

Revision of the genus *Aesobia* JÄCH, 1982 (Coleoptera: Elmidae)

H. YOSHITOMI, M.A. JÄCH & H. FREITAG

Abstract

The Oriental genus *Aesobia* JÄCH, 1982 (Coleoptera: Elmidae) is revised. The male of the type species, *A. pygmaea* JÄCH, 1982, is described for the first time. Three new species, *A. kachinensis* sp.n. (Myanmar), *A. laosensis* sp.n. (Laos), and *A. kodadai* sp.n. (Malaysia), are described. The genus is recorded from Malaysia and Myanmar for the first time. Most of the specimens of *Aesobia* collected so far, are brachypterous.

Key words: Coleoptera, Elmidae, *Aesobia*, taxonomy, new species, Oriental Region.

Introduction

The genus *Aesobia* JÄCH, 1982 was erected on a single female specimen from Sri Lanka, described as *A. pygmaea* JÄCH, 1982.

This genus is characterized by its very small and compact body, its pronotal features and its legs (tibiae without fringes of smoothing setae, each claw with one tooth) (JÄCH 1982). It is probably placed in “group 3” of KOBAYASHI et al. (2021) and obviously closely related to *Ancyronyx* ERICHSON, 1847 and *Podelmis* HINTON, 1941.

In this paper, we redescribe *Aesobia pygmaea* based on the female holotype and an additional male specimen, and we describe three new species from Southeast Asia.

Material and methods

General observations and dissections were made under a stereoscopic microscope (Leica MZ95). Dissected parts were mounted on hollow slides with pure glycerine, and their microstructures were examined under an Olympus BH-2 microscope. Afterwards, the dissected parts were mounted on slides with Canada Balsam. Some structures were examined with an SEM (Hitachi S-225) after coating with gold.

Completely dissected specimens, damaged specimens and gold coated specimens were not designated as paratypes.

Average measurements are given in parentheses after the range.

Technical terms of the genitalia follow KODADA et al. (2016).

Abbreviations:

AF	brachypterous form	MF	macropterous form
EL	length of elytra	PW	width of pronotum
EW	width of elytra	TL	PL + EL
PL	length of pronotum		

EUMJ	Ehime University Museum, Matsuyama, Japan
NMW	Naturhistorisches Museum Wien, Vienna, Austria

Aesobia JÄCH, 1982

Aesobia JÄCH 1982: 97; JÄCH 1984: 309; YOSHITOMI 2014: 4; JÄCH et al. 2016: 5.

Type species: *Aesobia pygmaea* JÄCH, 1982.

DIAGNOSIS: Body small, about 0.8–1.1 mm in TL, moderately convex dorsally, flattened ventrally. Antennae (Fig. 3A) 11-segmented, relatively long, filiform; terminal antennomere longest. Labrum (Fig. 3B) as long as wide. Mandibles (Fig. 3C) with two apical teeth. Maxillae (Fig. 3D) with long apical segment of galea; terminal palpomere of maxillary palpi oval, as long as the remaining palpomeres combined. Labial palpi (Fig. 3E) 3-segmented; terminal palpomere truncate apically. Pronotum (Fig. 2A) subparallel-sided, lateral margin bisinuous and distinctly rimmed; with distinct transverse median depression; posterior half with three gibbosities, median one large, reverse triangular, anteriorly with a pair of short longitudinal cariniform projections bridging the transverse depression; two basal ones small, situated near posterior angles of pronotum; anterior angles rectangular, not protruding; anterior margin straight; posterior angles rectangular; posterior margin shallowly bisinuate. Prosternum (Fig. 3F) anteriorly expanded; prosternal process about as long as wide, apically subtruncate or broadly rounded. Elytra (Fig. 2B–D) oval, rather acuminate at apex, with indistinct punctate striae, intervals VI and VIII with sublateral carinae, remaining intervals flat; humeri absent (AF) or present (MF). Hind wings absent in AF (confirmed only for dissected specimens) and present in MF; only three of the 74 hitherto recorded specimens are macropterous (2.22 %). Legs long; tibiae without fringe of smoothing setae; tarsi 5-segmented; claws (Fig. 3G) large, each claw with a small basal tooth.

COMPARATIVE NOTES: This genus is similar to *Ancyronyx* in the compact body shape and the long legs, but differs from the latter in the very small body size, the anteriorly expanded prosternum, the presence of elytral sublateral carinae, and the absence of fringes of smoothing setae on the tibiae. *Aesobia* is also similar to the Oriental genus *Podelmis* and the Neotropical genera *Onychelmis* HINTON, 1941, *Notelmis* HINTON, 1941, and *Ictelmis* ČIAMPOR et al., 2019 in the compact and small body and the shape of the pronotum (HINTON 1941, JÄCH 1982, 1984, ČIAMPOR et al. 2019, LINSKÝ et al. 2021), but differs from these in the combination of the following characteristics: 1) elytral sublateral carinae present on intervals VI and VIII, as in *Notelmis* (interval IX in *Podelmis*, interval VI in *Onychelmis*, interval V in *Ictelmis*); 2) each claw with one basal tooth (two basal teeth in *Podelmis*, *Onychelmis* and *Ictelmis*, without tooth in *Notelmis*); 3) parameres long and slender (short and wide in *Podelmis*); 4) ovipositor with unmodified cylindrical styli (distinctly modified in the other four genera).

DISTRIBUTION (Fig. 8): Sri Lanka to Peninsular Malaysia. The genus *Aesobia* was originally known only from Sri Lanka (JÄCH 1982); eventually, YOSHITOMI (2014) recorded the genus from Laos based on an unidentified species (described below) collected in 2013; and here it is recorded also from Malaysia and Myanmar.

Key to species of the genus *Aesobia*

- 1 Apices of parameres rounded (Fig. 4C)..... *kachinensis*
- Apices of parameres pointed (Fig. 4A–B, D)..... 2
- 2 Apex of penis sharply pointed (Fig. 4B); legs yellowish brown (Fig. 1C)..... *laosensis*
- Apex of penis rather rounded (Fig. 4A, C–D); legs brown, infuscate (Fig. 1A–B, F) 3
- 3 Penis (Fig. 4A) relatively short, about 1.3 times as long as parameres *pygmaea*
- Penis (Fig. 4D) relatively long, about 1.6 times as long as parameres *kodadai*

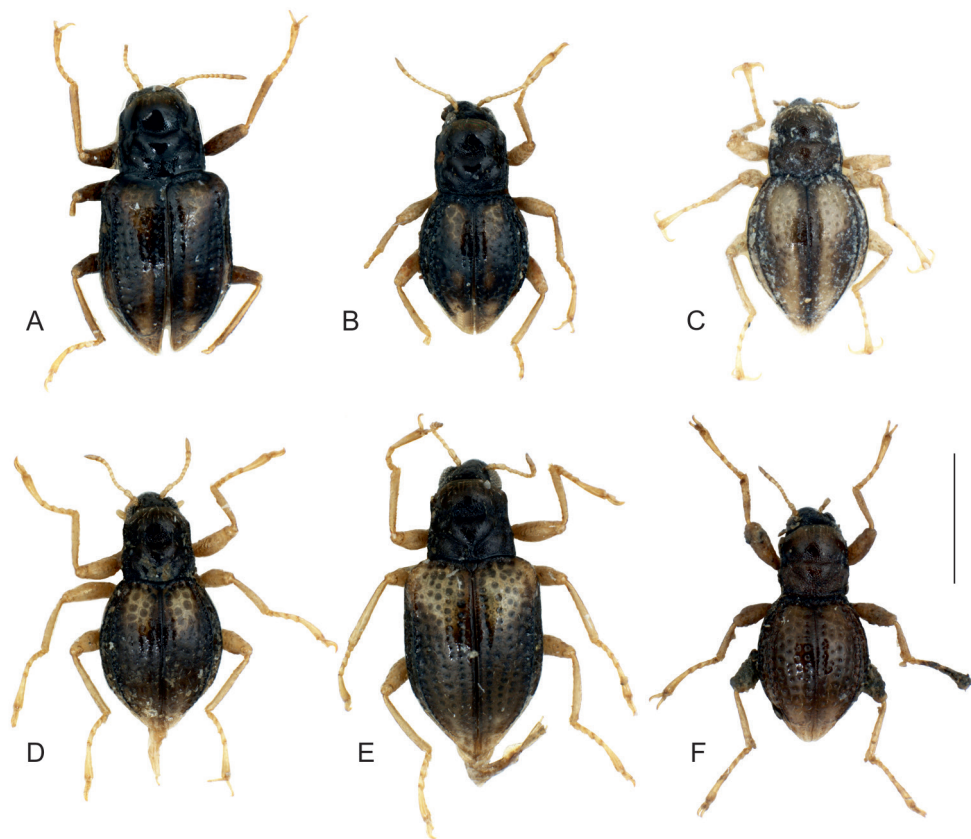


Fig. 1: Habitus of A) *Aesobia pygmaea*, holotype, female, MF; B) ditto, additional specimen, male, AF; C) *A. laosensis*, holotype, male, AF; D) *A. kachinensis*, holotype, male, AF; E) ditto, paratype, female, MF; F) *A. kodadai*, holotype, male, AF. Scale: 0.5 mm.

Aesobia pygmaea JÄCH, 1982

Aesobia pygmaea JÄCH 1982: 97. – JÄCH 1984: 310. – JÄCH et al. 2016: 5.

Holotype ♀, MF (NMW) (Fig. 1A): “Ceylon 9.12.[19]80 Haputale Umg [surroundings] leg M.Jäch C36”, “HOLOTYPE”, “*Aesobia* ♀ *pygmaea* m. [mihi] det. M. Jäch 81 [1981]” [handwritten by M.A. Jäch in 1981]. Ovipositor glued on the same card as the specimen.

ADDITIONAL MATERIAL EXAMINED:

SRI LANKA: 1 ♂, AF (NMW) (Fig. 1B): “SRI LANKA: Southern Prov. Galle Dist., Kottawa Forest 6°5'54"N 80°18'55"E 50 m a.s.l., 11.XII.1992 leg. H. Freitag (6)”.

ADDITIONAL DESCRIPTION: Body obovate, shiny. Coloration of body black; mouth parts, antennae and legs pale brown, but femora infusate in holotype; elytral longitudinal stripe yellowish brown (Fig. 1A–B).

Head finely punctate. Antennae reaching about proximal 1/4 of pronotum. Pronotum finely punctate in anterior portion, smooth in mesal gibbosity; PW/PL 0.92–1.00 (0.96). Elytra subparallel-sided near base to apical 3/4 in MF, strongly arcuate and widest near middle in AF; longitudinal stripes on intervals II–V, more or less distinctly interrupted in middle area; EL/EW 1.29–1.30 (1.30); EL/PL 1.86–2.00 (1.93); EW/PW 1.54–1.58 (1.56); TL/EW 1.95–1.98 (1.97).

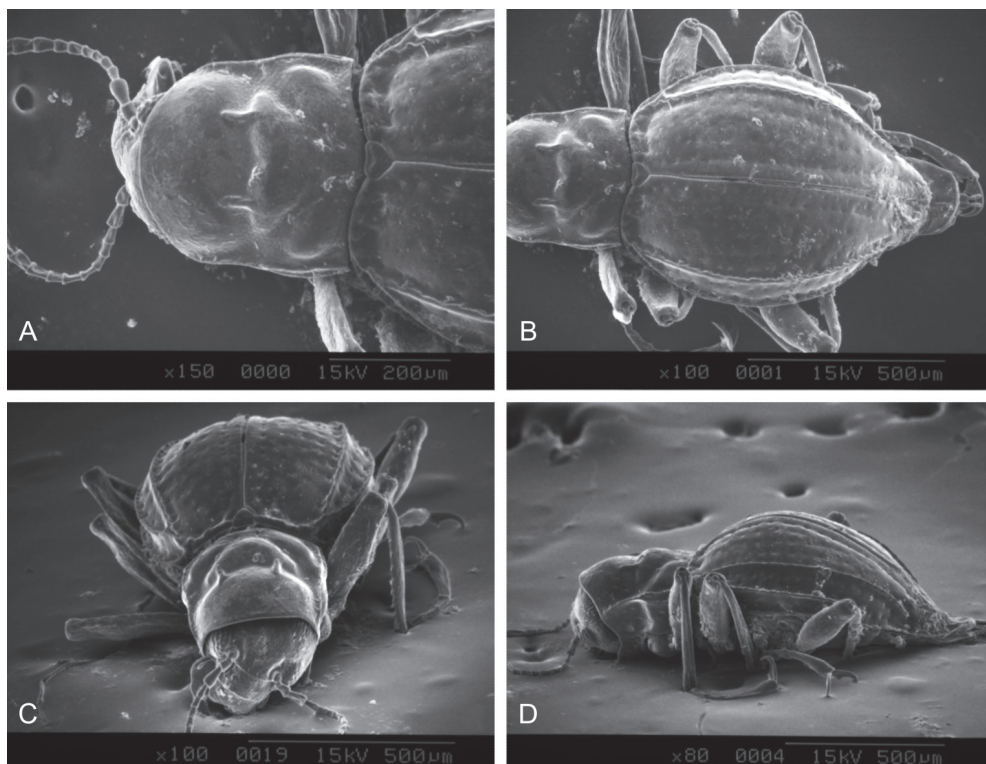


Fig. 2: SEM photographs of *Aesobia laosensis*, paratype, female: A) pronotum; B) elytra; C) body in frontal view; D) body in lateral view.

Aedeagus (Fig. 4A) small; phallobase long, as long as parameres; parameres long, straightly projecting apically, sparsely punctate, pointed at apex; median lobe long, about 1.3 times as long as parameres, subparallel-sided in basal 4/5, slightly pointed at apex and curved ventrad.

Measurements ($n = 2$): TL 0.84–1.03 (0.94) mm; PW 0.28–0.33 (0.31) mm; PL 0.28–0.36 (0.32) mm; EL 0.56–0.67 (0.62) mm; EW 0.43–0.52 (0.48) mm.

BIOLOGICAL NOTES: The type locality (“C36”, see JÄCH 1984: 234) is a small mountain river, ca. 5 m wide, with stones, sand, submerged wood, partly shaded by trees, ca. 470 m a.s.l.; the water was comparatively warm (25.2°C), and the associated water beetle fauna was found to be a mixture of mostly montane and lowland species (Elmidae: *Graphelmis ceylonica* (MOT-SCHULSKY, 1860), *Ilamelmis foveicollis* (GROUVELLE, 1896), *I. starmuhlneri* (DELÈVE, 1973), *Ordobrevia fletcheri* (CHAMPION, 1923), *Podelmis aenea* DELÈVE, 1973, *P. metallica* DELÈVE, 1973, *P. viridiaenea* JÄCH, 1982, *Stenelmis andersoni* DELÈVE, 1973, *S. brincki* DELÈVE, 1973, *Taprobanelmis carinata* DELÈVE, 1973, *Zaitzeviaria zeylanica* JÄCH, 1982; Hydrophilidae: *Pelthydrus suffarcinatus* SCHÖNMANN, 1995); in a small left tributary (temperature: 25.6°C) at the same elevation, 2–3 m wide, flowing through dense primary forest, five additional species of water beetles were collected: *Ilamelmis brunnescens* DELÈVE, 1973, *I. crassa* DELÈVE, 1973, *Podelmis similis* JÄCH, 1982, *Potamophilinus torrenticola* JÄCH, 1982 (Elmidae), *Elmomorphus naviculus* (DELÈVE, 1973) (Dryopidae); in total, 46 % of the elmid species recorded from Sri Lanka until today were found at the type locality of *Aesobia pygmaea* and its small tributary (“C37”, see JÄCH 1984: 234), but no typical species of the upper highlands, such as *Podelmis*

ater JÄCH, 1982, *P. ovalis* JÄCH, 1982, and *P. quadriplagiata* (MOTSCHULSKY, 1860), were found. The second known locality of *Aesobia pygmaea* is a meandering stream, shaded, ca. 50 m a.s.l., flowing through a lowland forest; it is characterized by predominantly sandy bottom substrates and the presence of immersed wood (Fig. 7).

DISTRIBUTION (Fig. 8): So far known only from two localities in southern Sri Lanka: 1) 6°44'15.55"N 80°55'48.3"E, near Kirawanagama Village, ca. 4 km SW Haputale, Badulla District, western Uva Province (type locality); 2) ca. 6°5'54"N 80°18'55"E, Kottawa Reserve Forest, Galle District, Southern Province.

Aesobia laosensis sp.n.

Holotype ♂, AF (EUMJ) (Fig. 1C): “[LA7] Ban Dokmai, Xieng Khouang Prov., Laos, N19 14.256 E103 39.744, ca. 1329 m, 24. V. 2013, H. Yoshitomi leg.”. **Paratypes**: 20 exs., AF (EUMJ: 2 exs., NMW: 18 exs.), same data as holotype; 40 exs., AF (EUMJ: 33 exs., NMW: 7 exs.), same locality, but “29. V. 2013”; 2 exs., AF (EUMJ): “[LA15] Ban Muang, Xieng Khouang Prov., N19 15.107 E103 36.341, ca. 1190 m, 30. V. 2013, H. Yoshitomi leg.”.

DESCRIPTION: Body obovate, weakly shiny. Coloration of body black; mouth parts, antennae, elytral stripes and legs pale brown (Fig. 1C).

Head finely and closely punctate. Antennae (Fig. 3A) reaching about basal 1/4 of pronotum; approximate ratio of each antennomeres ($n = 1$) as 1.5 : 1.7 : 1.2 : 1.0 : 1.0 : 1.0 : 1.0 : 1.5 : 1.3 : 3.2. Pronotum evenly and closely punctate; PW/PL 0.94–1.03 (0.97). Elytra strongly arcuate laterally, widest near middle; elytral longitudinal stripes on elytral intervals II–V (and sometimes on VII) variable (Fig. 5); sublateral carinae on interval VI arcuate, extending from humeri to near apex; sublateral carinae on interval VIII extending from base of carinae on interval VI to apical 1/4 of elytra; EL/EW 1.19–1.31 (1.25); EL/PL 1.94–2.14 (2.01); EW/PW 1.60–1.73 (1.67); TL/EW 1.78–1.98 (1.87); macropterous form unknown.

Male: Posterior margin of ventrite VIII (Fig. 3H) gently arcuate. Sternite VIII (Fig. 3J) trapezoidal, with short median strut. Sternite IX (Fig. 3K) asymmetrical, with short and wide median strut, with a pair of short paraprocts.

Aedeagus (Fig. 4B) larger than that of *A. pygmaea* and *A. kachinenis*; phallobase long, as long as parameres; parameres long, straightly projecting apically, sparsely punctate, pointed at apex; median lobe long, about 1.3 times as long as parameres, evenly tapered apically, pointed and slightly curved ventrad at apex.

Female: Posterior margin of ventrite VIII (Fig. 3I) rather pointed. Sternite VIII (Fig. 3L) fan-shaped, with long median strut. Ovipositor (Fig. 3M) relatively long, longer than sternite VIII, bearing minute apical sensilla on stylus and coxite; approximate ratio of stylus, distal part of coxite, basal part of coxite and valvifer ($n = 1$) as 1.0 : 3.9 : 2.2 : 5.6.

Measurements ($n = 10$): TL 0.89–0.97 (0.93) mm; PW 0.29–0.32 (0.30) mm; PL 0.29–0.32 (0.31) mm; EL 0.59–0.66 (0.62) mm; EW 0.48–0.54 (0.50) mm.

BIOLOGICAL NOTES: The type locality (Fig. 6A) is a small stream, ca. 2 m wide, 10–30 cm deep; water temperature: 25°C). The specimens were collected from the underside of submerged wood (Fig. 6B). As already mentioned by YOSHITOMI (2014), this species was collected together with 11 elmids and one dryopid species.

DISTRIBUTION (Fig. 8): So far known only from two close localities in Laos (Xieng Khouang Prov.).

ETYMOLOGY: The name of the new species (*laosensis*, adjectival) refers to Laos, where it has been collected.

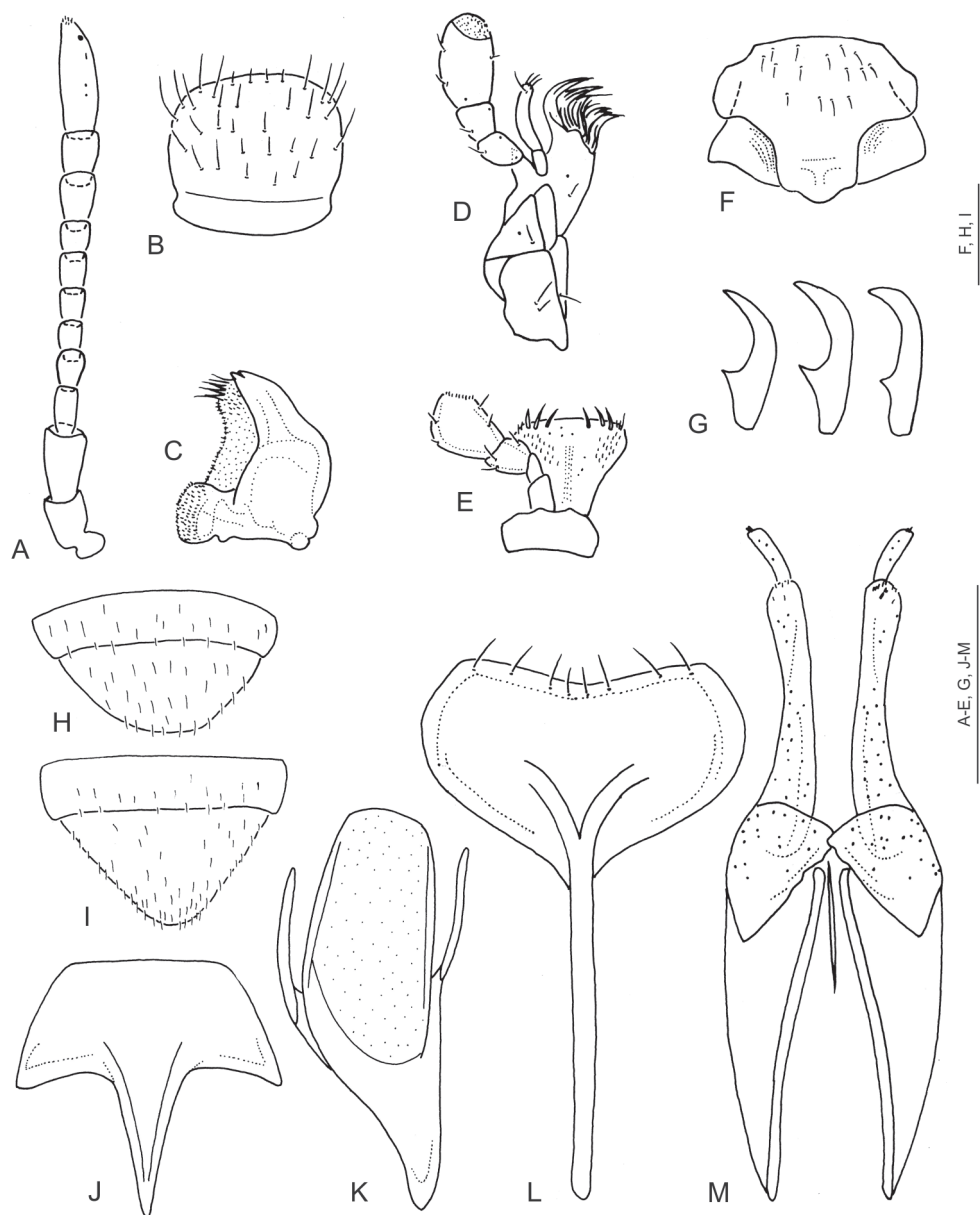


Fig. 3: *Aesobia laosensis*, male (A–H, J–K) and female (I, L–M): A) antenna; B) labrum; C) mandible in ventral view; D) maxilla; E) labium; F) prosternum; G) claws of fore, middle, and hind leg; H–I) abdominal ventrites VII–VIII; J, L) sternite VIII; K) sternite IX; M) ovipositor. Scales: 0.1 mm.

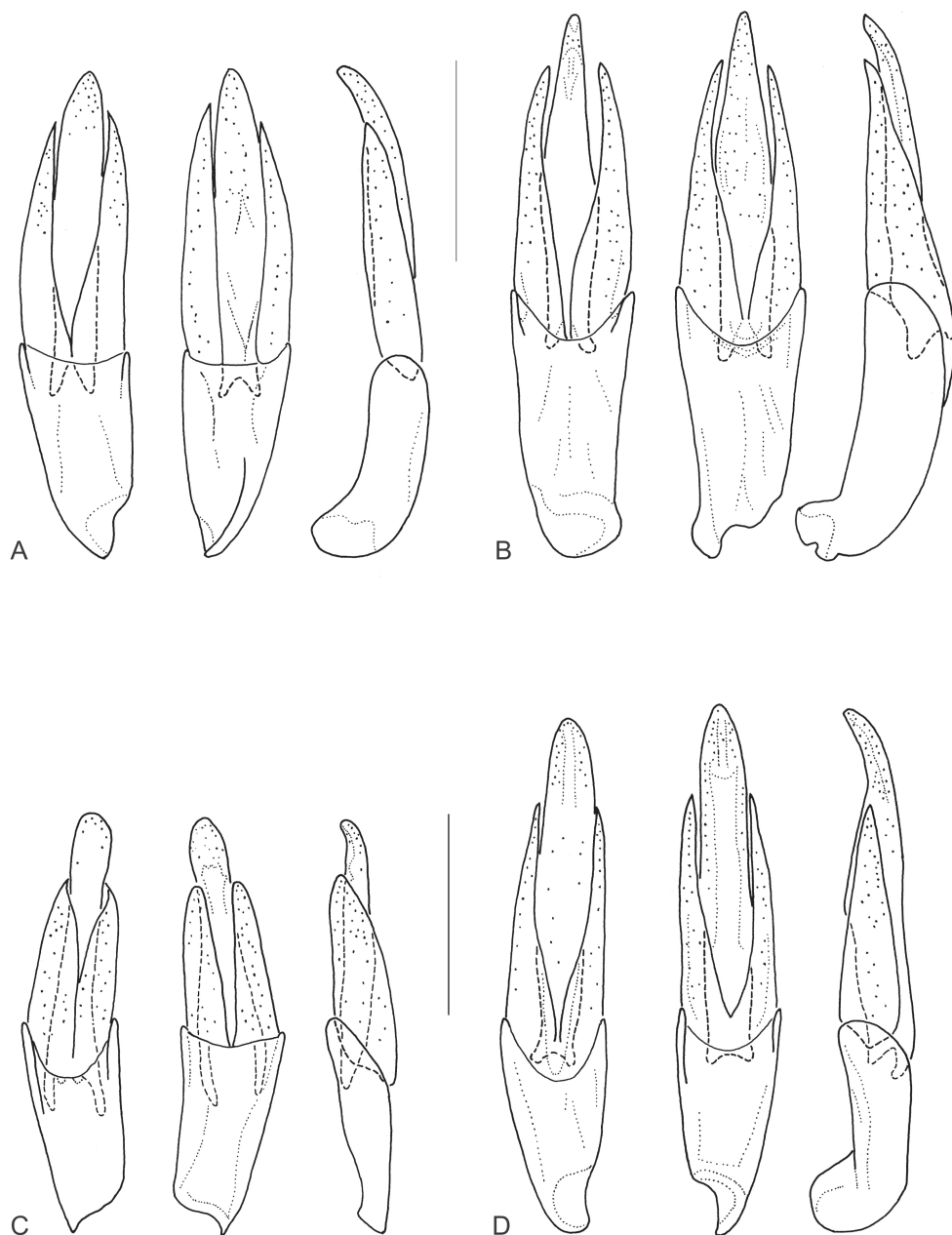


Fig. 4: Aedeagi in ventral, dorsal, and lateral views: A) *Aesobia pygmaea*; B) *A. laosensis*; C) *A. kachinensis*; D) *A. kodadai*. Scales: 0.1 mm.

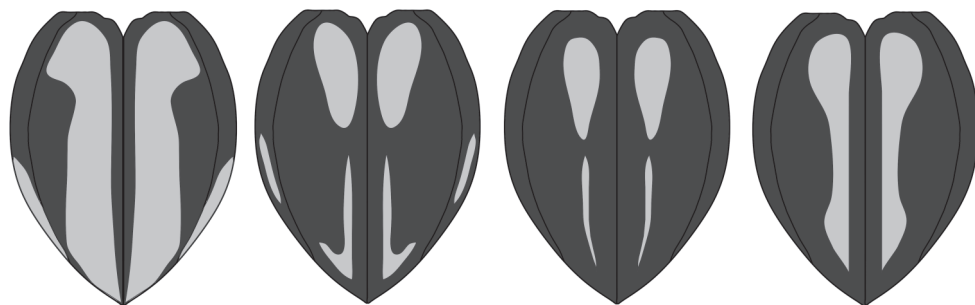


Fig. 5: Elytral color variation of *Aesobia laosensis*.

Aesobia kachinensis sp.n.

Holotype ♂, AF (NMW) (Fig. 1D): “MYANMAR: Kachin State (59) 3.8km SW Putao, 30.5./1.6.1999, Ma Kyaw Wa riv., 480m 27°18.90'N 97°22.93'E leg. Schuh & Schillhammer”. **Paratypes**: 3 ♀♀, AF (1), MF (2) (NMW), same data as holotype.

DESCRIPTION: Body obovate, shiny. Coloration of body black; mouth parts, antennae and legs pale brown; apex of elytra and basal 1/4 of elytral intervals II–V (Fig. 1D) or humeral parts (Fig. 1E) yellowish brown (Fig. 1D).

Head finely and closely punctate. Antennae rather short, reaching middle of pronotum. Pronotum evenly and closely punctate; PW/PL 0.88–1.00 (0.96). Elytra subparallel-sided near base to apical 3/4 in MF, strongly arcuate and widest near middle in AF; sublateral carinae on interval VI extending from humeri to apical 1/6 of elytra; sublateral carinae on interval VIII extending from near humeri to apical 1/4 of elytra; EL/EW 1.20–1.44 (1.30); EL/PL 1.88–2.29 (2.06); EW/PW 1.59–1.71 (1.66); TL/EW 1.80–2.07 (1.93).

Aedeagus of holotype (Fig. 4C) small, somewhat damaged in basal part; phallobase long, longer than parameres; parameres relatively short, curved ventrad, sparsely punctate, obtuse at apex; median lobe long, about 1.8 times as long as parameres, gently tapered near base to basal 1/3, then subparallel-sided in median part, obtuse at apex; basal apophyses distinctly longer than in the other species.

Measurements (n = 3): TL 0.90–1.12 (0.98) mm; PW 0.28–0.34 (0.31) mm; PL 0.30–0.34 (0.32) mm; EL 0.60–0.78 (0.66) mm; EW 0.48–0.54 (0.51) mm.

BIOLOGICAL NOTES: According to H. Schillhammer (pers. comm.), the specimens were collected in the bend of a small, ca. 5–8 m wide, rather shallow river; all specimens were taken from the undercut grassy margin by sweeping small rootlets.

DISTRIBUTION (Fig. 8): So far known only from the type locality in Myanmar (Kachin State).

ETYMOLOGY: The name of the new species (*kachinensis*, adjectival) refers to the Kachin State in Myanmar, where it has been collected.

Aesobia kodadai sp.n.

Holotype ♂, AF (NMW) (Fig. 1F): “MALAYSIA: Pahang Kuala Lipis env. Kenong Rimba Park Kenong River, 5.VI.2001 leg. J.F. Kočiam”. **Paratype** ♂, AF (NMW), same data as holotype.



Fig. 6: Type locality of *Aesobia laosensis*: A) small stream in Ban Dokmai, Laos; B) same locality, submerged wood.



Fig. 7: Habitat of *Aesobia pygmaea*; lowland stream with submerged wood and sandy bottom substrates in the Kottawa Reserve Forest, Sri Lanka.



Fig. 8: Geographical distribution of the species of *Aesobia*.

DESCRIPTION: Body obovate, shiny. Coloration of body brown, but head as well as basal, lateral and sutural parts of elytra infuscate (Fig. 1F).

Head finely and closely punctate. Antennae rather short, reaching middle of pronotum. Pronotum evenly and closely punctate; PW/PL 0.93–1.00 (0.96). Elytra strongly arcuate laterally, widest near middle; sublateral carinae on interval VI arcuate, extending from humeri to near apex; sublateral carinae on interval VIII extending from base of carinae on interval VI to apical 1/4 of elytra; EL/EW 1.31–1.36 (1.33); EL/PL 2.04–2.12 (2.08); EW/PW 1.62–1.62 (1.62); TL/EW 1.93–2.02 (1.98); macropterous form unknown.

Aedeagus (Fig. 4D) larger than that of *A. pygmaea* and *A. kachinensis*; phallobase long, as long as parameres; parameres long, straightly projecting apically, sparsely punctate, pointed at apex; median lobe long, about 1.6 times as long as parameres, subparallel-sided from base to near apex, rather pointed at apex and curved ventrad.

Measurements (n = 2): TL 0.81–0.85 (0.83) mm; PW 0.26 mm; PL 0.26–0.28 (0.27) mm; EL 0.55–0.57 (0.56) mm; EW 0.42 mm.

BIOLOGICAL NOTES: The type locality is a lowland river, ca. 10 m wide, flowing through degraded forest, ca. 70 m a.s.l. The two specimens were collected from coarse sand, in about

50 cm depth. In the same river, *Ancyronyx procerus* JÄCH, 1994 and *Graphelmis grouvellei* DELEVE, 1970 were collected from submerged wood.

DISTRIBUTION (Fig. 8): So far known only from the type locality in Malaysia (Pahang State): Kenong River (left tributary of Jelai River), ca. 4°10'29.0"N 102°11'35.2"E.

ETYMOLOGY: The species is named after Dr. Ján Kodada (Comenius University, Bratislava, Slovakia), excellent specialist of Elmidae and Dryopidae. Proper noun in apposition.

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