm 0.01$ ), in ♂: 0.77 mm; antennae eight-segmented. Terminal palpomere of maxillary palpus with lateral sensory field narrow, elongate and more or less confined to anterior half of palpus. Pronotum convex dorsally, wider than long, widest at posterior 0.3, anterolateral portions strongly deflected; sides weakly carinate, arcuate, converging more strongly anteriorly than posteriorly; punctures nearly as large as facets, posteriorly smaller, separated by one to three puncture diameters, more densely arranged anteriorly and laterally than posteriorly, interstices shiny; lateral bands of plastron widest anteriorly, where it is as wide as vertical diameter of eye,

gradually narrowed posteriorly, effaced near posterior angles; anterior angles protruding, about half as long as longitudinal length of eye; MPL in ♀♀: 0.9 – 1.0 mm ( $M = 0.92 \pm 0.04$ ), in ♂: 0.9 mm; APW in ♀♀: 0.9 – 1.0 mm ( $M = 0.94 \pm 0.02$ ), in ♂: 0.9 mm; PPW in ♀♀: 1.3 – 1.4 mm ( $M = 1.31 \pm 0.04$ ), in ♂: 1.2 mm. Prosternum punctate, entirely covered with plastron (Fig. 62); prosternum in front of coxae longer than prosternal process; prosternal process distinctly narrower than ID, sides arcuate, weakly and widely raised, apex moderately protruding, wide, nearly truncate. Hypomeron widest at posterior third, where it is more than half as wide as prosternal process. Punctuation of metaventrite similar to that on prosternum. Metaventral process wide, lateral margins raised, lateral depressions deep, anteromesal margin flat; metaventral disc flat to feebly convex; discrimen fine, placed in depression posterior of middle. Elytra moderately convex dorsally; punctuation similar to that on pronotum or slightly denser, punctures placed in remnants of weakly impressed meshes mainly near suture; elytra usually subparallel along anterior half, gradually narrowed posteriorly; lateral plastron bands widest at posterior fifth, where it surpasses a third of greatest width of elytron, gradually narrower anteriorly and posteriorly, not reaching anterior margin (lateral view); EW in ♀♀: 1.5 – 1.6 mm ( $M = 1.60 \pm 0.04$ ), in ♂: 1.4 mm; EL: in ♀♀: 2.5 – 2.6 mm ( $M = 2.55 \pm 0.02$ ), in ♂: 2.3 mm. Scutellum narrower than half of ID, wider than long; sides arcuate; surface finely, nearly regularly punctate. Protibia about as long as MPL; tarsi about 0.6 times as long as tibia, terminal tarsomere about as long as tarsomeres 2 – 4 together; protarsal claws moderately narrow and long in females. Ventrite 5 about as long as combined lengths of ventrites 2 – 4, posterior margin narrowly excised in females. Aedeagus (Fig. 112) 1.44 mm long; phallobasis robust, subcylindrical, moderately curved, about two times as long as parameres, wider basally than apically (lateral view). Parameres short, widest near base, gradually curved ventrad and gradually narrowed toward narrowly rounded apices (lateral view). Penis (Fig. 119) shorter than parameres, widest basally, gradually narrowed apically; apex narrow, acute (ventral view). Ovipositor slightly longer than abdomen; valvifer about two times as long as coxite; bursa copulatrix with numerous short sclerotized spinules (Fig. 130).

**Sexual dimorphism:** Females larger than male holotype, lacking setal tufts on prosternal process and metaventrite, as well as long setae on labrum.

**Distribution:** Known only from Taiwan (Fig. 133).

**Etymology:** Named for M.-L. Jeng (Taipei, Taiwan).

### *Stenomystax kubani* sp.n.

**Type locality.** Small shallow stream, about 2 – 3 m wide, partly shaded, flowing through degraded forest, ca. 1000 m a.s.l.; Ban Sanpakia, northern Thailand.

**Type material:** **Holotype** ♂ (NMW): "N-THAILAND Ban Sanpakia, 19° 19' N98° 50' E, 1000 m a.s.l., 3.V.1998, V. Kuban leg.". **Paratypes:** 4 ♂♂, 10 ♀♀ (CKB, NMW): same data as holotype; 1 ♀ (NMW): "THAILAND: Phrae 18.11. 50km NE Phrae 1995 5km SE B. Huai Kaet leg. Zettel (18a)"; 2 ♂♂, 3 ♀♀ (CKB, NMW): "LAOS, Bolikhamxai prov. Ban Nape Kaew Nua Pass 18. 4. - 1. 5. 1998, ca. 600 m a.s.l., small stream."

**Diagnosis:** *Stenomystax kubani* is recognized by the extent of the plastron, as well as by form and size of its genitalia. *Stenomystax similis* differs in the following characters: (1) body form more elongate, narrower, less convex; (2) lateral margins of metaventral process raised, produced posteriorly; (3) metaventral surface without plastron as wide as metaventral process; (4) ventrites 1 – 3 lacking plastron mesally; (5) bursa copulatrix with flat sclerites and sclerotized spinules; (6) female ventrite 5 deeply excised posteriorly.

**Description:** Habitus (Fig. 56). Length (TL) in ♀♀: 2.7 – 3.0 mm ( $M = 2.79 \pm 0.10$ ), in ♂♂: 2.6 – 2.7 mm ( $M = 2.62 \pm 0.05$ ); maximum width (EW) in ♀♀: 1.4 – 1.5 mm ( $M = 1.47 \pm 0.04$ ), in

♂♂: 1.3 – 1.5 mm ( $M = 1.38 \pm 0.05$ ). Cranial punctures slightly smaller than facets; punctures nearly confluent or widely separated (sometimes more than two puncture diameters), posterior punctures usually more densely set; narrow impunctate area near middle; frontoclypeal margin weakly arcuate; ID in ♀♀: 0.54 – 0.62 mm ( $M = 0.57 \pm 0.02$ ), in ♂♂: 0.50 – 0.56 mm ( $M = 0.53 \pm 0.02$ ); HW in ♀♀: 0.76 – 0.82 mm ( $M = 0.78 \pm 0.02$ ), in ♂♂: 0.71 – 0.76 mm ( $M = 0.74 \pm 0.02$ ); antennae nine-segmented. Terminal palpomere of maxillary palpus with lateral sensory field narrow, reaching nearly middle of palpus. Pronotum convex dorsally, wider than long, widest near posterior third or near base; sides weakly carinate, gradually arcuately converging anteriorly; pronotal punctures smaller than facets, separated by about one to three puncture diameters, punctures smallest in posterior angles and near posterior margin, interstices shiny; lateral plastron bands anteriorly as wide as vertical diameter of eye, narrowed posteriorly and reaching nearly posterior 0.25; anterior angles produced, about 0.5 times as long as longitudinal length of eye; MPL in ♀♀: 0.7 – 0.8 mm ( $M = 0.76 \pm 0.03$ ), in ♂♂: 0.6 – 0.7 mm ( $M = 0.70 \pm 0.02$ ); APW in ♀♀: 0.8 – 0.9 mm ( $M = 0.84 \pm 0.02$ ), in ♂♂: 0.7 – 0.8 mm ( $M = 0.79 \pm 0.02$ ); PPW in ♀♀: 1.1 – 1.3 mm ( $M = 1.17 \pm 0.05$ ), in ♂♂: 1.0 – 1.2 mm ( $M = 1.10 \pm 0.04$ ). Prosternum weakly deflected, nearly flat mesally, anterior margin straight; surface with plastron except on narrow anteromesal portion, area without plastron densely punctate; prosternum in front of coxae slightly longer than prosternal process; prosternal process slightly narrower than ID, sides moderately arcuate, weakly raised, posterior portion depressed, apex slightly protruding, wide and truncate. Hypomeron widest at posterior third, where it is about 0.6 times as wide as prosternal process. Metaventral process wide, moderately depressed laterally, depressions with plastron; lateral margins moderately raised; metaventral disc lacking plastron on median area narrower than prosternal process, feebly convex; discrimen fine; males with short posteromesal tubercle. Elytra convex dorsally; punctuation as on pronotum; greatest width near anterior 0.2 or 0.3, sides gradually narrowed posteriorly; lateral plastron widest at posterior 0.2, where it is about 0.4 times as wide as maximum width of elytron, weakly narrowed anteriorly, effaced near posterior margin of mesocoxa (lateral view); EW in ♀♀: 1.4 – 1.5 mm ( $M = 1.47 \pm 0.04$ ), in ♂♂: 1.3 – 1.5 mm ( $M = 1.38 \pm 0.05$ ); EL: in ♀♀: 2.0 – 2.2 mm ( $M = 1.92 \pm 0.04$ ), in ♂♂: 1.9 – 2.0 mm ( $M = 2.03 \pm 0.08$ ). Scutellum wider than long, narrower than half of ID; sides arcuate; surface finely punctate. Protibia subequal in length with MPL; tarsi about 0.6 times as long as tibia, terminal tarsomere about as long as tarsomeres 2 – 4 together; male protarsal claws wider and more curved than in female (Figs. 83, 84). Ventrite 5 shorter than combined lengths of ventrites 2 – 4, apex shallowly excised in female; all ventrites with plastron. Sternite 9 of male (Fig. 106) with anterior medial process moderately wide. Aedeagus 1.32 – 1.35 mm long; phallobasis robust (Fig. 113), moderately curved, 2.1 – 2.2 times as long as parameres, widest near base (lateral view). Parameres short, widest near base, curved ventrad at apical half; apices narrowly rounded (lateral view). Penis (Fig. 120) shorter than parameres, narrowed apicad; apex narrow (ventral view). Membranous ventral sac with fine longitudinal furrows; fibula absent. Ovipositor (Fig. 131) slightly longer than abdomen; valvifer ca. two times as long as coxite; bursa copulatrix with numerous sclerotized spinules.

**Sexual dimorphism:** Females differ in: (1) larger size; (2) prosternal process and mesal portion of prosternum without plastron setae; (3) absence of setal tufts on labrum, prosternal process and metaventrite; (4) metaventrite without short posteromesal tubercle; (5) apex of ventrite 5 excised.

**Distribution:** Known from Thailand and Laos (Fig. 133).

**Etymology:** Dedicated to Vít Kubáň (Brno, Czech Republic).

### *Stenomystax minutus* sp.n.

**Type locality.** Stream, ca. 2 - 3 m wide, below waterfall near Bungus Beach, ca. 10 m a.s.l., southeast of Padang, West-Sumatra, Indonesia.

**Type material:** **Holotype** ♂ (NMW): "INDONESIEN 1991 (18) W-Sumatra, Bungus Beach, 10m leg. Jäch 14.2.+23.2.". **Paratype:** 1 ♂ (CKB): "INDONESIA: Sumatra, Prov. Aceh-Selatan, Babahrot, 25. 7. 1995, leg. Neumann".

**Diagnosis:** Recognized among all other *Stenomystax* species by: (1) lateral plastron on pronotum small, confined to anterior angles; (2) parameres only weakly curved ventrad, setose mesally; (3) male protarsal claws extremely short and wide.

**Description:** Habitus (Fig. 57). Length (TL) in: ♂♂ 2.6 – 2.8 mm; maximum width (EW) in ♂♂: 1.3 mm. Cranial punctures smaller than facets; interstices smaller or up to two times as long as a puncture diameter, smaller posteriorly; frontoclypeal margin weakly arcuate; ID in ♂♂: 0.54 – 0.56 mm; HW in ♂♂: 0.72 – 0.84 mm; antennae nine-segmented. Terminal palpomere of maxillary palpus with lateral sensory field narrow, elongate and confined to anterior half of palpus. Pronotum moderately convex dorsally, slightly wider than long, widest at posterior fifth; anterolateral portions deflected; sides narrowly carinate, arcuate, converging more strongly anteriorly than posteriorly; punctures nearly as large as facets, smallest posteriorly, separated by distance of one to two puncture diameters, denser anteriorly and laterally than posteriorly; plastron setae confined to anterolateral angles; anterior angles acute, about 0.5 times as long as longitudinal length of eye; MPL in ♂♂: 0.8 – 0.9 mm; APW in ♂♂: 0.8 mm; PPW in ♂♂: 1.1 mm. Prosternum in front of coxae slightly deflected anteriorly, not flattened, anteromesally lacking plastron, punctate, longer than prosternal process; prosternal process distinctly narrower than ID, sides straight, weakly and widely raised, mesal portion without plastron, apex weakly protruding and slightly emarginate. Hypomeron widest at posterior third, where it is more than 0.5 times as wide as prosternal process. Metaventral disc lacking plastron, nearly flat anteriorly, weakly convex posteriorly; punctation similar to head, some punctures surrounded by irregular shallow furrows; metaventral process wide, sides raised laterally and anteriorly; discrimen distinct along entire length, posteriorly placed in shallow longitudinal depression. Elytra moderately convex dorsally; punctation slightly denser than on pronotum; elytra widest near middle; lateral plastron bands widest at posterior third, there width exceeds third of greatest width of elytron, narrowed anteriorly and posteriorly, not reaching anterior margin (lateral view); EW in ♂♂: 1.3 mm; EL: in ♂♂: 1.9 – 2.0 mm. Scutellum wider than long, about 0.5 times as wide as ID; sides arcuate; surface finely, nearly regularly punctate. Protibia slightly shorter than MPL; tarsi about 0.6 times as long as tibia, terminal tarsomere more or less as long as tarsomeres 2 – 4 together; male protarsal claws short and strongly widened (Fig. 85). Abdominal intercoxal process of ventrite 1 lacking plastron mesally; ventrite 5 subequal in length with combined lengths of ventrites 2 – 4, posterior margin narrowly rounded. Aedeagus (Fig. 114) 1.32 mm long; phallobasis robust, subcylindrical, moderately curved, about 2.1 times as long as parameres (lateral view). Parameres short, widest basally, near apex weakly curved, gradually narrowed at apical half, apices rounded, mesal portion finely setose. Penis (Fig. 121) slightly shorter than parameres, widest basally, gradually narrowed apically; apex gradually narrowed (ventral view); fibula absent.

**Sexual dimorphism:** Females are so far unknown.

**Distribution:** Known only from Sumatra, Indonesia (Fig. 133).

**Etymology:** From Latin, *minutus* (minute). Named in reference to the small plastron area on pronotum.

### *Stenomystax similis* sp.n.

**Type locality.** Forest stream, 2 - 3 m wide, densely shaded, ca. 550 m a.s.l., near Lake Maninjau, West-Sumatra, Indonesia (see SCHÖNMANN 1994: Fig. 47).

**Type material: Holotype** ♂ (NMW): "INDONESIEN 1991 (8) W-Sumatra, Maninjau 550m leg. Jäch 8.2".

**Paratypes:** 2 ♂♂, 2 ♀♀ (NMW): same data as holotype; 3 ♂♂, 3 ♀♀ (NMW, CKB): "INDONESIEN 1991 (9) W-Sumatra, Maninjausee leg. Schödl 8.2."; 3 ♂♂, 2 ♀♀ (NMW): "INDONESIEN 1991 (4) W-Sumatra, NSG Panti, 300m leg. Schödl 5.2."; 1 ♀ (NMW): "INDONESIEN 1991 (4) W-Sumatra, NSG Panti, 300m leg. Jäch 5.2.".

**Diagnosis:** *Stenomystax similis* is characterized by: (1) small size, (2) extent of plastron, (3) form and size of genitalia. Differences from *S. gracilis*, *S. inopinatus* and *S. kubani* are discussed above.

**Description:** Habitus (Fig. 58). Length (TL) in ♀♀: 2.4 – 2.6 mm ( $M = 2.51 \pm 0.09$ ), in ♂♂: 2.4 – 2.5 mm ( $M = 2.46 \pm 0.05$ ); maximum width (EW) in ♀♀: 1.2 – 1.4 mm ( $M = 1.25 \pm 0.06$ ), in ♂♂: 1.2 – 1.3 mm ( $M = 1.21 \pm 0.04$ ). Cranial punctures nearly as large as facets, interstices smaller than puncture diameter or up to two times as long as a puncture diameter; small mesal area impunctate; frontoclypeal margin arcuate in males, nearly straight in females; ID in ♀♀: 0.47 – 0.53 mm ( $M = 0.50 \pm 0.02$ ), in ♂♂: 0.44 – 0.49 mm ( $M = 0.46 \pm 0.02$ ); HW in ♀♀: 0.65 – 0.75 mm ( $M = 0.70 \pm 0.03$ ), in ♂♂: 0.63 – 0.71 mm ( $M = 0.67 \pm 0.03$ ); antennae nine-segmented. Terminal palpomere of maxillary palpus with lateral sensory field very narrow, slightly surpassing anterior third of palpus. Pronotum moderately convex dorsally, wider than long, widest posterior of middle; sides carinate, moderately arcuate and gradually converging anteriorly and posteriorly; pronotal punctures nearly as large as facets, separated by one to three puncture diameters, interstices shiny; lateral plastron bands anteriorly as wide as vertical diameter of eye, narrowed posteriorly and surpassing pronotal middle; anterior angles acute, slightly longer than half of longitudinal length of eye; MPL in ♀♀: 0.6 – 0.7 mm ( $M = 0.63 \pm 0.02$ ), in ♂♂: 0.6 – 0.7 mm ( $M = 0.63 \pm 0.01$ ); APW in ♀♀: 0.7 – 0.8 mm ( $M = 0.75 \pm 0.03$ ), in ♂♂: 0.7 – 0.8 mm ( $M = 0.73 \pm 0.02$ ); PPW in ♀♀: 0.9 – 1.1 mm ( $M = 0.98 \pm 0.04$ ), in ♂♂: 0.9 – 1.0 mm ( $M = 0.93 \pm 0.03$ ). Prosternum nearly flat mesally, anterior margin straight; males (Fig. 63) without plastron only on narrow anteromesal portion, entire mesal surface densely punctate, interstices micropunctate (sockets of plastron setae); females (Fig. 64) lacking plastron on mesal portion along entire prosternal length, portion without plastron narrower than prosternal process, punctate, interstices shiny; prosternum in front of coxae slightly longer than prosternal process. Prosternal process slightly narrower than ID, sides straight, moderately and widely raised, bordered by weak longitudinal depression mesally; apex slightly protruding, wide and truncate. Hypomerion widest at posterior third, where it is about 0.6 times as wide as prosternal process. Punctuation of metaventrite sparser than on prosternal process. Metaventral process wide, anterolaterally depressed; lateral margins raised, keel-like, keels effaced near middle of metaventrite; metaventral disc lacking plastron, flat; discrimen fine; males with short postero-mesal keel. Elytra moderately convex dorsally; punctuation similar to that of pronotum, but punctures smaller, in some specimens surrounded by weakly impressed, incomplete meshes near suture; greatest width near middle or posterior of middle; sides gradually narrowed anteriorly and more strongly narrowed posteriorly; lateral plastron widest at posterior fourth, where it is 0.4 times as wide as greatest width of elytron, weakly narrowed anteriorly, effaced near posterior margin of mesocoxa (lateral view); EW in ♀♀: 1.1 – 1.4 mm ( $M = 1.25 \pm 0.06$ ), in ♂♂: 1.2 – 1.3 mm ( $M = 1.21 \pm 0.04$ ); EL in ♀♀: 1.8 – 2.0 mm ( $M = 1.88 \pm 0.08$ ), in ♂♂: 1.7 – 1.9 mm ( $M = 1.83 \pm 0.05$ ). Scutellum wider than long, narrower than half of ID; sides arcuate; surface finely punctate. Protibia slightly longer than MPL; tarsi about 0.6 times as long as tibia, terminal tarsomere about as long as tarsomeres 2 – 4 together; male protarsal claws weakly wider and more curved than in female (Figs. 86, 87). Ventrite 5 shorter than combined lengths of ventrites 2 – 4, apex excised in females; abdominal intercoxal process and mesal portion of ventrites 2 and

3 lacking plastron. Sternite 9 of male (Fig. 108) with anterior medial process moderately wide. Aedeagus (Fig. 115) 1.27 – 1.30 mm long; phallobasis robust, moderately curved, 2.0 – 2.1 times as long as parameres, widest near middle. Parameres short, widest near base, curved ventrad near apex, apices narrowly rounded (lateral view). Penis (Fig. 122) shorter than parameres, subparallel-sided in basal 0.5 of penis length, gradually narrowed apically; apex narrow (ventral view). Membranous ventral sac with fine longitudinal furrows; fibula absent. Ovipositor (Fig. 132) slightly longer than abdomen; valvifer ca. 1.9 times as long as coxite; bursa copulatrix with numerous larger sclerotized spinules and few sclerites.

**Sexual dimorphism:** Females differ in: (1) larger size; (2) frontoclypeal margin nearly straight; (3) prosternal process and mesal portion of prosternum without plastron setae; (4) absence of setal tufts on labrum, prosternal process and metaventrite; (5) metaventrite without short postero-mesal keel; (6) apex of ventrite 5 excised.

**Distribution:** Known only from western Sumatra, Indonesia (Fig. 133).

**Etymology:** From Latin, *similis* (similar). Named in reference to the overall similarity to *S. gracilis*.

### *Elmomorphus* Sharp, 1888

*Elmomorphus* SHARP, 1888: 242. Type species: *Elmomorphus brevicornis* SHARP, 1888: 243.

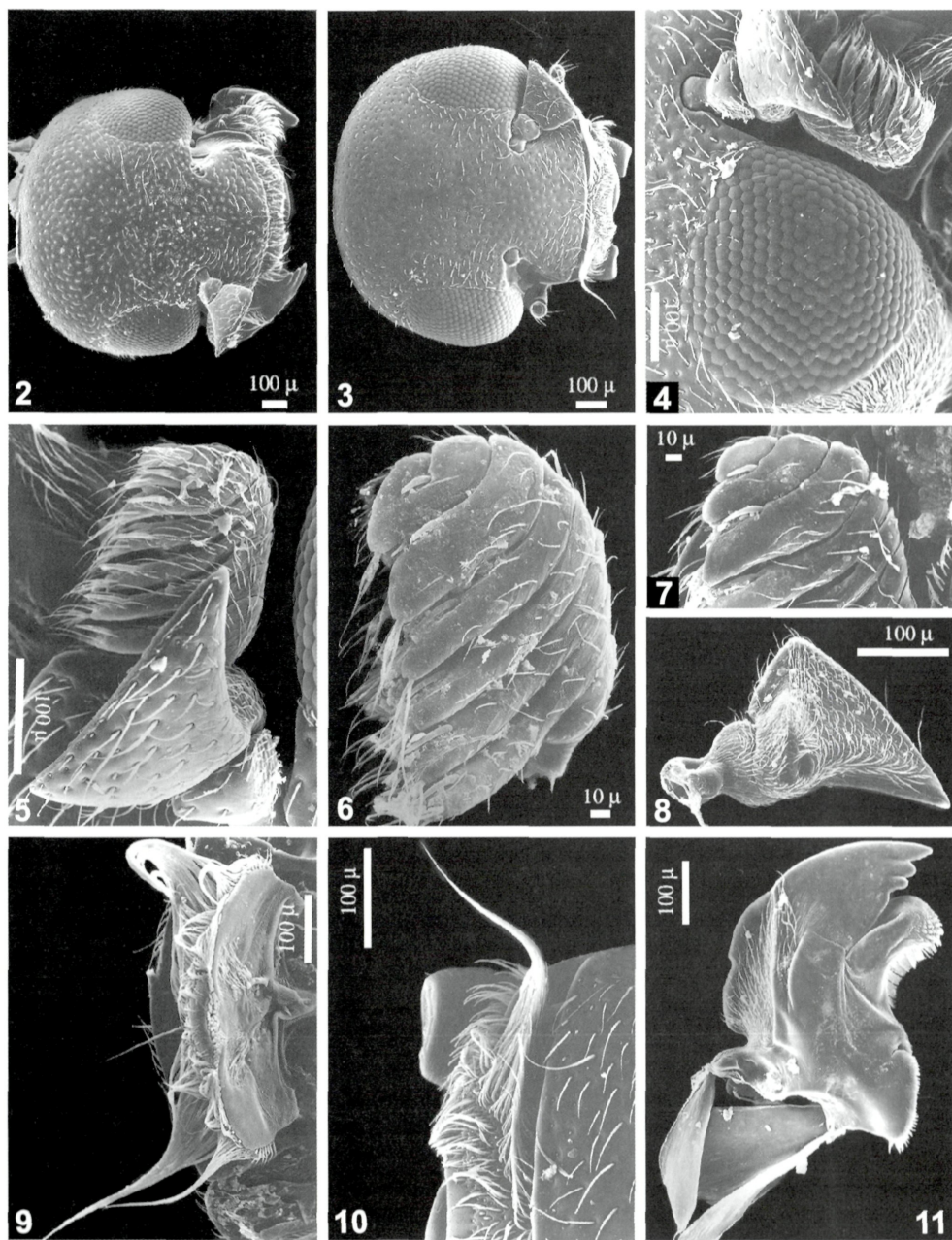
*Elmomorphellus* CHÛJÔ & SATÔ, 1964: 193, **syn.n.** Type species: *Elmomorphus (Elmomorphellus) sarawakensis* CHÛJÔ & SATÔ, 1964: 193.

**Type material: Holotype** ♂ (NMO): "Kaleti SARAWAK 30. I. 1962 G. IMADATE Leg.". Length of holotype: 4.05 mm, maximal width: 1.9 mm; glued on triangular card; right middle, right hind and left middle leg glued separately on the same card. Examination of mesofemora showed the presence of a row of long strong setae on the inner margin, a character found in all species of *Elmomorphus*.

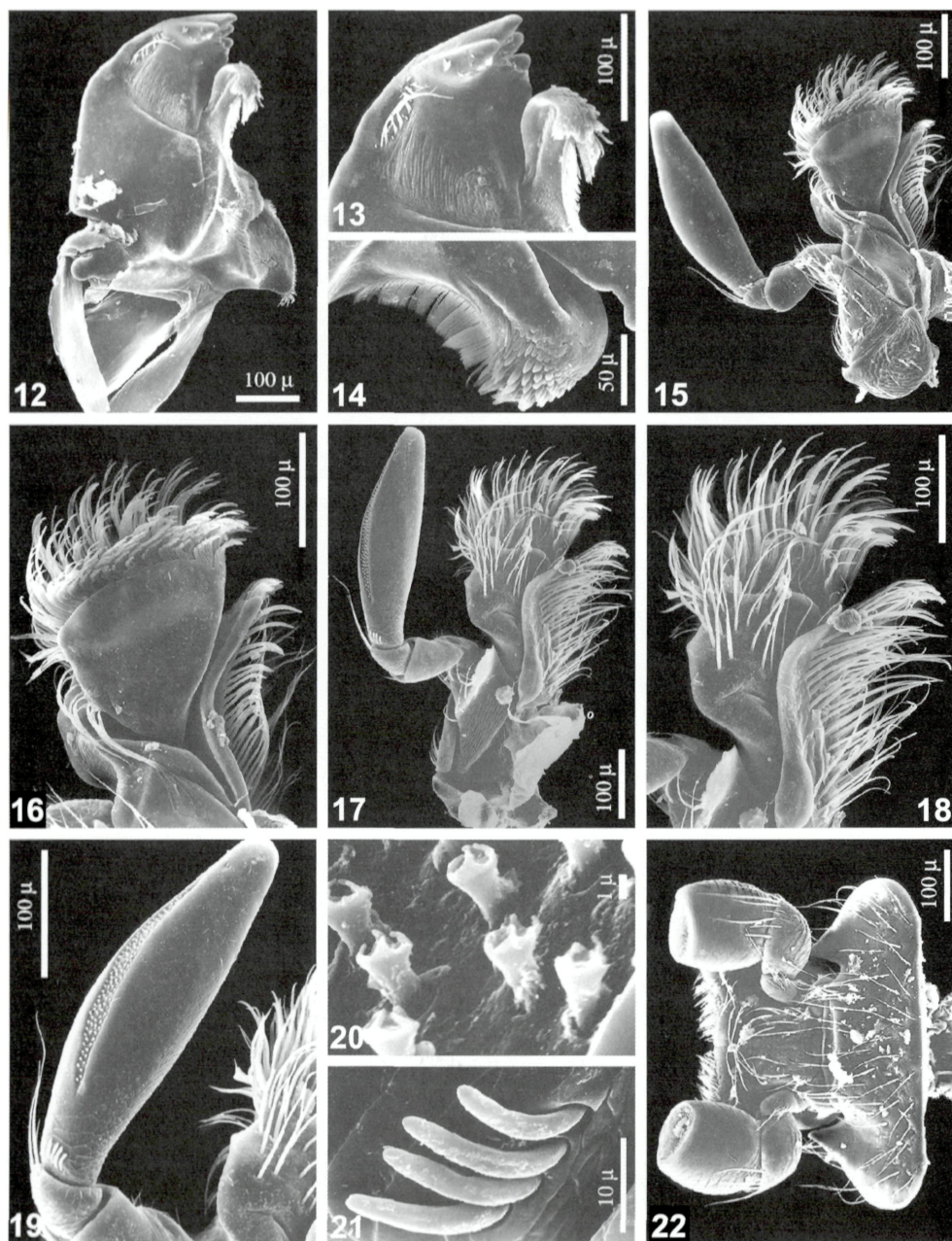
*Elmomorphellus* was described as a subgenus and characterized by CHÛJÔ & SATÔ (1964) as follows: "the pronotum with the straight side, the dorsal surface granulate, the elytra without any distinct punctate-striae and the mid-femora lacking the range of setigerous punctures on the inner side in dorsal view". The latter character probably reflects misidentification of middle and hind legs. The other characters vary in different combination in several *Elmomorphus* species and as such are not suitable for characterisation of species groups or subgenera. For this reason we consider *Elmomorphellus* to be a junior synonym of *Elmomorphus*.

### Acknowledgements

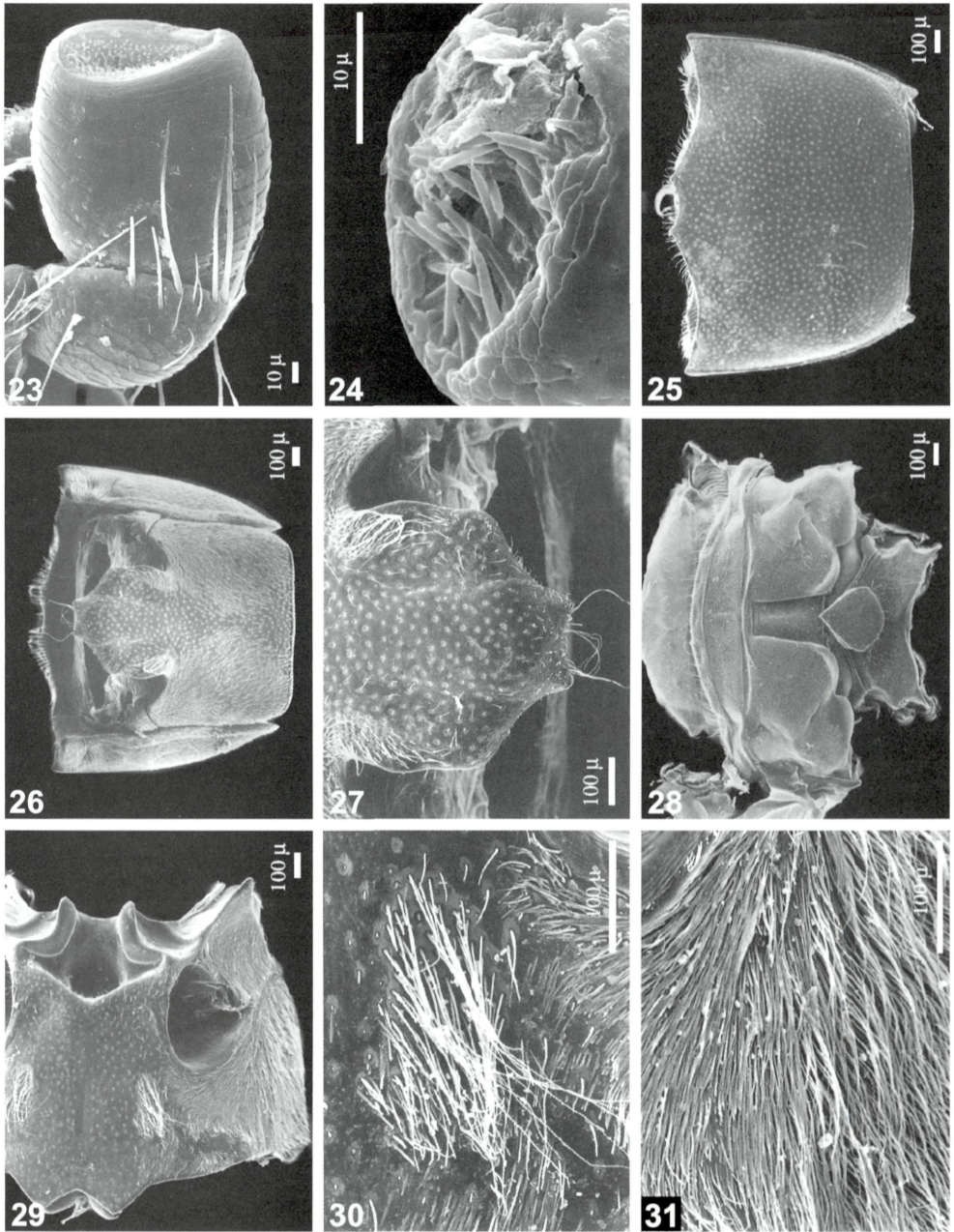
We are greatly indebted to W. Zelenka (Vienna, Austria) for the habitus illustration, and M.-L. Jeng (Taipei, Taiwan) and V. Kubáň (Brno, Czech Republic) for sending valuable material. Special thanks are due to K. Horák and J. Stankovič (Bratislava, Slovakia) for their assistance in preparing the scanning electron microscope photographs. This study was supported in part by the Slovak Scientific Grant Agency as Project No. 1/7196/20 and 2/7167/20.



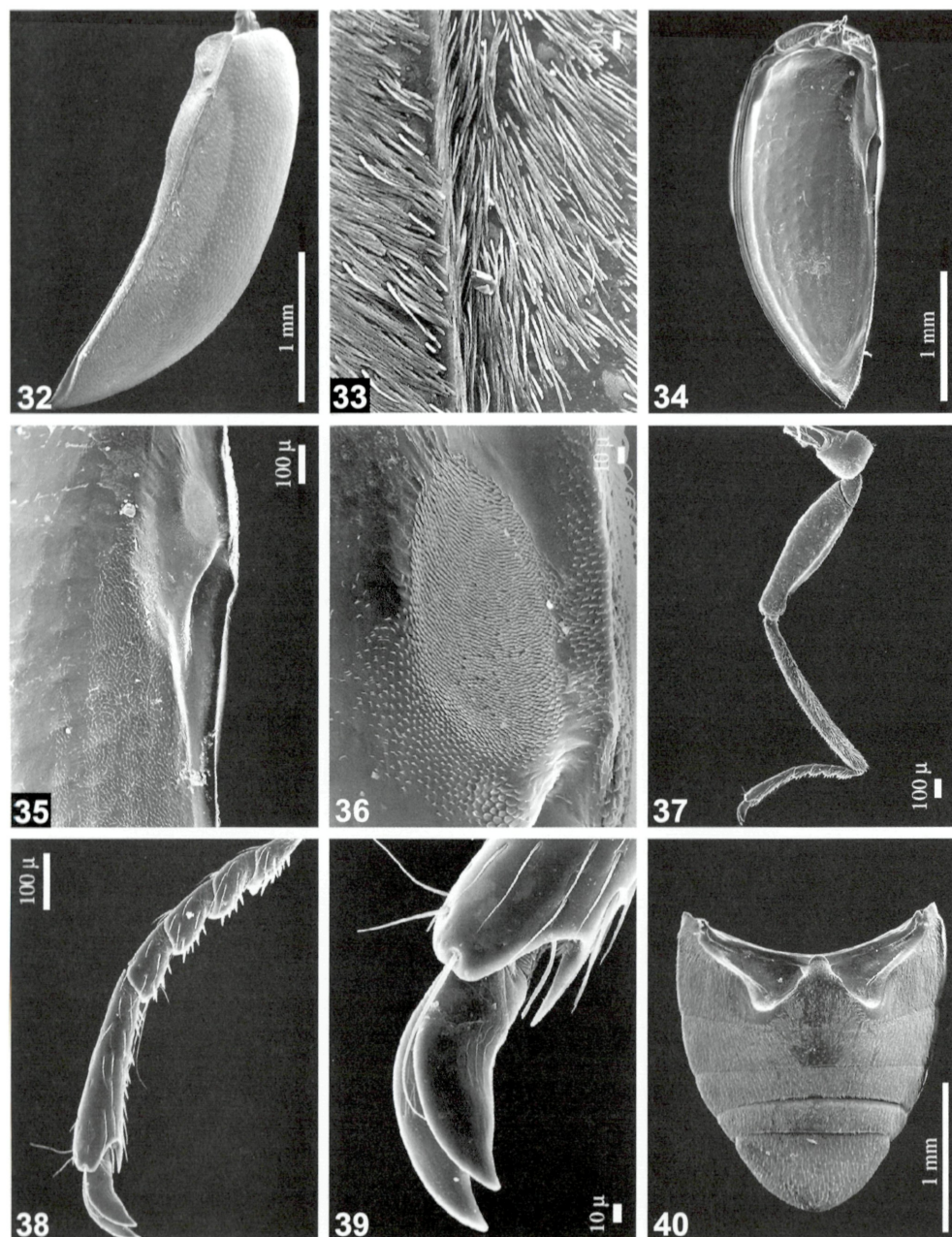
Figs. 2 – 11: *Stenomystax depressus* sp.n., 2) female head, dorsal view; 3) male head, dorsal view; 4) eye, lateral view; 5) antenna, dorsal view; 6) antennal club, dorsal view; 7) antennal apex, dorsal view; 8) scape and pedicel, ventral view; 9) male labrum, ventral view; 10) male labrum, dorsal view; 11) left mandible, dorsal view.



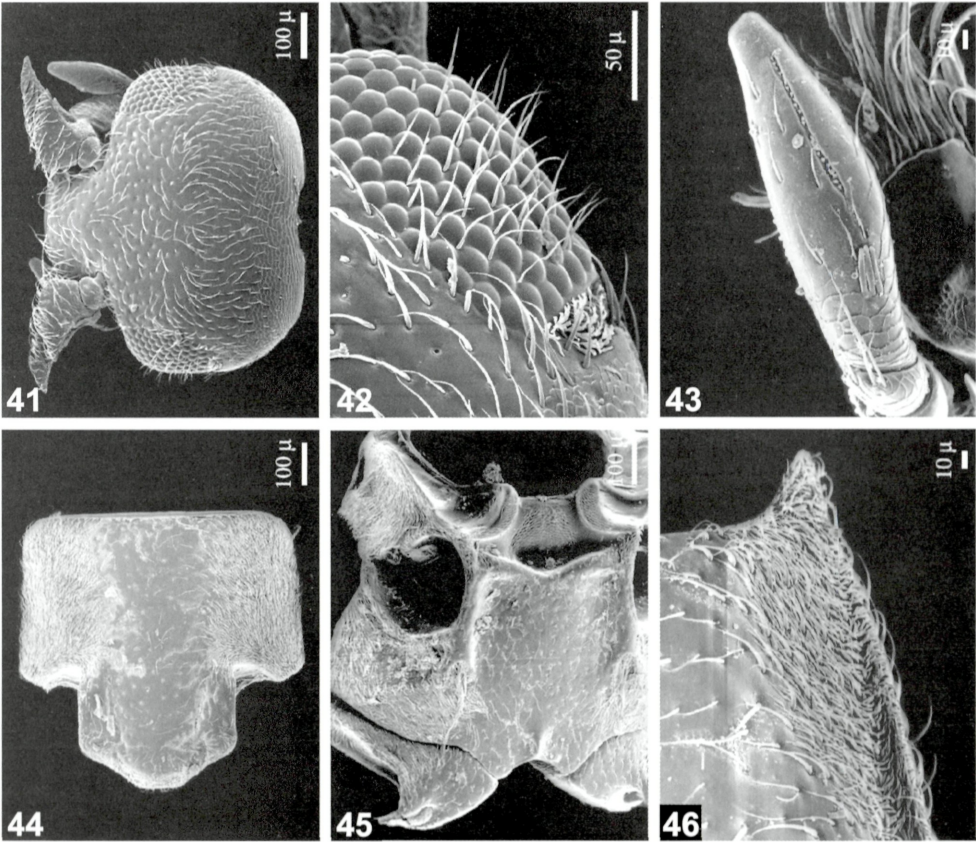
Figs. 12 – 22: *Stenomystax depressus* sp.n., 12) right mandible, ventral view; 13) same, apical portion, ventral view; 14) left prosthema, dorsal view; 15) right maxilla, ventral view; 16) lacinia and galea, ventral view; 17) left maxilla, dorsal view; 18) lacinia and galea, dorsal view; 19) maxillary palpus, dorsolateral view; 20) sensilla of lateral sensory field, dorsolateral view; 21) basal sensory field, dorsolateral view; 22) labium, ventral view.



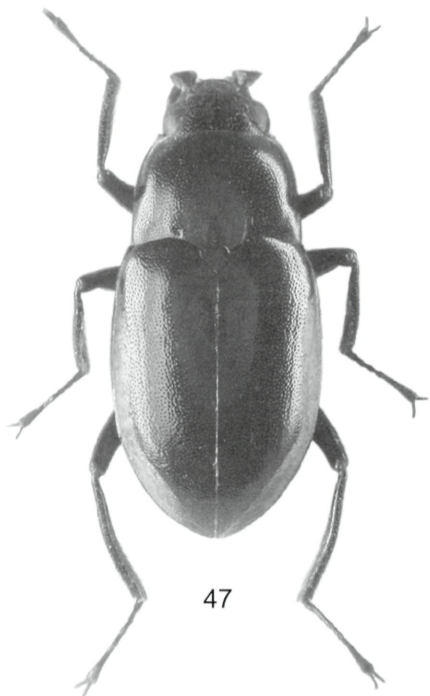
Figs. 23 – 31: *Stenomystax depressus* sp.n., 23) labial palpus, ventral view; 24) apex of labial palpus, anteroventral view; 25) pronotum, dorsal view; 26) prothorax, ventral view; 27) male prosternal process, ventral view; 28) meso- and metathorax, dorsal view; 29) meso- and metaventrite, ventral view; 30) setal tufts on male metaventrite, ventral view; 31) plastron setae on anterolateral portion of metaventrite, ventral view.



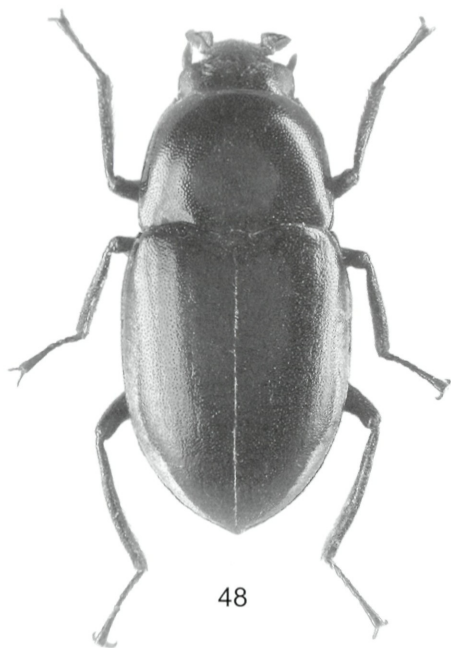
Figs. 32 – 40: *Stenomystax depressus* sp.n., 32) elytron, lateral view; 33) plastron setae on anterolateral portion of elytron, lateral view; 34) elytron, ventral view; 35) elytron, anterolateral portion, ventral view; 36) basolateral patch of binding spicules, ventral view; 37) male fore leg, lateral view; 38) male protarsus, lateral view; 39) male protarsal claws, lateral view; 40) male abdomen, ventral view.



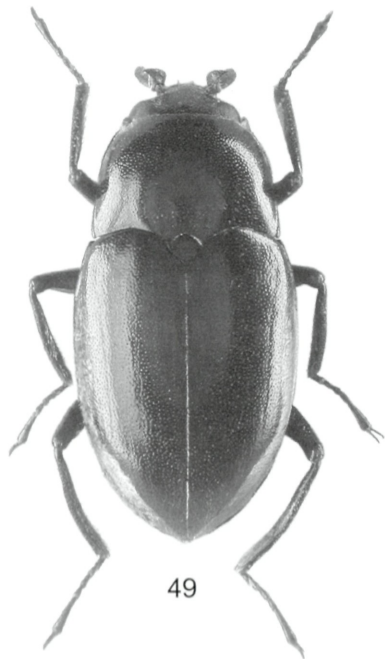
Figs. 41 – 46: *Stenomystax gracilis* sp.n., 41) female head, dorsal view; 42) eye with interfacetal setae, dorsal view; 43) maxillary palpus, lateral view; 44) male prosternum, ventral view; 45) meso- and metaventricle, ventral view; 46) anterolateral angles of pronotum, dorsal view.



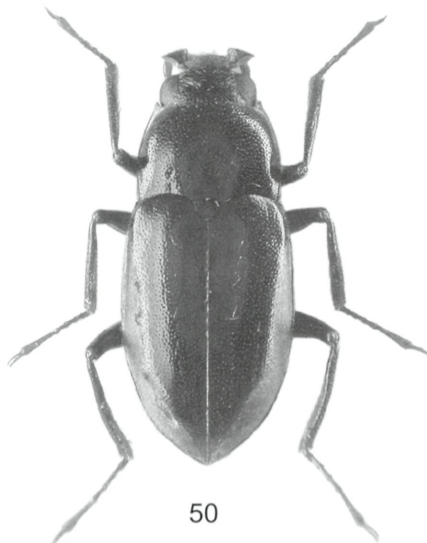
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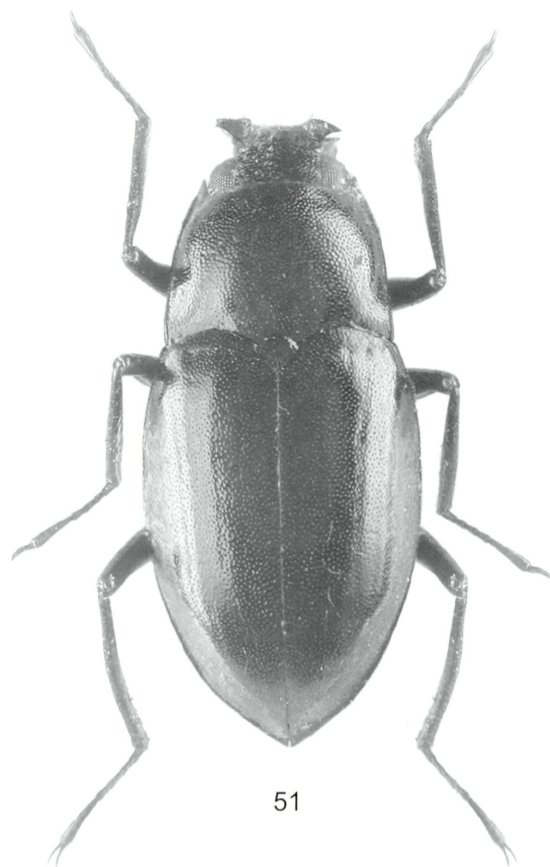


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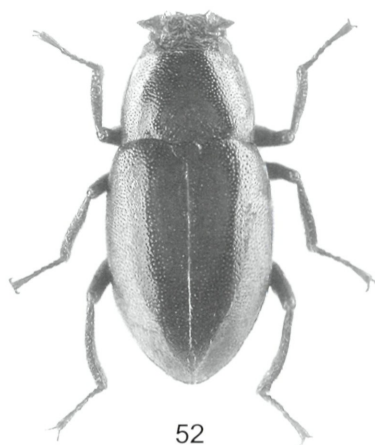


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Figs. 47 – 50: Habitus of *Stenomystax* males, 47) *S. depressus* sp.n., TL = 3.9 mm; 48) *S. convexus* sp.n., TL = 4.2 mm; 49) *S. montanus* sp.n., TL = 4.0 mm; 50) *S. splendidus* sp.n., TL = 3.5 mm.



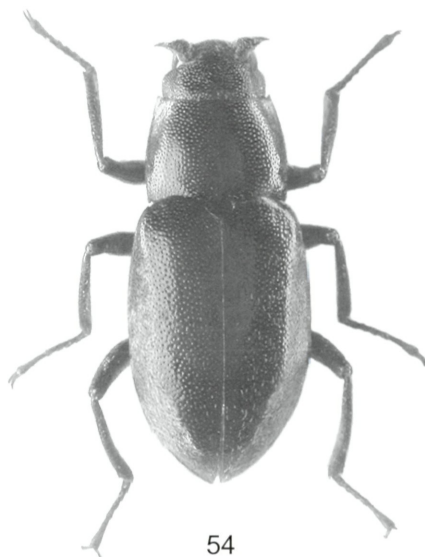
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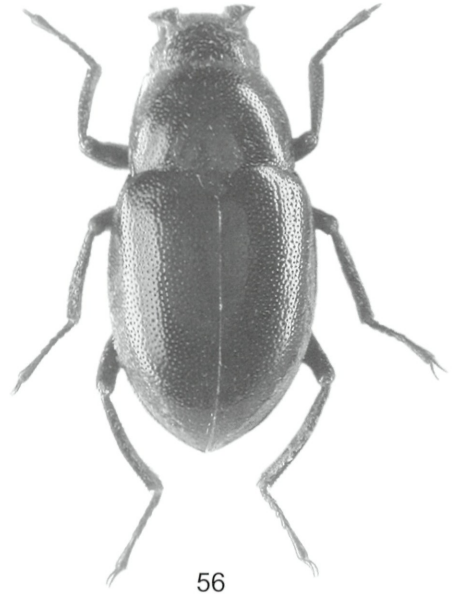
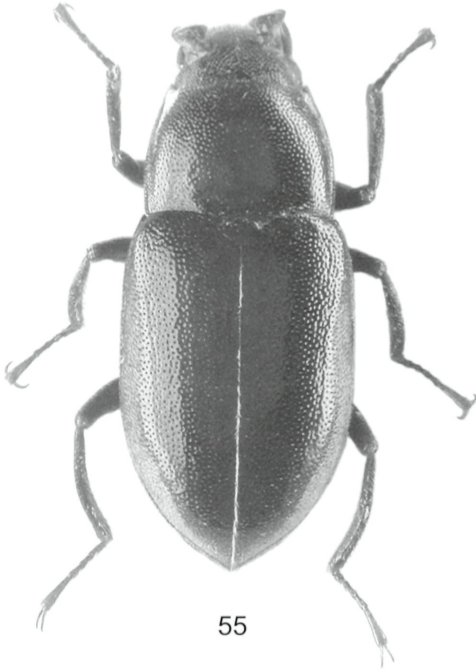


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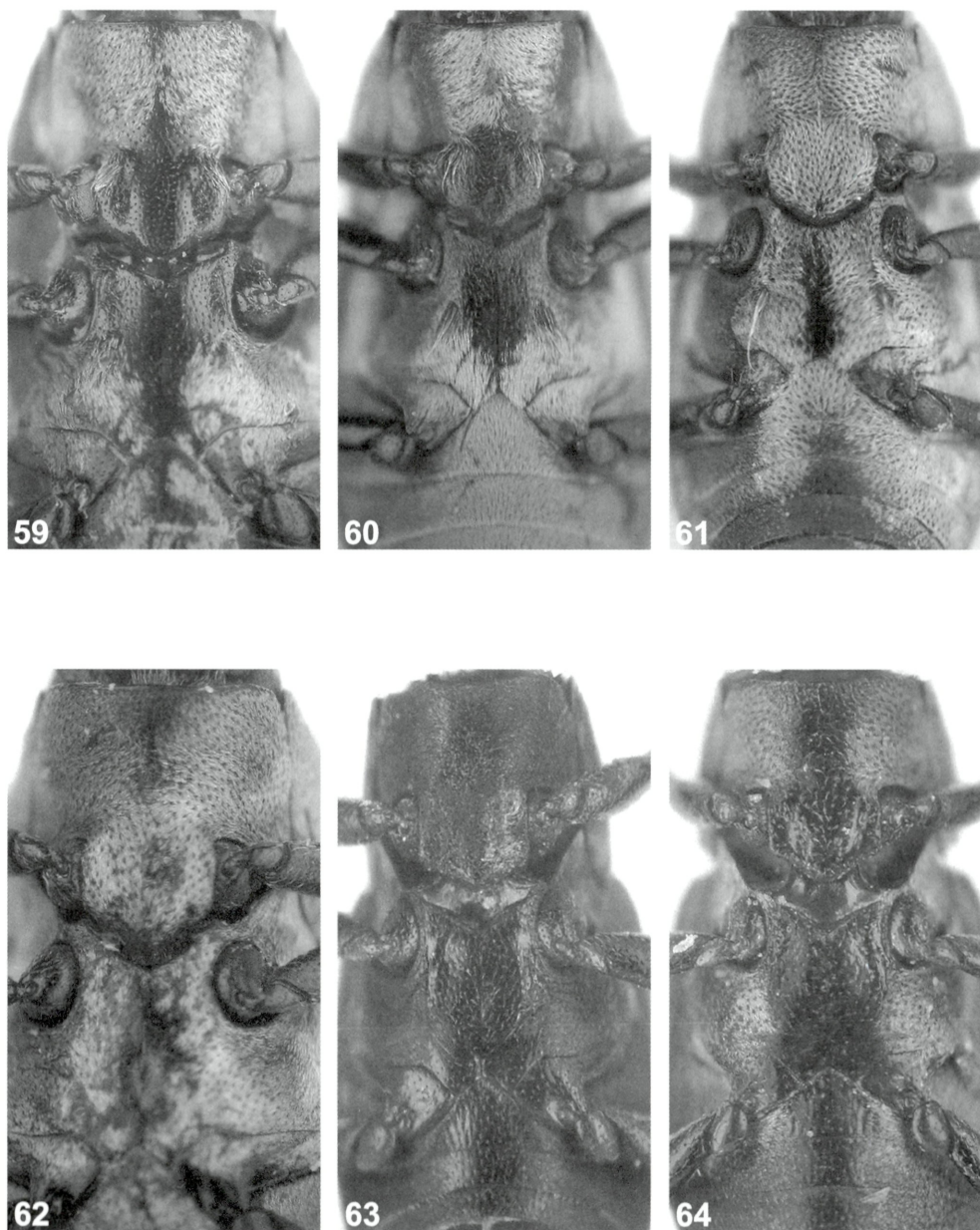


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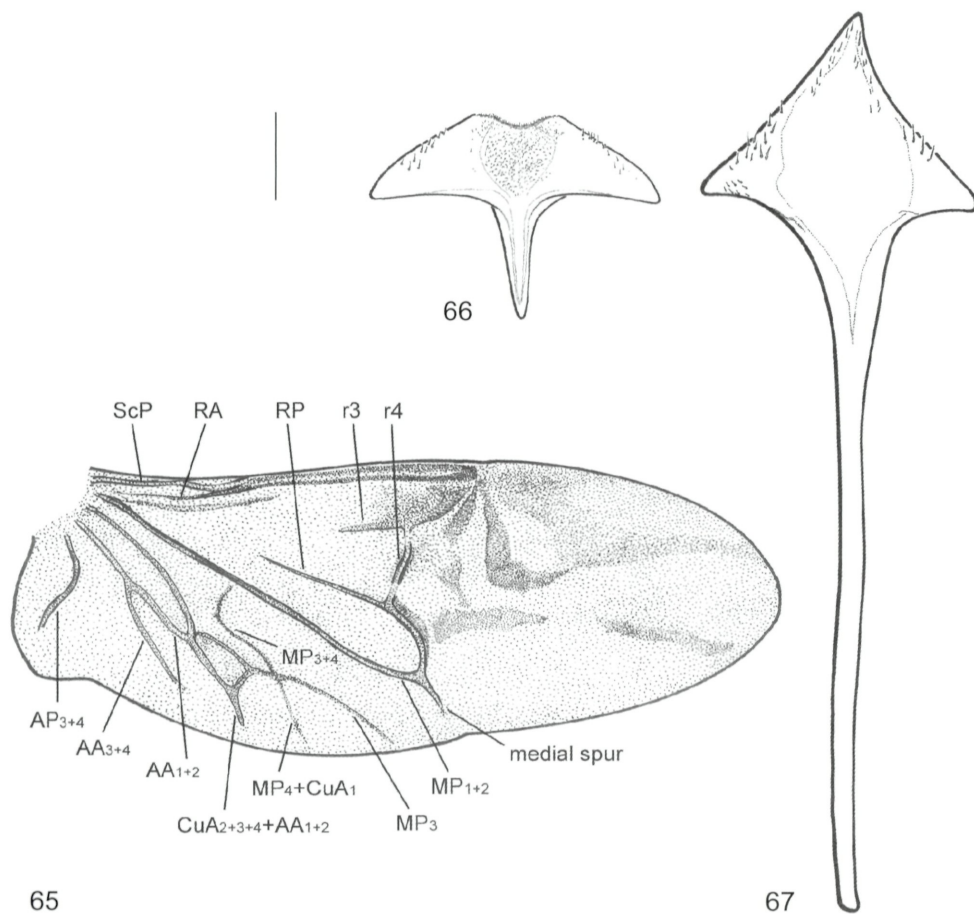
Figs. 51 – 54: Habitus of *Stenomystax* males, 51) *S. sumatranus* sp.n. (right hind leg added digitally), TL = 4.5 mm; 52) *S. saetosus* sp.n., TL = 2.7 mm; 53) *S. gracilis* sp.n., TL = 2.1 mm; 54) *S. inopinatus* sp.n., TL = 3.0 mm.



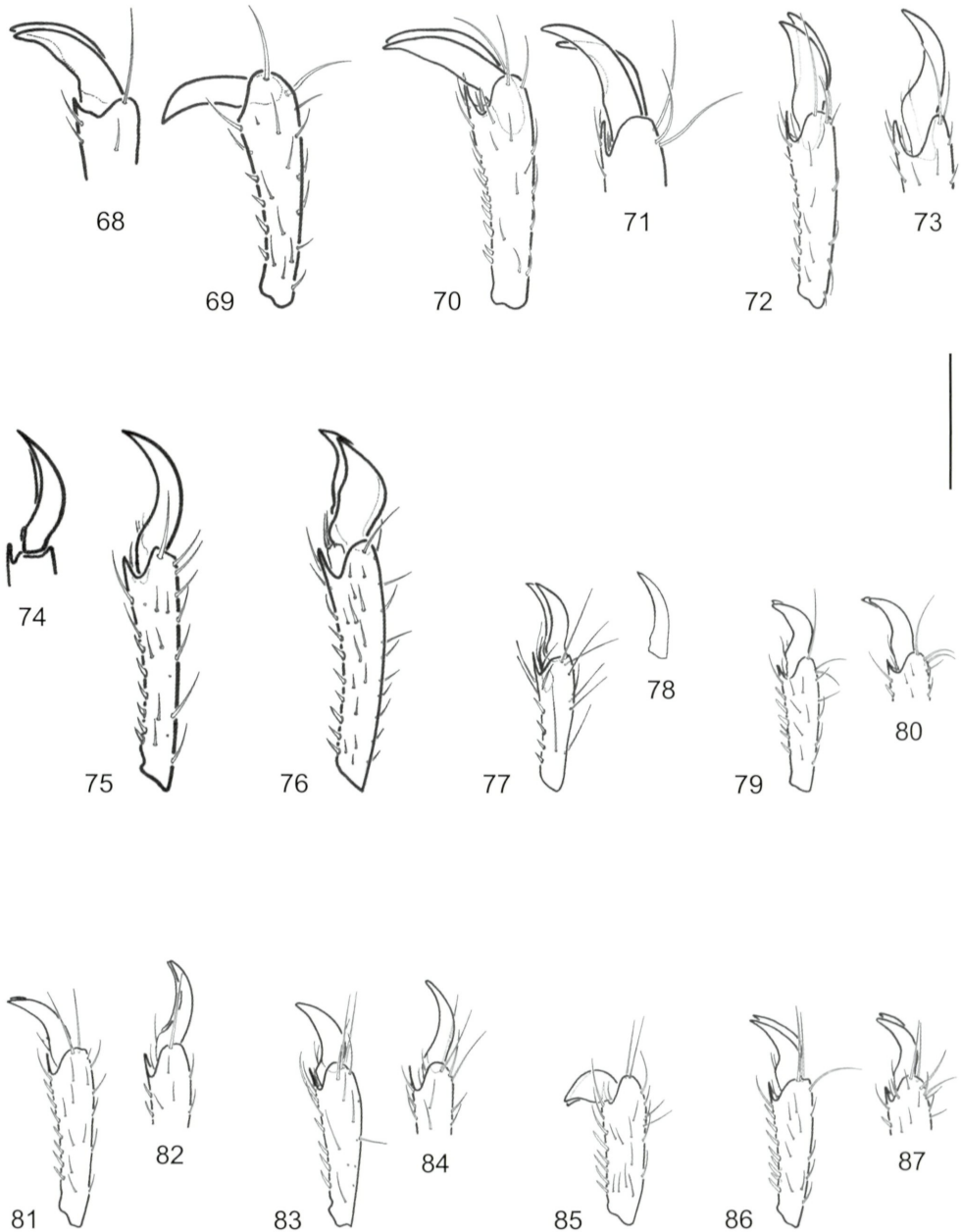
Figs. 55 – 58: Habitus of *Stenomystax*, 55) *S. jengi* sp.n., ♀, TL = 3.4 mm; 56) *S. kubani* sp.n., ♂, TL = 2.7 mm; 57) *S. minutus* sp.n., ♂, TL = 2.8 mm; 58) *S. similis* sp.n., ♂, TL = 2.5 mm.



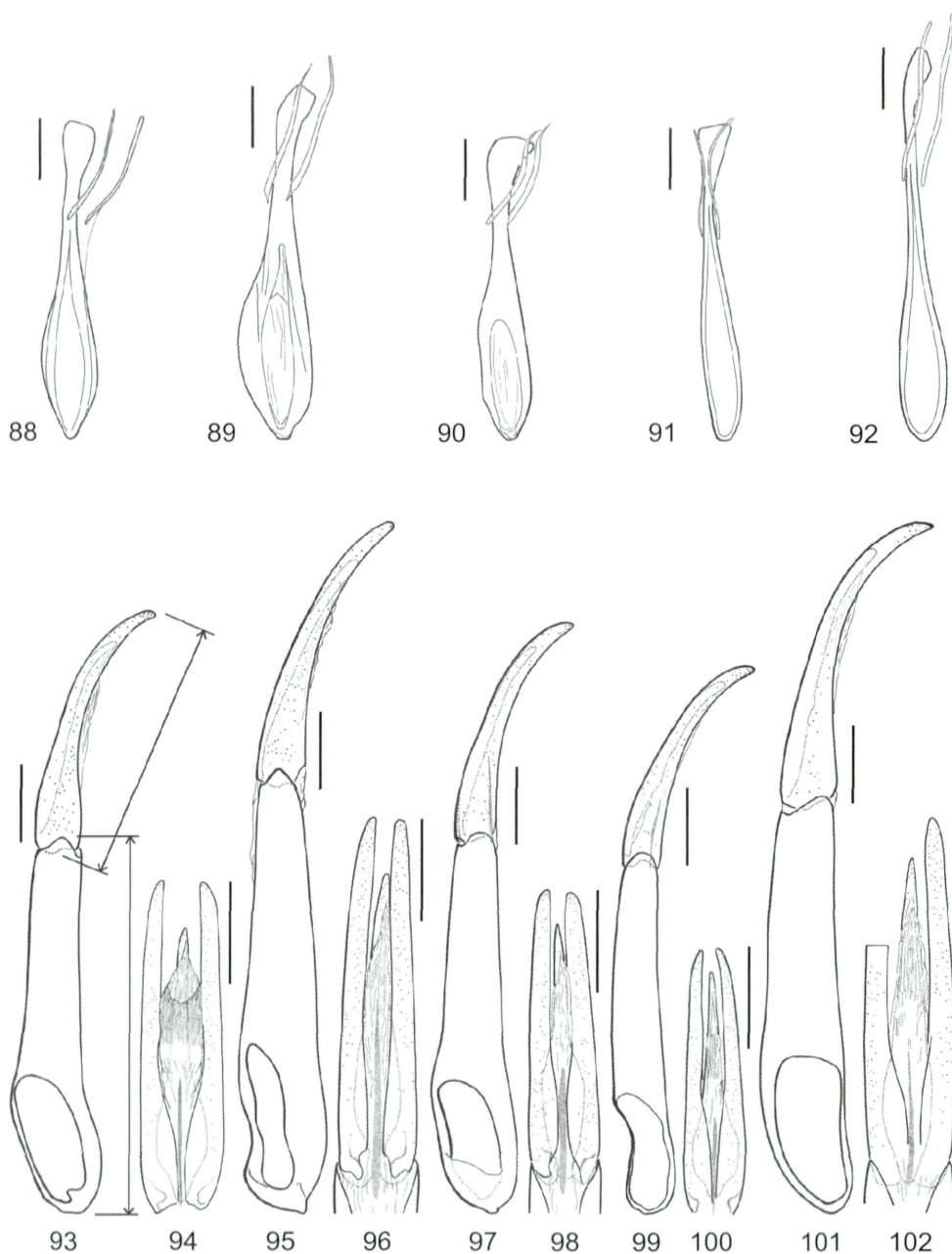
Figs. 59 – 64: Ventral portion of thorax and anterior ventrites of 59) *Stenomystax depressus* sp.n., male; 60) *S. splendidus* sp.n., male; 61) *S. saetosus* sp.n., male; 62) *S. jengi* sp.n., female; 63) *S. similis* sp.n., male; 64) *S. similis* sp.n., female.



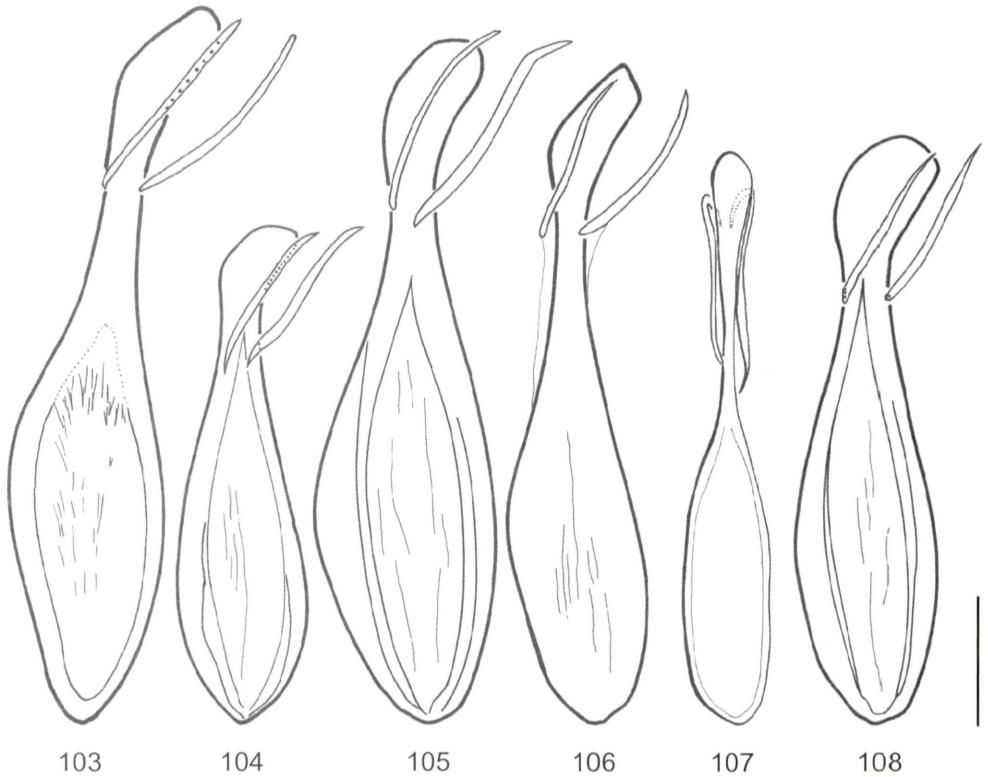
Figs. 65 – 67: *Stenomystax depressus* sp.n., 65) hind wing in dorsal view, wing length 4.5 mm; AA – Anal anterior; AP – Anal posterior; CuA – Cubitus anterior; MP – Media posterior; r3, r4 – radial cross-veins; RA – Radius anterior; RP – Radius posterior; ScP – Subcosta posterior; 66) male sternite 8, ventral view; 67) female sternite 8, ventral view. Scale = 0.2 mm.



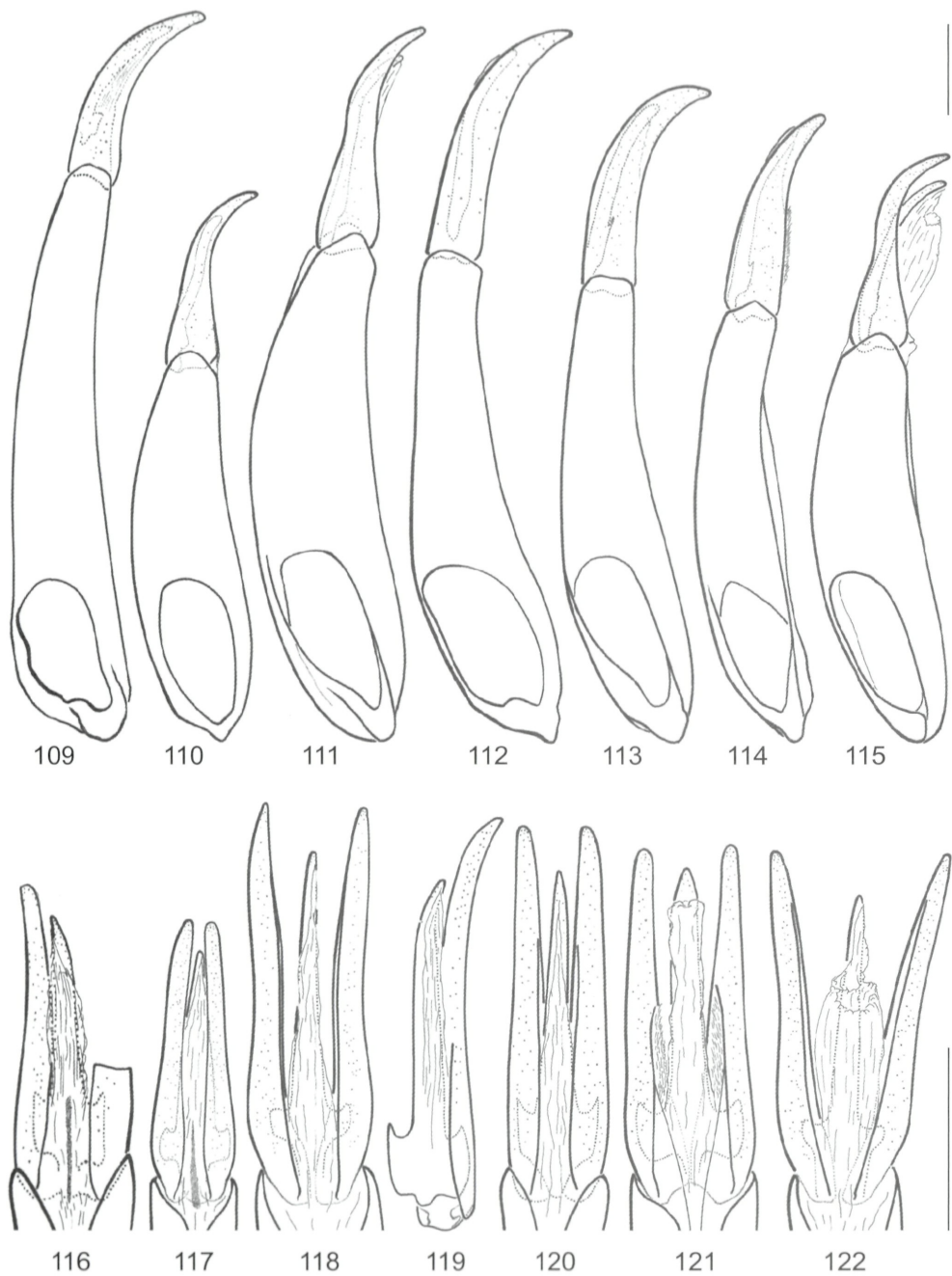
Figs. 68 – 87: Protarsal claws in lateral view: 68) *Stenomystax depressus* sp.n., male; 69) female; 70) *S. convexus* sp.n., male; 71) female; 72) *S. montanus* sp.n., male; 73) female; 74) *S. splendidus* sp.n., male; 75) female; 76) *S. sumatranus* sp.n., male; 77) *S. saetosus* sp.n., male; 78) female; 79) *S. gracilis* sp.n., male; 80) female; 81) *S. inopinatus* sp.n., male; 82) female; 83) *S. kubani* sp.n., male; 84) female; 85) *S. minutus* sp.n., male; 86) *S. similis* sp.n., male; 87) female. Scale = 0.2 mm.



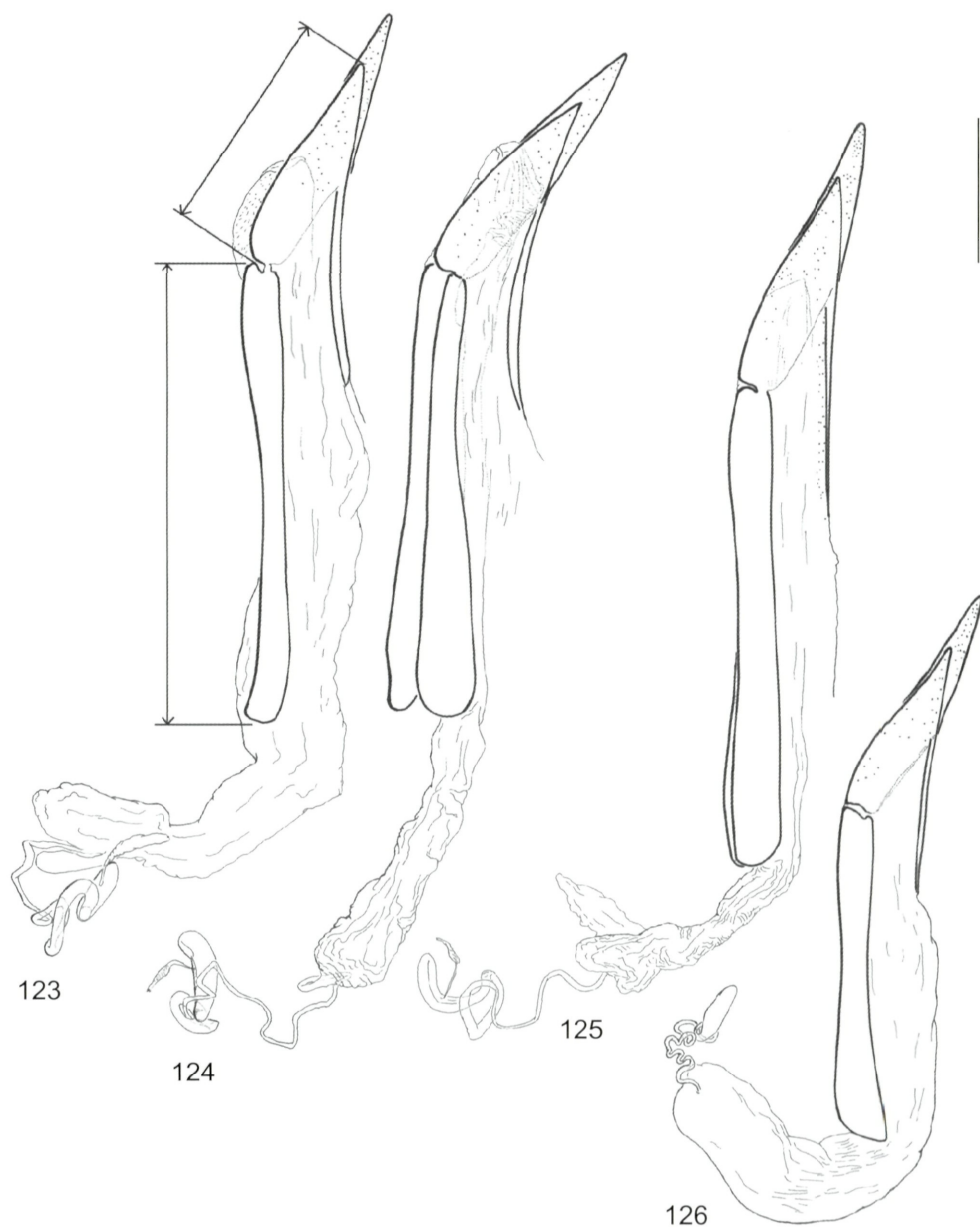
Figs. 88 – 92: Male sternite 9 in ventral view: 88) *Stenomystax depressus* sp.n.; 89) *S. convexus* sp.n.; 90) *S. montanus* sp.n.; 91) *S. splendidus* sp.n.; 92) *S. sumatranus* sp.n.  
Figs. 93 – 102: Aedeagus, penis and parameres in lateral and ventral view of 93 – 94) *S. depressus* sp.n.; 95 – 96) *S. convexus* sp.n.; 97 – 98) *S. montanus* sp.n.; 99 – 100) *S. splendidus* sp.n.; 101 – 102) *S. sumatranus* sp.n. Scale = 0.2 mm.



Figs. 103 – 108: Male sternite 9 in ventral view: 103) *Stenomystax saetosus* sp.n.; 104) *S. gracilis* sp.n.; 105) *S. inopinatus* sp.n.; 106) *S. kubani* sp.n.; 107) *S. minutus* sp.n.; 108) *S. similis* sp.n. Scale = 0.2 mm.



Figs. 109 – 122: Aedeagus, penis and parameres in lateral and ventral view: 109, 116) *S. saetosus* sp.n.; 110, 117) *S. gracilis* sp.n.; 111, 118) *S. inopinatus* sp.n.; 112, 119) *S. jengi* sp.n.; 113, 120) *S. kubani* sp.n.; 114, 121) *S. minutus* sp.n.; 115, 122) *S. similis* sp.n. Scale = 0.2 mm.



Figs. 123 – 126: Ovipositor and part of genital tract, lateral view, 123) *Stenomystax depressus* sp.n.; 124) *S. convexus* sp.n.; 125) *S. montanus* sp.n.; 126) *S. splendidus* sp.n. Scale = 0.5 mm.



Figs. 127 – 132: Ovipositor and part of genital tract, lateral view, 127) *Stenomystax saetosus* sp.n.; 128) *S. gracilis* sp.n.; 129) *S. inopinatus* sp.n.; 130) *S. jengi* sp.n.; 131) *S. kubani* sp.n.; 132) *S. similis* sp.n. Scale = 0.5 mm.

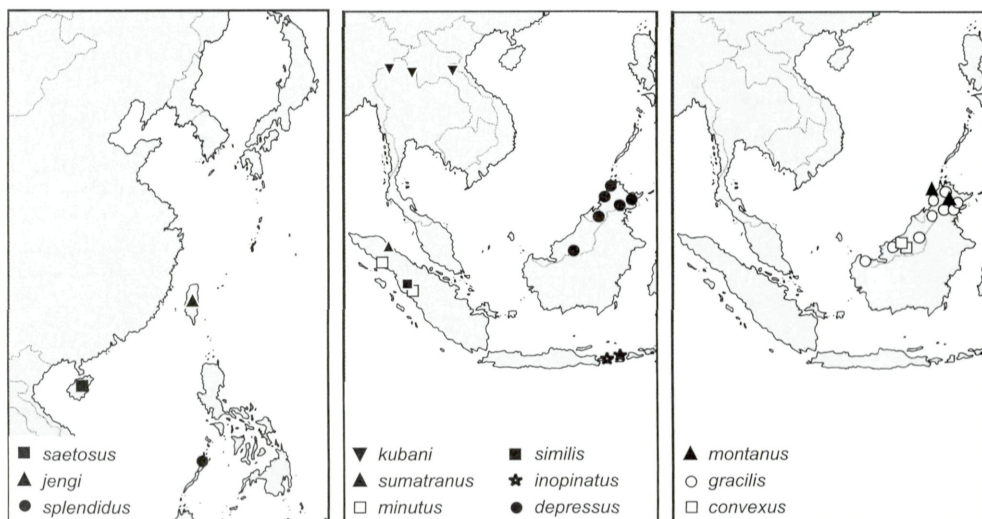


Fig. 133: Geographical distribution of the species of *Stenomystax*.

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