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Description of 33 new species of Calamoceratidae, Molannidae, Odontoceridae and Philorheithridae (Trichoptera), with detailed presentation of their cephalic setal warts and grooves

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Abstract

Additions to the taxonomy of the leptoceroid families Calamoceratidae, Molannidae, Odontoceridae, and Philorheithridae are given, and 33 new species in the superfamily are described based on characters in the male genitalia, head and thoracal setose warts, and groove patterns, wing venation, and forewing colour and pattern.

In the Calamoceratidae Ulmer, the *Anisocentropus latifasciata* diagnostic species-group and *Anisocentropus brevipennis* diagnostic species cluster are described for the first time. The following 17 species are described as new: *Anisocentropus bungus* (Vietnam), *A. csorbai* (Vietnam), *A. dvaupadhah* (Malaysia), *A. fridae* (Fiji Islands), *A. hannahae* (Fiji Islands), *A. hoisat* (Laos PDR), *A. malaisei* (Myanmar), *A. maralus* (Malaysia), *A. mjoeberti* (Borneo), *A. samuh* (Madagascar), *A. tapenan* (Solomon Islands), *A. thinlin* (Laos PDR), *A. thonmihn* (Vietnam), *A. vanuensis* (Fiji Islands), *A. vitiensis* (Fiji Islands), *Ganonema malickyi* (Thailand) and *G. rong* (Vietnam). In addition, *Ganonema fuscipenne* (Albarda) is synonymized with *G. ochraceellum* (McLachlan), and *Ganonema pallidum* Martynov is synonymized with *Anisocentropus kawamurai* (Iwata).

In the Molannidae Wallengren, a single new species, *Molanna gamdaha*, is described from Myanmar.

In the Odontoceridae Wallengren, the genus *Inthanopsyche* Malicky is synonymized with *Psilotreta* Banks. The following 14 species belonging to previously described genera, are described as new: *Lannapsyche birathena* (Myanmar), *L. sukma* (Myanmar), *L. kamba* (Myanmar), *Marilia enikiana* (Laos PDR), *M. jonssoni* (Laos PDR), *M. katakaha* (Malaysia), *M. malickyi* (Laos PDR, Malaysia, Vietnam), *M. mendolonga* (Malaysia), *M. namha* (Laos PDR), *M. tuyetmira* (Laos PDR), *Phraepsyche pectinata* (Vietnam), *P. yitungshana* (China: Hong Kong), *Psilotreta enikoae* (Vietnam), and *P. malickyi* (Myanmar). In addition, the following 3 diagnostic species-groups are described for the first time: *Psilotreta japonica* diagnostic species-group, *Psilotreta trimeresuri* diagnostic species-group, and *Psilotreta frontalis* diagnostic species group. The species *Ganonema odaenum* Kobayshi is synonymized with *Psilotreta locumtenens* Botosaneanu, and *Psilotreta pyonga* Oláh is synonymized with *P. falcua* Botosaneanu.

In the Philorheithridae Mosely, a single new species, *Psilopsyche granda*, is described from Chile.

In addition to describing new taxa, new species records for 34 species in the superfamily are presented.

Key words: Taxonomy, Trichoptera, Leptoceroidea, Calamoceratidae, Molannidae, Odontoceridae, Philorheithridae, new species

Introduction

Ross (1967) grouped the families of the superfamily Leptoceroidea into the leptocerid branch of the superfamily Limnephiloidea. He recognized the members of the leptocerid branch as those having lost their ocelli and supratentorium (dorsal tentorial arms), and in several 'primitive' genera the forewing M4 was retained in the males. The other branch in the Limnephiloidea *sensu* Ross (1967) is the limnephilid branch characterized by having intact ocelli and supratentorium, and having no Fork 4 (division of M3+M4) in the male forewings. The leptocerid branch *sensu* Ross (1967) was divided into 2 groups. These groups represented the Sericostomatoidea and Leptoceroidea in Weaver's (1984) Brevitentoria. The monophyly of the Brevitentoria is considered well supported, but the monophyly of "Leptoceroidea" received less support (Kjer *et al.* 2001, 2002) and has even been questioned (Francia & Wiggins 1996). This work aims at increasing our limited knowledge about the diversity of the "Leptoceroidea" families by describing new species. Four new diagnostic species-groups and a new diagnostic species-cluster also are described. These informal taxa are more appropriately called "pseudotaxa" because their phylogenetic status is not known, so that their predictive value in biology is uncertain. In other words, their scientific value is only diagnostic and is only for the species explicitly included. For this reason, we qualify them with the adjective "diagnostic".

Some of the taxa in these families have rather uniform genitalic structures. However, the structural persistence in the phallic apparatus is frequently accompanied by diversification of other structural components. Colourful forewing patterns helps to differentiate species having uniform genitalic structures in the genera *Nectopsyche* and *Anisocentropus*. Similarly, and shown below, the cephalic setose wart and groove patterns are important diagnostic features for species in the genera *Marilia* and *Phraepsyche*. Compared to characters

in the genitalia, the wing venation, wing colour pattern, cephalic grooves, and setal patterns have previously received little attention in taxonomic studies. In this study we examined the wart and groove patterns more systematically, applying a trinomial terminology (*sensu* Oláh & Johanson 2007).

The material available for this study comprises 4 families: Calamoceratidae, Molannidae, Odontoceridae and Philorheithridae. According to Parker & Wiggins (1987) the Odontoceridae and Philorheithridae are sister families, and we faced difficulties in determining whether some of the genera belong to one or the other of these 2 families. A character listed as synapomorphic for the 2 families, is the presence of the forewing postanal vein (Schmid 1964, 1998, Weaver *et al.* [submitted]). However, careful search of the morphology did not reveal any autapomorphic, consistently diagnostic characters for either of the 2 families. Instead, certain morphological character combinations separate the 2 families, casting doubt on the monophyly of each family.

Material and methods

This study is based mostly on animals preserved in 70-80% alcohol. Some material was available as dry pinned specimens, which were subsequently relaxed by incubating the animals in 1% Na₃PO₄ solution for 12–16 hours, washed in distilled water and thereafter transferred to alcohol. In order to detect details in the genitalia, the entire abdomen was removed and placed in a 25 cm³ glass beaker with 10% hot KOH solution for 5–15 minutes for maceration. After maceration, the abdomen, head, and thorax were transferred to distilled water and remaining tissue removed mechanically by fine-tipped forceps and needles. The cleared, wingless animals were subsequently transferred to 80% ethanol, and thereafter to glycerine for examination under microscope. Different sized pins were used to stabilize the abdomen and its genitalia when being drawn. In the illustrations, presence of setae is indicated only as alveoli, with the setal density only approximate. When essential to show seta length or seta shapes, only a single seta or a few setae are provided. The genitalia were drawn by pencil on white paper using a drawing tube mounted on a WILD M3Z microscope having a magnification between 260x and 416x. Final illustrations were prepared by enlarging the original pencil drawings and re-drawing them with Black India Ink on transparent paper. The inked illustrations were scanned on an Epson Expression 1680 Pro scanner in greyscale and at 800 dpi resolution. Each illustration was then arranged, and brightness and contrast edited in Adobe® Photoshop© 8.0 on a Macintosh G5.

When sufficient material was available, the head and thorax (except wings) were macerated together with the abdomen to remove the soft tissues for reliable detection of the chitinized groove and wart patterns on the head and thorax. The setal wart patterns of the head and thorax are rarely described and figured in literature. In intact, untreated specimens the wart and groove patterns are poorly visible and frequently indiscernible, especially if the warts have the same colour as the cranial sclerites, or if the wart setae cover the warts. Macerated bodies thus give us important information on the setal wart pattern. In the following species descriptions we apply the trinomial terminology outlined by Oláh & Johanson (2007) to describe the groove and setal wart patterns on the head.

Careful studies of wing venation were accomplished on intact right wings mounted dry on permanent slides or on freshly cut right wings without permanent wing preparation. The cut right wings were carefully managed under a glass cover in glycerine solution in order to spread them completely. A simplified presentation of the wing shape and wing pattern was prepared by bold wing-shape contour and dotted pattern lines. The wing pattern delineated by dotted lines is not specified whether dark, light, or coloured and not distinguished whether of membrane or setal origin. If patterns were not contrasting with the background colour, the dotted line was set on the middle of the colour density transition. The maxillary palps, groove, and wart patterns and other head and thoracic characters, leg claws, and spurs, were studied while mounted in glycerine and stabilized by pins. We emphasize the importance of the plane and angle of view that may change considerably the shape and ratio of structural elements in the final drawings, as was also demonstrated by Malicky

(1988). In addition to the spur formula, we have used amaxillary palp formula to simplify the presentation of the lengths of the 5 palp segments. The segment sequence represents increasingly longer segments, with equally long segments given in parenthesis. In maxillary palps where segment I is the shortest, segment III is longer than I but shorter than II and IV, segments II and IV are equally long but longer than segments I or III, and segment V is the longest, the maxillary palp formula is I-III-(II, IV)-V. Species descriptions are standardized to ensure consistently formatted and comparable template descriptions as in Evenhus (2007).

Abbreviations

The following abbreviations have been used for material depository collections.

BMH	Bishop Museum, Honolulu, Hawaii.
MZPW	Polish Academy of Science, Museum of the Institute of Zoology, Warszawa, Poland.
NHMB	Natural History Museum, Budapest, Hungary.
NHML	The Natural History Museum, London, Great Britain.
NMNH	National Museum of Natural History, Smithsonian Institution, Washington, D. C., USA.
MNHN	Muséum National d'Histoire Naturelle, Paris, France.
NRM	Swedish Museum of Natural History, Stockholm, Sweden.
OPC	Oláh Private Collection, presently under National Protection of the Hungarian Natural History Museum, Hungary.

Systematics

Calamoceratidae Ulmer

Calamoceratinae Ulmer, 1905: 80 [as subfamily of Leptoceridae]; type genus: *Calamoceras* Brauer, 1865.

Calamoceratidae Ulmer, 1906: 46 [as distinct family]

The individuals are mostly large, stout-bodied, and frequently with broad wings. Ocelli are absent. The cranial suture is invisible, but according to Prather (2004) a more or less developed posteromesal ridge forms a synapomorphy for the family. There are grooves present on the facial-cranial region and the occipito-postgenal groove is also visible, at least on species in *Anisocentropus*. The maxillary palps have 5 or apparently 6 segments. The antennae are much longer than the forewings. Similar to Leptoceridae and Molannidae, the mesoscutum has a pair of longitudinally extended, diffuse, or fragmented setal warts. The wing venation is complete, without sexual dimorphism. The discoidal, median, and thyridial cells are present and closed in the forewings. Tibial spurs are 2, 4, 2-4. Males have no intermediate appendages or phallic parameres. In most species there are 2 pairs of setose areas on segment IX, 1 dorsolateral, the other ventrolateral or ventral, with the number and length of setae are species-specific.

Calamoceratinae Ulmer, 1906; type genus: *Calamoceras* Brauer, 1865.

Ganonema McLachlan

Ganonema McLachlan, 1866: 253; type species: *Ganonema pallicorne* McLachlan, 1866: 254 (monobasic).

Asotocerus McLachlan, 1866: 254; synonymized by Ulmer (1951: 341); type species: *Asotocerus ochraceellus* McLachlan, 1866: 255 (monobasic).

Ganonema falcatum (Banks)

Asotocerus falcatus Banks, 1913: 235.

Ganonema falcatum (Banks); Schmid (1958: 122).

Ganonema elyakatuwa Schmid, 1958: 121; synonymized by Malicky (1994: 65).

Type locality: Sri Lanka.

New records: SRI LANKA: Gal. Dist. Udugama, Kaneliya Jungle, 400 feet, 6–12.x.1973, black light [K.V. Krombein, P.B. Karunaratne, P. Fernando & J. Ferdinando] — 1 female (NMNH). **SRI LANKA:** Kan. Dist. Hasalaka circuit, Bungalow, 30–31.v.1975 [D.H. Messersmith, G.L. Williams & P.B. Karunaratne] — 1 female (NMNH).

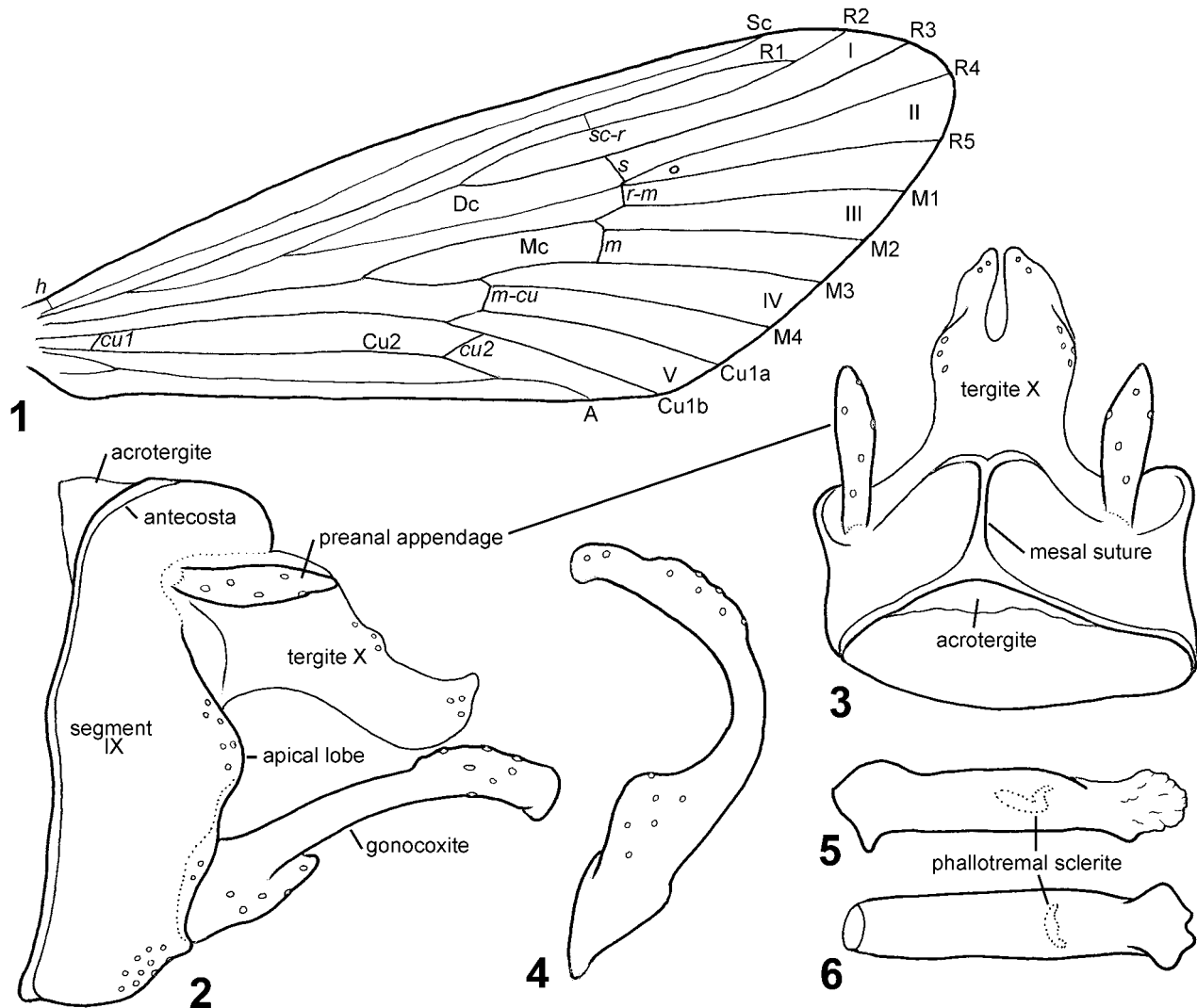
Ganonema malickyi, new species

Figs 1–6

This large-sized, dark-brown species lacks a forewing pattern. It is similar to *Ganonema rong*, new species from Vietnam, from which it is separated by the darker, almost greyish, dark-brown forewing colour. The pre-anal appendages are longer in lateral view, and exceeding the posterior apex of tergite IX. Segment X lacks lateral flanks but is supported by a pair of lateral humps on the middle in dorsal view. The gonocoxites have heavily setose subapical outgrowths and sub-basal lobes. The most significant distinguishing character of this species is the narrow forewings.

Male (pinned). Body large, dark greyish brown; legs, antennae and palps lighter; forewing membrane without pattern. Head rectangular in dorsal view, almost as long as broad. Ocelli absent. Tentorium invisible in uncleared holotype. Facial groove pattern modified by plate-like, transverse flange or rim of frontal sclerite between anterior tentorial pits; lines separating frons and clypeus manifested by frontal transverse rim; frontogenal vertical grooves oblique, stretching almost horizontally to antennifer pivots on ventral antennal grooves; dorsal continuations of anterior tentorial arms from anterior tentorial pits visible on cleared head as internal folds or frontogenal septa reaching circumantennal sclerites at antennifer pivots; clypeogenal vertical grooves located ventral of anterior tentorial pits short, running slightly mesad; highly visible pattern of plate-like flange and frontogenal and clypeogenal sutures forming complex of anterior tentorial arms (frontogenal septa); small, nearly invisible subantennal grooves obliquely sinuous between large frontogenal compact warts and palpifers, proximal articulation of palpi on stipes; subocular groove not visible; short, indistinct frontal grooves present between antennae on constricted frons, joining vertexal medioantennal compact setose wart. Vertexal groove pattern more reduced; large, anteriorly, rounded elevation dominating anterior half of vertex, reaching interantennal area and delineated laterally by extremely enlarged membranous antennal sockets encircled by antennal grooves. Enlarged sockets with corrugated or granulous surface near large frontogenal compact setose wart; stem of epicranial groove (coronal groove) vestigial; dorsomesal ridge or vestigium of coronal groove visible in middle of posterior end of vertex surrounded by less pigmented area; occipito-postgenal groove directed anterad to lateral margin of very large occipital compact setal warts. Labrum heart-shaped with rounded apex freely hanging, sparsely setose; anterior basal part with pair of rounded compact setose warts, labral setae, or moustache (*sensu* Prather 2002). Mandibles well-developed, slightly pigmented, located laterally along labrum; lacinia curving mesad, bearing few setae. Frontal setal warts and frontal interantennal warts absent; frons appearing more-pigmented, bordered laterally by enlarged, less-pigmented antennal sockets. Pair of large, subtriangular frontogenal compact setal warts present on posterior pregenae at obliquely to horizontally oriented frontogenal groove, stretching into clypeogenal area. Pronounced and dominating pair of setal warts forming compact warts visible on face together with labral moustache. Anterior, rounded elevation on vertex bearing pair of vertexal medioantennal compact, setose, anterior warts on top,

separated by anteromesal furrow. Pair of lateroantennal, compact setal warts on vertex visible, rounded, and transversal. Large central setal area of diffuse setae on vertex forming pair of large, horizontally elongating, compact setose warts; obliquely oriented, ovoid pair of large occipital compact setose warts dominating posterior half of vertex; small pair of narrow, elongate postgenal compact warts visible between posterior section of ocular grooves and large occipital compact setose wart encircling eyes ventrally. Pair of small lobes with compact setose warts present in continuation of dorsomesal ridge or vestigium of coronal grooves, separated by postoccipital groove.



FIGURES 1–6. *Ganonema malickyi*, new species, holotype. 1 — right forewing; 2 — genitalia, lateral; 3 — genitalia, dorsal; 4 — gonocoxite, ventral; 5 — phallus, lateral; 6 — phallus, ventral.

Maxillary palps 5-segmented, palp formula (I, IV, V)-III-II, filiform, densely covered by long setae. Antennal scapes each slightly longer than broad, half as long as head, 3 times longer than its pedicel. Two pairs of pronotal setal warts present: large dorsal pair transverse, slightly elongate, each located on elevated hump, widely separated mesally; second pair of smaller, rounded setal warts located more laterally, clearly visible only in lateral view. One pair of diffuse mesoscutal warts in longitudinal bands extending entire length of mesoscutum, composed of very densely packed setae with small alveoli and some larger setae arranged in double or triple rows. These bands of setal warts continuing onto quadrate mesoscutellum. Large, rounded setal warts located proximally above articulation of cervical sclerite on proepisternum, larger than setal wart

on each precoxale. Very large, elongate, compact setal wart present on each side mostly on membranous part of cervix, touching anterior arm of cervical sclerite. Lateral cervical sclerites distinctively formed; composed of narrow anterior arm articulating anteriorly to back of head with occipital condyle above posterior tentorial pits, fused to posterior cervical sclerites. Posterior cervical sclerites each forming narrow plate broadened posteriorly and reaching prothoracic episternum, articulating to weakly sclerotized anteromedian band of prothoracic eusternum by narrow, ventral intercervical sclerites. Leg claws symmetrical; spur formula 2, 4, 4; foreleg spurs similar, midleg anterior spurs half as long as posterior spurs; each hind leg anteroapical spur half as long as other hind leg spurs. Forewings: length 18.0 mm; membrane uniformly greyish brown, without pattern. Forewing R1 recurrent into R2 before costal margin; basis of discoidal cell located basally of midpoint of wing; forks I, II, III, IV, V present; crossveins *h*, *sc-r*, *s*, *r-m*, *m*, *m-cu*, *cu1*, and *cu2* present; postanal vein absent. Hins wings: R1 running into R2; forks I, II, III, V present; fork I longer than fork II.

Male genitalia. Segment IX smoothly glabrous, covered by acanthae, except apical lobes and ventropleural faces each with setose surfaces; fused annularly, without longitudinal grooves laterally separating dorsal and ventral parts; tergum slightly longer than venter, dorsum produced into rounded protrusion in lateral view (Fig. 2); anterior margin of segment IX regularly straight, vertical; antecosta weakly developed, forming narrow, marginal rim, without clearly visible external antecostal suture; apical lobe on each posterolateral margin subtriangular exactly at midheight of segment; suture-like rim present on posterolateral margins of segment IX starting from below apical lobes; spine rows on posterior ventrolateral margins of segment IX absent; in dorsal view (Fig. 3) tergum IX clearly triangular, with mesal suture running on ridge and diverging at apical end of tergum IX; anterior margin of tergum IX forming less pigmented acrotergite. Intersegmental depression between segment IX and segment X rounded stepwise. Segment X shorter than gonocoxites, with apex curving dorsad in lateral view (Fig. 2); in dorsal view (Fig. 3) elongate and slightly broader at midpoint due to presence of lateral humps; apicoventral setose lobes reduced to setose surfaces below dorsad-curving apices; subapicodorsolateral setose lobes forming sparsely setose surfaces of subdorsal humps at midpoint of segment X; apicomeral interlobular gap very narrow, deeply cleft, slightly wider basally. Preanal appendages long and slender, elongate-oval in lateral and dorsal views. Gonocoxites each 1-segmented, without harpago, forming arch varying in width along its length in ventral (Fig. 4) and lateral (Fig. 2) views; very pronounced subapicolateral setose outgrowth and subbasoventromesal setose lobe present. Phallic apparatus forming straight tube; phallosome more developed ventrally, its ventral apex projecting ventrad to excised apex and its lateral apices projecting as triangular wings; phallosomal sclerite small, located almost in middle of phallosome when in retracted condition; apical phallicata membranous.

Holotype male: THAILAND: Chiang Mai, Sirifum waterfall, 18°48.9'N, 98°53.0'E, 20.v.1996 [T.W. Donnelly] — (in alcohol, NMNH).

Distribution: Thailand.

Etymology: *malickyi*, named for Dr. Hans Malicky, in recognition of his contributions to caddisfly taxonomy, particularly for his invaluable assistance and encouragement throughout this study.

***Ganonema ochracellum* (McLachlan)**

Asotocerus ochraceellus McLachlan, 1866: 255.

Ganonema ochraceillum (McLachlan 1866); Ulmer (1951: 27).

Ganonema fuscipenne (Albarda, 1881: 17), **new synonym**.

Type locality: “Borneo”.

Distribution: India (South, North), Myanmar, Thailand, Laos, Vietnam, Malaysia (Peninsular, Sabah), Indonesia (Kalimantan, Java).

New records: **BORNEO:** O. Borneo, Pajau River [Mjöberg] – 1 male (NRM). **VIETNAM:** Hoabinh, 20 km to Tonlac, 31.i.1986, singled [J. Oláh] – 3 males, 1 female (OPC). **VIETNAM:** Ngoc Lac, 25.i.1986, singled [J. Oláh] – 1 male (OPC). **VIETNAM:** Lamdong, Baoloc, Duchma stream, 22.x.1988, singled [J. Oláh] – 1 males (OPC). **VIETNAM:** Lamdong, Baoloc, Locchau stream 24.x.1988, singled [J. Oláh] – 3 males (OPC). **MALAYSIA:** Perak, Halong stream, ix–x.1993, light [G.S. Robinson] – 18 males (NHML). **LAOS PDR:** Luang Namtha Prov., Nam Ha NBCA, Lakkhammai Village, Nam Leung stream, 749 m, UTM 47Q0744602, 2339873, 30.iv.2005, light trap, loc 29 [N. Jönsson, T. Malm & B. Viklund] – 1 male (NRM).

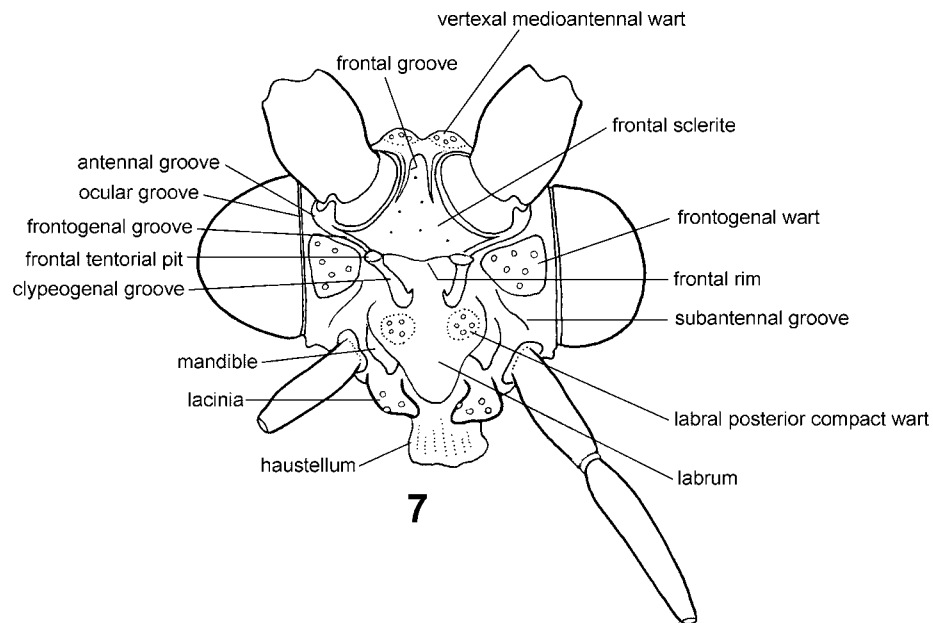
Remarks. This ochraceous animal with narrow forewing is widely distributed from India (south and north) to Borneo and Java. Malicky (1994) noted the possible synonymy of *Ganonema fuscipenne* (erroneously printed as *G. fuscicornis*) and *G. ochraceellum*. We have cleared, examined and drawn genitalia of a large number of specimens from India (Assam, Meghalaya), Myanmar, Thailand, Laos, Vietnam, Malaysia (Peninsular, Sabah), Indonesia (Kalimantan). The genitalia are nearly identical. The shape and length of the preanal appendages are highly sensitive to the examining angle, which has been thought upon as real differences in several published drawings. In dorsal view, the apex of segment X may be visible as rounded, cut or even excavated, depending on the view angle as well as on the degree of lateral expansion. There are variations in the development of the mesal longitudinal sutures on tergum IX as seen in dorsal view. These sutures may be present and well developed, or almost vestigial in the same population. There are intraspecific variations in the shape of the apices of the gonocoxites; varying from gradually to abruptly tapering, and in the section curving mesad. There are variations also in the presence or development of the less sclerotized acrotergite or acrosternite, frequently not indicated in the drawings in species descriptions. *Ganonema ochraceellum* has narrow forewings with intraspecific variations, including a more-or-less rounded apex; forewing subapical margin is usually strongly sickle-shaped, but variations are observed.

***Ganonema rong*, new species**

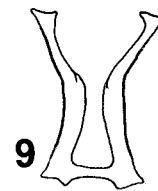
Figs 7–16

This large brown species lacks a forewing color pattern. It is similar to *G. circulare* Schmid from China (Yunnan). It is separated from that species by its shorter preanal appendages, which in lateral view do not surpass the posterior end of tergite IX. Segment X lacks lateral flanks but is supported by a pair of small humps at the intersegmental depression. Each gonocoxite has only 1 segment, not 2 as in *G. circulare*. Another distinguishing character is the very broad forewings. The shape of the forewing of *G. circulare* was described by Schmid as similar to the narrow forewings in *G. ochraceellum* McLachlan.

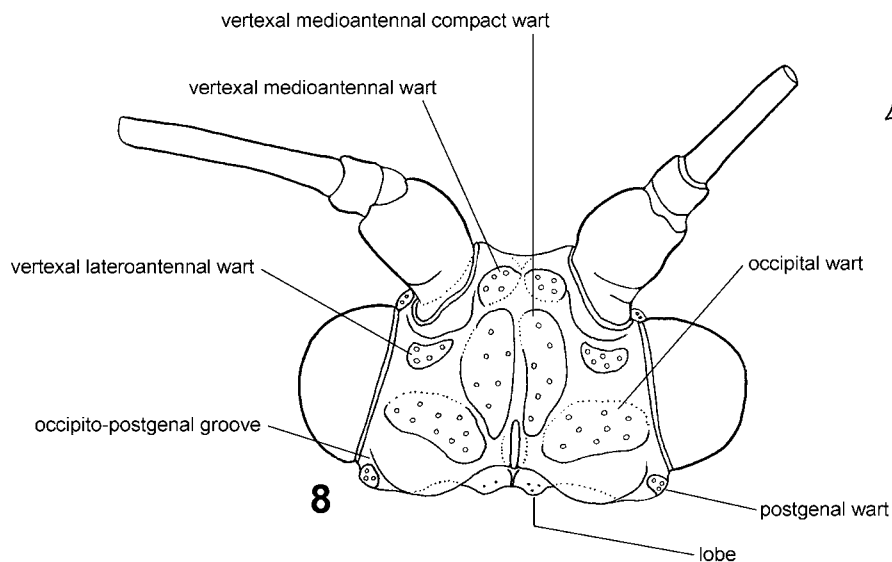
Male (in alcohol). Body size large, brown; wings broad. Legs, antennae and palps lighter, denuded forewing membrane brown without pattern. Head rectangular in dorsal view (Fig. 8), almost as long as broad. Ocelli absent. Tentorium slender, U-shaped; anterior half diverging in dorsal view (Fig. 9), without dorsal arms; posterior arms very short, robust, ending in pair of large posterior tentorial pits with strong tentorial bridge without anteromesal or posteromesal protuberances; anterior tentorial arms almost uniform, without median lamellate processes, each with anterior half diverging, curving dorsad (Fig. 10). Facial groove pattern (Fig. 7) modified by presence of plate-like flange or rim of frontal sclerite between anterior tentorial pits, theoretical lines separating frons and clypeus are manifested by transverse frontal rim; frontogenal vertical grooves oblique, forming dorsal continuations from anterior tentorial pits, stretching diagonally almost to antennifer pivots on ventral antennal grooves; dorsal continuation of anterior tentorial arms from anterior tentorial pits visible on cleared head as internal folds or frontogenal septa reaching circumantennal sclerites at antennifer pivots. Clypeogenal vertical grooves located ventrally of anterior tentorial pits, short, directed slightly mesad; highly visible pattern of plate-like flanges and frontogenal and clypeogenal sutures representing complex of anterior tentorial arms and frontogenal septa. Subantennal grooves small, weakly developed,



7



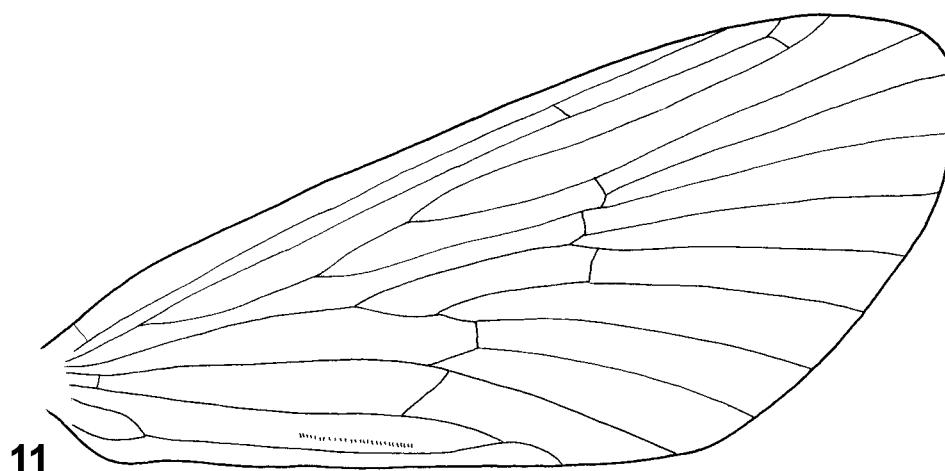
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8

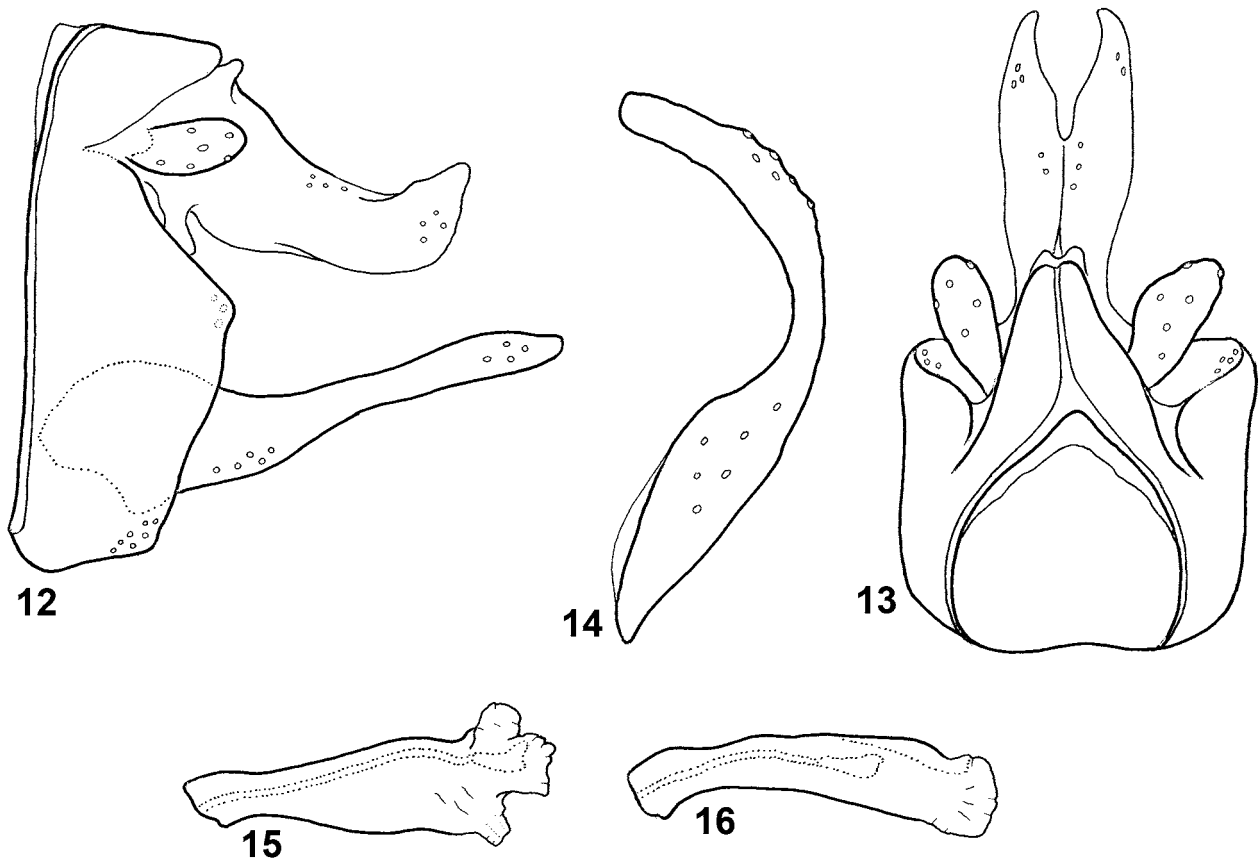


10



11

FIGURES 7–11. *Ganonema rong*, new species, holotype. 7 — head, frontal; 8 — head, dorsal; 9 — tentorium, dorsal; 10 — tentorium, lateral; 11 — right forewing.



FIGURES 12–16. *Ganonema rong*, new species, holotype. 12 — genitalia, lateral; 13 — genitalia, dorsal; 14 — gonocoxite, ventral; 15 — phallus, lateral; 16 — phallus, ventral.

sinuous, running obliquely between large frontogenal compact warts and palpifers; subocular grooves not visible. Short, indistinct frontal grooves present between antennae on constricted frons, joining compact vertexal medioantennal setose wart. Vertexal groove pattern (Fig. 8) more reduced, with large anterad-directed, rounded elevation dominating anterior half of vertex and reaching interantennal area, delineated laterally by extremely enlarged membranous antennal sockets circled by antennal grooves; enlarged sockets with corrugated or granulous surfaces near compact frontogenal setose warts; stem of epicranial groove (coronal groove) vestigial; dorsomesal ridge (vestigium) of coronal groove visible in middle of posterior end of vertex and surrounded by less pigmented area; anterad-directed occipito-postgenal groove meeting lateral margins of very large occipital compact setal warts. Labrum heart-shaped, with freely hanging, rounded, sparsely setose apex; anterior basal part holding pair of rounded, compact setose warts (with labral setae or moustache). Mandibles relatively well developed, less pigmented, located laterally beside labrum; laciniae curving mesad, bearing few setae. Frontal setal warts absent on face, frontal interantennal warts absent due to forward directed vertexal elevation; frons more strongly pigmented, laterally bordered by enlarged, less-pigmented antennal sockets; pair of large, subtriangular, compact frontogenal setal warts present on posterior pregenae on obliquely or almost horizontal frontogenal grooves, stretching into clypeogenal area; pronounced and dominating pair of setal warts being only compact warts visible on face, beside labral moustache. Anterad-directed, rounded elevation on vertex bearing pair of vertexal medioantennal compact setose warts anteriorly on top, separated by anteromesal furrow; pair of rounded, transverse, vertexal lateroantennal compact setal warts present; large central area with diffuse setae on vertex developed into pair of large, horizontally elongated, compact setose warts, giving dense hairy appearance to head dorsum. Occipital compact setose warts, ovoid, oriented obliquely, dominating posterior half of vertex; small pair of narrowly elongated postgenal compact warts visible between posterior section of ocular grooves and large occipital compact setose wart, encircling ventral

part of eyes. Pair of small lobes with compact setose warts present as continuation of dorsomesal ridge or vestigium of coronal groove, and separated by postoccipital groove. Very large elongated compact setal wart present mostly on membranous part of cervix, touching anterior arm of cervical sclerite. Lateral cervical sclerites each composed of narrow anterior arm articulating anteriorly to back of head, with occipital condyle above posterior tentorial pits, fusing to posterior cervical sclerite. Posterior cervical sclerites each forming narrow, posteriorly broadening plate reaching prothoracic episternum, articulating to weakly sclerotized anteromedian band of prothoracic eusternum by narrow, ventral intercervical sclerite. Maxillary palps 5-segmented, formula (I,IV,V)-III-II, filiform, densely covered by long setae. Scapes slightly longer than broad, half as long as head; each scape 3 times longer than its pedicel.

Two pairs of pronotal warts present, large dorsal pair slightly transversely elongated, located on elevated hump, widely separated mesally, second pair smaller, rounded, located farther laterally, clearly visible in lateral view. One pair of mesoscutal diffused warts present, arranged in longitudinal bands running along entire mesoscutum, composed of densely packed setae with smaller alveoli and some larger setae arranged in groups of 2 or 3; bands continuing on quadrate mesoscutellum, interspersed with larger setae. Large, rounded setose wart located proximally above articulation of each cervical sclerite on proepisternum, larger than setal wart on its precoxale. Leg claws symmetrical; spur formula 2, 4, 4; foreleg spurs equal; midleg anteroapical and anterosubapical spurs and hind leg anteroapical spur half as long as other spurs. Forewings: length 14.0 mm; membrane uniformly brown, without pattern (in alcohol); R1 free along its length; crossvein *r* located near apical margin of R1 cell; discoidal cell open (crossvein *s* absent), its base of discoidal cell located basad of midpoint of wing; forks I, II, III, IV, V present, crossveins *h*, *sc-r*, *r*, *s*, *r-m*, *m*, *m-cu*, *cu1* and *cu2* present; postanal vein absent. Hind wings: R1 meeting R2; forks I, II, III, V present; fork I longer than fork II.

Male genitalia. Abdominal segment IX fused annularly, without longitudinal grooves separating dorsal and ventral parts, shorter at preanal appendages where tergum and pleural sclerites meet in V-shaped excision; tergum slightly longer than venter, dorsum produced into protruding triangle in lateral view. Anterior margin of segment IX nearly straight, vertical; apical lobes on posterior margins triangular, sharply angled at mid-height of segment. Antecosta weakly developed, forming narrow, marginal rim, broader along dorsal margin, without clearly visible external groove of antecostal suture. Tergum IX triangular in dorsal view, with mesal suture running along ridge; spine row absent on posterior margin of segment IX; entire segment smoothly glabrous, covered by acanthae; setae located on mesal surface of apical lobes; large ventropleural setal areas located posteriorly. Intersegmental depression between segment IX and segment X sloping, filled with pair of small protuberances. Segment X shorter than gonocoxites, longer than preanal appendages, apex curving dorsad in lateral view; elongated in dorsal view, slightly constricted before wide bases; basal part forming chitinized ventral lobe visible in lateral view. Apicoventral setose lobes reduced to setose surfaces at dorsad-curving apices of segment X; apicodorsal setose lobes forming feeble and sparsely setose surfaces above middle of segment X. Dorsal interlobular gap narrow, deeply cleft at basal half, widening apically. Preanal appendages short, rounded in lateral view, slightly narrower in dorsal view. Gonocoxites without harpagones, forming equally wide arches along their length, slightly constricted at midpoints; basally broad. Phallic apparatus forming slightly ventrad-curving tube with membranous apex of phallicata; phallostremal sclerites small, located almost in middle of phallosome in retracted condition; extruded endotheca or phallicata with phallic apparatus slightly broadening from midway, with phallostremal sclerites disposed terminally.

Holotype male: VIETNAM: Tam Dao, sweep net along left side small tributary of main stream, 10.v.1987 [J. Oláh] – (alcohol, OPC).

Paratypes: VIETNAM: Same collection data as holotype – 3 males (alcohol, OPC).

Distribution: Vietnam.

Etymology: *Rong*, broad in Vietnamese, referring to the very broad forewings of the species.

Remarks: The specialized postoccipital lobes present in this species have been detected only in species of the distantly related family Hydroptilidae.

Anisocentropodinae Lestage, 1936

Anisocentropus McLachlan

Anisocentropus McLachlan, 1863: 492.

Type species: *Anisocentropus illustris* McLachlan, 1863: 492, subsequently selected by Ulmer (1929: 177).

Kizakia Iwata, 1927: 211, 217; synonymized by Ulmer, 1951: 345)

Type species: *Kizakia kawamurai* Iwata, 1927: 211, 217 (monobasic)

This genus is widely distributed, with many species described from the Australasian and Oriental biogeographical regions. It is also represented in the eastern part of the Afrotropical Region, including Madagascar, with few, less-known species, as well as a single species in the Nearctic Region and 1 Australasian-Oriental species ranging into the East Palearctic Region.

Malicky (1994) established 4 subgenera based primarily on the form of the preanal appendages:

- (1) *Anisocentropus* s. str.: preanal appendages simple and oval.
- (2) *Anisokantropus*: preanal appendages complex, subdivided.
- (3) *Anisolinthropus*: preanal appendages with supplementary small, filiform basal process.
- (4) *Anisomontropus*: preanal appendages very long.

Additional subgeneric characters were presented in his subgeneric discriminatory matrix.

- (1) The form of the forewing.
- (2) The presence of a basal setal brush on the hind wing.
- (3) The presence of a setal comb on each male hind leg.
- (4) The tibial spur formula.
- (5) The maxillary palp formula.

It appears that the 5 additional characters are systematically less important, secondary features that develop and become reduced sporadically and independently in unrelated species. We are of the opinion that the subgenera established by Malicky are simply diagnostic species-groups characterised by the genital structural elements, mostly the preanal appendages.

The gonocoxites are long and simple, each with a variously wide basal part in the following Oriental species: *A. annulicornis* (Hagen, 1858); *A. apis* Malicky, 1998; *A. atropurpurens* Flint, 2000; *A. bacchus* Malicky & Chantaramongkol, 1994; *A. cameloides* Malicky, 1995; *A. bungus*, new species *A. csorbai*, new species *A. diana* Malicky & Chantaramongkol, 1994; *A. flavomarginatus* Ulmer, 1906; *A. handschini* Ulmer, 1951; *A. insularis* Martynov, 1930; *A. ittikulama* Schmid, 1958; *A. janus* Malicky & Chantaramongkol, 1994; *A. kawamurai* (Iwata, 1994); *A. kempi* Martynov, 1936; *A. longulus* Navás, 1933; *A. maculatus* Ulmer, 1926; *A. magnus* (Banks, 1931); *A. minutus* (Martynov, 1930); *A. orion* Mey, 1997; *A. pyraloides* (Walker, 1852); *A. salsus* (Betten, 1909); *A. ulmeri* Malicky, 1998; and *A. thonmihn*, new species.

In a few Oriental species the basal part of each gonocoxite is divided, with a produced dorsal lobe, as in: *A. pandora* Malicky & Chantaramongkol, 1994; and *A. dvaupadhah*, new species. The division of the gonocoxites in these 2 species is accompanied by simple preanal appendages.

One species with complex, divided preanal appendages, *A. pan* Malicky & Chantaramongkol, 1994, has complex divided gonocoxites, each with 3 lobes.

Only 3 Oriental species have short gonocoxites: *A. malaisei*, new species *A. erichthonios* Malicky & Cheunbarn in Malicky *et al.*, 2001; and *A. golem* Malicky, 1994. Almost all known *Anisocentropus* species from the Australasian and Afrotropical Regions and from the Philippines (Oriental Region) have short gonocoxites. The single Nearctic species, *A. pyraloides* (Walker, 1852) is similar to the Oriental species in having long gonocoxites, with simple, elongated preanal appendages. Afrotropical species are rather poorly known, but

the species all appear to have short gonocoxites. We examined recently collected specimens of *A. voeltzkowi* Ulmer, 1909, and describe here a similar species, *A. samuh*, new species, both from Madagascar and having the same short gonocoxites, but each with a slender digitate process on its apicodorsal corner. A few species from the Australasian and Oriental Regions have the same short gonocoxites with slender digitate processes. Here we establish a new diagnostic species-group, *Anisocentropus latifascia* diagnostic species-group, based on the presence of short gonocoxites as well as presence of unusual lateral flanks on the posterior margins of segment IX. This diagnostic species-group includes the *Anisocentropus brevipennis*, new diagnostic species-cluster for species having short gonocoxites each with a slender, digitate process on its apicodorsal corner. The simple preanal appendages of the subgenus *Anisocentropus* (*Anisocentropus*) are modified in species from the Oriental region and include species with an elongated, robust structure in the subgenus *Anisocentropus* (*Anisomontropus*) and a complex structure in the subgenus *Anisocentropus* (*Anisokantropus*), both subgenera established by Malicky (1994). Until more species are known, we place the *A. latifascia* diagnostic species-group into the subgenus *Anisocentropus* (*Anisocentropus*) Malicky, 1994.

***Anisocentropus* (*Anisocentropus*) s. str. McLachlan**

Type species: *Anisocentropus illustris* McLachlan, 1863: 492.

Diagnosis (after Malicky 1994): Body medium-sized. Forewings less broad, basal setal brush on hindwings thin. Maxillary palps with 6 segment. Male tibial spur formula 2, 4, 3; setal comb on each male hindleg weakly developed. Cerci simple, oval.

***Anisocentropus* (*Anisocentropus*) *annulicornis* (Hagen)**

Macronema annulicorne Hagen, 1858: 485.

Anisocentropus annulicornis (Hagen, 1858); Ulmer (1951: 344).

Type locality: Sri Lanka.

New records: SRI LANKA: N. E. District, Horton Plains, Agrapatana rd., 6600', 4.x.1970 [O.S. Flint, Jr.] – 1 male (NMNH).

***Anisocentropus* (*Anisocentropus*) *cameloides* Malicky**

Anisocentropus cameloides Malicky, 1995: 870.

Type locality: Vietnam.

New records: VIETNAM: Tamdao, 1300 m, 14.x.1986, light [J. Oláh] – (alcohol, OPC).

***Anisocentropus* (*Anisocentropus*) *kawamurai* (Iwata)**

Figs 17–21

Kizakia kawamurai Iwata, 1927: 211 (larva only, very briefly described).

Anisocentropus immunis sensu Ulmer 1907b: 53–54, 1951: 345, *nec* McLachlan, 1963.

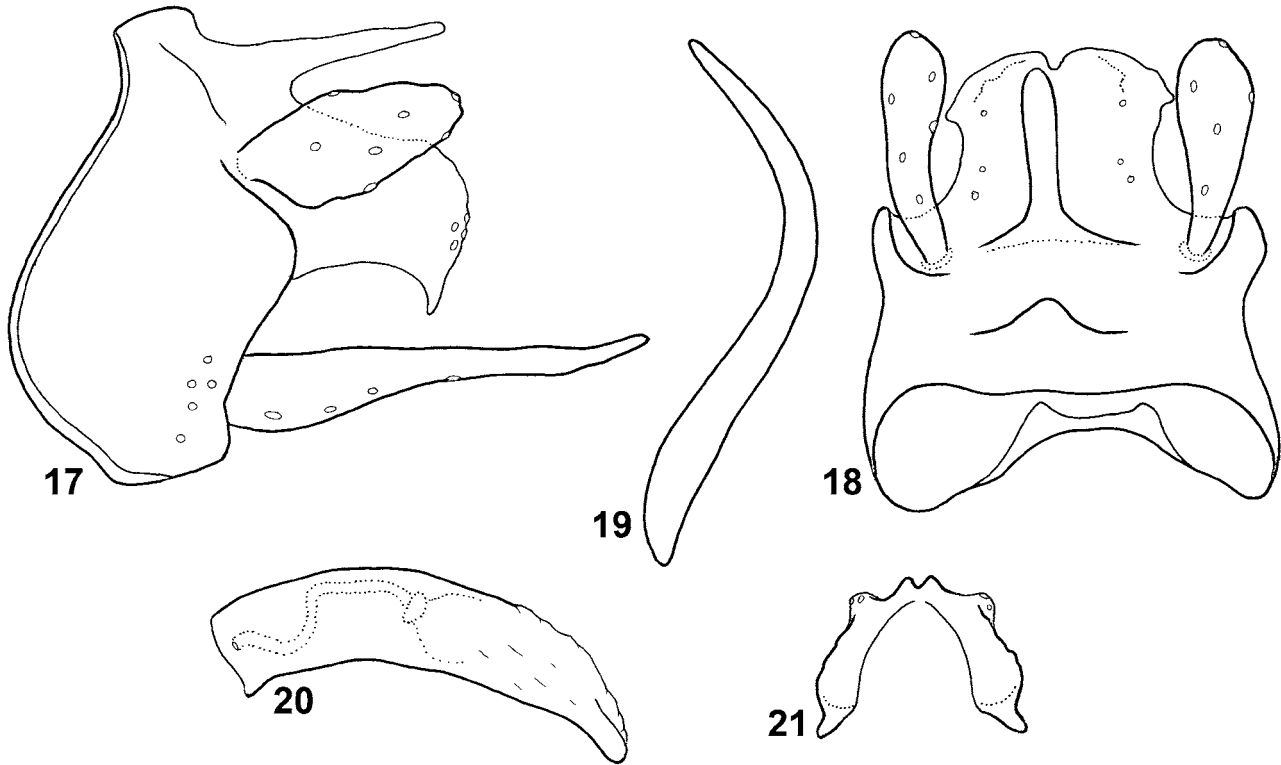
Kizakia kawamurai Iwata as a synonym of *Anisocentropus immunis* sensu Ulmer (1907b: 53–54) according to Ulmer (1951: 345).

Ganonema pallidum Martynov, 1935: 207, 214–217, figs 8–11, **new synonym.**

Type locality: Japan.

New records: JAPAN: Honshu: Shakujil-Tokyo, 22.vi.1952 [W. Nakahara] — 1 male (NMNH); **Hokkaido:** Nanae Cho, Onumako, Higashi onuma camp, 42°0.7'N, 140°43.0'E, 23.vi.2007 [C.O. Flint] — 1 female (NMNH); Chitose-shi, Chitose Lake, 42°47.6'N, 141°42.4'E, 28.vii.2007 [C.O. Flint] — 5 males (4 males NMNH, 1 male OPC); Tomakomai-shi, Bibigawa, Uenae.bashi, 42°43.4'N, 141°42.6'E, 3.viii.2007 [C.O. Flint] — 1 female (NMNH).

Distribution: Japan, Russia (Amurland).



FIGURES 17–21. *Anisocentropus kawamurai* (Iwata), male and female from Japan: Hokkaido, Nanae Cho, Onumako, Higashi onuma camp. 17 — male genitalia, lateral; 18 — male genitalia, dorsal; 19 — male gonocoxite, ventral; 20 — phallus, lateral; 21 — female genitalia, dorsal.

Remarks: *Anisocentropus immunis* McLachlan, 1863 was described from New Guinea (sex not stated, very briefly described and only habitus figure presented). Type depository: NHML; Abdomen lost (McLachlan 1863). Ulmer (1907b) identified, illustrated and re-described a species from Japan as *Anisocentropus immunis* based on McLachlan's brief description of body and wing colour. Later, Ulmer (1951) synonymised the genera *Kizakia* and *Anisocentropus*, and *Kizakia kawamurai* Iwata with his (1907b) concept of Japanese *Anisocentropus immunis* McLachlan. Neboiss (1986: 229), however, illustrated a male of *A. immunis* from New Guinea and concluded that the figures by Ulmer (1907b) as *A. immunis* McLachlan from Japan represent another species. *Anisocentropus immunis* McLachlan from New Guinea has short gonocoxites and a well-developed lateral flank on each posterolateral margin of segment IX, and is a true member of the *Anisocentropus latifascia* diagnostic species-group. The species drawn by Ulmer from Japan has very long and slender gonocoxites and no lateral flanks. *Anisocentropus kawamurai* is very close to *A. minutus* Martynov from China (Hainan) and is identical to *Ganonema pallidum* Martynov, 1935, from Amurland.

Based on larval material of this species from Japan (Honshu, Nagano Prefecture, Lake Kizaki), Iwata (1927) established a new genus, *Kizakia* within the Molannidae. According to the male genitalia, it belongs to the genus *Anisocentropus* and resembles *Anisocentropus minutus* Martynov. However, it is distinct from *A.*

minutus in having more slender median processes on segment IX, a differently shaped, ventrad-curving apex of segment X, and larger body size. Its body and wing colour may change from darker greyish brown to ochraceous in different habitats or during preservation. For example, a pinned specimen collected on Honshu Island near Tokyo in 1952 (W. Nakahara) is light ochraceous and freshly collected specimens in 2007 from Hokkaido are dark greyish brown.

Anisocentropus (Anisocentropus) minutus (Martynov)

Ganonema minuta Martynov, 1930: 84.

Anisocentropus minutus (Martynov, 1930); Malicky (1994: 69).

Ganonema pallidus sensu Malicky 1994: 69, nec Martynov, 1935. This misidentified species was incorrectly synonymized with *A. minutus*; it is instead a new synonym of *A. kawamurai* (Iwata).

Type locality: China (Hainan).

New records: **MYANMAR:** S. Shan States Road, 40 km E. Taunggyi, 13.x.1934 [R. Malaise] – 3 males, 2 females (Malaise B.M. 1938-258, NHML); **VIETNAM:** Bac Thai Province, Quang Chu, 24–25.v.1987, sweep net [J. Oláh] – 1 male (OPC).

Distribution: China (Hainan), Myanmar, and Vietnam.

Anisocentropus (Anisocentropus) latifascia, new diagnostic species-group

This diagnostic species-group, characterized by having males with short gonocoxites and simple preanal appendages includes the only representatives of the genus having a wide Gondwanan distribution, including the Afrotropical and Australasian Regions as far north as the Philippines (Oriental Region). Only a few species are present in the Oriental region. Species in the other diagnostic species-groups have variously modified inferior and preanal appendages and are diverse in and endemic to the Oriental Region and have highly modified forms present in the East Palaearctic Region.

The members of the *A. latifascia* diagnostic species-group are all medium-sized species with a forewing length between 7 and 14 mm. The cephalic groove and setal wart pattern are rather stable, not varying among species. The forewing shape varies among the species, but many have broad triangular forewings. Most species are coloured, and with more or less pronounced forewing patterns (Figs 138–159). Two genital characters seem discriminatory for this diagnostic species-group: (1) male genitalia with lateral flank on each side between preanal appendage and gonocoxite on the posterior margin of segment IX (in addition to the apicodorsal lobe). Its apical half is more glabrous and shiny compared to the rest of segment IX, apparently without microtrichia or acanthae (Oláh & Johanson 2007); (2) short gonocoxites. Two additional genital characters appear stable in this diagnostic species-group: (1) segment X forming a large hood with ventrad-oriented apical margin being variously excised apicomeresally and with apicolateral margin with various configurations; (2) preanal appendages simple, short and ovoid. Neboiss (1980) distinguished 3 diagnostic species-groups among the Australian *Anisocentropus* based on the size and shape of the phallotremal sclerites.

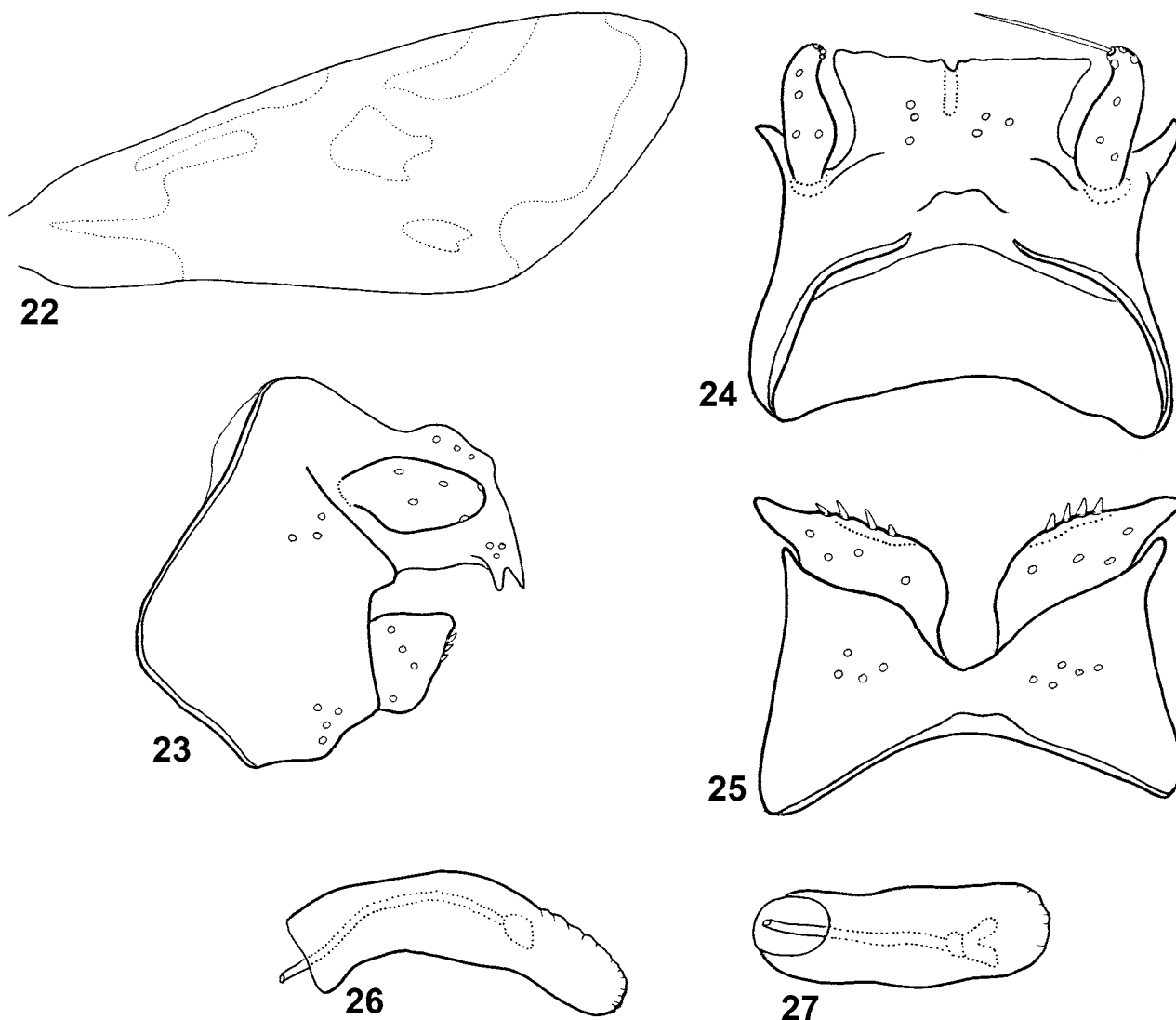
Anisocentropus (Anisocentropus) cretosus McLachlan

Figs 22–27

Anisocentropus cretosus McLachlan, 1875: 11.

Type country: Indonesia (Sulawesi).

New records: INDONESIA: Sumba, Nusa Tenggara Timur Province, near Lewapaku, 57 km on Waingapu to Waikabubak road, 500 m, 9–12.xii.1985, UV trap [J.D. Weintraub] — 1 male (NMNH).



FIGURES 22–27. *Anisocentropus cretosus* McLachlan, male from Indonesia: Sumba, Nusa Tenggara Timur Province, near Lewapaku, 57 km on Waingapu to Waikabubak road. 22 — right forewing; 23 — genitalia, lateral; 24 — genitalia, dorsal; 25 — genitalia, ventral; 26 — phallus, lateral; 27 — phallus, ventral.

***Anisocentropus (Anisocentropus) erichthonios* Malicky & Cheunbarn**

Anisocentropus erichthonios Malicky & Cheunbarn in Malicky *et al.* 2001: 13.

Type locality: Thailand.

New records: VIETNAM: Lamdong, Baoloc, River Danga, 21.x.1988, light [J. Oláh] – 1 male (OPC, in alcohol). **LAOS PDR:** Luang Namtha Prov., Nam Ha NBCA, Lakkhammai Village, Nam Leung stream, 749 m, UTM 47Q0744602, 2339873, 30.iv.2005, light trap, loc 29 [N. Jönsson, T. Malm & B. Viklund] – 1 male (NRM, in alcohol); Luang Namtha Prov., Tong Om Village, 552 m, UTM 47Q0750111, 2321825, 1.v.2005, light trap, loc 30 [N. Jönsson, T. Malm & B. Viklund] – 1 male (NRM, in alcohol).

Anisocentropus (Anisocentropus) fijianus Banks

Fig. 28

Anisocentropus fijianus Banks, 1936: 29.

Type locality: Fiji Islands.

New Records: FIJI ISLANDS: Vanua Levu: Nuvivanda, 3–5.ix.1975 [H.S. Robinson & P.A. Maddison] — 6 males (NHML, in alcohol); Savura Creek, 31.vii.1975 [P.A. Maddison] — 1 male (NHML, in alcohol); Savudvodra Dam, 10.ii.1971 [G.S. Robinson] — 4 females (NHML, in alcohol); Macuata Province, Dogotuki, 2.5 km E Nasavu River, 7.vii.2003, Malaise trap [M. Irwin, E. Schlinger & M. Tokota'a], 16.2519°S, 179.7833°E — 1 female (BMH, in alcohol); Macuata Province, Rokosalase, 8.vi.–21.vi.04 [M. Irwin, E. Schlinger & M. Tokota'a], Malaise trap in forest 179°1'147"E, 16°31'891"S, 105 m — 1 female (BMH, in alcohol). **Viti Levu:** Suva, Savura Creek, 31.vii.1975, MV light [P.A. Maddison] — 1 female (NHML, in alcohol); Vuda Prov., 1 km E Abaca Vlg., Koroyanitu Ntl. Pk., 800 m, Kokabula Trail, 17°40'S, 177°33'E, 12–19.xi.02, Malaise trap [E. Schlinger & H. Tokota'a] — 1 male (BMH, in alcohol); Vuda Prov., 1 km E Abaca Vlg., Savuione Trl. 800 m, 17.667°S, 177.55°E, 11–19.iii.2003, Malaise trap 1 [E. Schlinger & H. Tokota'a] — 1 male, 1 female (BMH, in alcohol); Vuda Prov., 1 km E Abaca Vlg., Koroyanitu, Ntl. Pk. 800 m, Savuione Trl., 17°40'S, 177.33°E, 7–12.x.2002, Malaise trap 1 [E. Schlinger & H. Tokota'a] — 1 female (BMH, in alcohol); Vuda Prov., Koroyanitu Eco Park, Mt Evans Range, 0.5 km N Abaca Vig. (17.557, 177.55) 800 m, 25.x–5.xi.2002, Malaise trap 1 [E. Schlinger & H. Tokota'a] — 1 female (BMH, in alcohol); Vuda Prov., Koroyanitu Pk. 1 km E Abaca Vig., 800 m, 22.iv–6.v.2003, Malaise trap 1 [E. Schlinger & H. Tokota'a], 17.667°S, 177.55°E — 1 female (BMH, in alcohol).

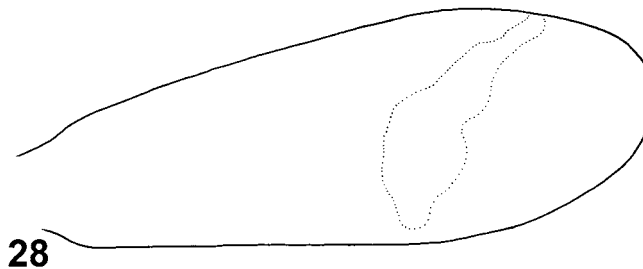


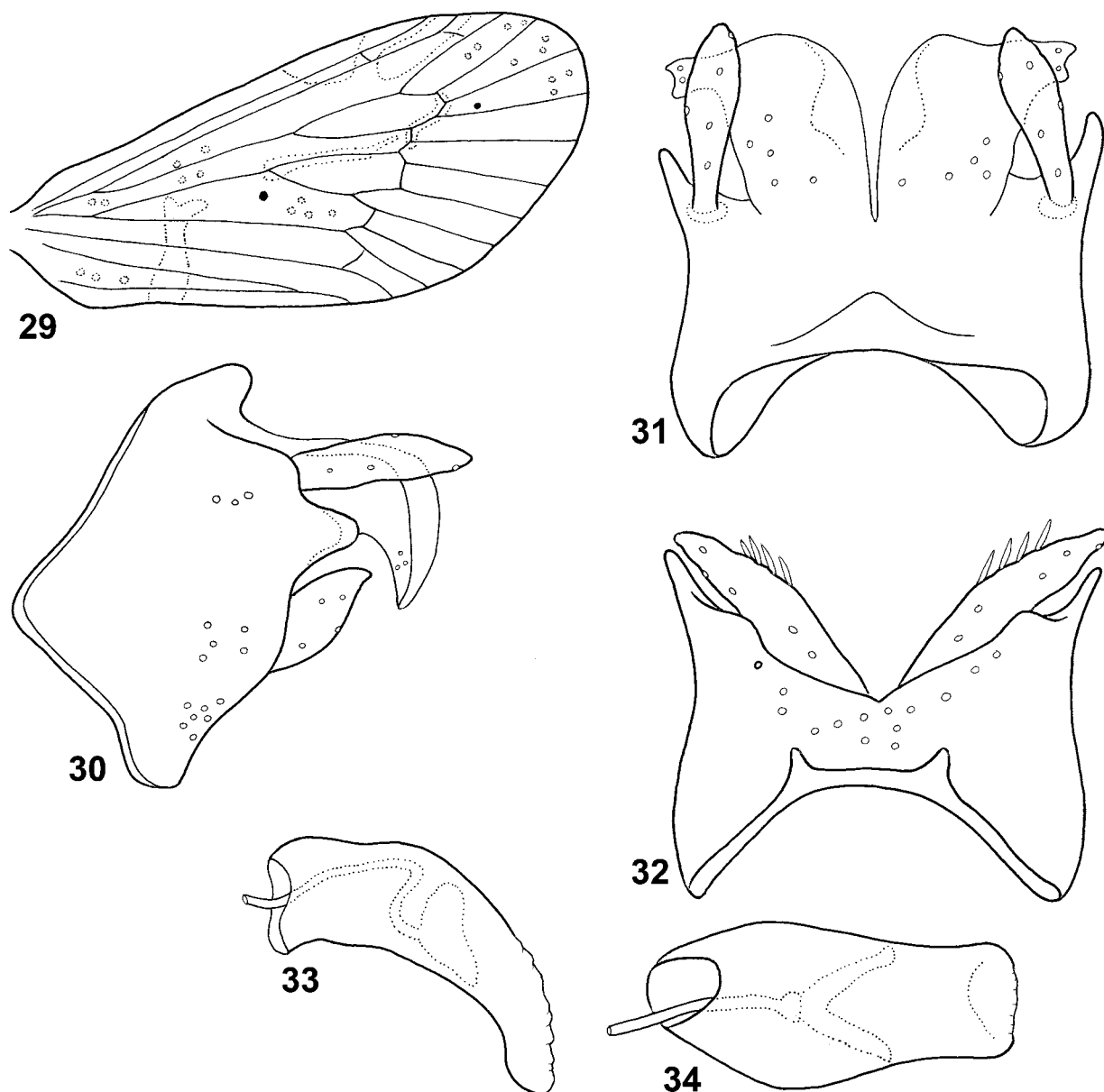
FIGURE 28. *Anisocentropus fijianus* Banks, male, right forewing from Fiji Islands: Viti Levu, Vuda Prov., 1 km E Abaca Vlg., Koroyanitu Ntl. Pk., 800 m, Kokabula Trail.

Anisocentropus (Anisocentropus) fridae, new species

Figs 29–34

This medium-sized species is chestnut brown with yellow underside and legs, and is distinguishable from other species on the Fiji Islands by this contrasting chestnut and yellow color. The dark chestnut colored forewing membrane has a large and specially shaped median hyaline window. The median keel on tergum IX is the shortest among the related *A. fijianus* and *A. hannahae*, new species. The mesal margin of the gonocoxites is clearly convex in ventral view and different from the concave margins of the gonocoxites of *A. fijianus* and *A. hannahae*, new species.

Male (in alcohol). Body medium-sized, with chestnut brown forewing membrane; legs, antennae and ventral part of body yellow; palps, vertex, scuta and scutella chestnut brown; forewings each with indistinct pale patches around pterostigma and pale, transverse, narrow band at basal 1/3rd. Head rectangular in dorsal view, almost as long as broad. Ocelli absent. Tentorium not observed. Facial groove pattern modified by plate-like



FIGURES 29–34. *Anisocentropus fridae*, new species, holotype. 29 — right forewing; 30 — genitalia, lateral; 31 — genitalia, dorsal; 32 — genitalia, ventral; 33 — phallus, lateral; 34 — phallus, ventral.

flange, or rim, connecting anterior tentorial pits, forming theoretical lines separating frons and clypeus; frontogenal vertical grooves forming dorsal continuation from anterior tentorial pits, oblique, almost horizontally merging with broad antennal grooves; clypeogenal vertical grooves located ventrally of anterior tentorial pits, short, ventrally directed mesad. Pattern of plate-like flange and frontogenal and clypeogenal sutures forming complex with anterior tentorial arms (frontogenal septum); small, poorly visible subantennal grooves running sinuously, almost horizontally between large frontogenal, compact warts and palpifers; subocular groove invisible; very short, pronounced frontal groove present between antennae and joining to vertexal medioantennal compact setose wart. Vertexal groove pattern reduced; large, anterad-directed, rounded elevation dominating anterior half of vertex, reaching interantennal area, delineated laterally by enlarged membranous antennal sockets; antennal sockets with corrugated or granulous surfaces near frontogenal compact setose wart. Stem of epicranial groove (coronal groove) vestigial; occipito-postgenal groove partly merging anteri-

orally, touching large, occipital, compact setal warts. Labrum vertically long, quadrangular, with narrowing, rounded apex, freely hanging, sparsely setose. Mandibles long, weakly pigmented, located laterally along labrum, lacinia narrow, elongate, bearing few setae. Frontal setal warts absent on face, frontal interantennal warts absent due to anterad-directed vertexal elevation. Pair of large, subtriangular frontogenal compact setal warts present on posterior pregenae, on obliquely or almost horizontal frontogenal groove, representing compact warts dominating face. Anterad-directed, rounded triangular elevation on vertex bearing fused vertexal medioantennal compact, anterodorsal setose wart. Vertexal, lateroantennal compact setal warts invisible due to enlarged antennal socket. Pair of small rounded vertexal ocellar compact setose warts and very small pair of vertexal medioocellar diffuse setose warts visible, with 1 or 2 setae in middle of vertex. Obliquely located, ovoid pair of large occipital compact setose warts dominating posterior half of vertex. Small pair of postgenal compact warts visible between posterior section of ocular grooves and large occipital compact setose warts. Maxillary palps broken on holotype and paratype; observed palp formula: II-I-III. Scapes rounded, long, 1/3rd as long as head; 2.5 times longer than pedicel. Two pairs of pronotal warts present; large-sized dorsal pair ovoid, transversely elongated, separated mesally by broad fissura; ovoid pair of small-sized, rounded, deeply laterally-located setal warts. One pair of mesoscutal diffused warts present, arranged in longitudinal lines running along entire mesoscutum, composed of 1, 2 or 3 setae on pale alveoli. Pair of mesoscutellar warts forming small, less pigmented, rounded areas, each with 5–6 setal alveoli. Minute, rounded setose warts present proximally on each side above articulation of cervical sclerite on proepisternum, even smaller than setal wart on precoxale. Large, compact setal wart present on each side mostly on membranous part of cervix, touching anterior arm of cervical sclerite. Lateral cervical sclerites forming narrow anterior arm articulating anteriorly with back of head, with occipital condyle above posterior tentorial pits and fused to posterior cervical sclerites; posterior cervical sclerite forming narrow elongated plate reaching prothoracic episternum, articulating with weakly sclerotized anteromedian band of prothoracic eusternum by slender ventral intercervical sclerites. Legs with symmetrical claws; spur formula 2, 4, 3; foreleg spurs equal; midleg anteroapical spur 1/6th as long as foreleg spurs, anterior subapical spur 1/3rd as long as foreleg spurs; hind leg anteroapical spur 1/3rd as long as foreleg spurs. Forewings: length 8.0 mm; membrane chestnut brown, nearly bare, with indistinct pale patches around pterostigma and pale traverse, narrow band at basal 1/3rd; large, hyaline, median, linear window present on vein M starting shortly before bifurcation of M, running to bifurcation of M1+2, continuing on crossveins *r-m* and *s*. R1 separate along its length; crossvein *r* connecting R1 and R2 near wing margin; discoidal cell base located at midpoint of wing; forks I, II, III, IV, V present; crossveins *h*, *sc-r*, *r*, *s*, *r-m*, *m*, *m-cu*, and *cu2* present, crossveins *cu1* and *cu-a* absent; postanal vein absent; nygma and thyridium darkly pigmented, large. Hind wings: R1 meeting R2; forks I, II, III, V present; fork I longer than fork II.

Male genitalia. Abdominal segment IX fused annularly, without longitudinal groove separating dorsal and ventral parts; tergum as short as venter, dorsum and venter narrowly produced in lateral view; anterolateral margin of segment IX triangular, slightly below middle of segment; posterior margin forming large regularly convex plate with well-developed lateral flank on each side between preanal appendage and gonocoxite; apical half of flank glabrous, less pigmented, slightly transparent. Antecosta weakly developed, forming narrow, marginal rim, equally thin along its entire margin, external groove of antecostal suture inconspicuous; tergum IX with slightly protruding mesal keel; short, obtusely angled triangle in dorsal view; spine row absent on posterolateral margin of segment IX, segment IX glabrous except for small dorsopleural and large ventropleural and ventral setose areas. Intersegmental depression between segments IX and X forming deep step in lateral view due to protruding mesal keel of tergum IX. Segment X much longer than gonocoxites, as long as preanal appendages and forming broad hood with ventrad- and laterad-directed apical rim characterised by sinuous excavations visible in dorsal and ventral view, excavations resulting in formation of tooth-like pattern on ventrad-curving margin, with 2 teeth; apicoventral setose lobes reduced to setose surface subapically; apicodorsal setose lobe forming feeble, sparsely setose surface above middle of segment X. Dorsal interlobular gap deep, triangular, narrowing anteriorly. Preanal appendages digitiform in lateral view; clavate in dorsal

view, slender basally, broadened slightly subapically. Gonocoxites without harpagones, triangular in lateral view, each elongate with convex mesal margin in ventral view, apex slightly narrowed; 4 stout setae located on middle of mesal surface. Phallic apparatus forming curving tube, dorsally slightly convex, ventrally concave in lateral view, elongated, ventral apical lobe sclerotized, only part of phallicata visible above ventral lobe while retracted; phallotremal sclerite barely visible in lateral view as large compact structure in membranous phallicata, phallotremal sclerite complex in ventral view, clearly visible as V-shaped sclerite with ends curving slightly laterad; slender ejaculatory duct clearly visible, reaching phallotremal sclerite complex, sinuous in lateral view, straight in ventral view.

Holotype male: FIJI ISLANDS: Viti Levu: Naitasiri Province, Nakobalevu Mt., 22.ix–9.x.2002, 18°03'S, 178°25'E, rainforest, Malaise trap [M. Irwin, E. Schlinger & M. Tokota'a] — (BMH, in alcohol).

Paratypes: same data as holotype — 1 female (BMH, in alcohol); Naitasiri Province, 4.8 km N Veisari Stlmt., log road to Waivudawa, 12.xii.2002–3.i.2003, 18.075°S, 178.362°E, FBA 177102, Malaise trap [E. Schlinger & M. Tokota'a] — 2 males (BMH, in alcohol); Pabitra Wabu Baseline Survey, 1034 m, 17–20.xi.2003, Malaise samples collected from Delena Veikovi, -17.5833°S, 178.0833°E — 2 females (BMH, in alcohol); Naitasiri Province, 1.8 km E Navai Village, old trail to Mt. Tomaniivi (Victoria), 700 m, 6.vi–15.vii.2003, Malaise trap: MO4 [E. Namatalau], -17.621°S, 177.998°E — 1 female (BMH, in alcohol); Vuda Prov., Koroyanitu Pk., 1 km E Abaca Vlg., Savuione Trl. 800 m 17.667°S, 177.55°E, 20.xi–3.xii.2002, Malaise trap 1 [E. Schlinger & H. Tokota'a] — 2 females (BMH, in alcohol); Vuda Prov., Koroyanitu N. M. P., 0.5 km N Abaca Village, Malaise trap, 7–12.x.2002 [E. Schlinger & H. Tokota'a], 17.666°S, 177.550°E, 800 m — 1 female (BMH, in alcohol); Vuda Prov., 1 km E Abaca Vlg., Koroyanitu, Ntl. Pk., 800 m, Savuione Trl., 17°40'S, 177.33°E, 26.x–5.xi.2002, Malaise trap [E. Schlinger & H. Tokota'a] — 1 female (BMH, in alcohol).

Distribution: Fiji Islands.

Etymology: *fridae*, named after Frida Svare Johanson, the name of the daughter of one of the authors (KAJ) of this species, name given to remember Frida's 16th birthday, representing the starting day of the work on this paper.

Anisocentropus (Anisocentropus) fulvus Navás

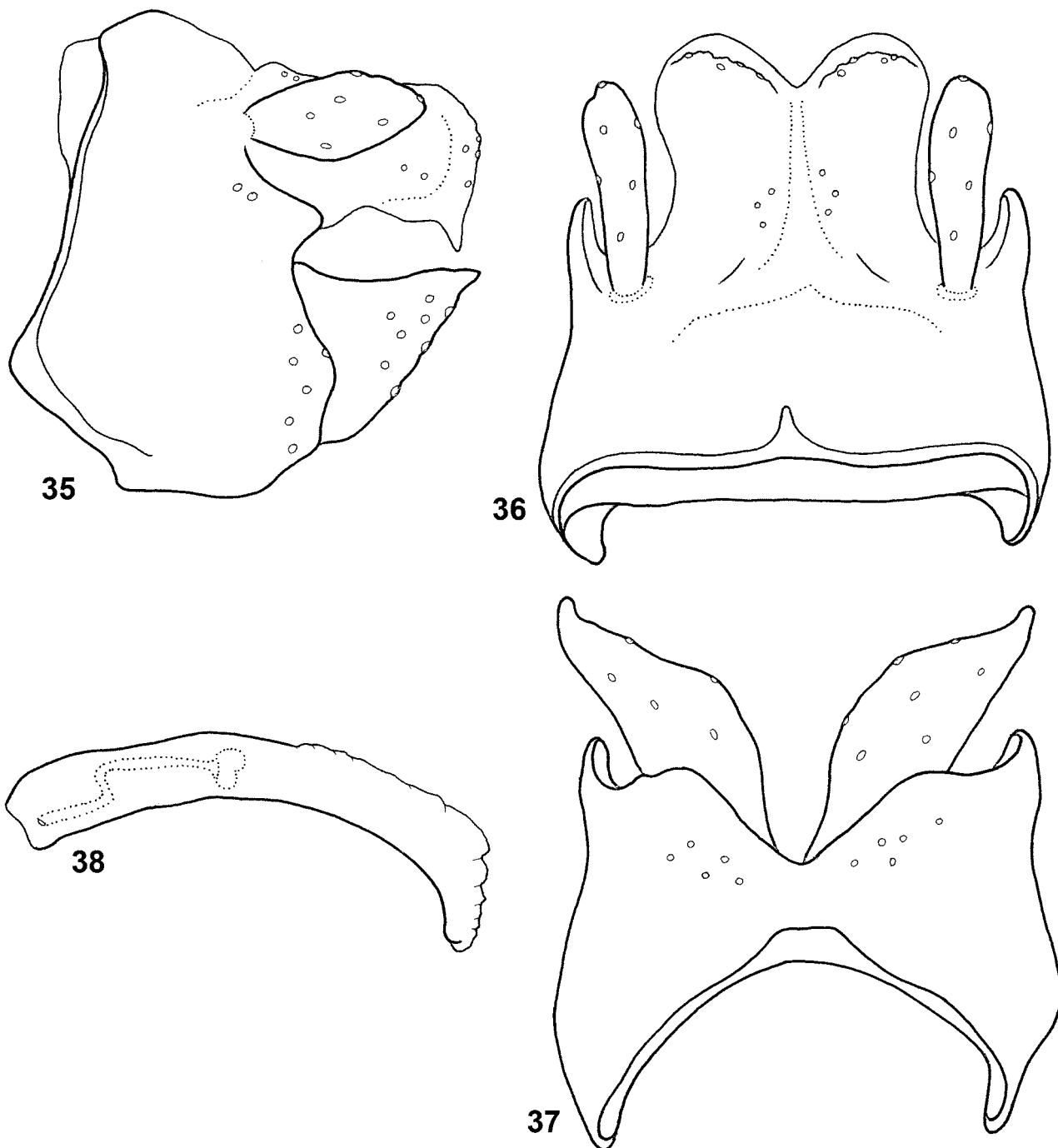
Figs 35–38

Anisocentropus fulvus Navás, 1934: 94.

Type country: Kenya.

New records: TANZANIA: Lake Victoria, Ukerewe Island, Tanzanian Territory [Father Conrads] — 2 males (NMNH, in alcohol).

Remarks. The specimen illustrated in the original description is probably *Anisocentropus fulvus* Navás. The original species description is restricted mostly to body and wing colour and based on a specimen from Meru, Kenya. The body and its appendages are ochraceous fulvous, both the setae and the membrane on the wings are testaceous and forming unicoloured wing surfaces without pattern. The type deposited in the Museum de Paris was not available for study. Two specimens collected not far from the type locality on the Ukerewe Island were examined. These males have forewing length 14.0 mm, i.e., considerably larger than those of the female type. The wing colour is similar to that given in the original description.



FIGURES 35–38. *Anisocentropus fulvus* Navás, male from Tanzania: Lake Victoria, Ukerewe Island, Tanzanian Territory. 35 — genitalia, lateral; 36 — genitalia, dorsal; 37 — genitalia, ventral; 38 — phallus, lateral.

***Anisocentropus (Anisocentropus) furcatus* (Banks)**

Figs 39–43

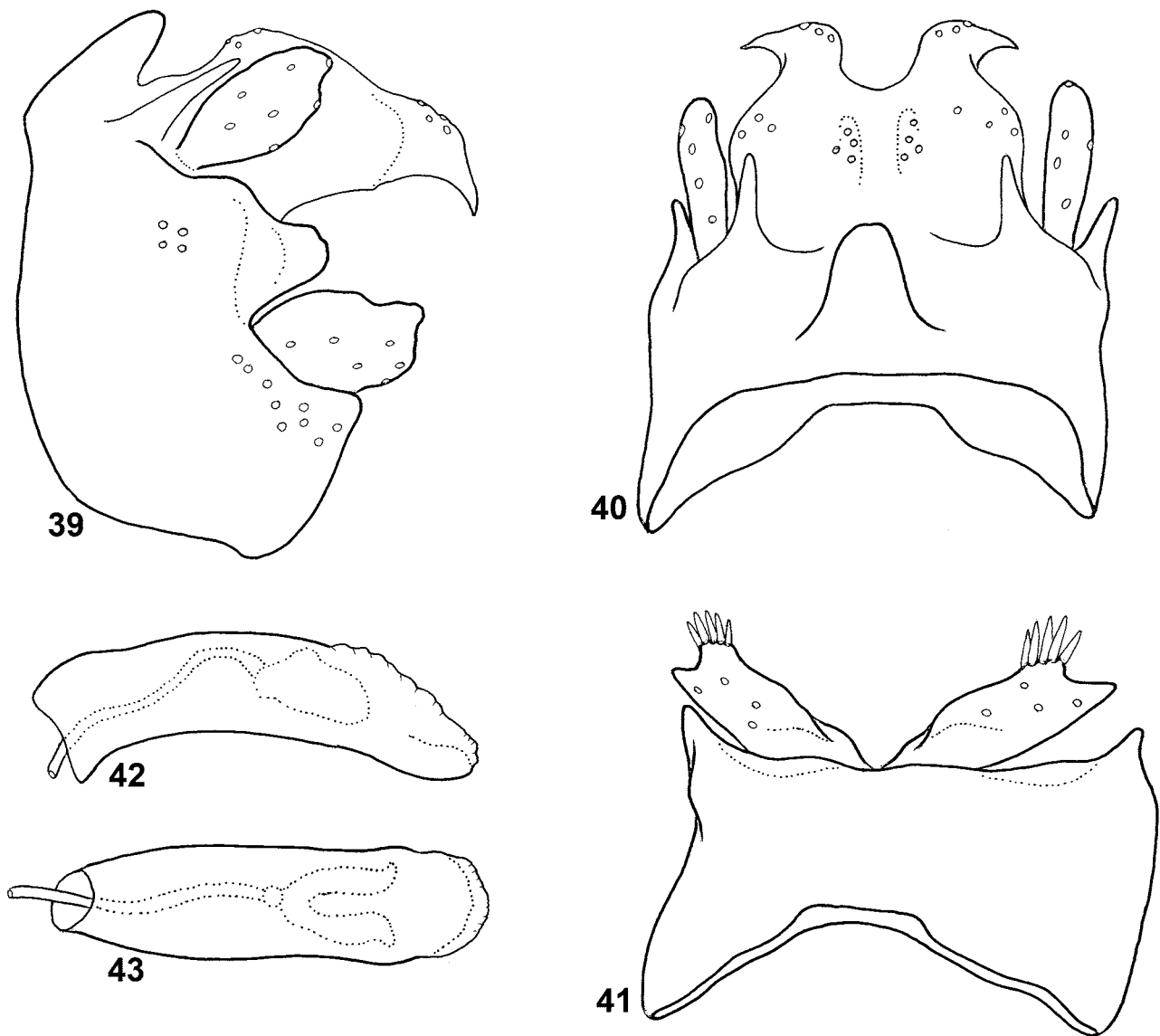
Ganonema furcatum Banks, 1924: 445.

Anisocentropus furcatus (Banks, 1924); Ulmer (1929: 169).

Type locality: Philippines.

New record. PHILIPPINES: Mindanao, Surigao [Baker] — 1 male, 1 female (NMNH, in alcohol).

Remarks. We examined a male and a female from the same locality that the holotype was collected, and recognized that the holotype drawn by Malicky (1994) from dorsal view was the anterodorsal view, and illustrating only partially the apex of segment X. Here we have re-drawn the species in dorsal view for demonstrating the ventrad- and laterad-curving and tapering apices of segment X.

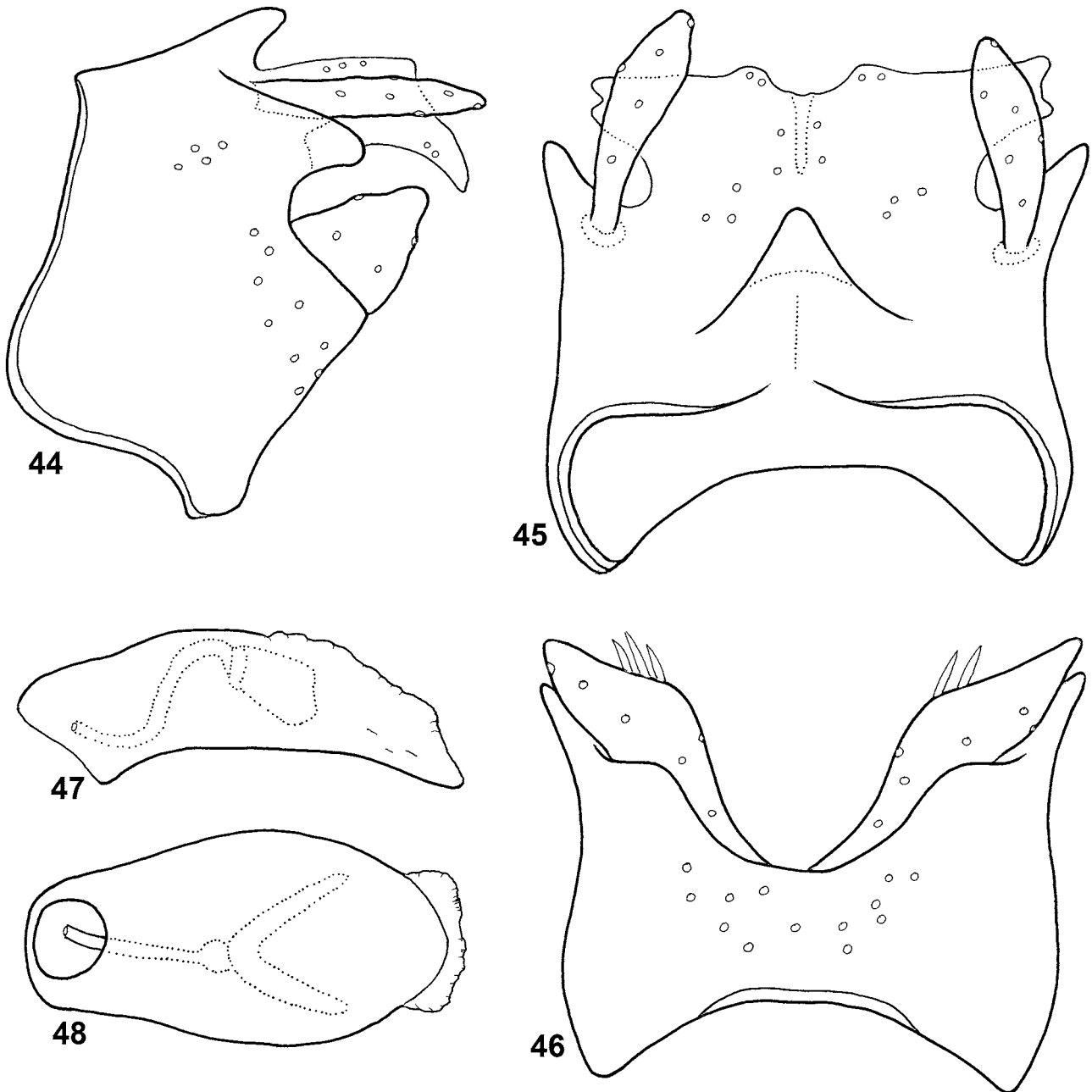


FIGURES 39–43. *Anisocentropus furcatus* (Banks), male non-type from the Philippines: Mindanao, Surigao. 39 — genitalia, lateral; 40 — genitalia, dorsal; 41 — genitalia, ventral; 42 — phallus, lateral; 43 — phallus, ventral.

Anisocentropus (Anisocentropus) hannahae, new species

Figs 44–48

This medium-sized species has hyaline-rich forewings, otherwise without colour and pattern on the forewings and hind wings. The body is also less pigmented than other species in the genus. The 2 female paratypes have more strongly pigmented, brownish bodies, but their wings are hyaline. Wing veins are hyaline, with only sparse, light gray-cinereous setae. The length of the median keel on tergum IX is medium-sized, between that of *A. fridae* and *A. fijianus*. The dorsal interlobular gap is filled, and only a shallow sinus is present, formed by a pair of setose humps visible in dorsal view.



FIGURES 44–48. *Anisocentropus hannahae*, new species, holotype. 44 — genitalia, lateral; 45 — genitalia, dorsal; 46 — genitalia, ventral; 47 — phallus, lateral; 48 — phallus, ventral.

Male (in alcohol). Body medium sized, ochraceous; appendages pale yellow in alcohol; wing membrane hyaline. Head rectangular in dorsal view, almost as long as broad. Ocelli absent. Tentorium not visible on uncleared head. Facial groove pattern modified by plate-like flange or rim connecting anterior tentorial pits, forming theoretical line separating frons and clypeus; frontogenal vertical grooves forming oblique, dorsal continuations from anterior tentorial pits, almost horizontally merging with broad antennal grooves; clypeogenal vertical grooves located ventrally of anterior tentorial pits, short, running slightly mesoventrad; conspicuous pattern of plate-like flanges and frontogenal and clypeogenal sutures forming complex with anterior tentorial arms, frontogenal septum; small, inconspicuous subantennal grooves sinuous, running almost horizontally between large frontogenal compact warts and palpifers, forming proximal articulation of palpi on stipes; subocular grooves not visible; very short, pronounced frontal groove present between antennae, joining

vertexal medioantennal compact setose warts. Vertexal groove pattern more reduced; large anterad-directed, rounded elevation dominating anterior half of vertex, reaching interantennal area, delineated laterally by enlarged membranous antennal sockets, enlarged sockets with corrugated or granulous surface near frontogenal compact setose warts; stem of epicranial groove (coronal groove) vestigial; usually permanent antennal and ocular grooves accompanied by occipito-postgenal grooves, partly merging anterally with, or tangential to very large occipital compact setal warts. Labrum vertically long, quadrangular, with narrowing, rounded apex, freely hanging, sparsely setose. Mandibles long, slightly pigmented, oriented laterally along beside each labrum, laciniae narrow, elongated, bearing few setae. Frontal setal warts absent on face, frontal interantennal warts absent due to forward-directed vertexal elevation. Pair of large, nearly triangular frontogenal compact setal warts present on posterior pregenae, angled obliquely or almost horizontally from frontogenal grooves; setal warts dominating face. Forward directed, rounded triangular elevation on vertex bearing anteriorly fused vertexal medioantennal compact setose wart, located anteriorly on head; vertexal lateroantennal compact setal warts absent; antennal socket enlarged; pair of small, rounded vertexal ocellar compact setose warts and smaller pair of vertexal medioocellar diffuse setose warts visible, with 1 or 2 setae in middle of vertex; obliquely located pair of large, ovoid occipital compact setose warts dominating posterior half of vertex; small pair of postgenal compact warts visible posteriorly between ocular grooves and large occipital compact setose warts. Maxillary palps filiform, palp formula II-IV-VI-V-I-III. Antennal scapes rounded, long, 1/3rd as long as head; pedicels 2/5ths as long as scapes. Ovoid setose warts, located proximally above articulation of cervical sclerites on proepisternum, larger than setal warts on precoxales. Large, compact setal warts present mainly on membranous part of cervix, touching anterior arms of cervical sclerites. Lateral cervical sclerites forming narrow anterior arms articulating anteriorly to back of head with occipital condyle above posterior tentorial pits, and fusing with posterior cervical sclerites; posterior cervical sclerites forming narrow, elongated plates reaching prothoracic episternum, articulating to weakly sclerotized anteromedian band of prothoracic eusterium by thin ventral intercervical sclerites. Two pairs of pronotal warts present; 1 large-sized dorsal pair of ovoid, transversely elongated warts separated mesally by broad fissura; 1 pair small, ovoid warts located deeply laterally, and visible only in lateral view. One pair of mesoscutal, diffused warts present, arranged in longitudinal lines along entire mesoscutum, composed mostly of single, rarely double, setae with pale alveoli or setal thecae, conspicuous on ochraceous background. Pair of mesoscutellar warts forming small, less-pigmented rounded areas, each with 5 to 6 setal alveoli. Legs with symmetrical claws; spur formula 2, 4, 3; foreleg spurs equal; midleg anteroapical spurs each 1/6th as long as its posteroapical spur, anterior subapical spurs each 1/3rd as long as its posterior subapical spur; hind leg anteroapical spurs each 1/3rd as long as its posteroapical spur. Forewings: length 8.0 mm; membrane and veins hyaline; covered by sparse cinereus setae; R1 separate from C along its length; crossvein *r* present near wing margin; base of discoidal cell located at midpoint of wing; forks I, II, III, IV, V present; crossveins *h*, *sc-r*, *r*, *s*, *r-m*, *m*, *m-cu*, and *cu2* present, crossveins *cu1* and *cu-a* absent, postanal vein absent; nygma and thyridium darkly pigmented, large. Hind wings: R1 meeting R2; forks I, II, III, V present; fork I longer than fork II.

Male genitalia. Abdominal segment IX fused annularly, without longitudinal groove separating dorsal and ventral parts; tergum longer than venter, due to presence of elongated mesal keel; venter produced, narrowing in lateral view; anterolateral margins of segment IX triangular, with apex slightly ventral of midheight; posterior margins each with well-developed lateral flank between its preanal appendage and its gonocoxite and large triangular plate with apex at ventral base of its gonocoxite; apical half of flank glabrous, less pigmented, slightly transparent. Antecosta weakly developed, forming narrow, marginal rim, equally thin along entire margin, without conspicuous external groove of antecostal suture; tergum IX with long protruding mesal keel; in dorsal view long, sharply triangular; spine row absent on posterior margin of segment IX; segment IX bare, glabrous, except with small dorsopleural, large ventropleural, and ventral setose areas. Intersegmental depression between terga IX and X deep, sharply triangular in lateral view, due to presence of long protruding mesal keel. Segment X longer than gonocoxites, as long as preanal appendages, forming broad hood with ventrad-

and laterad-directed apical rim characterised by sinuous excavations visible only in dorsal view, excavations forming tooth-like pattern on ventrad-curving margins, each apex with 2 teeth (Fig. 45); apicoventral setose lobes reduced to setose surfaces before apex; apicodorsal setose lobes forming sparsely setose surfaces above middle of segment X. Dorsal interlobular gap filled; shallow sinus visible, surrounded by pair of setose humps. Preanal appendages digitiform in lateral view, clavate in dorsal view; broadened slightly subapically, narrow basally. Gonocoxites without harpagones, triangular in lateral view, elongated, each with mesal margin almost straight in ventral view, its apex narrowed; 2–3 stout setae located on each gonocoxite just beyond middle corner of mesal surface. Phallic apparatus forming curving tube, dorsally convex, ventrally concave, elongated; apicoventral lobe sclerotized; part of phallicata visible above ventral lobe while retracted. Phallostremal sclerite visible in lateral view, forming large, compact structure in membranous phallicata; phallostremal sclerite complex in ventral view clearly V-shaped with straight ends; slender ejaculatory duct reaching phallostremal sclerite complex, sinuous in lateral view, straight in ventral view.

Holotype male: FIJI ISLANDS: Vanua Levu: Macuata Province, Dogotuki, 2.5 km E of Nasavu River, 7.vii.2003, Malaise trap [M. Irwin, E. Schlinger & M. Tokota'a], 16.2519°S, 179.7833°E — (BMH)

Paratypes: same data as holotype — 2 females allotypes (BMH).

Distribution: Fiji Islands.

Etymology: *Hannahae*, named after Hannah Svare Johanson, the younger daughter of one of the authors of this paper (KAJ).

Anisocentropus (*Anisocentropus*) *immunis* McLachlan

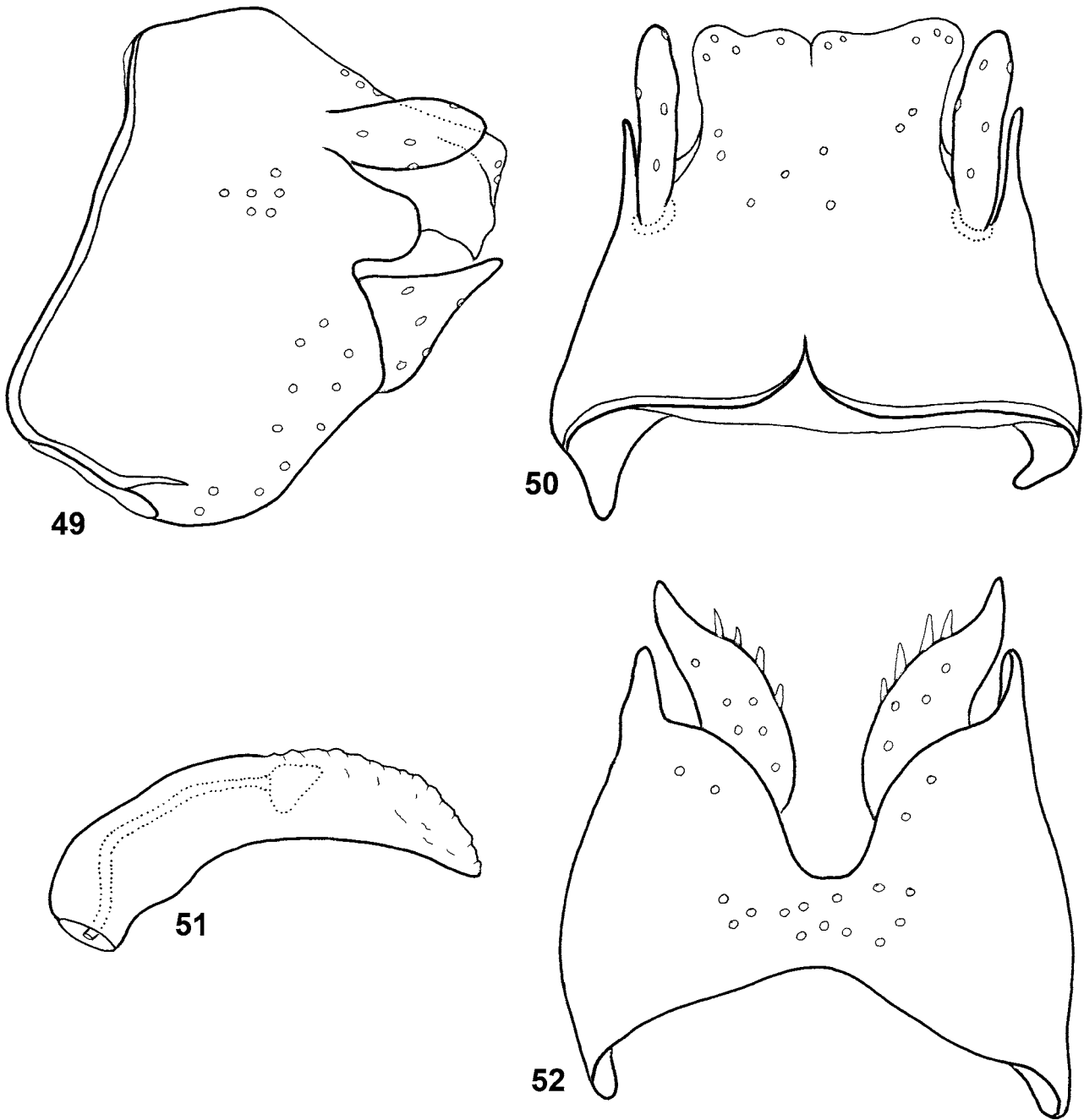
Figs 49–52

Anisocentropus immunis McLachlan, 1863: 494.

Type locality: New Guinea.

New records: PAPUA NEW GUINEA: **Morobe Province:** Wau, Wau Ecol. Inst., 1200 m, secondary montane forest, 12–24.vii.1983 [S.E. & P.M. Miller] — 1 male (NMNH); same data, except 23–31.viii.1983 — 1 male, 2 female (NMNH); same data, except 11–23.vii.1983 — 1 female (NMNH). **Madang:** Brahman Mission, 200 m, 11–15.x.1992 [V.O. Becker] — 3 males (NMNH, 1 male OPC). **Morobe Province:** Wau, 1000 m, 17–30.ix.1992 [V.O. Becker] — 2 males (NMNH). **E. Highlands Dist.:** Vic. Kainantu, x.1972, leg. Donnelly — 1 male (NMNH).

Remarks. McLachlan established the genus *Anisocentropus* based on 5 species, including the New Guinean *Anisocentropus immunis*. This species is known from only a single specimen, now with missing abdomen. The description of the species was brief: “Antennae with obscure greyish-brown annulations; head, thorax and legs pale ochreous; anterior wings densely clothed with short ochreous pubescence, costal margin darker; posterior wings hyaline,” and accompanied by only a simple habitus drawing. Ulmer identified Japanese (1907b) and Sri Lankan (1915) ochraceous coloured *Anisocentropus* specimens as *Anisocentropus immunis* based on McLachlan’s description of colour characters. However, as mentioned above, the Japanese species is *Anisocentropus kawamurai* (Iwata) and the Sri Lankan species is *Anisocentropus ittikulama* Schmid, as has been stated also by Flint (2000). Based mostly on the colour pattern presented in McLachlan’s original description, Neboiss (1986) identified specimens from New Guinea as *Anisocentropus immunis* McLachlan and drew the flagellomeres and the male genitalia in lateral view.



FIGURES 49–52. *Anisocentropus immunis* McLachlan, male, from Papua New Guinea: Morobe Province, Wau, Wau Ecol. Inst., 1200 m, secondary montane forest. 49 — genitalia, lateral; 50 — genitalia, dorsal; 51 — phallus, lateral; 52 — genitalia, ventral.

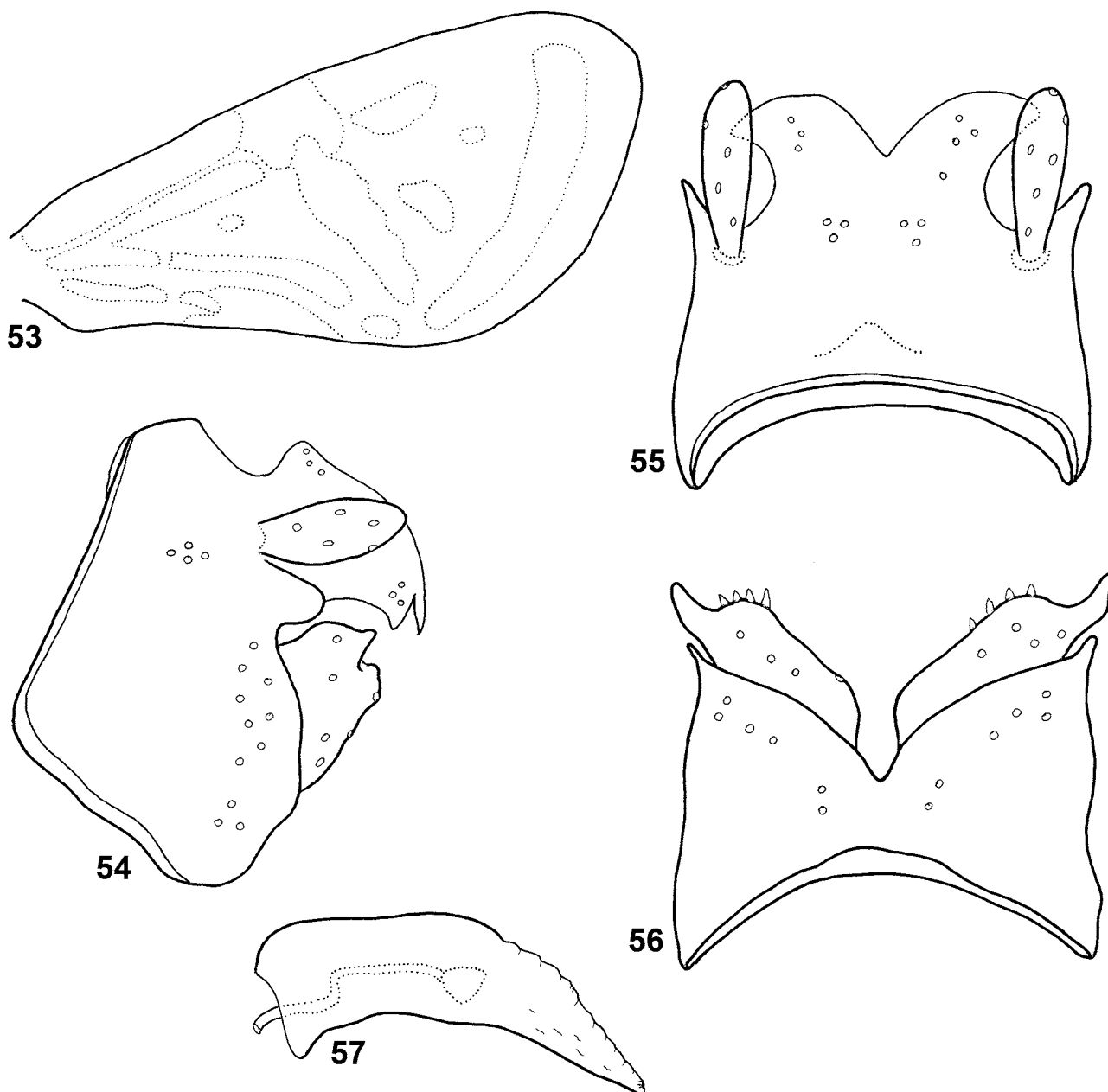
Anisocentropus (Anisocentropus) magnificus Ulmer

Figs 53–57

Anisocentropus magnificus Ulmer, 1906: 56.

Type country: Philippines.

New Records: PHILIPPINES: Mindanao P. I., Mt. Apo School, 15 km SW Davao, 500 m, 22–31.x.1965 [D. Davis] — 2 males, 1 female (NMNH).



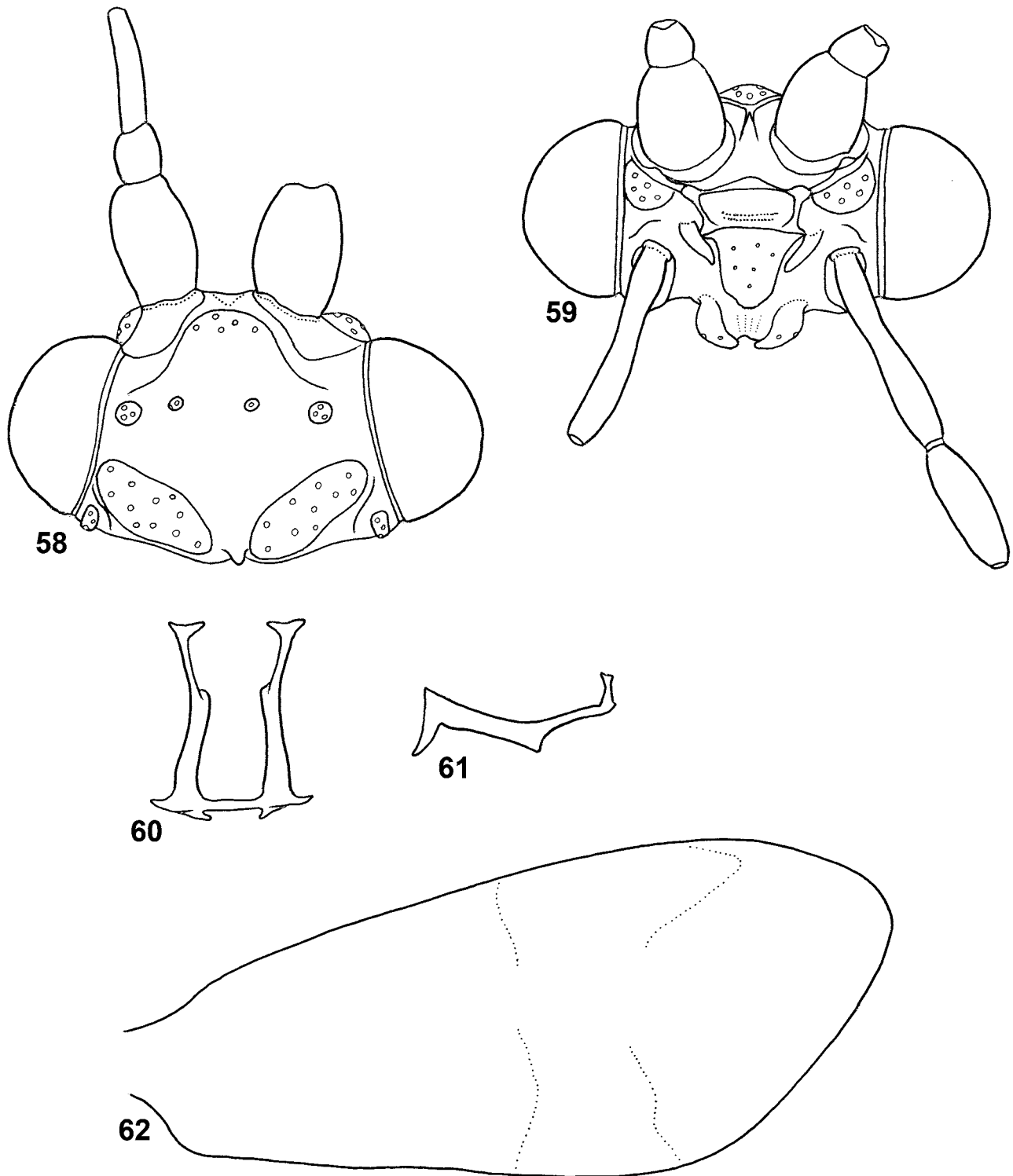
FIGURES 53–57. *Anisocentropus magnificentus* Ulmer, non-type male from the Philippines: Mindanao P.I. 53 — right forewing; 54 — genitalia, lateral; 55 — genitalia, dorsal; 56 — genitalia, ventral; 57 — phallus, lateral.

***Anisocentropus (Anisocentropus) malaisei*, new species**

Figs 58–67

This species is medium-sized and brown with a slightly darker brown and broad subapical transverse band on the forewing. It belongs to a diagnostic species-group from the Philippines, Indonesia, and southern Australasia characterized by having short gonocoxites, and with representatives populating the Philippines, Indonesia, and islands further south into Australasia. A single species from Thailand, *A. erichthonios* Malicky & Cheunbarn also has short gonocoxites. *Anisocentropus malaisei*, new species is most similar to *A. tapenan*, new species, from the Solomon Islands. *Anisocentropus malaisei* is easily distinguished from that species by the presence of a lateral flank on the posterior margin of segment IX being small and rectangular, and not so

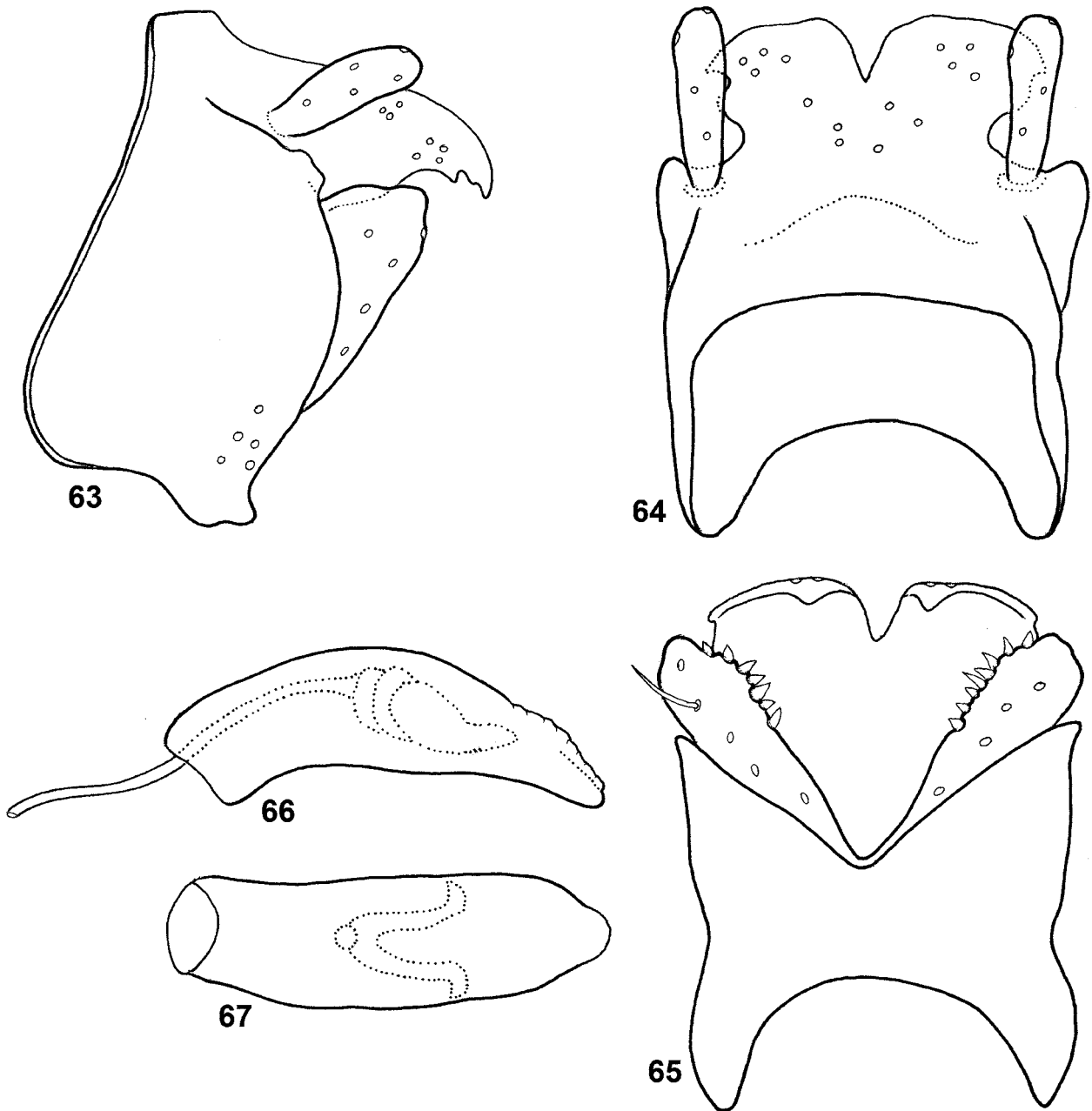
large and triangular as in *A. tapenan*; the preanal appendages are robust digitiform, not flattened; and the gonocoxites do not have the pronounced humps on the subapicomeral lobes.



FIGURES 58–62. *Anisocentropus malaisei*, new species, holotype. 58 — head, dorsal; 59 — head, frontal; 60 — tentorium, dorsal; 61 — tentorium, lateral; 62 — right forewing.

Male (in alcohol). Body medium-sized, small-eyed, brown; legs, antennae and palps lighter; wings brown, each with broad, dark brown subapical transverse band. Head rectangular in dorsal view, almost as long as broad. Ocelli absent. Tentorium slender, without dorsal arms; posterior arms very short, robust, ending

in pair of large posterior tentorial pits with strong tentorial bridge without anteromesal or posteromesal protuberances; anterior tentorial arms robust posteriorly and slender anteriorly, without median lamellate processes; broad posterior half ending in median keel in dorsal view and ventral corner in lateral view. Facial groove pattern modified, with plate-like flange or rim connecting anterior tentorial pits, theoretical lines separating frons and clypeus, frontogenal vertical groove, forming oblique, dorsal continuation from anterior tentorial pits, merging almost horizontally with broad antennal grooves; clypeogenal vertical grooves below anterior tentorial pits short, running slightly mesoventrad; conspicuous pattern of plate-like flanges and frontogenal and clypeogenal sutures forming frontogenal septum (complex of anterior tentorial arms). Small, inconspicuous subantennal grooves sinuous, running almost horizontally between large frontogenal compact warts and palpifers, forming proximal articulations of palpi on stipes; subocular grooves not visible; very short, pronounced frontal groove present between antennae, joining vertexal medioantennal compact setose warts. Vertexal groove pattern reduced, large anterad-directed, rounded elevation dominating anterior half of vertex, reaching interantennal area, delineated laterally by extremely large membranous antennal sockets with corrugated or granulous surface near frontogenal compact setose warts; stem of epicranial groove (coronal groove) vestigial; usually permanent antennal and ocular grooves accompanied by occipito-postgenal grooves, partly merging anterad, with or tangential to very large occipital compact setal warts. Labrum long, quadrangular, with rounded apex, freely hanging, sparsely setose. Mandibles long, slightly pigmented, oriented diagonally beside lateral edges of labrum, laciniae narrow, elongated, bearing few setae. Frontal setal warts absent on face, frontal interantennal warts absent due to forward directed vertexal elevation. Pair of large, nearly triangular frontogenal compact setal warts present on posterior pregenae, obliquely or almost horizontally from frontogenal grooves, alone representing warts visible on face. Forward directed, rounded triangular elevation on vertex bearing fused vertexal medioantennal compact setose warts anteriorly on head; vertexal lateroantennal compact setal warts absent; antennal socket enlarged. Pair of small, rounded vertexal ocellar compact setose warts and very small pair of vertexal medioocellar diffuse setose warts visible, with 1 or 2 setae in middle of vertex; obliquely located pair of large, ovoid occipital compact setose warts dominating posterior half of vertex; small pair of postgenal compact wart visible between posterior section of ocular grooves and large occipital compact setose warts. Maxillary palps damaged in holotype and paratype, filiform, maxillary palp formula incomplete: II-I-IV-III. Scapes rounded, long, about half as long as head; pedicels $\frac{2}{5}$ ths as long as scapes. Minute, rounded setose wart located proximally above articulation of each cervical sclerite on proepisternum. Large, compact setal warts present mainly on membranous part of cervix, touching anterior arms of cervical sclerites. Lateral cervical sclerites forming narrow anterior arms articulating anteriorly to back of head with occipital condyle above posterior tentorial pits and fusing with posterior cervical sclerites; posterior cervical sclerites forming narrow, elongate plates reaching prothoracic episternum, articulating to weakly sclerotized anteromedian band of prothoracic eusternum by thin ventral intercervical sclerites. Two pairs of pronotal warts present: large-sized dorsal pair transversely ovoid, elongate, with narrow ends almost touching mesally; second pair of small-sized, rounded setal warts located deep laterally, visible in lateral view. One pair of mesoscutal, diffused warts present, arranged in longitudinal lines along full length of mesoscutum, composed mostly of single, double and maximum triple setae in groups visible as weakly pigmented alveoli. Pair of mesoscutellar warts forming small, less-pigmented, rounded areas, each with 5 to 6 setal alveoli. Legs with symmetrical claws; spur formula 2, 4, 3; posteroapical spur on each foreleg twice as long as anteroapical spur; anterior spurs on midlegs $\frac{1}{4}$ th as long as posterior spurs; anteroapical spurs on hind legs $\frac{1}{4}$ th as long as posterior spurs. Forewings: length 8.0 mm, membrane brown, each forewing with darker brown, broad, subapical band, pale at middle; R1 running free along its length; base of discoidal cell located proximally of wing middle; forks I, II, III, IV, V present; crossveins *h*, *sc-r*, *r*, *s*, *r-m*, *m*, *m-cu*, and *cu2* present; crossveins *cu1* and *cu-a* absent; postanal vein absent. Hind wings: R1 meeting R2; forks I, II, III, V present; fork I longer than fork II.



FIGURES 63–67. *Anisocentropus malaisei*, new species, holotype. 63 — genitalia, lateral; 64 — genitalia, dorsal; 65 — genitalia, ventral; 66 — phallus, lateral; 67 — phallus, ventral.

Male genitalia. Abdominal segment IX fused annularly, without longitudinal groove separating dorsal and ventral parts; tergum as short as venter, dorsum and venter produced into narrow quadrangular processes in lateral view; anterior margins of segment IX convex, more developed in ventral half; posterior margins each forming large, regularly round plate with small additional flank below each preanal appendage. Antecosta weakly developed, forming narrow, marginal rim, equally thin along its entire length, without conspicuous external groove of antecostal suture; in dorsal view, tergum mesally convex, merging imperceptibly onto segment X; spine row absent on posterior margin of segment IX; entire segment smoothly glabrous, except larger subventral area. Intersegmental depression between segments IX and X gently sloping. Segment X longer than gonocoxites and preanal appendages, forming broad hood with ventrad-directed apical rim characterised by sinuous excavations visible in lateral, dorsal and ventral views, excavations forming 2 “teeth” pattern on

ventrally curving margin; apicoventral setose lobes reduced to setose surfaces before apex; apicodorsal setose lobe with few tiny setae above middle of segment X. Dorsal interlobular gap narrow, deep, triangular. Preanal appendages digitiform in lateral and dorsal views; broadening slightly before apex, with weak constriction only basally. Gonocoxites without harpagones, triangular in lateral view, elongate and apically broadened in ventral view, apex abruptly narrowing. Phallic apparatus forming curved tube, dorsally convex, ventrally concave, sclerotized ventral apical lobe elongate, only part of phallicata visible above ventral lobe while retracted; phallotremal sclerite visible in lateral view, forming dorsad-curving sclerite in membranous phallicata; in ventral view, phallotremal sclerite complex, U-shaped with laterad-curving ends; slender ejaculatory duct distinctly reaching phallotremal sclerite complex.

Holotype male: MYANMAR: North East, Kambaiti, 6800 ft, 7.iv.1934, Malaise trap [R. Malaise] — (NHML).

Paratype: Same data as holotype — 1 male (NHML).

Distribution: Myanmar.

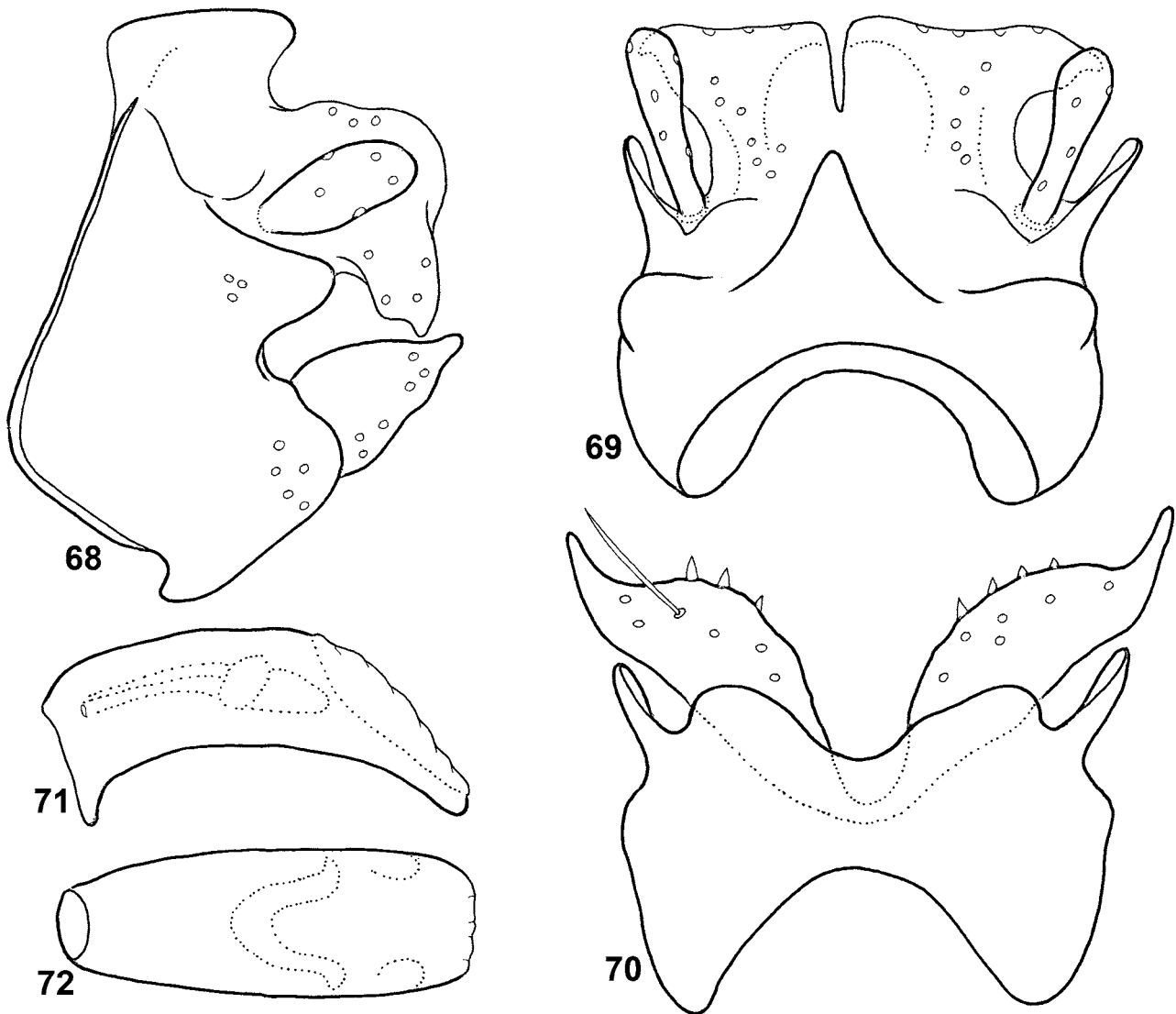
Etymology: *Malaisei*, name given to tribute René Malaise, former entomologist at the Swedish Museum of Natural History, for his extremely productive collecting trip in Burma, and for constructing the Malaise trap.

Anisocentropus (Anisocentropus) mjoebergi, new species

Figs 68–72

This medium-sized, brown species with bicoloured forewings, is most similar to *Anisocentropus io* Kimmins from New Guinea, especially in the genitalia. The 2 species are easily separated in that the forewing pattern is less colourfully in *A. io*. In the genitalia, *A. mjoebergi* differs by having a posterad-protruding tergum IX and having the lateral flank of segment X stretched more laterad and with bilobed apices.

Male (in alcohol). Body medium-sized, small-eyed, brown; legs, antennae and palps lighter; wings brown with darker apical half, visible even in alcohol. Head rectangular in dorsal view, almost as long as broad. Ocelli absent. Tentorium not examined. Facial groove pattern modified, with plate-like flange or rim connecting anterior tentorial pits, separating frons and clypeus; frontogenal vertical grooves forming oblique, dorsal continuations from anterior tentorial pits, almost horizontally merging with broad antennal grooves; clypeogenal vertical grooves located ventrally of anterior tentorial pits, short, running slightly mesoventrad; conspicuous pattern of plate-like flanges and frontogenal and clypeogenal sutures forming frontogenal septum (complex of anterior tentorial arms). Small, inconspicuous subantennal grooves sinuous, running almost horizontally between large frontogenal compact warts and palpifers, forming proximal articulation of palpi on stipes; subocular grooves not visible; short, pronounced frontal groove present on compressed frons between antennae and joining to vertexal medioantennal compact setose wart. Vertexal groove pattern reduced; large, anterad-directed, rounded elevation dominating anterior half of vertex, reaching interantennal area, delineated laterally by extremely large membranous antennal sockets with corrugated or granulous surfaces near frontogenal compact setose warts; stem of epicranial groove (coronal groove) vestigial, only posterior end remaining; usually permanent antennal and ocular grooves accompanied by occipito-postgenal grooves, partly merging anteriorly with, or tangential to, very large occipital compact setal warts. Labrum vertically long, quadrangular, with narrow, rounded apex, freely hanging, sparsely setose. Mandibles long, slightly pigmented, beside lateral margins of labrum; laciniae narrow, elongated, bearing few setae. Frontal setal warts absent on face, frontal interantennal warts absent due to forward-directed vertexal elevation and compressed narrow frons between antennae. Pair of large, nearly triangular frontogenal compact setal warts present on posterior pregenae, extending obliquely or almost horizontally from frontogenal grooves; no other warts visible on face. Forward-directed, rounded triangular elevation on vertex bearing fused vertexal medioantennal



FIGURES 68–72. *Anisocentropus mjoebergi*, new species, holotype. 68 — genitalia, lateral; 69 — genitalia, dorsal; 70 — genitalia, ventral; 71 — phallus, lateral; 72 — phallus, ventral.

compact setose warts anteriorly; vertexal lateroantennal compact setal warts absent; antennal sockets enlarged; pair of small, rounded, vertexal ocellar compact setose warts, and scattered, vertexal, medioocellar, diffuse setose warts present, with 1 or 2 setae in middle of vertex; obliquely located and elongated ovoid pair of large occipital compact setose warts dominating posterior half of vertex; small pair of postgenal compact warts visible between posterior section of ocular grooves and large occipital compact setose warts. Maxillary palps apparently 6-segmented; maxillary palp formula II-VI-IV-I-V-III, labial palps apparently 4-segmented, maxillary palp segments filiform, with long, mesad-directed setae. Scapes rounded, long, about half as long as head; pedicels 2/5ths as long as scapes. Minute, rounded setose wart located proximally above articulation of each cervical sclerite on proepisternum. Large, compact setal warts present mainly on membranous part of cervix, touching anterior arms of cervical sclerites. Lateral cervical sclerites forming narrow anterior arms articulating anteriorly to back of head with occipital condyles above posterior tentorial pits and fusing with posterior cervical sclerites. Posterior cervical sclerites forming narrow, elongate plates reaching prothoracic episternum, articulating to weakly sclerotized anteromedian band of prothoracic eusternum by thin ventral intercervical sclerites. Two pairs pronotal warts present: large-sized, transverse, ovoid dorsal pair widely sep-

arate mesally; second setal wart pair, small, rounded, located deep laterally, visible in lateral view. One pair of mesoscutal, diffused warts present, arranged in longitudinal lines along full length of mesoscutum, composed mostly of single, double and maximum triple setae in groups visible as more weakly pigmented alveoli. Pair of mesoscutellar warts forming small, rounded less-pigmented areas with few setal alveoli. Legs with symmetrical claws; spur formula 2, ?, 3, middle legs broken; foreleg spurs equally long; hind leg anteroapical spur half as long as posteroapical spur. Forewings: length 11.0 mm, membrane brown with dark brown apical half speckled with small, lighter dots; R1 running separately to C; base of discoidal cell located proximally of wing middle; forks I, II, III, IV, V present; crossveins *h*, *sc-r*, *r*, *s*, *r-m*, *m*, *m-cu*, and *cu2* present, crossveins *cu1*, *cu-a* and postanal vein absent. Hind wings: R1 meeting R2; forks I, II, III, V present; fork I longer than fork II.

Male genitalia. Abdominal segment IX fused annularly, without longitudinal groove separating dorsal and ventral parts; tergum little shorter than venter, elevated dorsum produced into protruding triangular posterior corner in lateral view; anterior margins of segment IX triangular in ventral half; posterior margins produced into apical lobe at base of each inferior appendage, additional flank present on each side below its preanal appendage, apical half of flank glabrous and shining, transparent. Antecosta weakly developed, forming narrow, marginal rim, equally thin along its full width, without conspicuous external groove of antecostal suture; elevated tergum regularly triangular in dorsal view; spine row on posterior margin of segment IX modified, concentrated as small setose patches of dorsopleural setose areas composed of 3–4 setae on each side and larger ventropleural setose area on each side. Intersegmental depression between segments IX and X forming deep step or excision. Segment X longer than gonocoxites and preanal appendages, forming broad hood with ventrad- and laterad-directed apical flanks, each with slightly bilobed apex; apicoventral setose lobes represented by these flanks; apicodorsal setose lobe with few tiny setae above middle of segment X. Dorsal interlobular gap parallel-sided, very narrow and deep. Preanal appendages short, compressed, plate-like in lateral view; digitiform to clavate in dorsal view. Gonocoxites without harpagones, triangular, each with bare digitiform apex in lateral view, more elongate and broad mesally in ventral view; dorsomesal surface armed with short stout peg-like setae, ventral surface with long setae. Phallic apparatus forming slightly ventrad-curving tube with elongate, sclerotized ventral apical lobe, only part of phallicata visible above ventral lobe while retracted; pair of phallotremal sclerites scarcely visible in lateral view as dorsad-curving structure inside membranous phallicata. Phallotremal sclerite complex in ventral view, U-shaped with laterad-curving ends; slender ejaculatory duct indistinctly reaching phallotremal sclerite complex.

Holotype male: BORNEO: O. Borneo, Pajau River [Mjöberg].

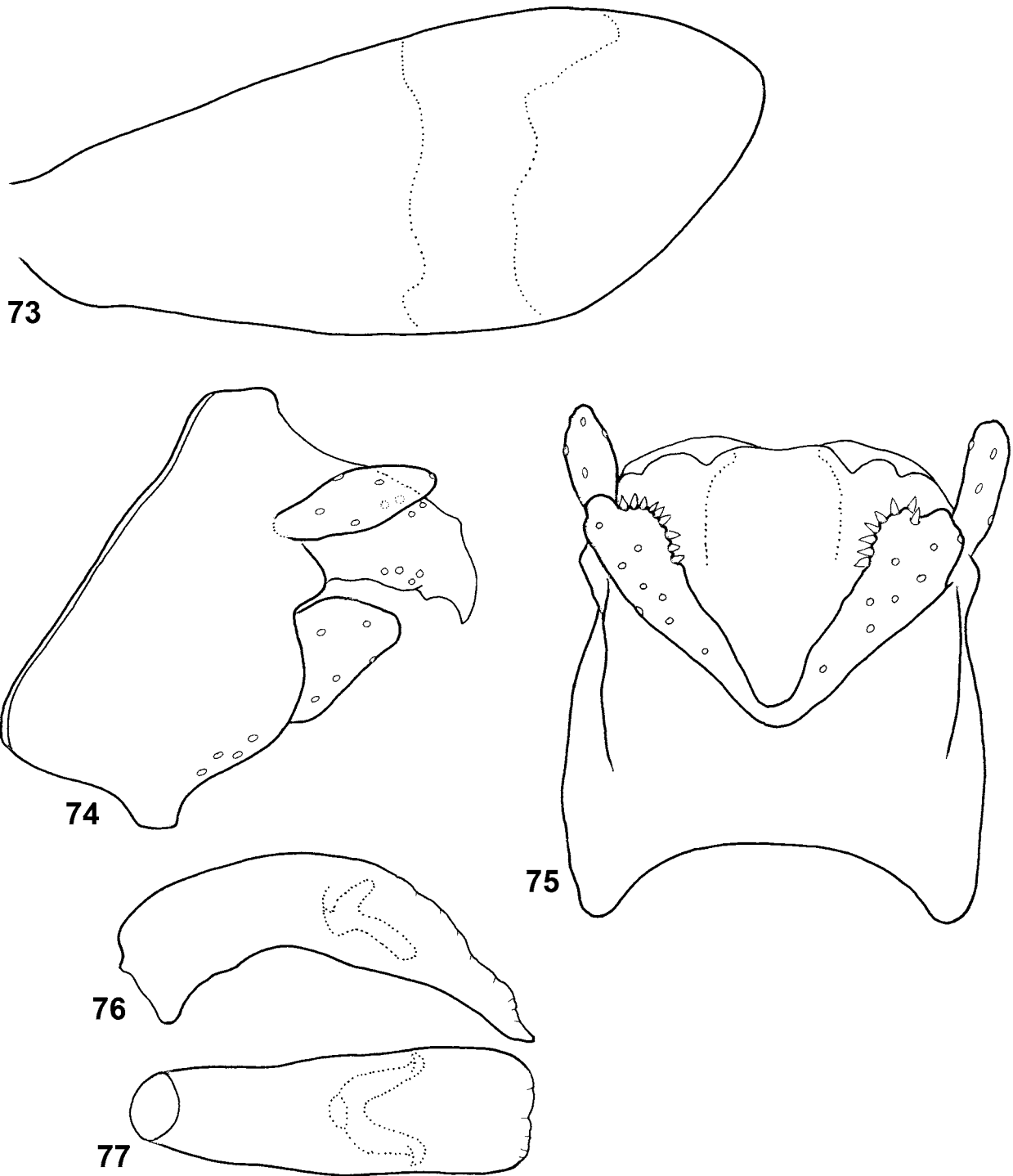
Distribution: Borneo.

Etymology: *Mjoebergi*, named after the Swedish zoologist and collector of the type specimen, Eric Mjöberg.

***Anisocentropus (Anisocentropus) tapenan*, new species**

Figs 73–77

This species is medium-sized, brown with a slightly darker brown and broad subapical transverse band on the forewings. It belongs to a diagnostic species-group having abbreviated gonocoxites. This new species is similar to *A. malaisei* described above from Myanmar. *Anisocentropus tapenan* is easily separated from *A. malaisei* due to the presence of a large and triangular lateral flank on the posterior margin of segment IX, not small and quadrangular as in *A. malaisei*; the preanal appendages are depressed, not robust digitiform; and the gonocoxites have a pronounced hump on the subapical, mesal, short-spined lobe, being easily seen in ventral view. The 2 species have similar cephalic, cervical, thoracic and proepisternal structural units, grooves and setal warts.



FIGURES 73–77. *Anisocentropus tapenan*, new species, holotype. 73 — right forewing; 74 — genitalia, lateral; 75 — genitalia, ventral; 76 — phallus, lateral; 77 — phallus, ventral.

Male (in alcohol). Medium-sized, small-eyed, brown body; legs, antennae and palps pale brown; wings brown with dark subapical, broad, transverse band. Head nearly rectangular in dorsal view, almost as long as broad. Ocelli absent. Tentorium slender, without dorsal arm; posterior arms very short, robust, ending in pair of large posterior tentorial pits; strong tentorial bridge without anteromesal or posteromesal protuberances; anterior tentorial arms robust posteriorly, slender anteriorly, without median lamellate processes; posterior half broad, ending in median keel in dorsal view and ventral corner in lateral view. Facial groove pattern mod-

ified, with plate-like flange, or rim, connecting anterior tentorial pits; theoretical lines separating frons and clypeus (frontogenal vertical groove) forming oblique, dorsal continuation from anterior tentorial pits; almost merging horizontally, with broad antennal grooves. Clypeogenal vertical grooves located ventrally of anterior tentorial pits, short, running slightly mesoventrad; well-visible pattern of plate-like flanges, frontogenal, and clypeogenal sutures forming complex of anterior tentorial arms (frontogenal septum). Small, poorly visible subantennal grooves sinuous, running almost horizontally between large frontogenal compact wart and palpi; forming proximal articulation of palpi on stipes; subocular grooves not visible. Short, pronounced frontal groove present between antennae, joining vertexal medioantennal compact setose warts. Vertexal groove pattern reduced; large, anterad directed, rounded elevation dominating anterior half of vertex, reaching interantennal area, delineated laterally by extremely large membranous antennal sockets with corrugated or granulous surface near frontogenal compact setose wart; stem of epicranial groove (coronal groove) vestigial; usually permanent antennal and ocular grooves accompanied by occipito-postgenal grooves, partly merging anterad; tangential to very large occipital compact setal warts. Labrum long, quadrangular, with rounded apex, freely hanging, sparsely setose. Mandibles long, slightly pigmented, oriented laterad along each labrum; laciniae narrow, elongated, bearing few setae. Frontal setal warts absent on face. Frontal interantennal warts absent due to forward directed vertexal elevation. Pair of large, nearly triangular frontogenal compact setal warts present on posterior pregenae; obliquely or almost horizontally from frontogenal grooves; alone representing warts visible on face. Rounded, oriented forwardly, triangular elevation on vertex bearing fused vertexal medioantennal compact setose warts anteriorly on head; vertexal lateroantennal compact setal warts absent; antennal socket enlarged. Pair of small, rounded vertexal ocellar compact setose warts and pair of very small vertexal medioocellar diffuse setose warts present. One or 2 setae present centrally on vertex; obliquely located pair of large, ovoid occipital compact setose warts dominating on posterior half of vertex; pair of small postgenal compact warts visible between posterior section of ocular grooves and large occipital compact setose warts. Maxillary palps filiform; maxillary palp formula II-V-I-IV-VI-III. Scapes rounded, long, about half as long as head; pedicels 2/5ths as long as scapes. Two pairs pronotal warts present: pair of large, dorsal, transversely ovoid, elongate, narrow warts almost touching mesally; pair of small, rounded, warts located deep laterally and visible in lateral view. One pair of mesoscutal, diffuse warts in longitudinal line along entire mesoscutum, composed mostly of single, double and maximum triple setae in groups visible as weakly pigmented alveoli. Pair of mesoscutellar warts forming small, weakly pigmented rounded area with 7–9 setal alveoli. Minute, rounded setose wart located proximally above articulation of each cervical sclerite on proepisternum. Large, compact setal warts present mainly on membranous part of cervix, touching anterior arm of cervical sclerites. Lateral cervical sclerites forming narrow anterior arms articulated anteriorly to back of head, with occipital condyle present above posterior tentorial pits, and fusing with posterior cervical sclerites; posterior cervical sclerites forming narrow, elongated plates reaching prothoracic episternum, articulated to weakly sclerotized anteromedian band of prothoracic eusternum by thin ventral intercervical sclerites. Legs with symmetrical claws; spur formula 2, 4, 3; each foreleg posteroapical spur 2 times longer than its anteroapical spur; midlegs each with anterior spurs about 1/4th as long as its posterior spurs; each hind leg anteroapical spur about 1/8th as long as posteroapical spurs. Forewings: length 7.8 mm; membrane brown, with dark brown, broad, subapical band being darker at pterostigmal margin; R1 running free along its length; base of discoidal cell located proximally of midpoint of wing; forks I, II, III, IV, V present; crossveins *h*, *sc-r*, *r*, *s*, *r-m*, *m*, *m-cu* and *cu2* present, crossveins *cu1* and *cu-a* absent; postanal vein absent. Hind wings: R1 meeting R2; forks I, II, III, V present; fork I longer than fork II.

Male genitalia. Abdominal segment IX fused annularly, without longitudinal groove separating dorsal mesal and ventral parts; tergum twice as long as venter, dorsum and venter producing into narrow quadrangular process in lateral view; anterior margin of segment IX convex, directed ventrad; posterior margin with convex ventral half, with well developed, triangular, additional flank below preanal appendages. Antecosta weakly developed, forming narrow, marginal rim, equally thin along margin, without conspicuous external

groove of antecostal suture; in dorsal view, tergum with small triangular mesal convexity, forming fading continuation towards segment X; spine row absent on posterior margins of segment IX; entire segment smoothly glabrous, except larger area on venter with sparse, scattered long setae. Intersegmental depression between segments IX and X gently sloping. Segment X much longer than gonocoxites and preanal appendages, forming broad hood with ventrad directed apical rim characterised by sinuous excavations visible in lateral, dorsal and ventral views, excavations forming tooth-like pattern on ventrad curving margin, 2 teeth clearly visible; apicoventral setose lobes reduced to setose, subapical surfaces or shallow protuberances; apicodorsal setose lobes with few tiny setae above middle of segment X. Dorsal interlobular gap U-shaped. Preanal appendages depressed in lateral view, digitiform in ventral and dorsal view; broader at mid-point, slightly tapering apicad. Gonocoxites without harpago, short triangular in lateral view, elongate and apically broadening in ventral view, with pronounced mesal, subapical hump of large protuberance covered with short and stout spines. Phallic apparatus forming curving tube; basal part slightly convex; ventral part concave, elongated sclerotized ventral apical lobe. Part of retracted phallicata visible above ventral lobe; phallosomal sclerite nearly invisible in lateral view; forming complex unit in membranous phallicata; phallosomal sclerite complex in ventral view, U-shaped, laterad curving corners. Thin ejaculatory duct reaching phallosomal sclerite complex.

Holotype male: SOLOMON ISLANDS: Guadalcanal Island, Tapenanje, 10–23.xii.1953, at light [J.D. Bradley & I. Rennell] – (B.M. 1954-222, NHML).

Distribution: Solomon Islands.

Etymology: *Tapenan*, after the type locality, Tapenanje.

Anisocentropus (Anisocentropus) vanuensis, new species

Figs 78–82

This species is small, with bright chestnut brown forewings having a slightly paler patch around each forewing pterostigma. It belongs to a diagnostic species-group having shortened gonocoxites. This new species is similar to *A. vitiensis*, new species from the Fijian Island Viti Levu. *Anisocentropus vanuensis* is separated from *A. vitiensis* by the absence of a broad, dark brown, transverse band on the middle of the forewing; and the different shape of the gonocoxites in ventral view, i.e. being clearly sigmoid, not triangular. The cephalic, cervical, thoracic and proepisternal structural units, grooves, setal warts are similar in the 2 species.

Male (in alcohol). Body small, brown, eyes small; legs, antennae and palps light brown, denuded forewing membrane bright chestnut brown, paler at pterostigma. Head rectangular in dorsal view, almost as long as broad. Ocelli absent. Tentorium slender, without dorsal arm; posterior arms very short, robust, ending in pair of large posterior tentorial pits with strong tentorial bridge without anteromesal or posteromesal protuberance; anterior tentorial arm posteriorly robust, anteriorly slender, without median lamellate process; broad posterior half ending in median keel in dorsal view and ventral corner in lateral view. Facial groove pattern forming plate-like flange or rim connecting anterior tentorial pits, theoretical lines separating frons and clypeus (frontogenal vertical groove), forming oblique, dorsal continuation from anterior tentorial pits; almost horizontally merged with broad antennal grooves. Clypeogenal vertical grooves located ventrally of anterior tentorial pits, short, running slightly mesoventrad; well-visible pattern of plate-like flanges, and frontogenal and clypeogenal sutures, forming complex of anterior tentorial arms (frontogenal septum). Subantennal grooves small, poorly visible, horizontal sinuous between large frontogenal compact wart and palpifers; forming proximal articulation of palpi on stipes. Subocular grooves not visible. Short, pronounced frontal groove present between antennae, joining vertexal medioantennal compact setose warts. Vertexal groove pattern reduced; large, anterad directed, rounded elevation dominating anterior half of vertex, reaching interantennal area, delineated laterally by extremely large membranous antennal sockets with corrugated or granulous surface near frontogenal compact setose wart. Stem of epicranial groove (coronal groove) vestigial. Antennal and

ocular grooves accompanied by occipito-postgenal grooves, partly merging anteriorly; tangential to large occipital compact setal warts. Labrum long, quadrangular, with rounded apex, freely hanging, sparsely setose. Mandibles long, slightly pigmented, oriented laterad along each labrum; laciniae narrow, elongated, bearing few setae. Frontal setal warts absent on face, frontal interantennal warts absent. Pair of large, nearly triangular frontogenal compact setal warts present on posterior pregenae, obliquely or almost horizontally from frontogenal grooves, alone representing only visible warts on face. Anterad directing, rounded triangular elevation on vertex with fused vertexal medioantennal compact setose warts anteriorly on head. Vertexal lateroantennal compact setal warts absent. Antennal sockets enlarged. Pair of small, rounded vertexal ocellar compact setose warts, and pair of very small vertexal medioocellar diffuse setose warts present, 1 or 2 setae present centrally on vertex. Occipital compact setose warts located obliquely, large, ovoid, dominating on posterior half of vertex. Postgenal compact warts small, visible between posterior section of ocular grooves and large occipital compact setose warts. Maxillary palps filiform; maxillary palp formula II-V-I-IV-VI-III. Scapes rounded, long, about half as long as head; pedicels 2/5ths as long as scapes. Two pairs pronotal warts present: 1 pair forming large, dorsal transverse ovoid, elevated humps with narrowest end almost tangential mesally; 1 pair small, rounded, located deep laterally, visible in lateral view. Mesoscutum with 1 pair diffuse warts arranged in longitudinal line along mesoscutum, composed mostly of single, double and triple setae in groups, visible as weakly pigmented alveoli. Pair of mesoscutellar warts forming small, weakly pigmented, rounded areas with 7–9 setal alveoli. Each proepisternum with minute, rounded setose wart located proximally above articulation of cervical sclerites. Large, compact setal warts present mainly on membranous part of cervix, touching anterior arm of cervical sclerites. Lateral cervical sclerites forming narrow anterior arms articulating anteriorly with back of head, with occipital condyle above posterior tentorial pits; fusing with posterior cervical sclerites. Posterior cervical sclerites forming narrow, elongated plates, reaching prothoracic episternum, articulating with weakly sclerotized anteromedian band of prothoracic eusternum by thin, ventral intercervical sclerites. Legs with symmetrical claws; spur formula 2, 4, 3; each foreleg with posteroapical spur 2 times longer than anteroapical spur; midleg anterior spurs 1/4th as long as posterior spurs; hind leg anteroapical spur 1/5th as long as posteroapical spurs. Forewings: length 6.4 mm; membrane chestnut brown, with pale area at pterostigma; narrow, hyaline, horizontal lines around crossvein *s* and on R4+5 fork base, above apical section of M, and along the stem of M1+2; Forewing R1 free to C; crossvein *r* appearing as diffused less pigmented area at apical margin of radial cell; base of discoidal cell ending at middle of wings; forks I, II, III, IV, V present; crossveins *h*, *sc-r*, *r*, *s*, *r-m*, *m*, *m-cu* and *cu2* present; crossveins *cu1* and *cu-a* absent; postanal vein absent. Hind wings: R1 fusing with R2; forks I, II, III, V present; fork I longer than fork II.

Male genitalia. Abdominal segment IX fused annularly, without longitudinal groove separating dorsal mesal and ventral parts; tergum shorter than venter; venter produced into narrow quadrangular process in lateral view; segment IX with ventrad directed, convex anterior margin; posterior margins concave at ventral half, with well developed, long lateral flank below preanal appendages above gonocoxites. Antecostae weakly developed, forming narrow, marginal rim, equally thin along margins, without conspicuous external groove of antecostal sutures; in dorsal view, tergum with small, triangular mesal elevation; spine row absent on posterior margins of segment IX; entire segment smooth, glabrous, covered by acanthae, except with small dorsopleural and large ventropleural setal areas. Intersegmental depression between segments IX and X gently sloping. Segment X much longer than gonocoxites, slightly longer than preanal appendage, forming broad hood with ventrad directing apical rim characterised by sinuous excavations visible in dorsal and ventral view, excavations forming tooth-like pattern on ventrad curving margin, with 2 visible teeth; apicoventral setose lobes reduced to setose, subapical surfaces or shallow protuberances; apicodorsal setose lobes with few tiny setae above middle of segment X. Dorsal interlobular gap forming narrow, deep cleft. Preanal appendages depressed in lateral view; broad at mid-length, slightly narrowing apically. Gonocoxites each without harpago; short triangular in lateral view; with subapical hump visible on ventral half; elongate, slightly sigmoid in ventral view, with pronounced mesal “knee” formed by large protuberance covered with long, stout spines.

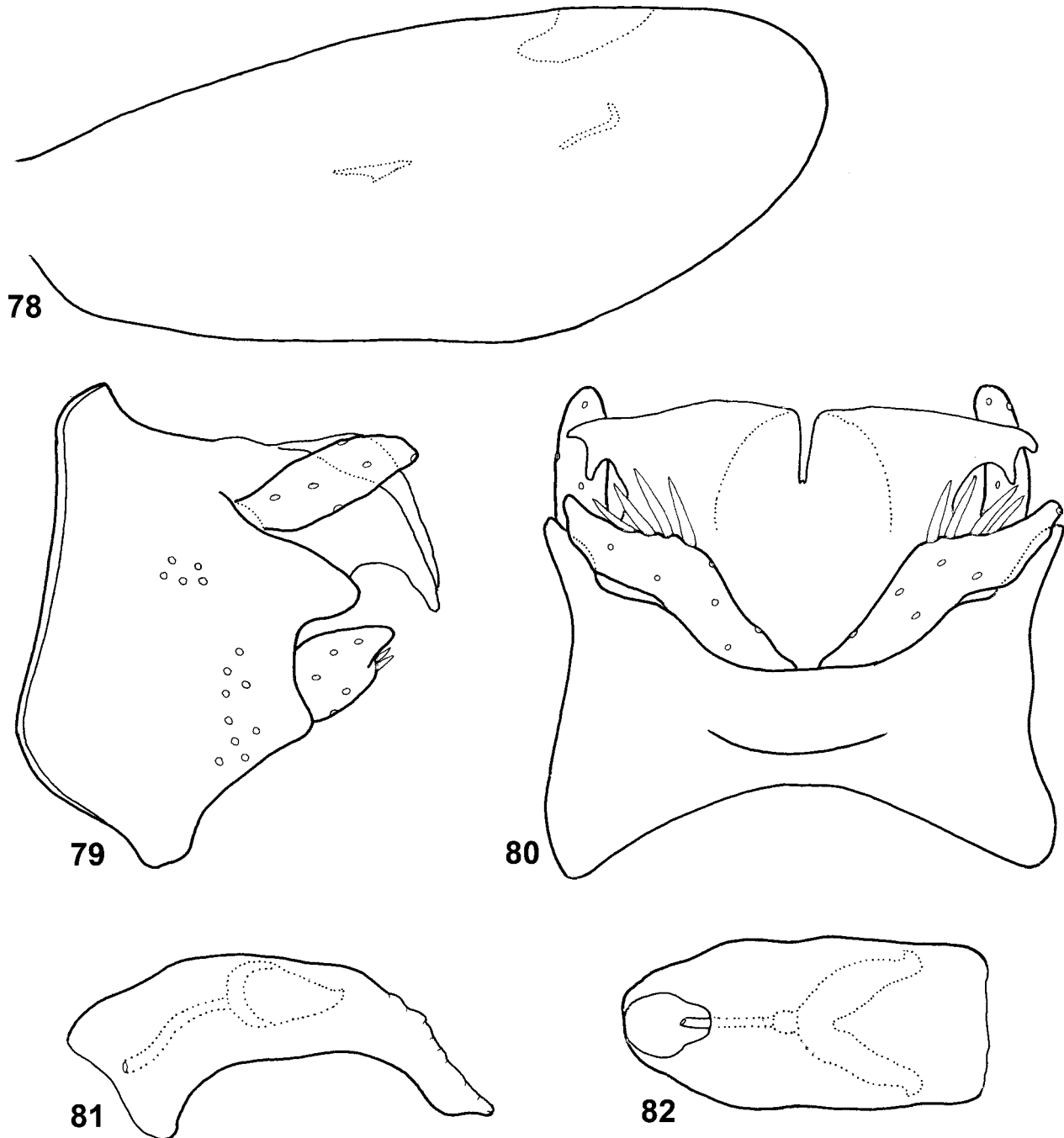
Phallic apparatus curving; basal part slightly convex; ventral part concave; ventral apical lobe elongated, sclerotized; part of phallicata visible in retracted state above ventral lobe. Phallostremal sclerite nearly invisible in lateral view, forming complex unit inside membranous phallicata; complex, U-shaped, with laterad curving corners. Ejaculatory duct thin, ending in phallostremal sclerite.

Holotype male: FIJI ISLANDS: Vanua Levu: Savudvodra Dam, 10.ii.1971 [G.S. Robinson] – (NHML).

Paratypes: same data as holotype —1 male, 1 female paratypes (NHML).

Distribution: Fiji Islands.

Etymology: *Vanuensis*, named after the type locality, Vanua Levu Island.

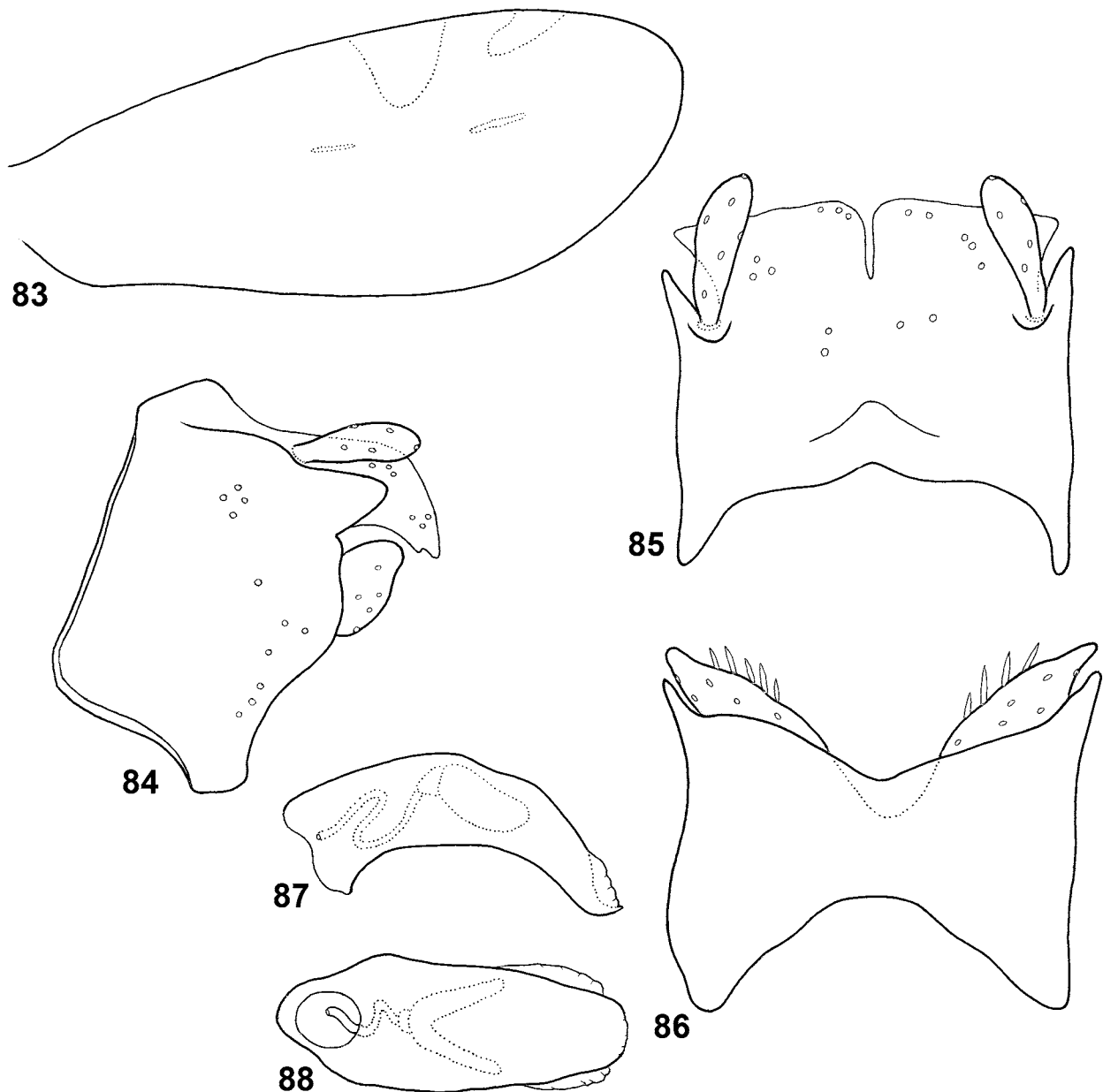


FIGURES 78–82. *Anisocentropus vanuensis*, new species, holotype. 78 — right forewing; 79 — genitalia, lateral; 80 — genitalia, ventral; 81 — phallus, lateral; 82 — phallus, ventral.

Anisocentropus (Anisocentropus) vitiensis, new species

Figs 83–88

This species is medium-sized, bright chestnut brown, with wide transverse band on each of the forewings. It belongs to diagnostic species-group having short gonocoxites. It is most similar to *Anisocentropus vanuensis*, new species described above. *Anisocentropus vitiensis* is separated from *A. vanuensis* by having a broad, dark brown, transverse band on both forewings; and in the genitalia by its gonocoxites being clearly triangular, not sigmoid in ventral view. The cephalic, cervical, thoracic and proepisternal structural units, grooves, and setal warts are similar in the 2 species.



FIGURES 83–88. *Anisocentropus vitiensis*, new species, holotype. 83 — right forewing; 84 — genitalia, lateral; 85 — genitalia, dorsal; 86 — genitalia, ventral; 87 — phallus, lateral; 88 — phallus, ventral.

Male (in alcohol). Medium-sized, eyes small, body brown, legs, antennae and palps light brown; membrane of each forewing brown, with broad, dark brown transverse band on central part; with pale patch on each pterostigma. Head rectangular in dorsal view, almost as long as broad. Ocelli absent. Tentorium slender,

without dorsal arm; each posterior arms short, robust, ends in pair of large posterior tentorial pit; tentorial bridge strong, without anteromesal or posteromesal protuberances; anterior tentorial arms robust posteriorly, slender anteriorly, without median lamellate processes; broad posterior half ending in median keel in dorsal view and ventral corner in lateral view. Facial groove pattern forming plate-like flange or rim connecting anterior tentorial pits; theoretical lines separating frons and clypeus (frontogenal vertical groove) forming oblique, dorsad continuation from anterior tentorial pits, almost horizontally merging with broad antennal grooves. Clypeogenal vertical grooves located ventrally of anterior tentorial pits, short, running slightly mesoventrad; well-visible pattern of plate-like flanges, frontogenal and clypeogenal sutures, forming complex of anterior tentorial arms (frontogenal septum). Subantennal grooves small, sinuous, running almost horizontally between frontogenal compact setal wart and palpifers, forming proximal articulation of palpi on stipes. Subocular grooves invisible. Frontal groove pronounced, short, present between antennae, joining vertexal medioantennal compact setose warts. Vertexal groove pattern reduced. Large, anterad directed, rounded elevation dominating anterior half of vertex, reaching interantennal area, delineated laterally by large, membranous antennal sockets, with corrugated or granulous surface near frontogenal compact setose wart. Stem of epicranial groove (coronal groove) vestigial. Antennal and ocular grooves accompanied by occipito-postgenal grooves, partly merging anterad; tangential to large occipital compact setal warts. Labrum long, quadrangular, with rounded apex, freely hanging, sparsely setose. Mandibles long, slightly pigmented, orienting laterad along each labrum; laciniae narrow, elongating, bearing few setae. Frontal setal warts absent on face, frontal interantennal warts absent due to forward directed vertexal elevation. Pair of large, nearly triangular frontogenal compact setal warts present on posterior pregenae, obliquely or almost horizontally from frontogenal grooves, alone representing only warts visible on face. Triangular elevation on vertex with fused vertexal medioantennal compact setose warts located anteriorly on head. Vertexal lateroantennal compact setal warts absent. Antennal sockets large. Pair of small, rounded vertexal ocellar compact setose warts, and pair of very small vertexal medioocellar diffuse setose warts present, each with 1 or 2 setae in middle of vertex; obliquely located pair of large, ovoid occipital compact setose warts dominating on posterior half of vertex; pair of small postgenal compact setose warts visible between posterior section of ocular grooves and occipital compact setose warts. Maxillary palps filiform; maxillary palp formula II-IV-V-VI-III. Scapes rounded, long, about half as long as head; pedicels 2/5ths as long as scapes. Two pairs pronotal warts present: pair of large dorsal transverse ovoid warts forming elevated humps, almost tangential mesally; pair of rounded, small warts located deep laterally, visible in lateral view. Mesoscutum with 1 pair diffused warts, arranged in longitudinal line along entire mesoscutum, composed mostly of single, double and triple setae in groups, visible as weakly pigmented alveoli. Pair of mesoscutellar warts forming small, weakly pigmented, rounded areas with 7 to 9 setal alveoli. Each proepisternum with minute, rounded setose wart located proximally above articulation of each cervical sclerite. Large, compact setal warts present mainly on membranous part of cervix, touching anterior arm of cervical sclerites. Lateral cervical sclerites forming narrow anterior arms articulating anteriorly with back of head, with occipital condyle above posterior tentorial pits; fusing with posterior cervical sclerites. Posterior cervical sclerites forming narrow, elongated plates, reaching prothoracic episternum, articulating with weakly sclerotized anteromedian band of prothoracic eusternum by thin, ventral intercervical sclerites. Legs with symmetrical claws; spur formula 2, 4, 3; foreleg posteroapical spur 2 times longer than anteroapical spur; midleg anterior spurs 1/4th as long as posterior spurs; hind leg anteroapical spur 1/4th as long as posterior spur. Forewings: length 8.8 mm; membrane brown with dark brown transverse band on middle, pale area at pterostigma; narrow, hyaline, horizontal lines present around crossvein *s*, on R4+5 fork base, above short apical section of M, and along stem of M1+2; crossvein *sc-r* with subcostal-radial crossvein connecting Sc and R hypertrophied at confluence of Sc; R1 free to C; crossvein *r* located at apical margin of radial cell; base of discoidal cell ending at wing middle; forks I, II, III, IV, V present; crossveins *h*, *sc-r*, *r*, *s*, *r-m*, *m*, *m-cu* and *cu2* present; crossveins *cu1* and *cu-a* absent; postanal vein absent. Hind wings: R1 fusing with R2; forks I, II, III, V present; fork I longer than fork II.

Male genitalia. Abdominal segment IX fused annularly, without longitudinal grooves separating dorsal and ventral parts; tergum longer than venter; dorsum and venter narrowly protruding into quadrangular in lateral view; anterior margin of segment IX convex triangular, directed ventrad; posterior margin straight vertical at ventral half; with well developed, long additional lateral flank below preanal appendages and above gonocoxites. Antecosta forming weak, narrow, marginal rim being equally thin along margin, without conspicuous external groove of antecostal suture. Tergum IX with small triangular mesal elevation in dorsal view; spine row absent on posterior margins of segment IX; entire segment smoothly glabrous, covered only by acanthae, except smaller dorsopleural and larger ventropleural setal areas. Intersegmental depression between segment IX and segment X gently sloping. Segment X longer than gonocoxites, slightly longer than preanal appendage, forming broad hood with ventrad directed apical rim characterised by sinuous excavations visible in lateral and ventral view; excavations forming tooth-like pattern on ventrad curving margin, with 2 blunt teeth. Apicoventral setose lobes reduced to setose, subapical surfaces or shallow protuberances. Apicodorsal setose lobes with few tiny setae above middle of segment X. Dorsal interlobular gap forming narrow, deep cleft. Preanal appendages depressed in lateral view, broad at mid-length, slightly narrowing apically. Gonocoxites without harpago; short, triangular in lateral view, with visible subapical sinus; triangular in ventral view, with long, stout spines on mesal surfaces. Phallic apparatus curving, basal margins convex, ventral margin concave with elongated, sclerotized ventral apical part forming slightly tapering lobe; part of phallicata visible in retracted state above ventral lobe. Phallotremal sclerite looks forming rounded, complex unit in membranous phallicata in lateral view; in ventral view, phallotremal sclerite complex V-shaped. Ejaculatory duct thin, reaching phallotremal sclerite complex.

Holotype male: FIJI ISLANDS: Viti Levu: Nandarivatu, 3–5.ix.1974 [G.S. Robinson] – (B.M. 1974-462, NHML).

Distribution: Fiji Islands.

Etymology: vitiensis, named after the type locality, Viti Levu Island.

Anisocentropus (Anisocentropus) brevipennis, new diagnostic species cluster

This diagnostic species-cluster belongs to the *Anisocentropus latifascia* diagnostic species-group in the subgenus *Anisocentropus (Anisocentropus)*. The discrimination of the *A. brevipennis* diagnostic species-cluster is based on the presence of an intermediate shape of the gonocoxites and the lateral flank on the posterior margins of segment IX. The short body of the gonocoxites has a slender, digitate process on its apicodorsal corner in lateral view. This elongated process is longer and more complex in the Oriental member of the subgenus. The posterior margins of segment IX have a lateral flank usually being less developed in species in this diagnostic species-cluster than in other species. The members in the diagnostic species-cluster have a shortened additional flank, while there has been a loss of the flank in other species of the subgenus, also lacking in other subgenera. In the *Anisocentropus latifasciata* diagnostic species-group many species have an elongate apicodorsal corner forming a digitate process, like in *A. fulgidus* and *A. io*; and more advanced in *A. maclachlani* and *A. mjoebergi*. These species have a completely developed lateral flank. In the *A. brevipennis* diagnostic species-cluster, the digitate process is elongated, and the lateral flank short and partly reduced. Several species in the diagnostic species-cluster form intermediate forms. The species are recorded from the Afrotropical, Oriental and Australian Regions, and comprise the following species: *A. brevipennis* Ulmer, 1906 (Borneo), *A. hoisat*, new species (Laos), *A. maralus*, new species (Malaysia), *A. semiflavus* Banks, 1939 (Australia), *A. thinlin*, new species (Laos), *A. valgus* Neboiss, 1980 (Australia) and *A. voeltzkowi* Ulmer, 1909 (Madagascar).

Anisocentropus (Anisocentropus) brevipennis Ulmer

Ganonema brevipennis Ulmer, 1906: 46.

Anisocentropus brevipennis (Ulmer, 1906); Ulmer (1951: 349).

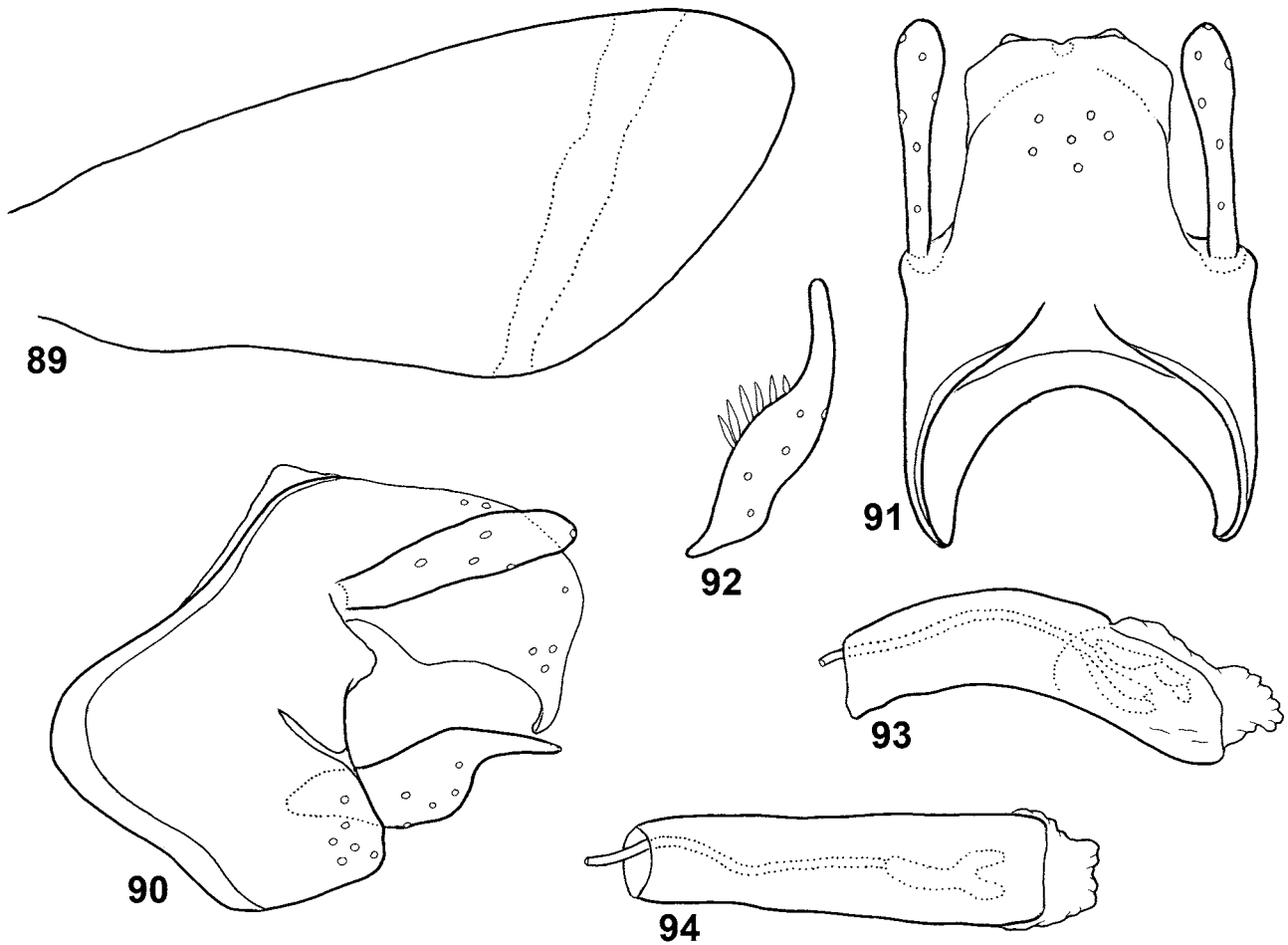
Remark. *Anisocentropus brevipennis* was very briefly described by Ulmer (1906) from 2 males collected at 2 different localities in Borneo, and deposited in the former Stettiner Museum (now MZPW), and MNHN, respectively. This type series has no selected holotype or lectotype. The first listed syntype (in Stettiner Museum) was re-examined and re-described by Ulmer (1951). The other syntype (MNHN) was illustrated by Mey (2001), and according to the detailed drawing of the genitalia, that specimen differs from that in the Stettiner Museum. The syntype of the Stettiner Museum is possibly lost.

Anisocentropus (Anisocentropus) hoisat, new species

Figs 89–94

This species is medium-sized, brown, with light brown forewings. It belongs to the *Anisocentropus brevipennis* diagnostic species-cluster of the *Anisocentropus latifascia* diagnostic species-group characterized by having shortened gonocoxites. Its genitalia are unique in having a digitate process at the apicodorsal corner of the gonocoxites. The lateral flank between the preanal and gonocoxites is small. It is close to *A. brevipennis*, but segment X is not excised apicomesally, and the preanal appendages are not sigmoid; instead they are long and filiform in lateral view, and clearly clavate in dorsal view.

Male (in alcohol). Eyes small, body medium-sized, light brown. Head rectangular in dorsal view, almost as long as broad. Ocelli absent. Tentorium slender, without dorsal arm; posterior arms short, robust, ending in pair of large posterior tentorial pits; strong tentorial bridge without anteromesal or posteromesal protuberance; anterior tentorial arm posteriorly robust, anteriorly slender, without median lamellate process; broad posterior half ending in median keel in dorsal view, and in ventral corner in lateral view. Facial groove pattern modified by presence of plate-like flange, or rim, of frontal sclerite between anterior tentorial pits. Theoretical lines separating frons and clypeus manifested by transverse frontal rim. Frontogenal vertical groove, forming oblique, dorsad continuation from anterior tentorial pits, merging almost horizontally with broad antennal grooves. Clypeogenal vertical grooves located ventrally of anterior tentorial pits, short, running slightly mesoventrad. Plate-like flanges, frontogenal, and clypeogenal sutures form complex of anterior tentorial arms (frontogenal septum). Subantennal grooves small, sinuous, running almost horizontally between frontogenal compact setal wart and palpifers, forming proximal articulation of palpi on stipes. Subocular grooves invisible. Frontal groove pronounced, short, present between antennae, joining vertexal medioantennal compact setose warts. Vertexal groove pattern reduced; large, anterad directed, rounded elevated hump dominating on anterior half of vertex, reaching interantennal area; laterally delineated by large membranous antennal sockets with corrugated or granulous surface near frontogenal compact setose wart. Stem of epicranial groove (coronal groove) vestigial. Antennal and ocular grooves accompanied by occipito-postgenal grooves, partly merged anterad; tangential to large occipital compact setal warts. Labrum heart-shaped, distal half narrow, freely hanging. Mandibles long, weakly pigmented, orienting laterad along each labrum; laciniae narrow, elongate, bearing few setae. Frontal setal warts absent on face. Pair of large, nearly triangular frontogenal compact setal warts present on posterior pregenae, obliquely or almost horizontally from frontogenal grooves, representing only visible setal warts on face. Triangular elevation on vertex with fused vertexal medioantennal compact setose warts located anteriorly on head. Vertexal lateroantennal compact setal warts absent. Antennal sockets large. Pair of small, rounded vertexal ocellar compact setose warts and pair of minute vertexal medioocellar diffuse setose warts present, each with 1 or 2 setae in middle of vertex. Obliquely located pair of large, ovoid occipital compact setose warts dominating posterior half of vertex. Pair of small postgenal compact setose



FIGURES 89–94. *Anisocentropus hoisat*, new species, holotype. 89 — right forewing; 90 — genitalia, lateral; 91 — genitalia, dorsal; 92 — gonocoxite, ventral; 93 — phallus, lateral; 94 — phallus, ventral.

warts visible between posterior section of ocular grooves and occipital compact setose warts. Maxillary palps filiform, each segment with long setae, maxillary palp formula II-VI-IV-I-V-III. Scapes rounded, about half as long as head; pedicels 2/5ths as long as scapes. Two pairs pronotal warts present: pair of large, dorsal, transverse ovoid, almost tangential mesally; pair of small, rounded warts located deep laterally, visible in lateral view. Mesoscutum with 1 pair diffused warts, arranged in longitudinal line along entire mesoscutum, composed mostly of single, double and maximum triple setae in groups visible as weakly pigmented alveoli. Pair of mesoscutellar warts form small, less pigmented, rounded area, each with 5 to 6 setal alveoli. Each proepisternum with minute, rounded setose wart located proximally above articulation of each cervical sclerite. Large, compact setal warts present mainly on membranous part of cervix, touching anterior arm of cervical sclerites. Lateral cervical sclerites forming narrow anterior arms articulating anteriorly with back of head; with occipital condyle above posterior tentorial pits; fusing with posterior cervical sclerites. Posterior cervical sclerites forming narrow, elongated plates reaching prothoracic episternum, articulating with weakly sclerotized anteromedian band of prothoracic eusternum by thin, ventral intercervical sclerites. Legs with symmetrical claws; spur formula 2, 4, 3; foreleg posteroapical spur half as long as anteroapical spurs; midleg anteroapical spurs 1/5th as long as posteroapical spur. Forewings: length 8.0 mm, membrane brown with inconspicuous, lighter band before apex; minute dots present on membrane; sparsely scattered, tiny, light dots more dense around median cell; R1 apparently running free along its length, however hypertrophied crossvein *r* dominates and terminal section of R1 atrophied, almost vestigial; base of discoidal cell located near midpoint of wing; forks I, II, III, IV, V present; crossveins *h*, *sc-r*, *r*, *s*, *r-m*, *m*, *m-cu* and *cu2* present; crossveins

cul and *cu-a* absent; postanal vein absent. Hind wings: R1 meeting R2; forks I, II, III, V present; fork I and fork II nearly equally large.

Male genitalia. Abdominal segment IX fused annularly, without longitudinal groove separating dorsal mesal and ventral parts; tergum shorter than venter; acrotergite (precostal lip of tergum) less pigmented, granulous, significantly contrasting in colour from heavily sclerotized antecosta and antecostal suture. Anterior margin of segment IX convex, sub-triangular, more developed in ventral half; posterior margin slightly concave; short, dorsad curving groove and ridge running obliquely from bottom or middle of concavity, visible in lateral view; additional lateral flank below preanal appendages small, glabrous, less pigmented. Antecosta well developed, directed mesad in dorsal view; curving slightly apicad; 2 lateral rims not tangential; gap between rims filled by acrotergite; antecosta broader ventrally than dorsally in lateral view. Spine row absent on posterior margins of segment IX; segment smoothly glabrous, except with large setose area on venter. Intersegmental depression between segment IX and segment X filled, forming straight horizontal line in lateral view. Segment X as long as gonocoxites and preanal appendages, forming broad hood with ventrolaterad directed apices; segment X quadrangular in dorsal view; mesal excision absent, wide, U-shaped excising on apical margin visible in caudal view. Apicoventral setose lobes reduced to setose surfaces before apex. Apicodorsal setose lobes with few tiny setae above middle of segment X. Dorsal interlobular gap wide U-shaped. Preanal appendages long, filiform in lateral view, straight clavate in dorsal view. Gonocoxites without harpago; basal half broad, with digitate process on apicodorsal corner; dorsal margin convex in lateral view. Phallic apparatus forming regularly curving tube; dorsal margin slightly convex; ventral margin concave; ventroapically elongate, sclerotized, with endotheca and phallicata. Phalotheca forming straight tube in ventral view; slightly broadening apically. Phallostremal sclerite feeble visible in lateral view; forming sclerotized complex accompanied by spines in membranous phallicata. Phallostremal sclerite complex; in ventral view forming Y-shaped structure. Ejaculatory duct slender, reaching phallostremal sclerite complex.

Holotype male: LAOS PDR: Luang Phrabang Prov.: Nam Sat stream, 150 m upstr. Hoi Sat Village, 344 m, UTM 48Q0220680, 2260258, 28.iv–2.v.2005, Malaise trap, loc 17 [N. Jönsson, T. Malm & B. Viklund] – (NRM).

Paratypes: same data as holotype – 3 females allotypes (NRM).

Distribution: Laos.

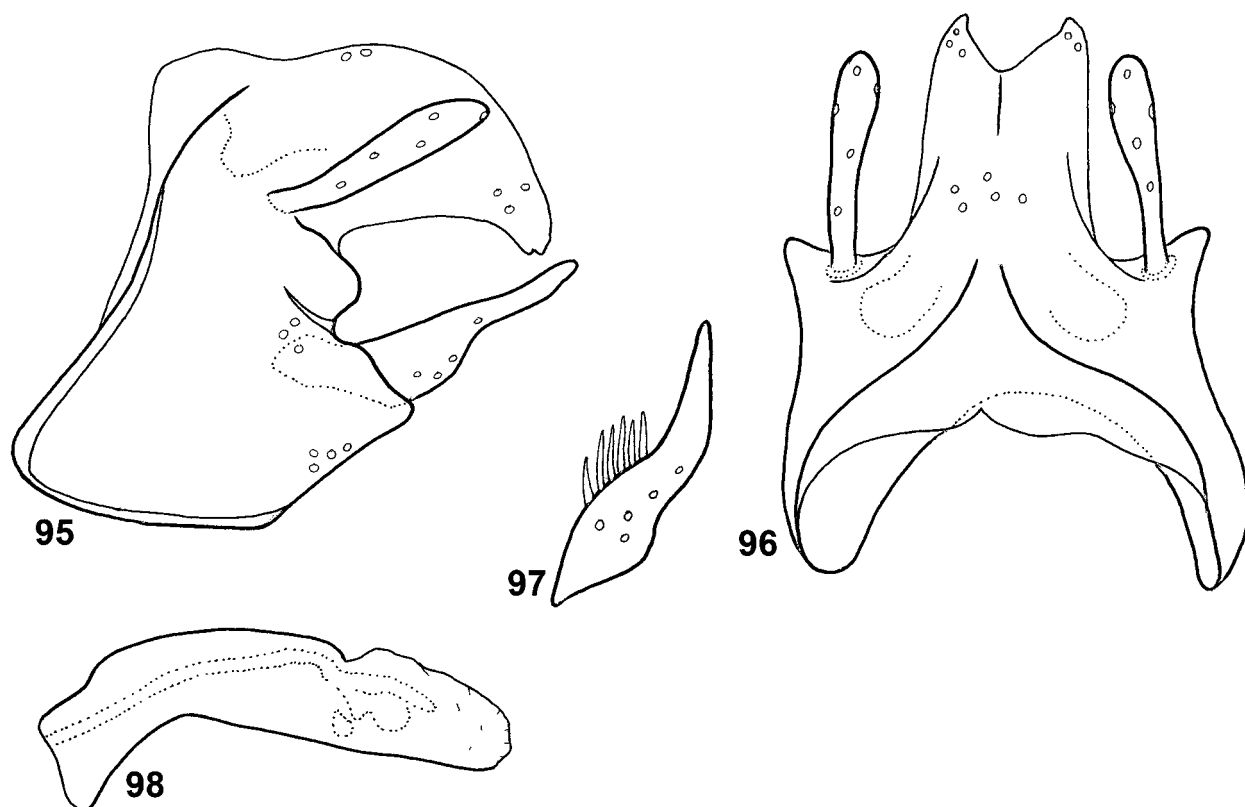
Etymology: *Hoisat*, named after the village Hoi Sat, situated 150 meters downstream the type locality.

Anisocentropus (Anisocentropus) maralus, new species

Figs 95–98

This species is medium sized and light brown. It is morphologically close to *A. brevipennis* in having apicomesally excised segment X. The preanal appendages are not sigmoid but clavate in lateral and dorsal views as in *A. brevipennis*, and the dorsum of both gonocoxites is almost straight, not bulbous.

Male (in alcohol). Eyes small, body medium-sized, light brown. Head rectangular in dorsal view, almost as long as broad. Ocelli absent. Tentorium slender, without dorsal arm; posterior arms short, robust, ending in pair of large posterior tentorial pits; strong tentorial bridge without anteromesal or posteromesal protuberance; anterior tentorial arms posteriorly robust, anteriorly slender, without median lamellate process; posterior half broad, ending in median keel in dorsal view and in ventral corner in lateral view. Facial groove pattern modified by plate-like flange, or rim, of frontal sclerite between anterior tentorial pits. Theoretical lines separating frons and clypeus manifested by transverse frontal rim. Frontogenal vertical groove forming oblique, dorsal continuation from anterior tentorial pits; almost horizontally merging with antennal grooves. Clypeogenal vertical grooves located ventrally of anterior tentorial pits, short, running slightly mesoventrad; pattern of plate-like flanges, frontogenal and clypeogenal sutures forming anterior tentorial arm complex (frontogenal



FIGURES 95–98. *Anisocentropus maralus*, new species, holotype. 95 — genitalia, lateral; 96 — genitalia, dorsal; 97 — gonocoxite, ventral; 98 — phallus, lateral.

septum). Subantennal grooves small, sinuous, running almost horizontally between frontogenal compact setal wart and palpifers, forming proximal articulation of palpi on stipes. Subocular grooves invisible. Frontal groove pronounced, short, present between antennae, joining vertexal medioantennal compact setose warts. Vertexal groove pattern reduced; large, anterad directed, rounded elevated hump dominating on anterior half of vertex, reaching interantennal area, laterally delineated by large membranous antennal sockets with corrugated or granulous surface near frontogenal compact setose wart. Epicranial groove (coronal groove) with vestigial stem. Antennal and ocular grooves accompanied by occipito-postgenal grooves, partly merging anteriorly; tangential to large occipital compact setal warts. Labrum triangular, distal half narrow, freely hanging. Mandibles long, weakly pigmented, orienting laterad along each labrum; laciniae narrow, elongated, with few setae. Frontal setal warts absent; frontal interantennal warts absent due to forward directed vertexal elevation. Pair of large, nearly triangular frontogenal compact setal warts present on posterior pregenae, directed obliquely or almost horizontally from frontogenal grooves, representing only visible setal warts on face. Triangular elevation on vertex with fused vertexal medioantennal compact setose warts located anteriorly on head. Vertexal lateroantennal compact setal warts absent. Antennal sockets enlarged. Pair of small, rounded vertexal ocellar compact setose warts and pair of minute vertexal medioocellar diffuse setose warts present, each with 1 or 2 setae in middle of vertex. Pair of large, ovoid occipital compact setose warts dominating on posterior half of vertex. Pair of small postgenal compact setose warts visible between posterior section of ocular grooves and occipital compact setose warts. Maxillary palps filiform, each segment with long setae, maxillary palp formula II-VI-IV-V-I-III (II-I-IV-VI-V-III in a male paratype). Scapes rounded, about half as long as head; pedicels 2/5ths as long as scapes. Two pairs pronotal warts present: pair of large, dorsal, transverse ovoid, almost tangential mesally; pair of small, rounded warts located deep laterally, visible in lateral view. Mesoscutum with 1 pair diffuse warts arranged in longitudinal line along entire mesoscutum, composed mostly of single, double and triple setae in groups visible as weakly pigmented alveoli. Pair of mesoscutellar

warts forming small, weakly pigmented, rounded area with 5 to 6 setal alveoli. Each proepisternum with minute, rounded setose wart located proximally above articulation of each cervical sclerite. Large, compact setal warts present mainly on membranous part of cervix, touching anterior arm of cervical sclerites. Lateral cervical sclerites forming narrow anterior arms articulating anteriorly with back of head, with occipital condyle present above posterior tentorial pits; fusing with posterior cervical sclerites. Posterior cervical sclerites forming narrow, elongated plates reaching prothoracic episternum, articulating with weakly sclerotized anteromedian band of prothoracic eusternum by thin, ventral intercervical sclerites. Legs with symmetrical claws; spur formula 2, 4, 3; foreleg posteroapical spur and hind leg anteroapical spur about half as long as other spurs, midleg anteroapical spur 1/5th as long as posteroapical spur. Forewings: length 8.0 mm, membrane brown with inconspicuous, light subapical band and minute dots scattered on membrane, mostly around median cell; R1 running separate along its length, but crossvein *r* apicad shifted and more developed than terminal part of R1; base of discoidal cell located around middle of wing; forks I, II, III, IV, V present; crossveins *h*, *sc-r*; *r*, *s*, *r-m*, *m*, *m-cu*, *cu2* and *cu-a* present, crossvein *cu1* absent; postanal vein absent. Hind wings: R1 meeting R2; forks I, II, III, V present, fork I and fork II equal.

Male genitalia. Abdominal segment IX fused annularly, without longitudinal groove separating dorsal mesal and ventral parts; tergum half as long as venter; acrotergite (precostal lip of tergum) less pigmented and granulous, contrasting in colour from heavily sclerotized antecosta and antecostal suture; anterolateral margins of segment IX convex, triangular below midheight; posterior margin straight at gonocoxites; groove and ridge running obliquely from small excision ventrally of additional lateral flank in lateral view; additional lateral flank below preanal appendages medium sized, triangular, glabrous, less pigmented. Antecosta well developed, directing mesad before curving apicad; lateral rims separate; gap between rims filled by acrotergite; antecosta broader at anterior apex of triangular lobe in lateral view. Spine row absent on posterior margins of segment IX; segment smoothly glabrous, except presence of small dorsopleural setose areas at flank, and large ventropleural setose area on venter. Intersegmental depression between segment IX and segment X sloping gently in lateral view. Segment X as long as gonocoxites and preanal appendages, forming broad hood with ventrad and laterad directed double dentate apices; segment X quadrangular with triangular mesal excision visible in dorsal view, with triangular mesal excision. Apicoventral setose lobes reduced into setose surfaces before apex. Apicodorsal setose lobes with few tiny setae located above midheight of segment X. Dorsal interlobular gap widely V-shaped. Preanal appendages long, filiform in lateral view, straight clavate in dorsal view. Gonocoxites without harpago; basal half broad, with digitate process on apicodorsal corner; dorsum straight in lateral view. Phallic apparatus, apically forming straight, regular tube, curving ventrad at basal 1/3rd, ending in sclerotized ventral apical trough hosting endotheca and phallicata. Phalotheca forming straight tube in ventral view. Phalotremal sclerite feeble in lateral view, forming complex of sclerotized structure accompanied by spines in membranous phallicata. Phalotremal sclerite complex in ventral view, nearly Y-shaped. Ejaculatory duct thin, reaching phalotremal sclerite complex.

Holotype male: MALAYSIA: Perak, Halong stream, ix-x.1993, light [G. S. Robinson] – (NHML).

Paratypes: same data as holotype – 3 males (2 males in NHML, 1 male in OPC); West-Malaysia, Belum Expedition, Lichtfang Falle 1, 27.xii.1993 [M. Erle] – 1 male (NHML).

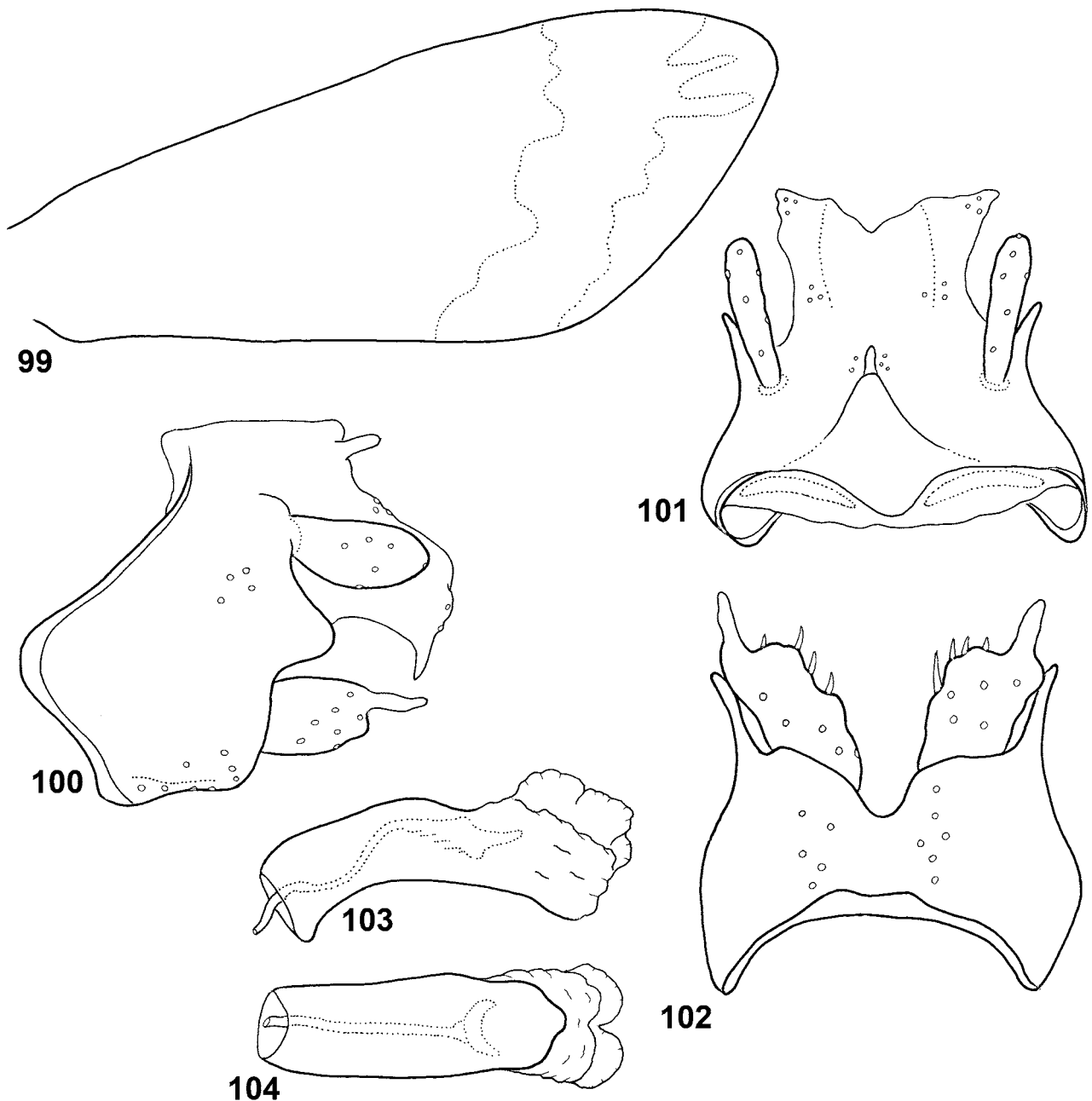
Distribution: Malaysia (Perak).

Etymology: *Maralus*, from Sanskrit “marala”, meaning straight, referring to the straight dorsum of the gonocoxites.

***Anisocentropus (Anisocentropus) samuh*, new species**
Figs 99–104

This species is very similar to *Anisocentropus voeltzkowi* Ulmer from Madagascar. In the genus *Ganonema* and the *Anisocentropus latifascia* diagnostic species-group, the shape of the genitalia is rather uniform, and

the wing and body colour, as well as wing shape and forewing pattern, are effectively used to discriminate species. The genitalia of *Anisocentropus samuh*, new species are nearly identical with those of *Anisocentropus voeltzkowi* only differing in the presence of a more developed median, finger-like, small process at the intersegmental depression between segment IX and segment X, as seen in lateral view; and the gonocoxites are more quadrangular. The most striking difference between the 2 species is the larger size and presence of dark brown-banded forewings.



FIGURES 99–104. *Anisocentropus samuh*, new species, holotype. 99 — right forewing; 100 — genitalia, lateral; 101 — genitalia, dorsal; 102 — genitalia, ventral; 103 — phallus, lateral; 104 — phallus, ventral.

Male (pinned). Medium-sized, body light brown-ochraceous; legs, palps and antennae lighter than body; forewings with wide, dark, subapical band. Head rectangular in dorsal view, slightly shorter than broad. Ocelli absent. Facial groove pattern modified, with plate-like flange, or rim, of frontal sclerite between anterior tentorial pits. Theoretical lines separating frons and clypeus manifested by transverse frontal rim. Frontogenal

vertical groove forming oblique, dorsal continuation from anterior tentorial pits; almost horizontally merging with antennal grooves. Clypeogenal vertical grooves located ventrally of anterior tentorial pits, short, running slightly mesoventrad; plate-like flanges, and frontogenal and clypeogenal sutures forming complex of anterior tentorial arms (frontogenal septa). Subantennal grooves small, sinuous, running almost horizontally between frontogenal compact setal wart and palpifers, forming proximal articulation of palpi on stipes. Subocular grooves invisible. Frontal groove pronounced, short, present between antennae, joining vertexal medioantennal compact setose warts. Vertexal groove pattern reduced; large, anterad directed, rounded elevated hump dominating on anterior half of vertex, reaching interantennal area; laterally delineated by large membranous antennal sockets with corrugated or granulous surface near frontogenal compact setose wart. Epicranial groove (coronal groove) with vestigial stem. Antennal and ocular grooves accompanied by occipito-postgenal grooves, partly merging anteriorly; tangential to large occipital compact setal warts. Labrum triangular, distal half narrow, freely hanging. Mandibles long, weakly pigmented, orienting laterad along each labrum; laciniae narrow, elongated, with few setae. Frontal setal warts absent; frontal interantennal warts absent due to forward directed vertexal elevation. Pair of large, nearly triangular frontogenal compact setal warts present on posterior pregenae, obliquely or almost horizontally from frontogenal grooves, representing only compact warts visible on face. Triangular elevation on vertex with fused vertexal medioantennal compact setose warts present anteriorly on head. Vertexal lateroantennal compact setal warts absent. Antennal sockets large; pair of rounded vertexal ocellar compact setose warts and pair of small vertexal, medioocellar setose warts present, with 1 or 2 setae in middle of vertex. Pair of large, obliquely located, ovoid occipital compact setose warts dominating on posterior half of vertex. Pair of small postgenal compact setose warts visible between posterior section of ocular grooves and occipital compact setose warts. Maxillary palps filiform, each segment with long setae, maxillary palp formula II-IV-I-VI-V-III. Scapes rounded, about half as long as head; pedicels 2/5ths as long as scapes. Two pairs pronotal warts present: pair of large dorsal transverse ovoid pair almost touching mesally; pair of small, rounded warts located deep laterally, visible in lateral view. Mesoscutum with 1 pair diffused warts, arranged in longitudinal line along entire mesoscutum, composed of single, double and triple setae in groups visible as weakly pigmented alveoli. Pair of mesoscutellar warts forming small, weakly pigmented, rounded area with 5 to 6 setal alveoli. Each proepisternum with minute, rounded setose wart located proximally, above articulation of cervical sclerites. Large, compact setal warts present mainly on membranous part of cervix, touching anterior arm of cervical sclerites. Lateral cervical sclerites forming narrow anterior arms, articulating anteriorly with back of head, with occipital condyle above posterior tentorial pits; fusing with posterior cervical sclerites. Posterior cervical sclerites forming narrow, elongated plates reaching prothoracic episternum, articulating with weakly sclerotized anteromedian band of prothoracic eusternum by thin, ventral intercervical sclerites. Legs with symmetrical claws; spur formula 2, 4, 3; foreleg spurs about equally large, midleg posterior subapical spurs 1/3rd as long as anterior subapical spur, hind leg posteroapical spur 1/6th as long as other spurs. Forewings: length 13.0 mm, membrane densely covered by long setae; setae on proximal 2/3rds silky, light brown-ochraceous; wide subapical transverse band dark brown, with fringed anterior and posterior margins followed by light brown apical marginal band.

Male genitalia. Abdominal segment IX fused annularly, without longitudinal groove separating dorsal mesal and ventral parts; tergum as long as venter; acrotergite (precostal lip of tergum) less pigmented and granulous, contrasting from stronger sclerotized antecosta and antecostal suture; anterolateral margins of segment IX convex, triangular below midheight; posterior margins straight at gonocoxites, additional lateral flank ventrally of preanal appendages medium sized, rounded subtriangular, glabrous, less pigmented on apical half. Antecosta well developed, short in dorsal view, directed mesad, lateral rims well separate; gap between antecostae filled by acrotergite; antecosta broadest on apex of triangular apodeme in lateral view; broadest on mesal 1/3rd of venter in ventral view. Acrotergites well developed, pale, forming pair of laterally elongating surfaces separate from large part; covered with microtrichia; in dorsal view tergum forming triangular median keel densely packed with microtrichia; spine row absent on posterior margins of segment IX;

segment smoothly glabrous by microtrichia, except at smaller dorsopleural setose area behind flank, and larger ventropleural setose area on venter. Intersegmental depression between segment IX and segment X forming steep slope in lateral view, armed with median, finger-like process below triangular apex of median keel. Segment X as long as gonocoxites; longer than preanal appendage, forming broad hood with ventrolaterad directed apices, ending in long spine; in dorsal view segment X quadrangular with laterad curving apices and broad, triangular, mesal excision. Apicoventral setose lobes forming setose surfaces before each apex. Apicodorsal setose lobes forming sparsely setose surfaces above middle of segment X. Dorsal interlobular gap widely V-shaped. Preanal appendages filiform in lateral view; straight rod-shaped in dorsal view. Gonocoxites without harpago; basal body broadly quadrangular in lateral and ventral view, ending in digitate process on apicodorsal corner in lateral view. Phallic apparatus forming slightly curving tube, ending in sclerotized ventral apical lobe hosting endotheca and phallicata. Phalotheca straight in ventral view. Phallostremal sclerite feeble in lateral view as sclerotized triangle structure in membranous phallicata; in ventral view phallostremal sclerite sickle-shaped. Ejaculatory duct slender, clearly visible, nearly reaching phallostremal sclerite.

Holotype male: MADAGASCAR: Fianarantsoa Province, 7 km W Ranomafana, 900 m, 8–13.iii.1990, Malaise trap across stream, montane rain forest [W.E. Steiner] – (NMNH).

Distribution: Madagascar.

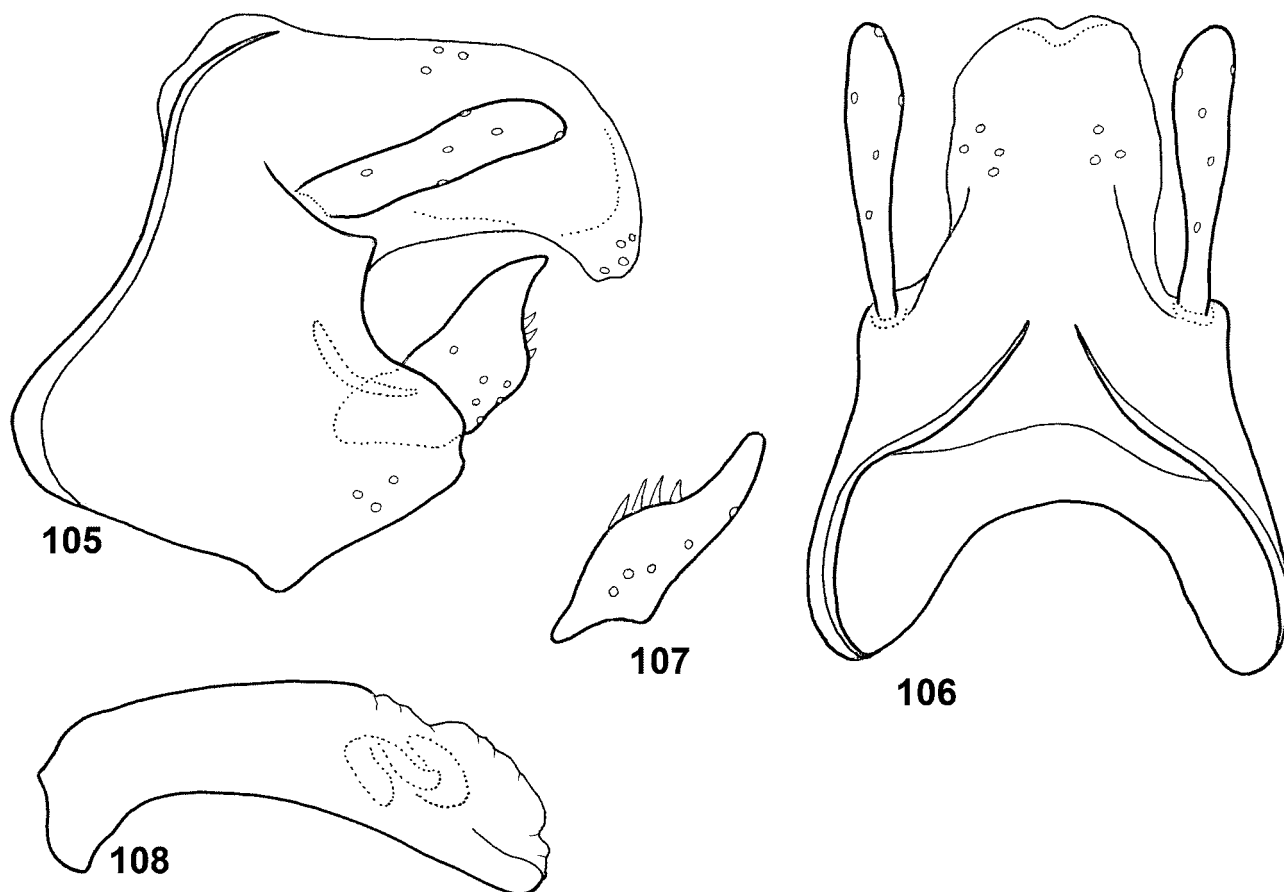
Etymology: *Samuh*, band in Sanskrit. This species is named after the dark brown wide transverse subapical band on the ochraceous forewing.

Anisocentropus (Anisocentropus) thinlin, new species

Figs 105–108

This species is medium-sized, with dark ochraceous-brown body and brown forewings. It belongs to the *Anisocentropus brevipennis* diagnostic species-cluster in the *Anisocentropus latifascia* diagnostic species-group, characterized by having abbreviated gonocoxites, but has a digitate process on the apicodorsal corner of the gonocoxites in lateral view. The lateral flank between the preanal appendages and the gonocoxites is small. The species is most similar to *Anisocentropus hoisat*, new species, from which it is separated by segment X being longer than the gonocoxites; ventrad-curving apices are blunt and not spine-like; and the digitate process on the apicodorsal corner of each gonocoxite is short. The forewings of *A. thinlin* have no visible setal or membrane patterns while the forewings of *A. hoisat* have an inconspicuous band and dots.

Male (in alcohol). Medium-sized; body dark ochraceous-brown; forewings brown, without patch or band pattern, with small light dots on membrane. Head rectangular in dorsal view, almost as long as broad. Ocelli absent. Tentorium slender, without dorsal arm; posterior arms short, robust, ending in pair of large posterior tentorial pits; strong tentorial bridge without anteromesal or posteromesal protuberance; anterior tentorial arms posteriorly robust, anteriorly slender, without median lamellate process; posterior half broad, ending in median keel in dorsal view and in ventral corner in lateral view. Facial groove pattern with plate-like flange, or rim, of frontal sclerite between anterior tentorial pits. Theoretical lines separating frons and clypeus manifested by transverse frontal rim. Frontogenal vertical groove forming oblique, dorsal continuation from anterior tentorial pits; almost horizontally merging with antennal grooves. Clypeogenal vertical grooves located ventrally of anterior tentorial pits, short, running slightly mesoventrad; plate-like flanges, and frontogenal and clypeogenal sutures forming complex of anterior tentorial arms (frontogenal septa). Subantennal grooves small, sinuous, running almost horizontally between frontogenal compact setal wart and palpifers, forming proximal articulation of palpi on stipes. Subocular grooves invisible. Frontal groove pronounced, short, present between antennae, joining vertexal medioantennal compact setose warts. Vertexal groove pattern reduced;



FIGURES 105–108. *Anisocentropus thinlin*, new species, holotype. 105 — genitalia, lateral; 106 — genitalia, dorsal; 107 — gonocoxite, ventral; 108 — phallus, lateral.

large anterad directed, rounded elevated hump dominating anterior half of vertex, reaching interantennal area, laterally delineated by large membranous antennal sockets with corrugated or granulous surface near frontogenal compact setose wart. Epicranial groove (coronal groove) with vestigial stem. Antennal and ocular grooves accompanied by occipito-postgenal grooves, partly merging anteriorly; tangential to large occipital compact setal warts. Labrum heart-shaped, distal half narrow, freely hanging. Mandibles long, weakly pigmented, orienting laterad along each labrum; laciniae narrow, elongated, with few setae. Frontal setal warts absent on face; frontal interantennal warts absent due to anterad directed vertexal elevation. Pair of large, nearly triangular frontogenal compact setal warts present on posterior pregenae, directed obliquely or almost horizontally from frontogenal grooves, representing only visible setal warts on face. Triangular elevation on vertex with fused vertexal medioantennal compact setose warts located anteriorly on head. Vertexal lateroantennal compact setal warts absent. Antennal sockets large. Pair of small, rounded vertexal ocellar compact setose warts and pair of minute vertexal medioocellar diffuse setose warts present, each with 1 or 2 setae in middle of vertex. Pair of large, obliquely located, ovoid occipital compact setose warts dominating on posterior half of vertex. Pair of small postgenal compact setose warts visible between posterior section of ocular grooves and occipital compact setose warts. Maxillary palps filiform, each segment with long setae, maxillary palp formula II-IV-VI-I-V-III. Scapes rounded, about half as long as head; pedicels 2/5ths as long as scapes. Two pairs pronotal warts present: pair of large dorsal transverse ovoid warts almost touching mesally; second wart pair small, rounded, located deep laterally, visible in lateral view. Mesoscutum with 1 pair diffused warts, arranged in longitudinal line along entire mesoscutum, forming single, double and triple setae in groups visible as weakly pigmented alveoli. Pair of mesoscutellar warts forming small, less pigmented, rounded area

with 5 to 6 setal alveoli. Each proepisternum with minute, rounded setose wart located proximally above articulation of each cervical sclerite. Large, compact setal warts present mainly on membranous part of cervix, touching anterior arm of cervical sclerites. Lateral cervical sclerites forming narrow anterior arms articulating anteriorly with back of head, with occipital condyle present above posterior tentorial pits; fusing with posterior cervical sclerites. Posterior cervical sclerites forming narrow, elongated plates reaching prothoracic episternum, articulating with weakly sclerotized anteromedian band of prothoracic eusternum by thin, ventral intercervical sclerites. Legs with symmetrical claws; spur formula 2, 4, 3; foreleg posteroapical spur and hind leg anteroapical spur half as long as other spurs; midleg anteroapical spurs 1/5th as long as posteroapical spur. Forewings: length 8.0 mm, membrane brown, without patches, with densely scattered, small, light dots on brown membrane; R1 confluent with, or recurrent into R2 well before C, without clearly visible continuation to C; base of discoidal cell located around middle of wing; forks I, II, III, IV, V present; crossveins *h*, *sc-r*, *s*, *r-m*, *m*, *m-cu*, *cu2* and *cu-a* present, crossveins *r* and *cu1* absent; postanal vein absent. Hind wings: R1 meeting R2; forks I, II, III, V present, fork I and fork II equal.

Male genitalia. Abdominal segment IX fused annularly, without longitudinal groove separating dorsal mesal and ventral parts; tergum shorter than venter; acrotergite (precostal lip of tergum), less pigmented, with granulous surface due to presence of conspicuous microtrichia; contrasting in colour from heavily sclerotized antecosta and antecostal suture; anterolateral margins of segment IX convex, each triangular in ventral half; posterior margins irregularly straight, slightly concave; with short, dorsad curving groove and ridge running obliquely from bottom or middle of concavity, visible in lateral view; additional lateral flank below each preanal appendage small, glabrous, less pigmented. Antecosta well developed, orienting mesad before curving apicad, lateral rims not tangential; gap between filled by acrotergite. Antecosta broader ventrally than dorsally in lateral view; spine row absent on posterior margins of segment IX; segment smoothly glabrous, except with small, ventropleural, setose area. Intersegmental depression between segment IX and segment X completely filled, forming almost straight horizontal line in lateral view, with small slope. Segment X longer than gonocoxites and preanal appendages, forming broad hood with ventrad directed blunt apices; in dorsal view, segment X rounded quadrangular, without mesal excision, with wide V-shaped excising on apical margin visible in caudal view. Apicoventral setose lobes reduced to setose surfaces before apex. Apicodorsal setose lobes forming sparsely setose surfaces above middle of segment X. Dorsal interlobular gap wide V-shaped. Preanal appendages long, filiform in lateral view, straight clavate in dorsal view. Gonocoxites without harpago, quadrangular, with short digitate process on apicodorsal corner in lateral view. Phallic apparatus curving; dorsal margin slightly convex, ventral margin concave with elongate, sclerotized ventral apically shallow trough hosting endotheca and phallicata; phalotheca curving ventrad as basis. Phallostremal sclerite feeble in lateral view, forming complex of sclerotized structure accompanied by spines in membranous phallicata. Phallostremal sclerite complex in ventral view, Y-shaped. Ejaculatory duct thin, nearly reaching phallostremal sclerite complex.

Holotype male: LAOS PDR: Odomxai Prov.: Hoi Nga stream, next to R13, just upstr. Hoi Nga Village, 870 m, UTM 48Q0199131, 2277876, 28.iv–2.v.2005, Malaise trap, loc 20 [N. Jönsson, T. Malm & B. Viklund] — (NRM).

Paratypes: same data as holotype — 1 male (NRM); **Luang Namtha Prov.:** Nam Ha NBCA, Lakkhammai Village, Nam Leung stream, 749 m, UTM 47Q0744602, 2339873, 30.iv.2005, light trap, loc 29 [N. Jönsson, T. Malm & B. Viklund] – 1 male (OPC).

Distribution: Laos.

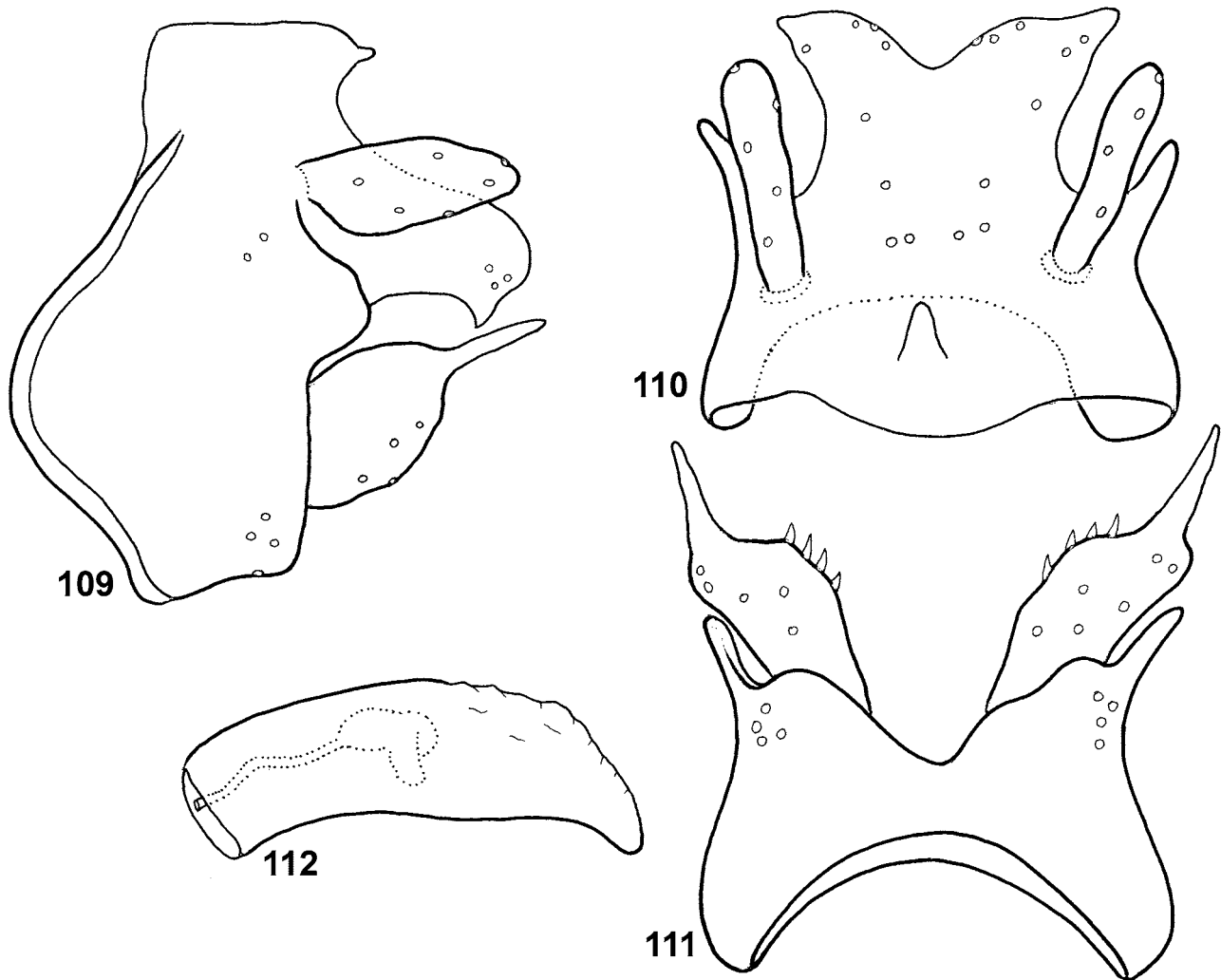
Etymology: *Thinlin*, from Vietnamese “*thinh linh*”, short, referring to the short, digitate process on the gonocoxites.

Anisocentropus (Anisocentropus) voeltzkowi Ulmer

Anisocentropus voeltzkowi Ulmer, 1909: 357, Figs 109–112

Type locality: Madagascar

New records: MADAGASCAR: Maroansetra, 1954 [R. Paulian] – 1 male (MNHN); Namoroka, Ambovonombly, ix.1952 [R. Paulian] – 1 male (MNHN); Majunga Province, 25 km SW Ambalanjankomby, 3–11.xi.1962, lot7 [E.D. Cashatt] — 1 male (NMNH).



FIGURES 109–112. *Anisocentropus voeltzkowi* Ulmer, male, from Madagascar: Maroansetra. 109 — genitalia, lateral; 110 — genitalia, dorsal; 111 — genitalia, ventral; 112 — phallus, lateral.

Subgenus *Anisocentropus (Anisokantropus)* Malicky

Anisocentropus (Anisokantropus) Malicky, 1994: 71.

Type species: *Anisocentropus (Anisokantropus) diana* Malicky & Chantaramongkol, 1994: 71.

Diagnosis following Malicky (1994): Body medium-sized species; forewings broad; hind wings with thin basal setal brush. Maxillary palps with 6 segments; male tibial spur formula: 2, 4, 3; setal comb on each male hindleg weakly developed; cerci complex, subdivided.

Anisocentropus (Anisokantropus) diana Malicky & Chantaramongkol

Anisocentropus (Anisokantropus) diana Malicky & Chantaramongkol in Malicky, 1994: 71.

Type locality: Thailand.

Distribution: Thailand, Malaysia (Perak), Indonesia (Sumatra).

New record: MALAYSIA: West-Malaysia, Belum Expedition, Lichtfang Falle 1, 27.xii.1993 [M. Erle] – 1 male (OPC).

Anisocentropus (Anisokantropus) dvaupadhah, new species

Figs 113–116

This species resembles *A. pandora* Malicky & Chantaramongkol from Thailand in having bilobed gonocoxites. *Anisocentropus dvaupadhah* is separated from *A. pandora* in the presence of 4 processes instead of 1 process at the median dorsum basally on segment X, visible between the preanal appendages in dorsal view. Other distinguishing characters are the presence of more slender, finger-like preanal appendages; and the presence of a pair of robust, foot-shaped processes on the dorsum of segment X, visible in dorsal and lateral view. The other known species with divided gonocoxites is *A. pan* Malicky & Chantaramongkol from Thailand. In *A. pan* the gonocoxites are trilobed, and the preanal appendages are bilobed.

Male (in alcohol). Body large; light brown; legs, antennae and palps lighter than rest of body; wings uniformly pale brown. Head rectangular in dorsal view, half as long as broad. Ocelli absent. Cephalic and thoracic groove pattern and setal wart pattern unknown. Maxillary palps 6-segmented, filiform; maxillary palp formula II-I-(IV-V-VI)-III. Scapes rounded, half as long as head; pedicels half as long as scapes. Legs with symmetrical claws; spur formula 2, 4, 3; each foreleg with posteroapical spur 2 times longer than anteroapical spur; midleg anterior spurs 1/4th as long as posterior spur; hind leg anteroapical spur 1/5th as long as posteroapical spur. Forewings: length 15.0 mm; membrane light brown, without visible pattern, setae pale; R1 apparently confluent with, or recurrent into R2 well before C, terminal end of R1 probably disappeared, crossvein *r* joining R1 and R2; base of discoidal cell located proximally of wing middle; forks I, II, III, IV, V present; crossveins *h*, *sc-r*, *s*, *r-m*, *m*, *m-cu*, *cu1*, *cu2* and *cu-a* present; only crossvein *r* absent; postanal vein absent. Hind wings: R1 fusing with R2; forks I, II, III, V present; fork I longer than fork II.

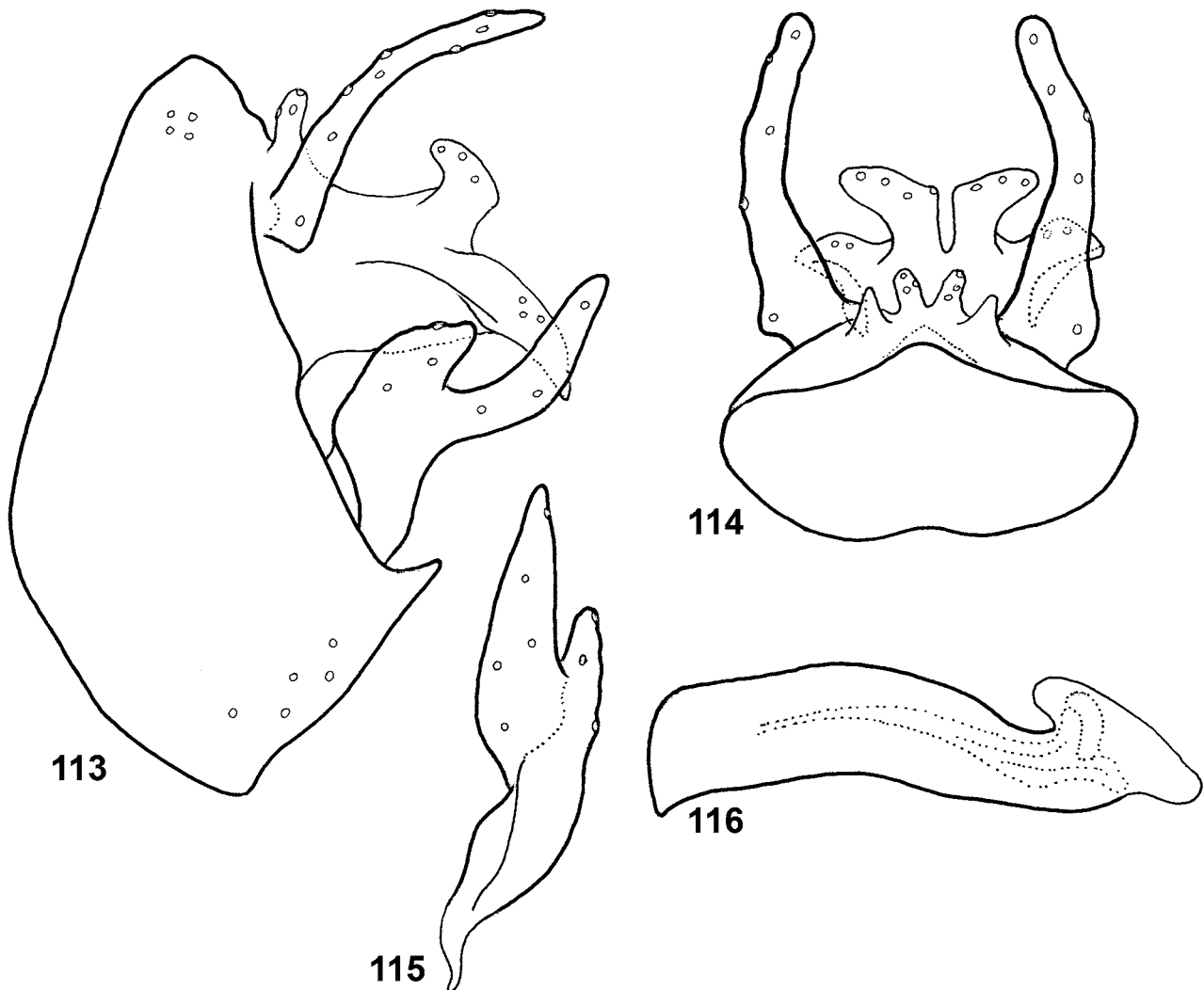
Male genitalia. Abdominal segment IX fused annularly, without longitudinal groove separating dorsal, mesal and ventral parts; tergum short, narrowing dorsally; venter broad, flat, producing into posteromedian, small triangle visible in lateral and ventral view; anterior margin convex, more strongly developed at ventral half; posterior margin straight. Antecosta weakly developed, forming narrow, marginal rim; equally thin along margin, without conspicuous external groove of antecostal suture; tergum with small mesal triangular; spine row absent on posterior margins of segment IX; segment smoothly glabrous, except at large ventral area and small dorsolateral area. Intersegmental depression between segment IX and segment X sloping, basally occupied by 2 pairs short processes in lateral view, mesal pair setose, lateral pair bare glabrous. Segment X nearly as long as gonocoxites; dorsal basement at tergum IX armed with 2 pairs short processes. Apicoventral setose lobes with marginal rim, curving ventrolaterad. Apicodorsal setose lobes in lateral and dorsal view formed like feet. Dorsal interlobular gap narrow, deep. Superior or preanal appendages long, filiform, slightly curving ventrad in lateral view; curving mesad in dorsal view. Gonocoxites without harpago; divided into short dorsal and long ventral lobe. Phallic apparatus forming horizontal, straight tube; slightly convex basally; ventral margin concave; phallicata dilated. Phallosomal sclerite curving inside membranous phallicata; end part of ejaculatory duct visible.

Holotype male: MALAYSIA: Peninsular (no other data available).

Distribution: Malaysia (Peninsular).

Etymology: *Dvaupadhah*, after “dvau padhah” in Sanskrit, meaning 2 feet, named after the presence of foot-like processes on the dorsum of segment X, visible in lateral and dorsal view.

Remarks: The holotype male is pinned and the cephalic and thoracic groove and setal wart patterns was impossible to examine on the dry mounted head and thorax.



FIGURES 113–116. *Anisocentropus dvupadhah*, new species, holotype. 113 — genitalia, lateral; 114 — genitalia, dorsal; 115 — gonocoxite, ventral; 116 — phallus, lateral.

Anisocentropus (*Anisomontropus*) Malicky

Anisocentropus (*Anisomontropus*) Malicky, 1994: 71.

Type species: *Anisocentropus* (*Anisomontropus*) *janus* Malicky, 1994: 75.

Diagnosis following Malicky (1994): Body large. Forewings broad; hind wing with large, well-developed basal setal brush; maxillary palps with 6 segments; male tibial spur formula: 2, 4, 2; setal comb on each male hind leg well developed. The genitalia of the species in this subgenus are rather uniform, all having very long cerci. The forewings are variously coloured, involving light patterns on darker greyish brown membrane. *Anisocentropus bungus*, new species has no pattern; *Anisocentropus flavomarginatus* Ulmer has light-spotted

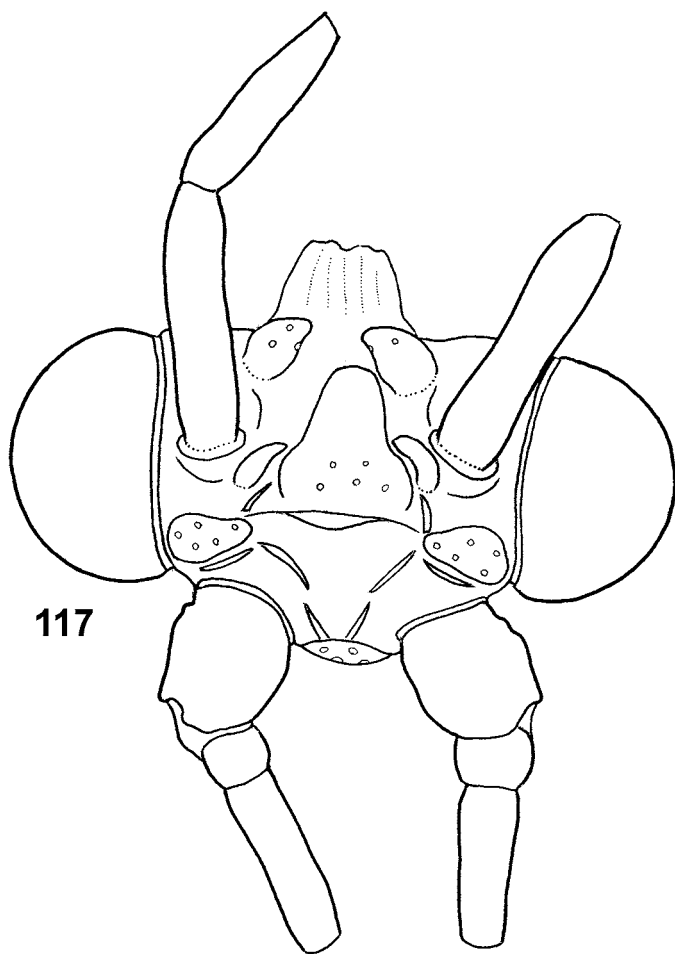
forewings, with yellow margin; *Anisocentropus csorbai*, new species has light-spotted forewings, with small transverse maculation around crossveins; *Anisocentropus maculatus* Ulmer and *Anisocentropus janus* Malicky & Chantaramongkol both have forewings with rounded maculae around or near the crossveins; *Anisocentropus thonmihn*, new species has large rounded, light maculae around forewing crossveins, and 2 large patches on the anterior margin of the forewings; and *Anisocentropus insularis* Martynov has forewings with fused spots, forming transverse and longitudinal bands.

***Anisocentropus (Anisomontropus) bungus*, new species**

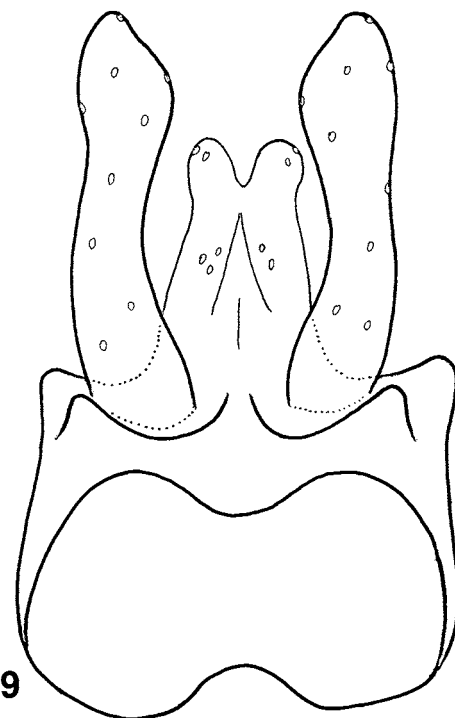
Figs 117–122

This large, brown species is the only one in the subgenus without pattern on the forewing membrane. The genitalia resemble those of *A. janus* from which it is separated by the more slender gonocoxites; and it has more regularly arched gonocoxites in lateral view, while the arch in *A. janus* is dorsally flat; the preanal appendages are more robust and more strongly constricted at midlength in dorsal view; segment X has a broader dorsal interlobular gap with more rounded and slightly laterad directed lobes in dorsal view, while straight and tapering in *A. janus*; in lateral view the dorsal ridge is more elevated than in *A. janus*.

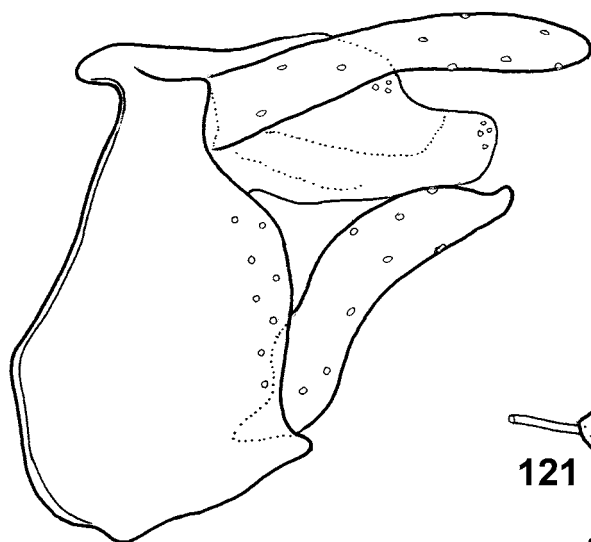
Male (in alcohol). Body large; body and forewings brown. Head rectangular in dorsal and facial view, almost as long as broad. Ocelli absent. Tentorium not visible. Facial groove pattern forming plate-like flange, or rim, connecting anterior tentorial pits. Theoretical line separating frons and clypeus forming oblique, dorsal continuation from anterior tentorial pits; almost horizontally merging with antennal grooves. Clypeogenal vertical grooves located ventrally of anterior tentorial pits, short, running slightly mesoventrad; plate-like flanges, and frontogenal and clypeogenal sutures forming complex of anterior tentorial arms (frontogenal septa). Small subantennal grooves horizontal, sinuous, located between frontogenal compact setal wart and palpifers, forming proximal articulation of palps on stipes. Subocular grooves invisible. Frontal groove pronounced, short, present between antennae, joining vertexal medioantennal compact setose warts. Vertexal groove pattern reduced. Large, anterad directed, rounded elevation dominating on anterior half of vertex; reaching interantennal area; laterally delineated by antennal sockets; with corrugated or granulous surface near frontogenal compact setose wart. Epicranial groove (coronal groove) with vestigial stem. Antennal and ocular grooves accompanied by occipito-postgenal grooves, partly merging anteriorly; tangential to large occipital compact setal warts. Labrum vertically long, subquadrangular with rounded apex, freely hanging, sparsely setose. Mandible long, turning mesally, weakly pigmented, oriented laterad along labrum; lacinia broad, elongated, bearing few setae. Frontal setal warts absent; frontal interantennal warts absent due to anterad directed vertexal elevation. Pair of large, nearly triangular, frontogenal compact setal warts present on posterior pregenae, obliquely or almost horizontally from frontogenal grooves, representing only visible setal warts on face. Triangular elevation on vertex with fused vertexal medioantennal compact setose warts located anteriorly on head. Vertexal lateroantennal compact setal warts absent. Antennal sockets large; pair of small, rounded vertexal ocellar compact setose warts and equally large to larger pair vertexal medioocellar compact setose warts visible in middle of vertex. Pair of large, obliquely located, ovoid occipital compact setose warts dominating on posterior half of vertex. Pair of small postgenal compact setose warts visible between posterior section of ocular grooves and occipital compact setose warts. Maxillary palps filiform, covered by long setae; maxillary palp formula VI-IV-(II, V)-I-III. Scapes rounded, about half as long as head; pedicels 2/5ths as long as scapes. Two pairs pronotal warts present: 1 pair of large dorsal transverse ovoid, widely separated mesally with deep cleft; 1 pair small, rounded warts located deep laterally, visible in lateral view. Pair of mesoscutal warts arranged in longitudinal line running long along entire mesoscutum of bright yellow colour, almost indiscernible. Pair of mesoscutellar warts forming irregular, less pigmented area with 5 to 6 setal alveoli. Proepisternum with large, rounded setose wart located proximally above articulation of cervical sclerite;



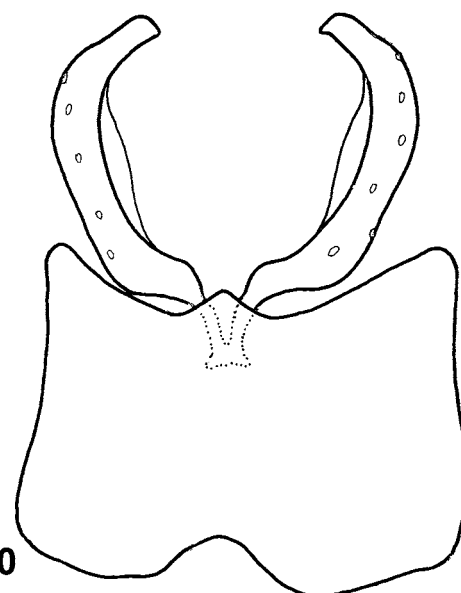
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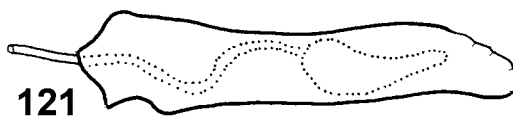
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118



120



121



122

FIGURES 117–122. *Anisocentropus bungus*, new species, holotype. 117 — head, frontal; 118 — genitalia, lateral; 119 — genitalia, dorsal; 120 — genitalia, ventral; 121 — phallus, lateral; 122 — phallus, ventral.

larger than setal wart on precoxale. Large, compact setal warts present mainly on membranous part of cervix, touching anterior arm of cervical sclerites. Lateral cervical sclerites composed of narrow anterior arm articulating anteriorly to back of head with occipital condyle above posterior tentorial pits, fused to posterior cervical sclerites. Posterior cervical sclerites forming narrow, elongated plates reaching prothoracic episternum, articulating with weakly sclerotized anteromedian band of prothoracic eusternum by thin, ventral intercervical sclerites. Legs with symmetrical claws; spur formula 2, 4, 2; each foreleg with posteroapical spur 2 times longer than anteroapical spur; midleg anteroapical and anterosubapical spurs 1/4th as long as other spurs; hind leg apical spurs equally long. Forewings: length 12.0 mm; membrane brown, without pattern; Sc hypertrophied with crossvein *sc-r*, forming deep furrow running along costal margin of wing; R1 confluent with, or recurrent into, R2 well before C, without visible continuation to C; base of discoidal cell located proximally of mid-length of wing; forks I, II, III, IV, V present; crossveins *h*, *sc-r*, *s*, *r-m*, *m*, *m-cu*, *cu1*, *cu2* and *cu-a* present; crossvein *r* absent; postanal vein absent. Hind wings: R1 meeting R2; forks I, II, III, V present; fork I longer than fork II.

Male genitalia. Abdominal segment IX fused annularly, without longitudinal groove separating dorsal, mesal and ventral parts; tergum shorter than venter; anterior margins of segment IX ventrally convex in lateral view, more developed ventrally; posterior margin forming large, regular circular apical lobe. Antecosta weakly developed, forming narrow, marginal rim, equally thin along margin, without conspicuous external groove of antecostal suture; tergum IX with narrow triangular mesal keel in dorsal view, forming continuation of sharp dorsal keel of segment X, characterised by lateral triangular projections; in dorsal view, tergite with rounded mesal lobe on anterior margin; similar excision present on anterior margins of venter IX; spine row on posterior lateral margins forming setal patches on almost entire apical lobe areas. Intersegmental depression between segment IX and segment X filled. Segment X about as long as gonocoxites, forming broad hood with blunt apex, sclerotized band running from apex to base of gonocoxites, near ventral margin. Apicoventral setose lobes forming setose surfaces before and at apex. Apicodorsal setose lobes with few tiny setae above middle of segment X. Dorsal interlobular gap broad, deeply triangular. Preanal appendages much longer than segment X; almost parallel-sided, slightly arching in lateral view; more robust and broader in dorsal view; constriction present at middle. Gonocoxites without harpago; slender, sinuous, broadening mesally in ventral view; forming regular arch in lateral view. Phallic apparatus straight in lateral and ventral view; with elongating, sclerotized apicoventral lobe, endotheca and phallicata membranous above apicoventral lobe. Phallosomal sclerites U-shaped in ventral view; apices curving mesad, tapering. Ejaculatory duct sinuous in lateral view; straight in ventral view.

Holotype male: VIETNAM: Nghta Bihn Province: Bung stream, 10.i.1991, light [S. Andrikovics] – (OPC).

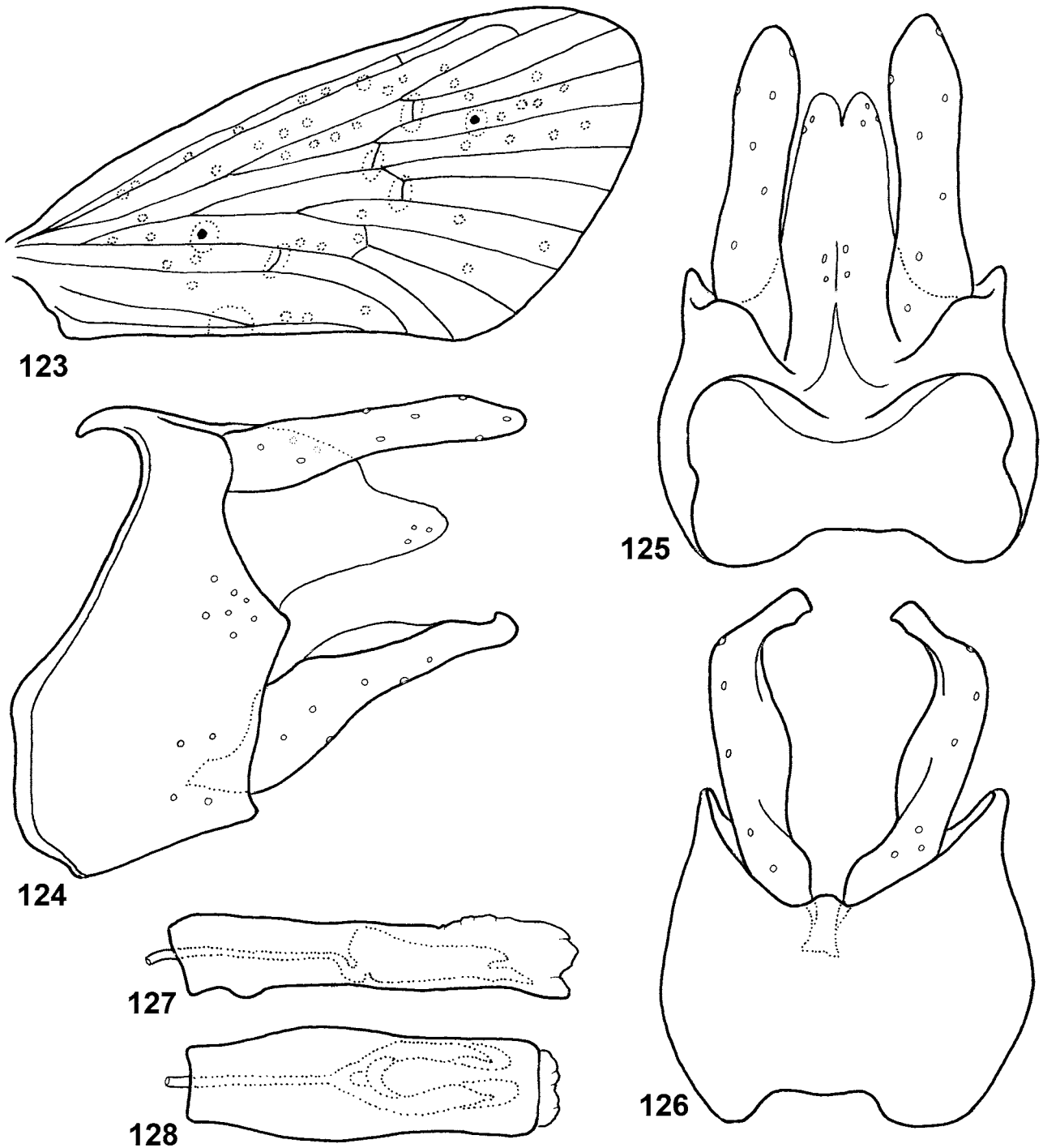
Distribution: Vietnam.

Etymology: *Bungus*, named after the type locality, the Bung Stream.

Anisocentropus (Anisomontropus) csorbai, new species

Figs 123–128

This species is large and ochraceous, with almost whitish mesoscutum. The forewing membranes and setae are brownish; lighter patches are present around the crossveins. The genitalia are similar to those of *A. janus* Malicky & Chantaramongkol, but in *A. csorbai* the gonocoxites are broader, and the preanal appendages are straight in lateral view. The wing pattern is also different between the 2 species.



FIGURES 123–128. *Anisocentropus csorbai*, new species, holotype. 123 — right forewing; 124 — genitalia, lateral; 125 — genitalia, dorsal; 126 — genitalia, ventral; 127 — phallus, lateral; 128 — phallus, ventral.

Male (in alcohol). Body large, ochraceous; palps, legs paler than rest of body; mesoscutum nearly whitish dorsally; forewings brownish, with lighter patches along crossveins; forewing membrane light dotted. Head rectangular in dorsal and facial view, almost as long as broad. Ocelli absent. Tentorium not visible. Facial groove pattern forming plate-like flange, or rim, connecting anterior tentorial pits. Theoretical line separating frons and clypeus forming oblique, dorsad continuation from anterior tentorial pits, almost horizontally merging with broad antennal grooves. Clypeogenal vertical grooves located ventrally of anterior tentorial pits, short, running slightly mesoventrad; plate-like flanges, and frontogenal and clypeogenal sutures forming com-

plex of anterior tentorial arms (frontogenal septa). Small, poorly visible, subantennal grooves sinuous, running almost horizontally between large frontogenal compact wart and palpifers, forming proximal articulation of palpi on stipes. Subocular grooves invisible. Frontal groove pronounced, short, present between antennae, joining vertexal medioantennal compact setose warts. Vertexal groove pattern reduced. Large, anterad directed, rounded elevation dominating anterior half of vertex, reaching interantennal area, laterally delineated by large membranous antennal sockets with corrugated, or granulous, surface near compact frontogenal setose wart. Epicranial groove (coronal groove) with vestigial stem. Antennal and ocular grooves accompanied by occipito-postgenal grooves, partly merging anteriorly; tangential to large occipital compact setal warts. Labrum vertically long, nearly triangular with rounded apex, freely hanging, sparsely setose. Mandibles long, curving mesad, weakly pigmented, located laterally along labrum. Lacinia broad, elongate, bearing few setae. Frontal setal warts absent; frontal interantennal warts absent due to anterad directed vertexal elevation. Pair of large, nearly triangular frontogenal compact setal warts present on posterior pregenae, directed obliquely or almost horizontally from frontogenal grooves, representing only visible setal warts on face. Triangular elevation on vertex with fused vertexal medioantennal compact setose warts anteriorly on head. Vertexal lateroantennal compact setal warts absent. Antennal sockets large; pair of small, rounded vertexal ocellar compact setose warts, and equally sized or slightly larger pair of vertexal medioocellar compact setose wart visible in middle of vertex. Pair of large, obliquely located, ovoid occipital compact setose warts dominating on posterior half of vertex. Pair of small postgenal compact setose warts visible between posterior section of ocular grooves and occipital compact setose warts. Maxillary palps filiform, covered by long setae; maxillary palp formula VI-IV-(II, V)-I-III. Scapes rounded, about half as long as head; pedicels 2/5ths as long as scapes. Two pairs pronotal warts present: pair of large dorsal, transverse ovoid warts, widely separated mesally by deep cleft; pair of small, rounded warts located deep laterally, visible in lateral view. Pair of mesoscutal, almost indiscernible, diffuse warts present in longitudinal lines running along entire mesoscutum. Pair of mesoscutellar warts forming ovoid, obliquely located, more strongly pigmented area with 5 to 6 setal alveoli. Large, rounded setose warts located proximally, above articulation of cervical sclerite on proepisternum, larger than setal wart on precoxale. Cervix with large, compact setal warts present mainly on membranous part, touching anterior arm of cervical sclerites. Lateral cervical sclerites forming narrow anterior arm articulating anteriorly to back of head with occipital condyle above posterior tentorial pits, fusing to posterior cervical sclerites. Posterior cervical sclerites forming narrow, elongated plates reaching prothoracic episternum, articulating with weakly sclerotized anteromedian band of prothoracic eusternum by thin, ventral intercervical sclerites. Legs with symmetrical claws; spur formula 2, 4, 2; forelegs with posteroapical spur 2 times longer than anteroapical spur; midleg anteroapical and anterosubapical spurs 1/4th as long as other spurs; hind leg apical spurs equally long; hind leg tibiae with comb of long hairs. Forewings: length 11.0 mm; membrane brown with light patches along crossveins; light dotted; Sc hypertrophied with crossvein *sc-r*; R1 confluent with, or recurrent into, R2 well before C; base of discoidal cell located proximally of mid-length of wing; forks I, II, III, IV, V present; crossveins *h*, *sc-r*, *s*, *r-m*, *m*, *m-cu*, *cu1*, *cu2* and *cu-a* present; crossvein *r* absent; postanal vein absent. Hind wings: R1 meeting R2; forks I, II, III, V present; fork I longer than fork II.

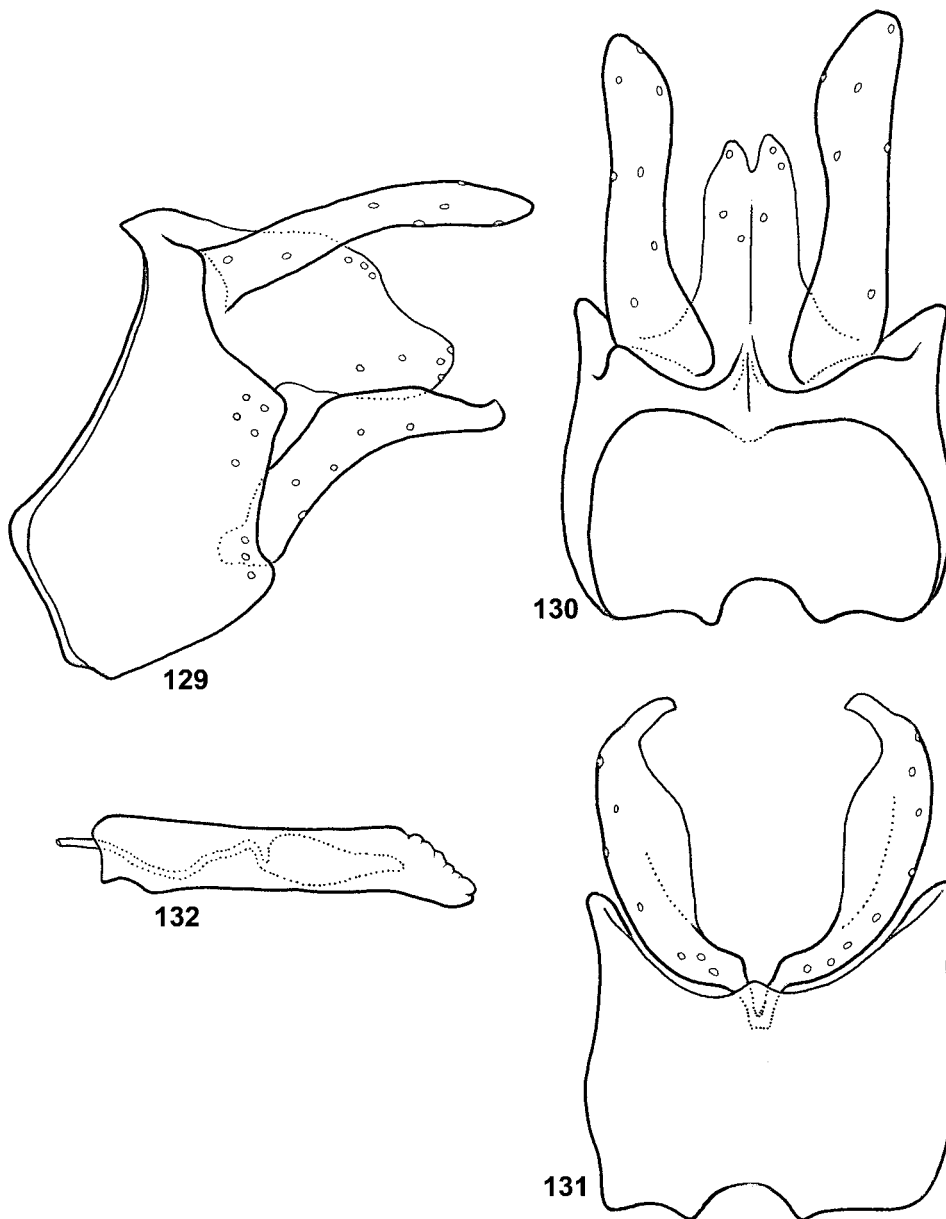
Male genitalia. Abdominal segment IX fused annularly, without longitudinal groove separating dorsal, mesal and ventral parts; tergum half as long as venter; anterior margins of segment IX ventrally convex in lateral view, more developed ventrally; posterior margins forming triangular plate of apical lobes; antecosta developed, more on anteroventral half, forming narrow marginal rim, equally thin on dorsal half, without conspicuous external groove of antecostal suture; tergum IX with narrow triangular mesal keel in dorsal view, forming continuation of sharp dorsal keel of segment X; with lateral, rounded projections, overhanging basis of preanal appendages; in dorsal view, tergite with rounded mesal lobe on anterior margin, acrotergite, and anterior margin of venter IX; spine row on posterolateral margins forming setal patches behind triangular apical lobe and on ventropleural region. Intersegmental depression between segment IX and segment X filled. Segment X about as long as gonocoxites, forming broad hood with blunt apex; more chitinized band running

from apex to base of gonocoxites on lower ventral submargins absent. Apicoventral setose lobes forming setose surfaces before and at apex. Apicodorsal setose lobes with few tiny setae above middle of segment X. Dorsal interlobular gap sharp and deeply triangular. Preanal appendages longer than segment X; almost parallel-sided, straight in lateral view; in dorsal view straight, with weak constriction at middle, narrowing apicad. Gonocoxites without harpago, broad on basal 2/3rds in lateral view; straight, with mesad directed apices in lateral view. Phallic apparatus straight; narrow in lateral view; broad in ventral view, with elongated, sclerotized ventral apical lobe; endotheca and phallicata membranous; phallotremal sclerites U-shaped in ventral view, with bifid apices; ejaculatory duct straight in lateral and ventral view.

Holotype male: VIETNAM: Quang Tri Province: Huong Hoa District, Huong Hoa Nature Reserve, near Cup Village, 400 m, loc. No. 92, centered at 16°56'15"N, 106°34'52"E, 7–10.xi.2007, at light [G. Csorba] — (OPC).

Distribution: Vietnam.

Etymology: *Csorbai*, named after the collector of the species, Gábor Csorba.



FIGURES 129–132. *Anisocentropus janus* Malicky & Chantaramongkol, male, from Vietnam: Dalat, Tanung Valley. 129 — genitalia, lateral; 130 — genitalia, dorsal; 131 — genitalia, ventral; 132 — phallus, lateral.

Anisocentropus (Anisomontropus) janus Malicky & Chantaramongkol

Anisocentropus (Anisomontropus) janus Malicky & Chantaramongkol in Malicky, 1994: 75, Figs 129–132

Type locality: Thailand.

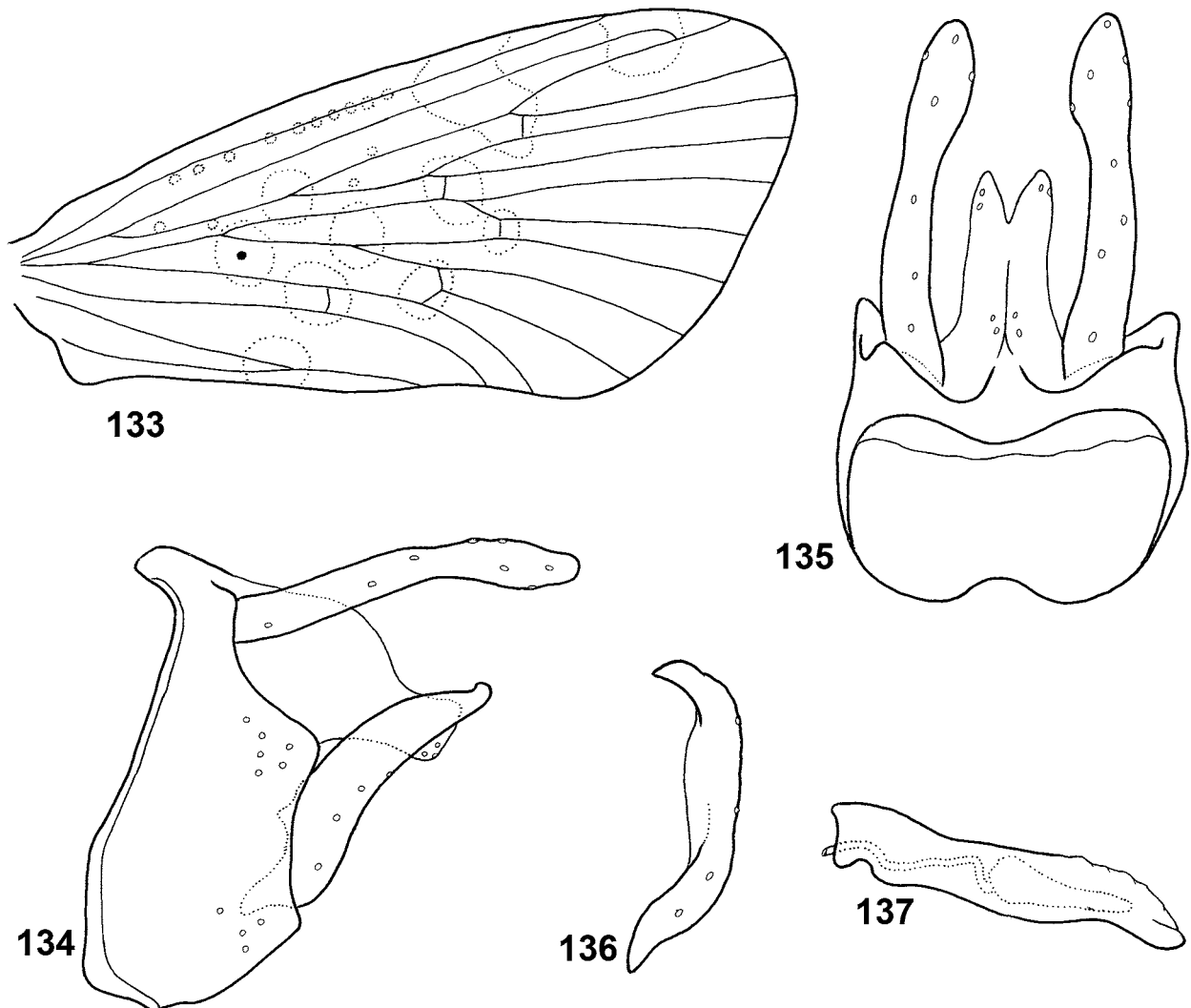
New Record. VIETNAM: Dalat: Tanung Valley, 17.ii.2007, light trap [G. Simay] – 1 male, 1 female (OPC); **Quang Tri Province:** Da Krong Nature Reserve, 2 km SE HQ, 16.v.2007 light trap, at forest stream [G. Csorba] – 1 male (OPC).

Anisocentropus (Anisomontropus) maculatus Ulmer

Anisocentropus (Anisomontropus) maculatus Ulmer, 1926: 72.

Type locality: China (Guangdong).

New Records. VIETNAM: Tamdao: 1400 m, 13.x.1986, small side stream in deep forested valley, sweep net [J. Oláh] – 1 male (OPC); **Bac Thai Province:** Quang Chu, 24–25.v.1987, sweep net along the upper part of the stream, sweep net [J. Oláh] – 2 males, 2 females (OPC).



FIGURES 133–137. *Anisocentropus thonmihn*, new species, holotype. 133 — right forewing; 134 — genitalia, lateral; 135 — genitalia, dorsal; 136 — gonocoxite, ventral; 137 — phallus, lateral.

Anisocentropus (Anisomontropus) thonmihn, new species

Figs 133–137

This species is large, greyish brown, with light patterned forewing membrane. The genitalia resemble those of *A. bungus*. *Anisocentropus thonmihn*, new species is separated from *A. bungus* in the genitalia by the more slender preanal appendages in dorsal view; and possessing triangular apical lobes on the posterior margins of segment IX. Another distinguishing character is the large maculae along each forewing crossveins and fork bases, and the presence of 2 irregular patches on the anterior margin of the forewings. The forewings of *Anisocentropus bungus* have no membrane pattern.

Male (in alcohol). Body large, brown; forewings with large, light maculae and patches. Head rectangular in dorsal and facial view, almost as long as broad. Ocelli absent. Tentorium is visible. Facial groove patterns with plate-like flange, or rim, connecting anterior tentorial pits. Theoretical line separating frons and clypeus forming oblique, dorsad continuation from anterior tentorial pits; almost horizontally merging with antennal grooves. Clypeogen vertical grooves located ventrally of anterior tentorial pits; short, running slightly mesoventrad; plate-like flanges, and frontogenal and clypeogenal sutures forming complex of anterior tentorial arms (frontogenal septa). Small subantennal grooves sinuous, running almost horizontally between large frontogenal compact wart and palpifers, forming proximal articulation of palpi on stipes. Subocular grooves invisible. Frontal groove pronounced, short, present between antennae, joining vertexal medioantennal compact setose warts. Vertexal groove pattern reduced. Large, anterad directed, rounded elevation dominating anterior half of vertex, reaching interantennal area, laterally delineated by large membranous antennal sockets with corrugated or granulous surface near frontogenal compact setose wart. Epicranial groove (coronal groove) with vestigial stem. Antennal and ocular grooves accompanied by occipito-postgenal grooves, partly merging anteriorly; tangential to large occipital compact setal warts. Labrum vertically long, subquadrangular, with rounded apex, freely hanging, sparsely setose. Mandibles long, turning mesad, weakly pigmented, located laterad along labrum. Lacinia broad elongate, bearing few setae. Frontal setal warts absent; frontal interantennal warts absent due to anterad directing elevation of vertex. Pair of large, nearly triangular frontogenal compact setal warts present on posterior pregenae, directed obliquely or almost horizontally from frontogenal grooves, representing only visible setal warts on face. Triangular elevation on vertex with fused vertexal medioantennal compact setose warts located anteriorly on head. Vertexal lateroantennal compact setal warts absent. Antennal sockets large. Pair of small, rounded vertexal ocellar compact setose warts, as well as equally large, or slightly larger pair of vertexal medioocellar compact setose warts visible centrally on vertex. Pair of large, obliquely located, ovoid occipital compact setose warts dominating on posterior half of vertex. Pair of small, postgenal compact warts visible between posterior section of ocular grooves and large occipital compact setose warts. Maxillary palps filiform, covered by long setae; maxillary palp formula VI-IV-(II,V)-I-III. Scapes rounded, about half as long as head; pedicels 2/5ths as long as scapes. Two pairs pronotal warts present: pair of large dorsal, ovoid, transversely elongated warts mesally widely separated by deep cleft; pair of small, rounded warts located deep laterally, visible in lateral view. Pair of mesoscutal warts almost indiscernible, arranged in pair of longitudinal lines running along mesoscutum. Pair of mesoscutellar warts forming round, weakly pigmented areas with 5 to 6 setal alveoli. Large, rounded setose warts located proximally, above articulation of cervical sclerite on proepisternum, larger than setal wart on precoxale. Large, compact setal warts present mainly on membranous part of cervix, touching anterior arm of cervical sclerites. Lateral cervical sclerites, forming narrow anterior arm articulating anteriorly to back of head with occipital condyle, above posterior tentorial pits; fused with posterior cervical sclerites. Posterior cervical sclerites forming narrow, elongated plates, reaching prothoracic episternum, articulating with weakly sclerotized anteromedian band of prothoracic eusternum by thin, ventral intercervical sclerites. Legs with symmetrical claws; spur formula 2, 4, 2; each foreleg with posteroapical spur 2 times longer than anteroapical spur; midleg anteroapical and anterosubapical spurs 1/4th as long as other spurs; hind leg apical spurs equally long. Forewings: length 12.0 mm; membrane brown, without pattern; Sc hypertrophied with crossvein *sc-r*, forming thick, strengthened longitu-

dinal vein; R1 confluent with, or recurrent into, R2 well before C; vestigial crossvein *r* visible at confluence of R1 and R2; base of discoidal cell located proximally of mid-length of wing; forks I, II, III, IV, V present; crossveins *h*, *sc-r*, *r*, *s*, *r-m*, *m*, *m-cu*, *cu1* and *cu2* present; crossvein *cu-a* absent; postanal vein absent. Hind wings: R1 meeting R2; forks I, II, III, V present; fork I longer than fork II.

Male genitalia. Abdominal segment IX fused annularly, without longitudinal groove separating dorsal, mesal and ventral parts; tergum shorter than venter; anterior margin of segment IX convex towards venter in lateral view, more developed ventrally; apical lobes triangular. Antecostae weakly developed, forming narrow, marginal rim, almost equally thin along margins, without conspicuous external groove of antecostal sutures; tergum IX with narrow triangular mesal keel in dorsal view, forming continuation of sharp dorsal keel of segment X, characterised by lateroapical rounded projections, overhanging partially base of preanal appendages; tergite with less pigmented band in dorsal view; acrotergite visible on anterior margin; spine row on postero-lateral margin forming setal patches of almost equal size behind apical lobes, below ventropleural region. Intersegmental depression between segment IX and segment X filled. Segment X slightly shorter than gonocoxites, forming broad hood with straight-cut apex; sclerotized band running from apex to base of gonocoxites on lower ventral sub margin less developed. Apicoventral setose lobes forming setose surfaces before and at apex. Apicodorsal setose lobes with few tiny setae above middle of segment X. Dorsal interlobular gap narrow, deeply triangular. Preanal appendages much longer than segment X; almost parallel-sided, arching on apical 1/3rd in lateral view, slender in dorsal view, with well developed constriction at middle, with clavate apices. Gonocoxites without harpago, slender, sinuous, with mesal broadening in ventral view; forming regular arch in lateral view. Phallic apparatus straight; with elongated, sclerotized apicoventral lobe; endotheca and phallicata membranous above apicoventral lobe. Phallosomal sclerites U-shaped in ventral view, with tapering apices. Ejaculatory duct sinuous in lateral view.

Holotype male: VIETNAM: Quang Tri Province, Huong Hoa District, Huong Hoa Nature Reserve, near Cup Village, 400m, loc. No. 92, centered at 16°56'15N 106°34'52E, 7–10.xi.2007, light [G. Csorba] — (OPC).

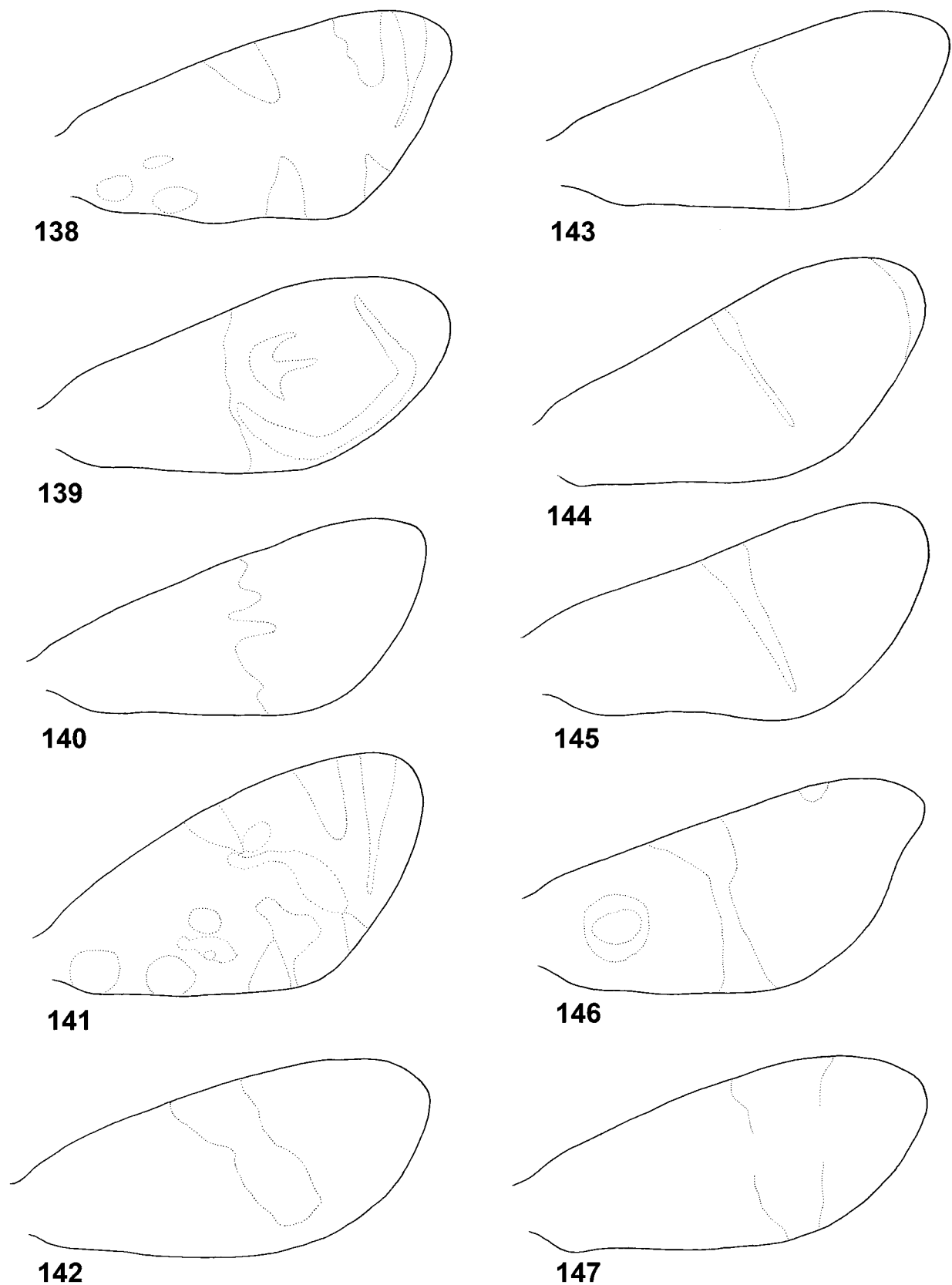
Distribution: Vietnam.

Etymology: *thonmihn*, after “thon mihn”, slender in Vietnamese, named after the slender preanal appendages.

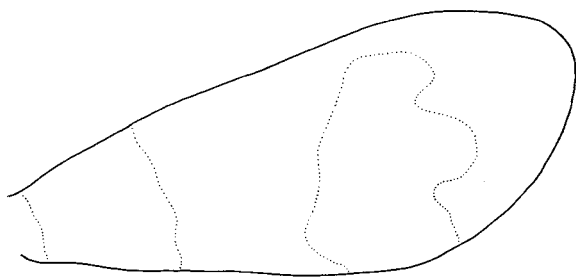
Remarks: The *Anisocentropus latifasciata* diagnostic species-group has a Gondwanan distribution, including Sri Lanka and India. The following 43 species belong to this group, all with unique forewing patterns (Fig. 138–159): *A. banghaasi* Ulmer, 1909, *A. bellus* Banks, 1931, *A. bicoloratus* (Martynov, 1914), *A. bipustulatus* Botosaneanu & DeVos, 2004, *A. brevipennis* (Ulmer, 1906), *A. corvinus* Neboiss, 1980, *A. cretosus* McLachlan, 1875, *A. croesus* McLachlan, 1875, *A. dilucidus* Botosaneanu & DeVos, 2004, *A. eungellus* Neboiss, 1980, *A. fijianus* Banks, 1936, *A. fridae*, new species, *A. fulgidus* Navás, 1933, *A. furcatus* (Banks, 1924), *A. gilvimacula* Botosaneanu & DeVos, 2004, *A. hannahae*, new species, *A. hoisat*, new species, *A. hyboma* Neboiss, 1986, *A. illustris* McLachlan, 1863, *A. immunis* McLachlan, 1863, *A. io* Kimmins, 1962, *A. kirramus* Neboiss, 1980, *A. krampus* Malicky, 1994, *A. latifascia* (Walker, 1852), *A. maclachlani* Ulmer, 1929, *A. magnificus* Ulmer, 1906, *A. maralus*, new species, *A. mjoebergi*, new species, *A. muricatus* Neboiss, 1980, *A. nitidus* Banks, 1937, *A. pictilis* Neboiss, 1986, *A. piepersi* McLachlan, 1875, *A. semiflavus* Banks, 1939, *A. sierramadrensis* Mey, 2003, *A. solomonis* Banks, 1939, *A. tapenan*, new species, *A. thinlin*, new species, *A. torulus* Neboiss, 1980, *A. triangulatus* Ulmer, 1907, *A. tristis* Ulmer, 1929, *A. valgus* Neboiss, 1980, *A. vanuensis*, new species, and *A. vitiensis*, new species.

There are 3 species of this diagnostic species-group recorded from outside Gondwana: *A. erichthonios* Malicky & Cheunbarn in Malicky *et al.* 2001 (Thailand), *A. golem* Malicky, 1994 (Brunei), and *A. malaisei*, new species (Myanmar).

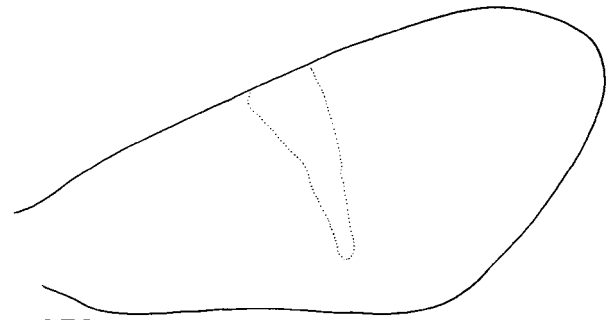
It seems that all the species described from the Afrotropical Region belong to this group as well. However, the genitalia of most of these species are poorly described. The Afrotropical species are: *A. brunneus* Jacquemart, 1966, *A. fischeri* Marlier, 1971, *A. usambarensis* Ulmer, 1908, *A. fulvus* Navás, 1934, *A. samuh*, new species, and *A. voeltzkowi* Ulmer, 1909.



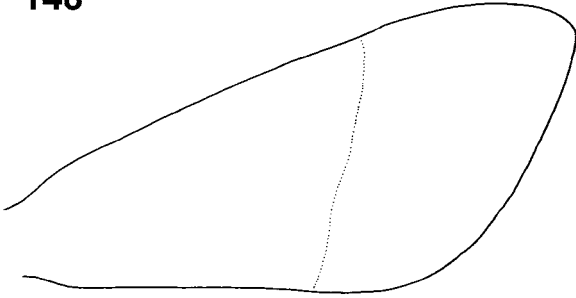
FIGURES 138–147. *Anisocentropus* species, right forewings, non-types. 138 — *A. banghaasi* Ulmer; 139 — *A. bellus* Banks; 140 — *A. bicoloratus* (Martynov); 141 — *A. bipustulatus* Botosaneanu & DeVos; 142 — *A. dilucidus* Botosaneanu & DeVos; 143 — *A. eungellus* Neboiss; 144 — *A. fulgidus* Navás; 145 — *A. illustris* McLachlan; 146 — *A. io* Kimmins; 147 — *A. kirramus* Malicky.



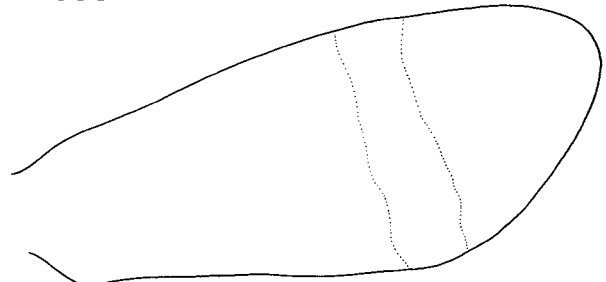
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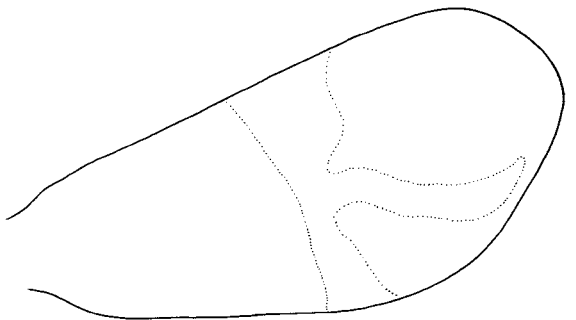
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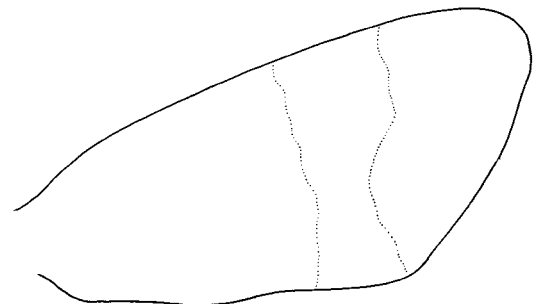
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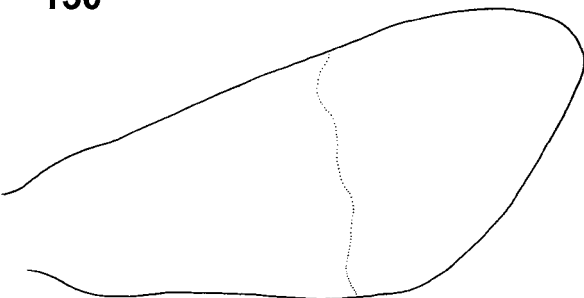
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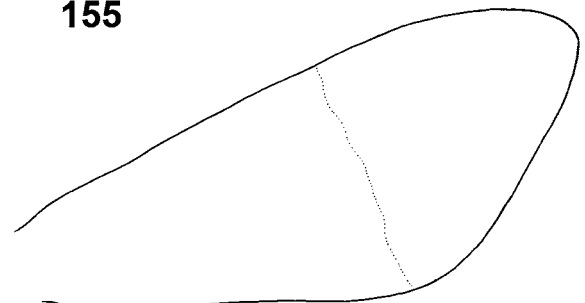
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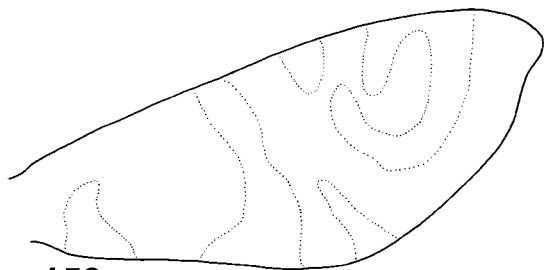
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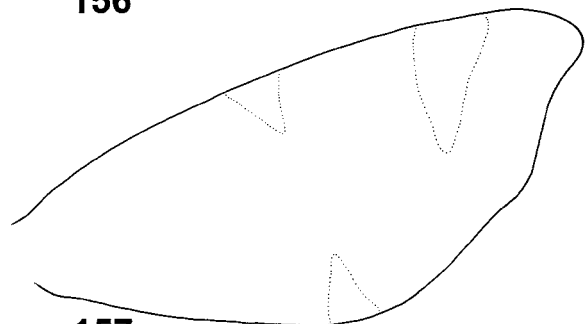
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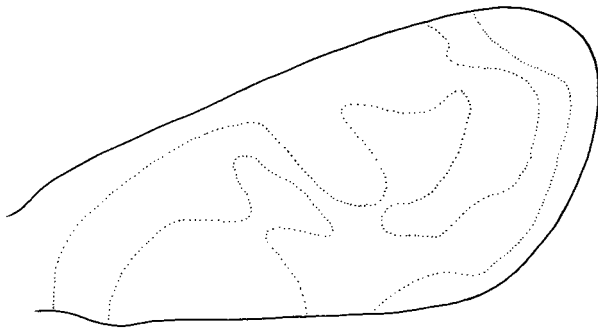


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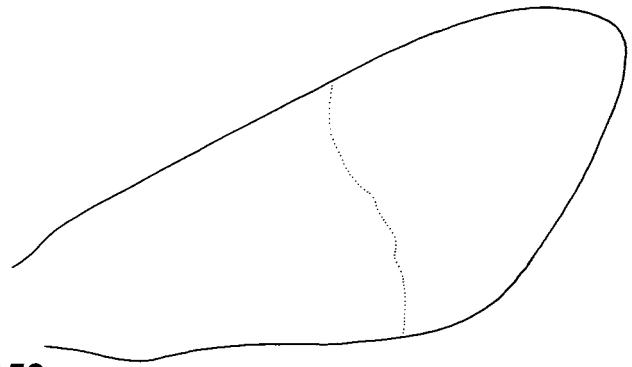


157

FIGURES 148–157. *Anisocentropus* species, right forewings, non-types. 148 — *A. krampus* Maicky; 149 — *A. latifascia* (Walker); 150 — *A. machlachlani* Ulmer; 151 — *A. muricatus* Neboiss; 152 — *A. pictilis* Neboiss; 153 — *A. piepersi* McLachlan; 154 — *A. semiflavus* Banks; 155 — *A. solomonis* Banks; 156 — *A. torulus* Neboiss; 157 — *A. triangulatus* Ulmer.



158



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FIGURES 158–159. *Anisocentropus* species, right forewings, non-types. 158 — *A. tristis* Ulmer; 159 — *A. valgus* Neboiss.

Molannidae Wallengren

Molannidae Wallengren, 1891: 116.

As in the Calamoceratidae and Leptoceridae, the mesoscutal setose warts form a pair of elongate areas of setae in diffuse setose warts elevated from the surface. The antenna in the species of this family are shorter compared to those in the other 2 families, and the 2 preapical spurs on each hind leg are located at mid-length of. The maxillary palps are 5-segmented, with the proximal segments sometimes modified and armed with scent organs in palpal lobes. The forewings lack discoidal and thyridial cells; the median cell is absent or present in hind wings, always absent in the forewings. The hind wing venation is frequently reduced. In the hind wings, the discoidal cell is absent, and the thyridial cell is present.

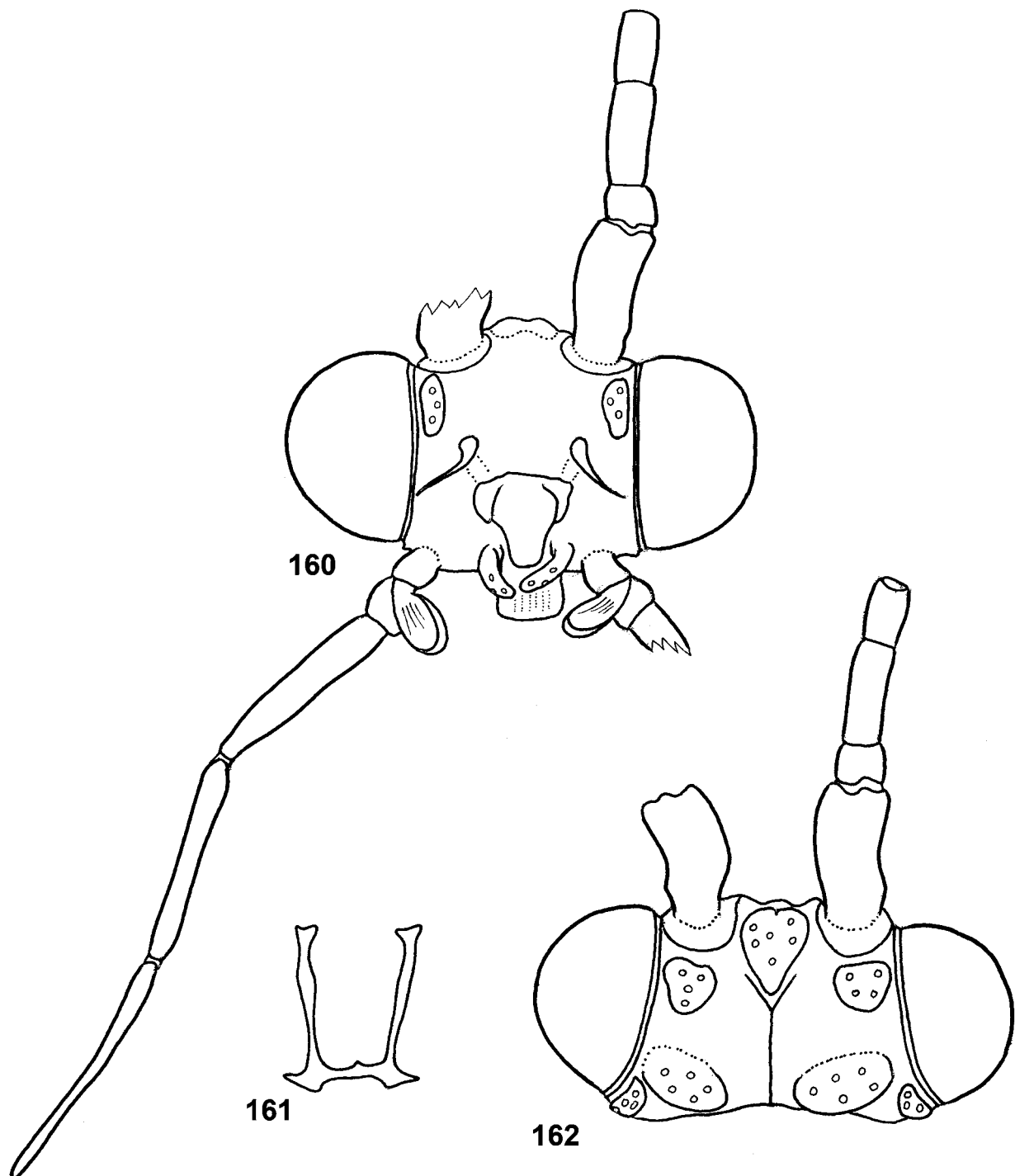
Molanna gamdaha, new species

Figs 160–167

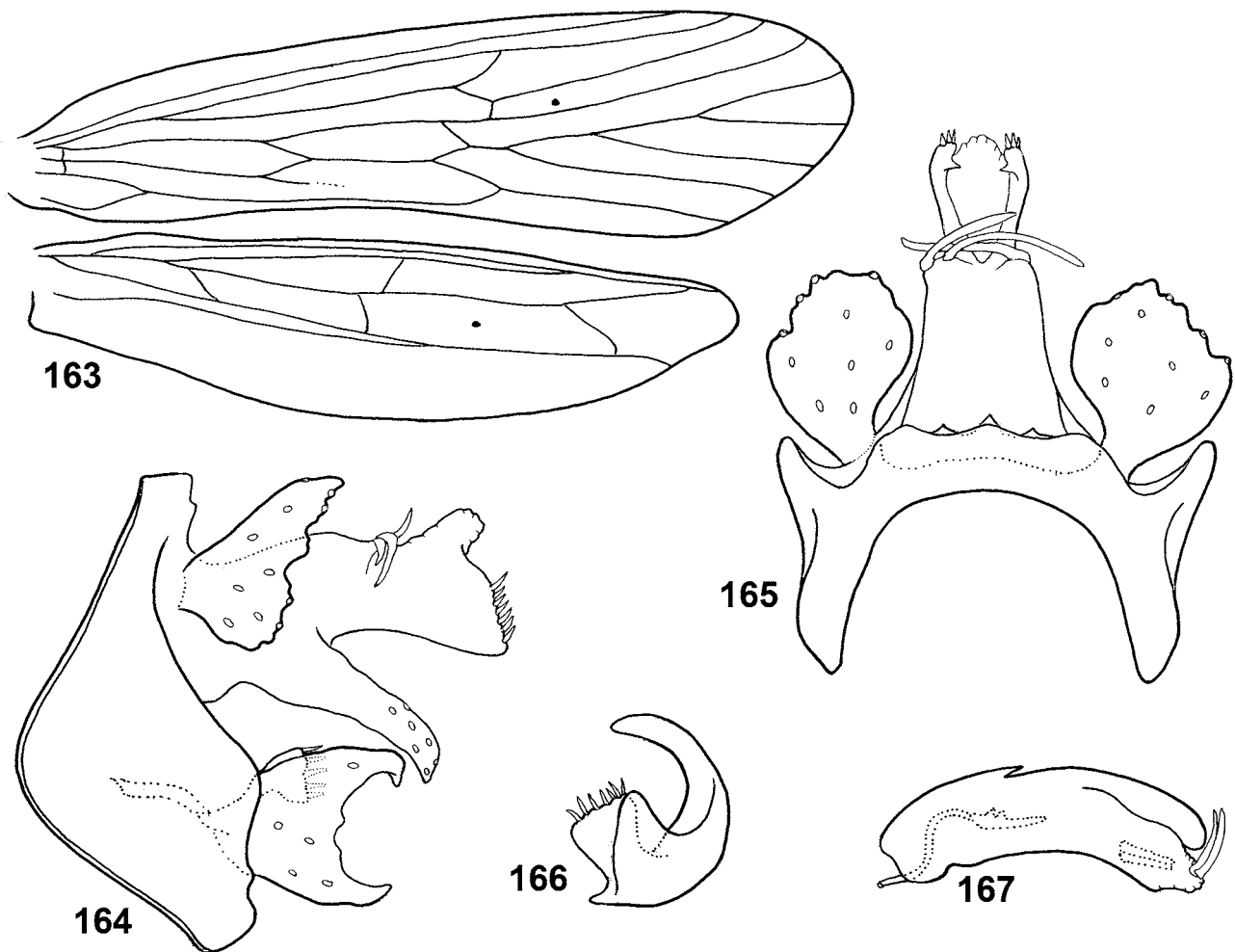
This species is similar to *M. crinita* Wiggins from India (Assam) and *M. oglamar* Malicky from Thailand. These 3 species are separated by having differently shaped trilobed coxopodites. The new species has 3 transverse, long and curved spines on the middle of segment X, conspicuous in dorsal view. The hind wing venation is reduced compared to in the other 2 species, as well as in most Oriental *Molanna* species. All Holarctic species have more complete hind wing venation.

Male (pinned, transferred to alcohol). Body medium-sized, brown; wings narrow, light brown, without patterns. Ocelli absent. Tentorium slender, without vestigial dorsal arm; posterior arms well developed, short, robust, ending in pair of large posterior tentorial pits; tentorial bridge separating anterior and posterior tentorial arms slender, with small anteromesal protuberance. Facial groove pattern almost entirely reduced; frontal area above anterior tentorial pits glabrous, without warts or setal areas, apparently covered by palpal lobe in resting position; frontogenal vertical grooves not visible. Clypeogenal vertical grooves located ventrally of anterior tentorial pits, short, running obliquely laterad, not reaching subgenal process; subantennal groove not observed; subocular groove indiscernible, merging to anterior clypeogenal grooves. Vertex almost 2 times wider than long; vertexal groove pattern simple; epicranial grooves complete, with frontal branch almost in middle of vertex, coronal groove well developed; postocipital groove encircling *foramen magnum*, or occipital foramen, forming pair of postocipital setal lobes. Labrum elongate, pyriform, without setae. Mandibles membranous, almost indiscernible. Lacinia forming long, narrow, mesad-curving, setose lobe. Pair of large,

fused, heart-shaped frontal interantennal compact setal warts occupying middle of anterior half of vertex, delineated posteriorly by braches of postfrontal grooves, anterior arms of epicranial groove, or ecdysial cleavage line. Longitudinally elongate, narrow pair of frontogenal compact setal warts present on pregenae from antennal sockets, along ocular groove, nearly to level of anterior tentorial pits. Pair of enlarged, irregularly rounded, vertexal lateroantennal compact setal warts present on anterior half of vertex, anterolaterally more delineated and visible by skeletal wart ring; postero-mesal border weakly delineated. Vertexal mediantennal compact setose warts absent, replaced by frontal medioantennal compact setal warts. Occipital compact setose warts forming largest setal structure on vertex, more strongly delineated posteromesally than anterolaterally.



FIGURES 160–162. *Molanna gamdaha*, new species, holotype. 160 — head, frontal; 161 — tentorium, dorsal; 162 — head, dorsal.



FIGURES 163–167. *Molanna gamdaha*, new species, holotype. 163 — right forewing; 164 — genitalia, lateral; 165 — genitalia, dorsal; 166 — gonocoxite, ventral; 167 — phallus, lateral.

Vertically elongated postgenal compact warts curving along posterior section of ocular grooves; narrow strip located near ocular groove. Postgenal surface glabrous. Maxillary palp formula (I, II)-(III, IV, V); first 2 segments very short, about 1/5th as long as others; spoon-shaped palpal lobe located dorsally at distal end of segment I; dorsal concavity filled by setal brush; in resting position lobes covering glabrous frontal area. Antennal scape shorter than head; pedicels much shorter than first segment of flagellum. One pair pronotal warts present, transverse elongate, oviform, well separated mesally. One pair elongated mesoscutal diffuse setose warts present, represented by only few alveoli, arranged longitudinally. Mesoscutellar surface sparsely covered by diffuse setal warts with few setal alveoli. Each proepisternum with ovoid setose wart about as large as precoxal warts, with thin, irregularly bending setae, and smaller alveoli. Large compact setal wart present on anterior section of cervical sclerite; apparently representing independent sclerotized surface on membranous part of neck touching anterior cervical sclerite. Lateral cervical sclerites form narrow anterior arm articulating anteriorly to back of head with occipital condyle above posterior tentorial pits; fused to posterior cervical sclerites. Posterior cervical sclerite large, triangular, broadening posterad, reaching prothoracic episternum at posterior angle, articulating to weakly sclerotized anteromedian band of prothoracic eusternum by ventral intercervical sclerites. Ventral intercervical sclerites fused to posterior sclerite forming triangular plate, articulating to eusternum at ventral angle. Pattern of cervical sclerite complex, darkly pigmented, clearly visible on pale membranous background. Legs with symmetrical claws; spur formula 2, 4, 4; spurs almost equal; legs covered by thin, short, light brown clothing vestitural setae interspersed by erect, dark,

spine-like individual setae. Forewings: 9.5 mm; membrane light brown, without visible pattern, termen convex. Venation typical for the genus; Sc and R1 separate before C; R2 very short, joining R1 almost at middle of wing; R4+5 linked to stem of M by crossvein *r-m*; stem of M1, M2 and M3+4 anatomized on Cu1b by short distance. Hind wings: venation modified: anal region enlarged, without veins; dark fold and densely packed band of setae absent.

Male genitalia. Abdominal segment IX fused annularly, sub triangular in lateral view; tergum IX almost as long as venter; anterior margins triangular; posterior margins each with rounded apical lobe below basis of gonocoxites; antecosta on anterior margins narrow, forming strongly pigmented marginal rim running evenly along anterior margins; spine row absent on posterior margins of segment IX, setose areas absent from apicopleural and apicoventral regions. Intersegmental depression between segment IX and segment X deep, rectangular. Segment X with dorsal and ventral branch in lateral view; each divided into 2 lateral lobes; dorsal branch fused basally with sclerotized dorsum; distal end of sclerotized dorsum with 3 large spines; 2 from right corner bending across to left side; 1 from left corner turning across to right side; 1 paratype with opposite configuration; distal mesal half of sclerotized dorsal branch not directly fused with sclerotized dorsum, instead filled by median membranous lobe. Apicoventral setose lobes represented by ventral branches; dorsal margins with thin setae. Apicodorsal setose lobes forming dorsal branch, terminal vertical margin armed with 8 to 10 short, stout setae; apex of segment X not excavated; dorsal interlobular gap filled by median membranous lobe. Preanal appendages vertically elongate in lateral view; rounded in dorsal view, with serrate apical margin. Coxopodites with 3 branches: primary branches large, curving mesad; secondary branches located ventrally, directed apicad, apical surface of basimedial branch armed with short, stout setae. Phallic apparatus having sclerotized phallosome with dorsal lobes and membranous apical endotheca, and retracted phallicata; pair of stout, long and dorsad erect spines embedded at end of membranous part, with pair of smaller spines located inside invaginated membranous part. Sclerotized phallosomal sclerites retracted basad, continuing into ejaculatory duct.

Holotype male: MYANMAR: Kambaiti: 2000 m, 16.v.1934 [R. Malaise], Malaise B.M. 1938-258 — (NHML).

Paratypes: same data as holotype, except 7000 ft, 7–8.vi.1934, Malaise B.M. 1938-258 — 3 males (NHML).

Distribution: Myanmar.

Etymology: *Gamdaha*, “gamdah” in Sanskrit, meaning rhinoceros, named after the rhinoceros shape of the phallic apparatus apex due to the presence of a pair of dorsad directed, erect, strong spines.

Remarks: The cephalic and thoracic groove and setal wart patterns were examined on the cleared paratype in glycerine, not on the holotype. The spoon-shaped palpal lobe dorsally at the distal end of the first segment of the maxillary palps, with a dorsal concavity filled by a setal brush also being present in *Molanna angustata* Curtis (Crichton 1957), which in living specimens are visible when bent ventrally; the setae are probably scent organs.

Odontoceridae Wallengren

Odontoceridae Wallengren, 1891: 12 [listed as a family without description].

Odontoceridae Ulmer, 1907c: 11,122 [first description of the family].

The forewing postanal vein (*sensu* Schmid 1998) forms a synapomorphy supporting the monophyly of Philorheithridae and Odontoceridae (Weaver *et al.* [submitted]). Sexual dimorphism is frequent in the wing venation of several species in the family. A sclerotized and microtrichous forewing anal lobe is frequently present on the base. The wing venation is variously reduced compared to the Philorheithridae. In the forewings, the dis-

coidal cell is present and closed, and the median cell is open or absent in both sexes; the thyridial cell is present in females, but lacking in the males of the 2 genera *Marilia* and *Psilotreta*, and in *Pseudogoera* since the M stem is missing. The extinct species *Electrocerum pedestre* Ulmer from Baltic Amber, and extant members of the genera *Barypenthus* Burmeister, *Namamyia* Banks, *Perissoneura* McLachlan, *Barynema* Banks, *Parthina* Denning, *Nerophilus* Banks, *Pseudogoera* Carpenter, *Lannapsyche* Malicky, *Phraepsyche* Malicky & Chantaramongkol, and *Anastomoneura* Huamantincó & Nessimian all have closed thyridial cells in the male forewings. Reduction of the median vein occurs otherwise only in the Molannidae and in the Beraeidae. Mesoscutellar setal warts are usually single, large, ovoid and sparsely covered with setae, but in *Barypenthus* they are paired and small. The apicomeral nodule on the first maxillary palp segments is usually absent, but may be present in some taxa, like in species within *Lannapsyche*.

***Marilia* Müller**

Marilia Müller, 1880: 127. Type species: *Marilia major* Müller (subsequent selection by Mosely & Kimmins 1953: 165).
Type country: Brazil.

This is a widespread genus known from the Oriental, Australasian, Nearctic and Neotropical Regions. The male eyes are variously large, and there is a high degree of setal reduction in genitalic segments IX and X. The body of these segments is glabrous. The posterior spine row, and the dorsopleural or ventropleural setal surfaces are reduced on segment IX. The apicoventral and apicodorsal setose areas on segment X are weakly developed and represented only by few setae. Many species have similar male genitalia, and it is difficult to differentiate all species by examining the phallic apparatus alone. Flint (1983, 1991) and Bueno-Soria & Rojas-Ascencio (2004) found diagnostic differences in the suture pattern on segment IX in the Neotropical species, but this character seems less diverse among Oriental species. The cephalic setal wart pattern and genital characters are in combination important characters for separating species from this region. Important characters include (1) the shape of the lateroapical, roof-like, corner of tergum IX, (2) the groove pattern on segment IX, and (3) the longitudinal ridge pattern on segment X. A particular feature of the species in the genus *Marilia* is the large eye size, which resulted in specific modifications of the cephalic setal wart pattern. The dorsal setal wart pattern on the head is usually differently modified in different species, as is the facial setal wart pattern. Besides the cephalic groove and setal wart pattern, body colour and wing characters are also important for separating species. Table 1 summarizes distinguishing characters of the 8 *Marilia* species examined in this work. The characters used in the matrix are explained below.

General colour — This character represents appearances of a general body colour or a unique colour when present at particular body parts. For instance, “whitish” in *M. tuyetmira* means that this species has a white abdomen and setal warts, as well as whitish hyaline wings.

Foreleg tibia/tarsus colour — Four species out of the 8 species have dark foreleg tibia and tarsus.

Wing membrane pattern — All species examined have wing membrane without pattern except *M. malickyi*, new species that has light spotted forewing membrane and hind wings with anterior costal band. Other species, like *M. tuyetmira*, new species, may have dotted forewings due to presence of small groups of darker setae.

Forewing termen — Species with dark foreleg tibia/tarsus and smaller eye/wider vertex have concave termen.

Basal hind wing brush — Some species have hind wings with a long basal brush originating from the marginal surface of the small anal costal lobe, near the wing base. The setae are closely set and about equally long. Similar brushes occur in the Australian *Marilia bola* Mosely and *Marilia aenigmata* Neboiss, and the Neotropical *Marilia crea* Mosely and *Marilia major* Müller. The hind wing brushes of *Phylloicus* species (Prather 2003) and *Banyalarga* species (Prather 2004) arise from the dorsum of the third axillary sclerite, and

are therefore not homolog with those of the costal lobe of the hind wings. The species that are examined for this work have various degrees of brush complexity, from absent to dense brushes enclosed in semi membranous sleeve.

Maxillary palp formula — There are differences among the examined species in the segmental ratio of the maxillary palp. In most species the first maxillary palp segment is the longest.

Interocular distance — The distance between the compound eyes on the vertex is probably determined by the size of the eyes. Eyes are mainly enlarged dorsally on vertex, and less in facial plane on the frons or clypeus. Intraspecific variation in the interocular distance has not previously been recorded, and observed variation in the interocular distance in the widespread *Marilia malickyi*, new species is therefore interesting.

Modified setal warts — The modification in size and shape of the vertexal setal warts is probably induced by the limiting space on the vertexal surface due to variation in eye size. The following shapes are observed: (1) compressed, longitudinally elongate; (2) small, rounded; (3) fused, with preserved vestigial septum, i.e. remnant of the rims on the fused part of the skeletal rings of 2 original warts; (4) complete fusion, with no rims of the skeletal rings.

Postoccipital setal lobe — A pair of triangular postoccipital setal lobes is present behind the occipital compact setal warts, in the deep triangular cleft or fissure, delineated by the postoccipital grooves. Similar setose lobes are observed in the genus *Ganonema*. Postoccipital setal lobes are also present in several Hydroptilidae groups, but these are possibly not homolog structures, and might have originated from the occipit (Oláh & Johanson 2007). Postoccipital setal lobes are variously covered with setae, sense tubercles or sense pits.

Vertexal tubercle — A single pair of vertexal tubercle, sensory papillae or *sensilla basiconicae* is observed in genus *Marilia*. These sense tubercles, not previously studied in Trichoptera, are located along the posterior end of the coronal groove, between the occipital compact setal warts. The wall of these small peg-like or conical tubercles, or short, rod-like processes, appears thick and strongly sclerotized. They have possibly tactile function.

Lateroapical corner on tergum IX — The sclerotized lateroapical region of tergum IX forms variously shaped plates overhanging the articulation of the preanal appendages. The shape of this area is an important diagnostic character for many *Marilia* species, and is present in all examined species, except *M. enikiana*, new species.

Groove pattern on segment IX — The true antecosta is the anterior submarginal, or marginal, ridge on the inner surface of segment IX. A strong ridge, or rim system, can include 3 components: (1) the primary intersegmental folds accompanied on the surface by the antecostal suture, i.e. the external groove of antecosta; (2) the dorsal and ventral longitudinal grooves attached to antecosta, and may represent seamed pleurotergal and pleurosternal lines; (3) the sclerotized sutures, or lines, on the posterior margins of segment IX, which might represent the vestigial antecosta and sutures of segment X. The skeletal reinforcement, or brace pattern, described by Flint (1983, 1991), is basically formed by similar components. In that system the anterior marginal or submarginal brace is the true antecosta; the dorsal and ventral brace represent the pleurotergal and pleurosternal lines; and the posterior marginal, or submarginal, brace on segment IX, is possibly the antecosta of segment X. Following this interpretation, the dorsal suture described by Bueno-Soria & Rojas-Ascencio (2004) being present on the apicodorsal margin of segment IX along the boundary of segments IX and X, is the dorsolateral marginal suture of segment IX. The suture appears to be common in Mexican and Central American species of this genus, although we have not detected it in any of the herein examined Oriental species.

Ridge pattern on segment X — Various developed longitudinal ridges may be present on segment X. In *Marilia* species segment X is usually less sclerotized and the ridge system is less visible. A specific ridge pattern on segment X is found to be stable, and includes: (1) a single, or double, mesal longitudinal ridge running along dorsum from the basal area of segment X to apex, where it fuses or divides by the dorsal interlobular gap, as visible in dorsal view; (2) a pair of lateral, longitudinal ridges may be present along the marginal ridge

of the apicolateral depressions; (3) the marginal ridge of the depression or concavity usually forms an oblique, dark line running from anterodorsal to posteroventral part of segment, as seen in lateral view.

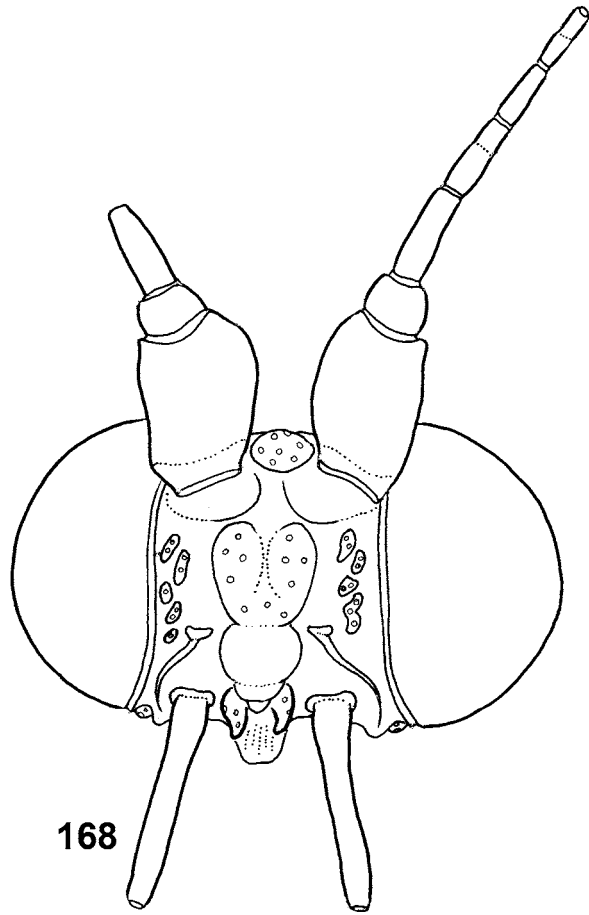
Coxopodites — The size, shape and setal cover of the coxopodites are important diagnostic characters. Variation in the examination plane can erroneously indicate different forms, and making comparison of species unreliable.

***Marilia enikiana*, new species**

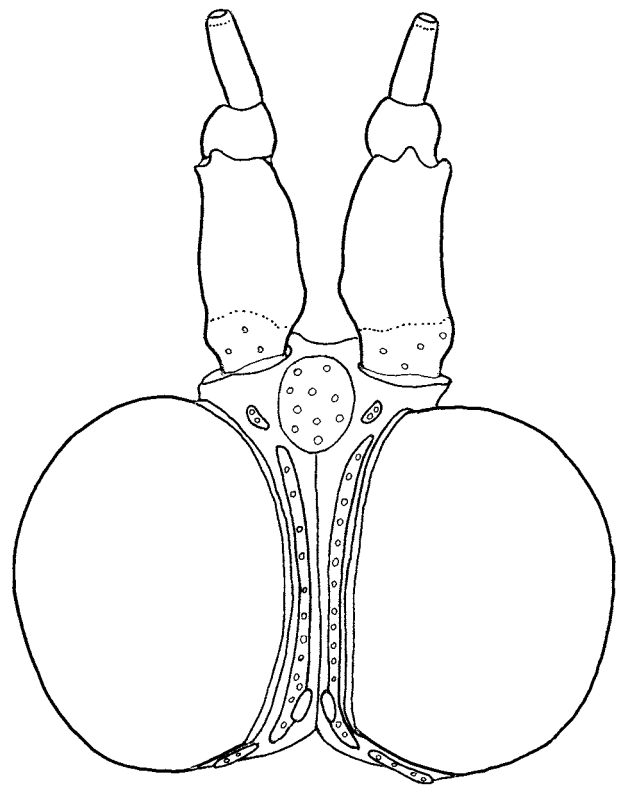
Figs 168–177

This small-sized and light-coloured species is similar to *Marilia aerope* Malicky & Chantaramongkol from Thailand. It is easily discriminated from *M. aerope* in the genitalia, by having longer segment IX; more slender and filiform preanal appendages; and by the much broader and trilobed segment X seen in dorsal view. This species has a modified forewing and hind wing venation. The forewings vein M1+2 is confluent with R4+5 and R5 for a short distance, branching from R5 beyond the nygma. The hind wings vein R2+3 is separate for a very short distance and merges with R1 at the wing middle, like a short crossvein. The cephalic setal warts are strongly modified. The vertexal medioantennal compact setal warts are completely fused, without a vestigial septum of merged, thickened rim of the skeletal ring encircling the isolated setal theca or alveoli. This large, medioantennal compact setal wart dominates on the anterior part of the constricted vertex. The vertexal, lateroantennal compact setal warts are reduced to a very small setose area. Another unique character is the extremely long occipital compact setal warts.

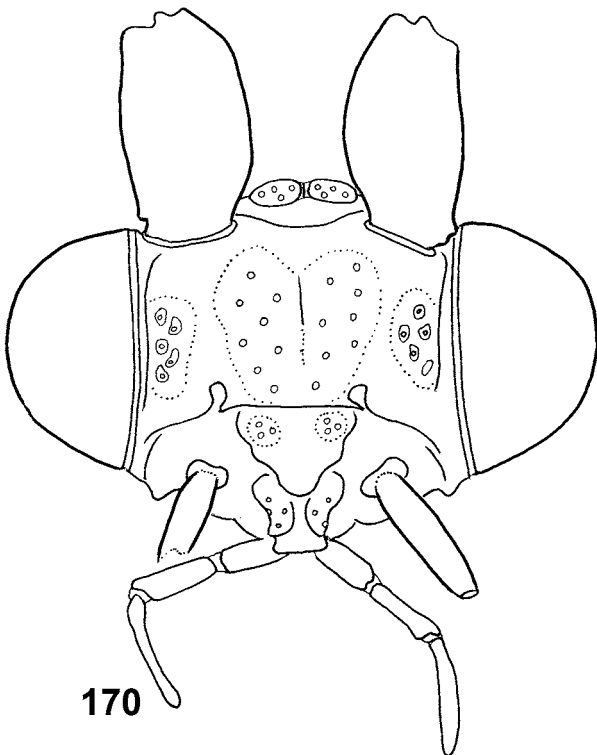
Male (in alcohol). Body small, brown; legs, antennae and palps light brown, almost yellowish; wings unicoloured light brown without pattern. Eyes black; extremely large; vertex constricted to narrow strip; interocular distance 1/5th the eye width, almost 5 times longer than wide. Ocelli absent. Tentorium not examined. Facial groove pattern modified, frons dominated by single, nearly quadrangular or heart-shaped, large compact setose wart and enlarged antennal sockets. Anterior remnant of frontal groove (facial arms) branching from coronal groove, visible at ventral margin of antennal sockets. Frontogenal vertical groove not visible. Clypeogenal vertical grooves located ventrally of anterior tentorial pits; long, running obliquely laterad, reaching subgenal process. Subantennal groove running vertically in narrow strip between ocellar groove and frontogenal compact setose wart. Subocular groove merging to anterior clypeogenal grooves. Vertexal groove pattern simple, constricted to narrow stripe; coronal groove forming straight line in middle of vertexal stripe; postoccipital groove encircling foramen magnum, or occipital foramen. Labrum small, short, without setal warts, with movable anterior part, freely hanging. Mandibles almost indiscernible on uncleared head; lacinia broad. Central frontal setal warts large, compact, partially fused, heart-shaped on face beside elongate, narrow pair of frontogenal fragmented setal warts running from antennal sockets, along subantennal groove of pregenae, anteriorly narrowing. Narrow stripe of vertex with pair of small, elongate, vertexal lateroantennal compact setal warts. Pair of vertexal mediantennal compact setose warts fused, forming large area of ovoid setose wart behind interantennal area; without remnant septum of vestigial compressed rims of fused skeletal rings. Occipital compact setose warts well developed, modified into pair of narrow strips running along entire length of vertexal stripes and separated by coronal grooves. Pair of sense tubercles, or sensilla basiconicae, present, slightly longitudinally elongate along end of coronal grooves, surrounded by occipital warts. Vertically elongated postgenal compact warts curving along posterior section of ocular grooves; narrow strip pressed to ocular grooves. Postgenal surface glabrous, postgenal surface hidden by eyes. Maxillary palps darker than legs and antennae; maxillary palp formula II-IV-III-V-I; each basal segment without setose subapicomeresal nodule. Each scape slightly shorter than head. Each pedicel shorter than first segment of each antennal flagella. One pair pronotal warts present, transversely elongated, located on posterior 1/3rd of pronotum, almost tangential on dorsum, mesally broad, narrowing laterally. Pair of mesal, almost fused, broad bands of mesoscutal diffuse setose warts present; longitudinally elongate, covering almost entire dorsal surface of mesoscutum; separated



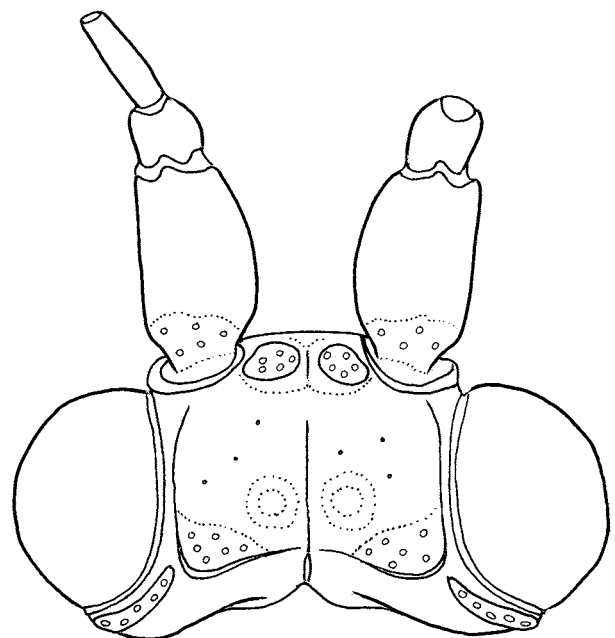
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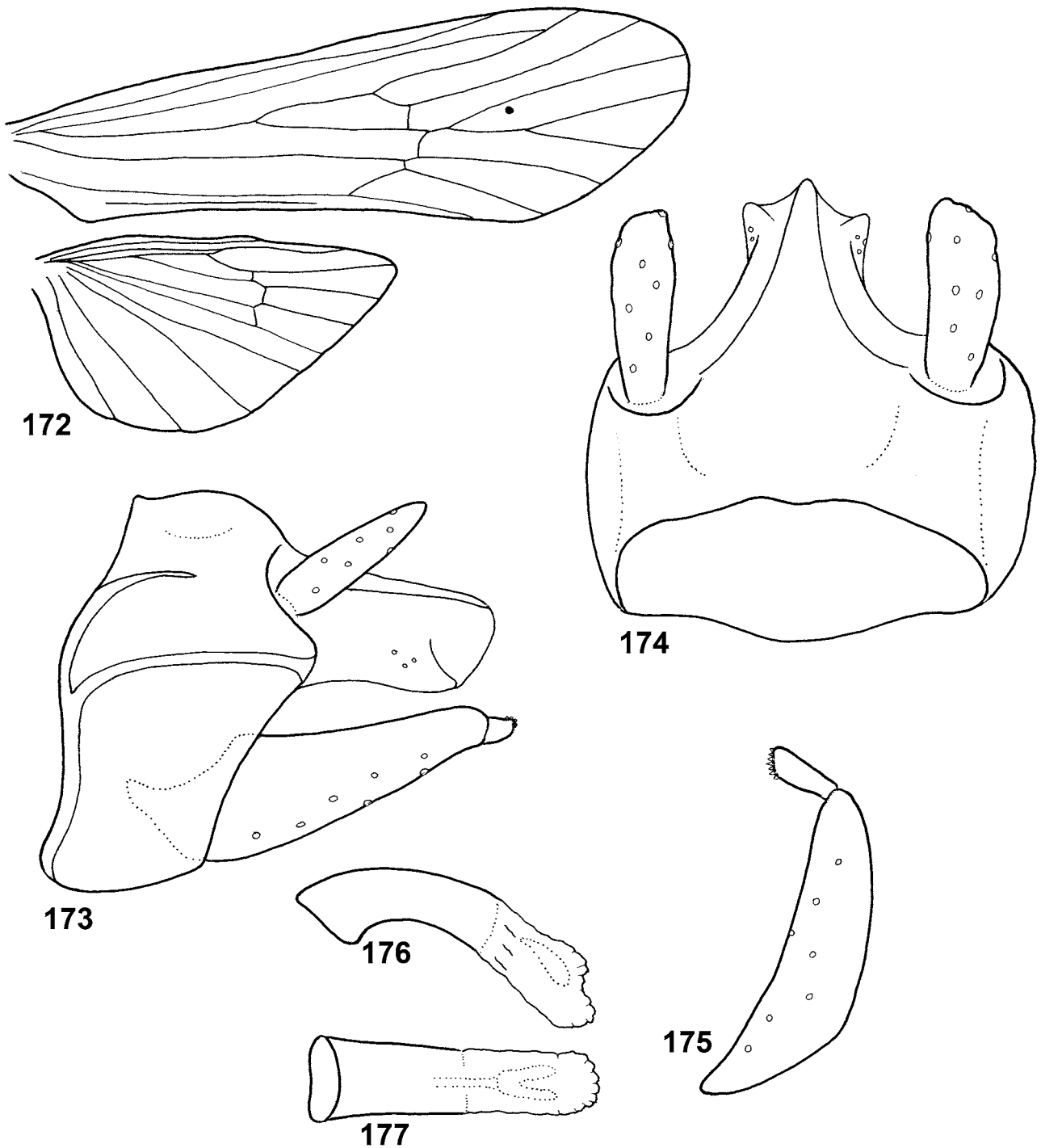


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FIGURES 168–171. *Marilia enikiana*, new species, holotype and allotype. 168 — male head, frontal; 169 — male head, dorsal; 170 — female head, frontal; 171 — female head, dorsal.



FIGURES 172–177. *Marilia enikiana*, new species, holotype. 172 — right wings; 173 — genitalia, lateral; 174 — genitalia, dorsal; 175 — gonocoxite, ventral; 176 — phallus, lateral; 177 — phallus, ventral.

by median notal groove; mesal half dark brown, touching at mesal notal groove, forming dark mesal bands being broader on posterior 1/3rd; lateral parts lighter. Almost entire surface of mesoscutellar area covered by diffuse setal warts separated by median notal groove. Each proepisternum with small-sized, ovoid setose wart, being much smaller than setose wart on precoxale. Large, compact, setal wart present anteriorly on cervical sclerites; apparently forming sclerotized surface on membranous part of neck, touching only anterior cervical sclerite. Lateral cervical sclerites forming narrow anterior arm articulating anteriorly to back of head with

occipital condyle above posterior tentorial pits, fused to posterior cervical sclerites; posterior cervical sclerite forming posterad broadening plate reaching prothoracic episternum, articulating to weakly sclerotized antero-medial band of prothoracic eusternum by ventral intercervical sclerites; structural pattern of cervical sclerite complex, dark, clearly visible on pale membranous neck. Legs claws symmetrical; spur formula 2, 4, 4. Foreleg spurs equally large; midleg posterior subapical spur half as long as anterior subapical spur; midleg posteroapical spur 1/4th as long as anteroapical spur; hind leg posteroapical spur 2 times longer than other spurs. Forewings: length 6.5 mm; membrane light brown without pattern; termen convex; R1 confluent with R2 shortly before C; base of discoidal cell located proximally of mid-length of wing; fork I longer than fork II; forks III-V absent; fork I sessile, fork II short petiolate, almost sessile; M1+2 short, merges with R5 after nygma. Hind wings: R1 meeting C subapically; R2 very short; fork I almost 2 times longer than fork II.

Male genitalia. Abdominal segment IX fused annularly, with 2 longitudinal grooves; most pronounced groove separating ventral and dorsal half in lateral view, running to end of apical lobe; less pronounced groove running to base of preanal appendages; tergum IX as long as venter; anterior margins straight, vertical, slightly convex at middle; apical lobes subtriangular, excised at preanal appendages; lateroapical corners of tergum IX not forming roof plate overhanging articulation of preanal appendages. Antecostae well developed, forming dark, marginal rims connected to broader longitudinal grooves; spine row absent on posterior margins of segment IX; setose areas absent on apicopleural and apicoventral areas. Intersegmental depression between segment IX and segment X gently sloping. Segment X weakly pigmented, forming quadrangular plate, as long as gonocoxites in lateral view; central ridge long, triangular in dorsal view, running to end of segment, accompanied by 2 small lateral lobes producing trilobed apex. Apicoventral setose lobes forming small setose surfaces behind lateral lobes. Apicodorsal setose area not discernible. Apex of segment X filled; dorsal interlobular gap absent. Preanal appendages long, filiform in lateral view; robust, parallel-sided, nearly truncate in dorsal view. Each coxopodite and harpago together as long as segment X; coxopodites straight, narrowing apicad in lateral and ventral view; harpagones small, narrow, slightly clavate in ventral view. Phallic apparatus with basal part strongly curved ventrad; straight at apical half in lateral view. Sclerotized phallosoma not clearly outlined. Endotheca and phallicata indiscernible. Small, elongated phallosomal sclerite present at beginning of phallicata; U-shaped in ventral view.

Holotype male: LAOS PDR: **Luang Namtha Prov.:** Nam Ha NBCA, Lakkhammai Village, Nam Leung stream, 749 m, UTM 47Q0744602, 2339873, 30.iv.2005, light trap, loc 29 [N. Jönsson, T. Malm & B. Viklund] – (NRM).

Paratypes: same data as holotype – 17 males, 1 female (NRM). **Luang Namtha Prov.:** Nam Ha NBCA, Nam Gngang stream, 300 m upstr. Namngnen Village, 558 m, UTM 47Q0746256, 2321311, 29.iv.–1.v.2005, Malaise trap, loc 24 [N. Jönsson, T. Malm & B. Viklund] – 1 male (NRM); Namming stream, 300 m upstr. Namming Village, 353 m, UTM 48Q0205691, 2173925, 27.iv.–3.v.2005, Malaise trap, loc 13 [N. Jönsson, T. Malm & B. Viklund] – 1 male paratype (OPC). **Vientiane Prov.:** Vang Vieng, Nam Xong River, upstream bamboo footbridge, 363 m, UTM 48Q0223506, 2115465, 26.iv.2005, light trap, loc 10 [N. Jönsson, T. Malm & B. Viklund] – 1 male (NRM).

Distribution: Laos.

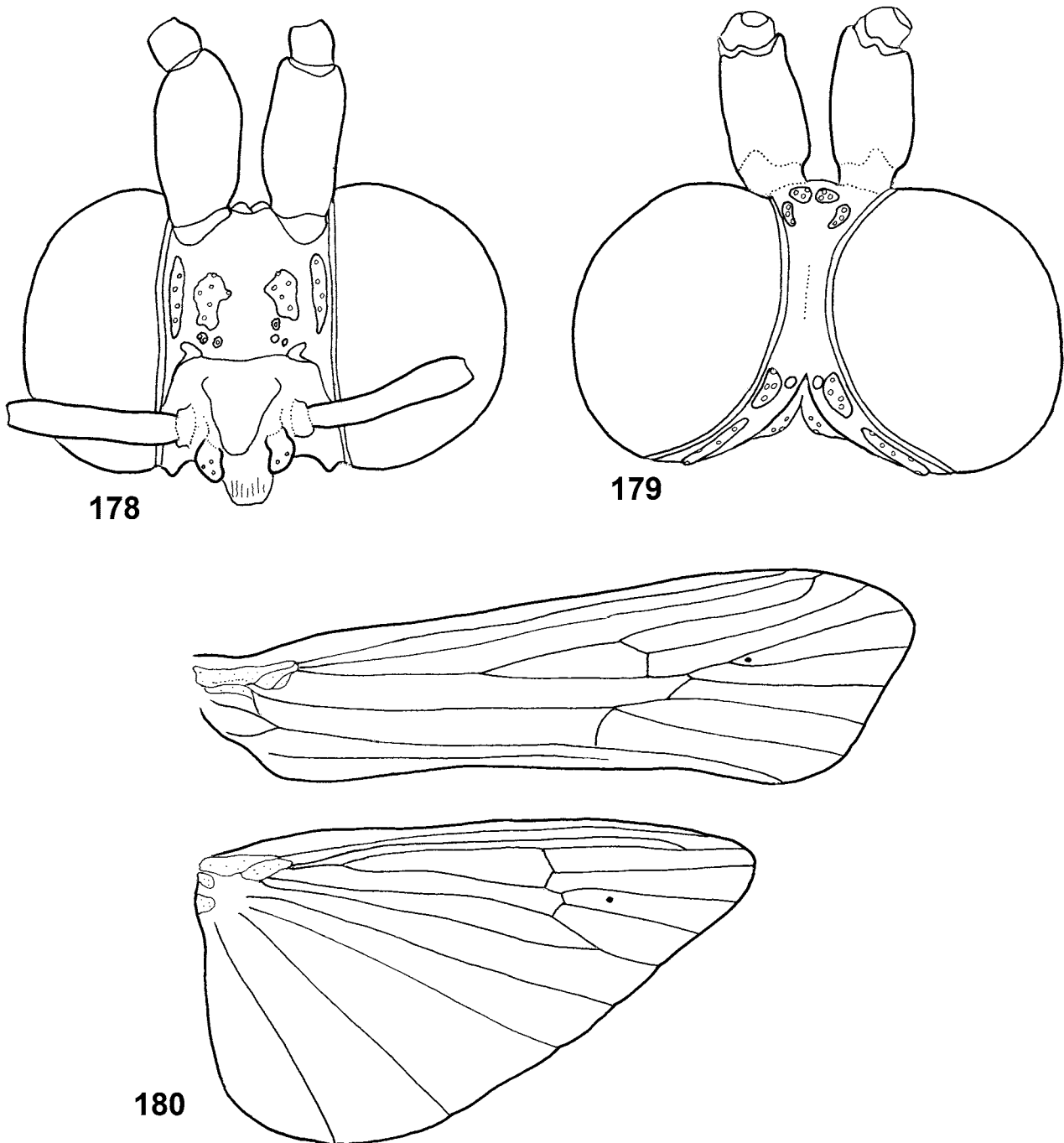
Etymology: *Enikiana*, named after Enikő Julia Oláh, the granddaughter of one of the authors (JO), to remember her big blue eyes.

***Marilia jonssoni*, new species**

Figs 178–184

This species has a dark chestnut brown body colour, and together with the characteristic shape of the phallic apparatus, it resembles *M. malickyi*, new species. *Marilia jonssoni* is easily separated from *M. malickyi*, and other species, by the presence of highly enlarged first and second axillary sclerites on all wings, as well as

having narrower vertex and small, almost rudimentary, medioantennal and lateroantennal compact setose warts.



FIGURES 178–180. *Marilia jonssoni*, new species, holotype. 178 —head, frontal; 179 —head, dorsal; 180 — right wings.

Male (in alcohol). Body medium-sized; chestnut brown; legs, antennae and palps light brown; cephalic and thoracic setal warts white; wing membrane uniformly light grey with scattered dark gray setae. Eyes large, black; vertex constricted; distance between eyes about 1/5th the eye width; inter-ocular area 5 times longer than broad. Ocelli absent. Tentorium unknown. Facial groove pattern reduced; with pair of short, wide frontal lateral compact setose warts located strongly anteriorly; with fragmented white alveoli or setal thecae. Antennae with small antennal sockets on frons. Anterior remnant of frontal grooves invisible. Frontogenal vertical groove between frontal lateral compact warts and frontogenal compact setose warts invisible on untreated

head. Clypeogenal vertical grooves located ventrally of anterior tentorial pits; running obliquely laterad, reaching subgenal process. Subantennal grooves running vertically in narrow strip between ocellar groove and frontogenal compact setose warts; subocular groove not discernible. Vertexal groove pattern simplified, constricted; coronal groove almost complete, weakly discernible. Postoccipital groove encircling *foramen magnum*, or occipital foramen and postoccipital lobes. Labrum small, short, without setal warts, with movable anterior part, freely hanging. Mandibles almost indiscernible on uncleared head; lacinia visible, broader, setose. Pair of vertexal lateroantennal compact setal warts on constricted vertex small, round, elongate, drop-shaped, posterior end narrower, following shape of compressed vertex. Vertexal mediantennal compact setose warts nearly tangential. Occipital compact setose warts diminished, nearly triangular at posterior end of coronal groove, following ocular groove of compressing eyes. Pair of *sensilla basiconicae* located at end of coronal grooves, almost tangential with occipital warts. Pair of postgenal compact warts following postgenal areas, curving along posterior part of ocular grooves, narrow strips pressed to ocular grooves. Postgenal surfaces glabrous, hidden by eyes. Maxillary palps slightly darker than legs and antennae; maxillary palp formula V-(II, III, IV)-I; each basal segment without setose subapicomeresal nodule. Antennal scapes shorter than head. Pedicels shorter than first segment of flagellae. Pair of pronotal warts present, with white surfaces, covered by setae; transversely elongate, occupying entire pronotum, almost touching mesally, narrowest laterally. Second pair of pronotal warts small, ovoid, well separated from mesal warts. White mesoscutal diffuse setose warts arranged in longitudinally elongate, short, narrow, irregular patches on middle of dorsal surface of mesoscutum; separated by median notal groove. Median notal groove white, widening at mid-length. Narrow pair of lateral and oblique white bands continuing on apical half of mesoscutum. Almost entire surface of mesoscutellar areas white, covered by diffuse, white setal warts separated by median notal groove. Each proepisternum with ovoid setose wart being smaller than setose wart on each precoxale. Large, compact, setal wart present anteriorly on cervical sclerites; apparently forming sclerotized surface on membranous part of neck, touching only anterior cervical sclerite. Lateral cervical sclerites forming narrow anterior arm articulating anteriorly to back of head with occipital condyle above posterior tentorial pits, fused to posterior cervical sclerites. Posterior cervical sclerite forming posterad broadening plate reaching prothoracic episternum, articulating to weakly sclerotized anteromedian band of prothoracic eusternum by ventral intercervical sclerites; dark pattern of cervical sclerite complex clearly visible on pale membranous neck. Legs claws symmetrical; spur formula 2, 4, 4; forelegs with anteroapical spur half as long as posteroapical spur. Midlegs with apical posterior spur 1/4th as long as apical anterior spur and subapical posterior spur; half as long as subapical anterior spurs. Hind legs with posterior spurs half as long as anterior spurs. Forewings: length 9.5 mm; membrane light-grey, with dark gray setae, without visible pattern, termen concave; first and second axillary sclerites enlarged on forewings and hind wings; R1 confluent with R2 shortly before C; base of discoidal cell located proximally of mid-length of wing; fork I longer than fork II; forks I and II present; fork I sessile, fork II short petiolate, almost sessile, crossveins *s*, *r-m* and *m-cu* present; postanal vein present. Hind wings: R1 meeting R2 apically; fork I slightly longer than fork II.

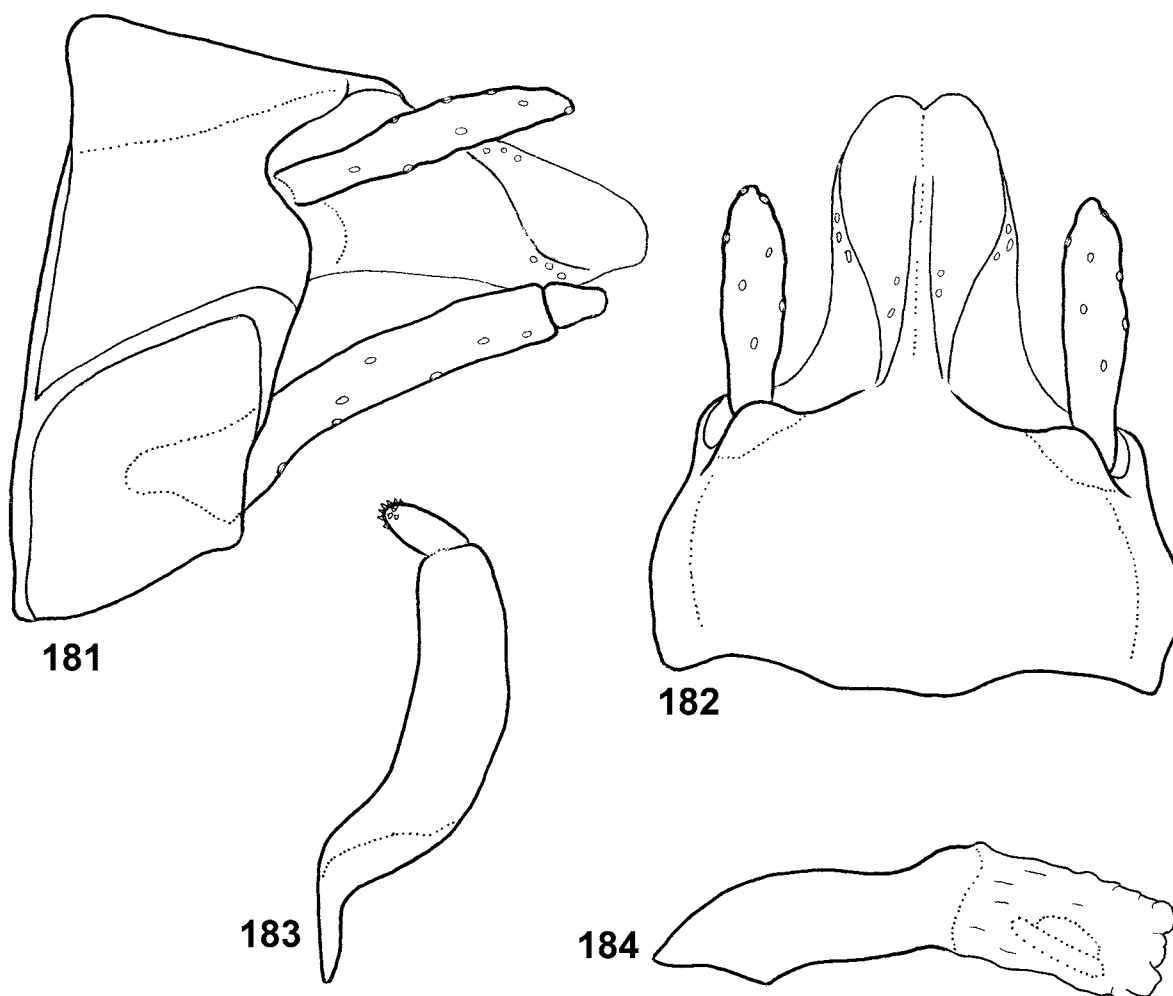
Male genitalia. Abdominal segment IX fused annularly, each side with 1 longitudinal groove running apicad, widening into sclerotized plate on apical lobes dorsally of coxopodites; dorsal longitudinal grooves absent, but with vestigial path forming fold in lateral and dorsal views; tergum slightly longer than venter; anterior margins vertical, nearly straight. Apicodorsal lobes rounded, extending beyond bases of preanal appendages. Lateroapical corners of tergum IX forming short, triangular plates over articulation of preanal appendages. Antecostae well developed, absent on dorsum, forming darkly pigmented marginal rims connected to ventral longitudinal grooves; spine rows absent on posterior margins of segment IX; apicopleural and apicoventral areas without setae. Segment IX nearly glabrous, with few setal alveoli scattered around apical lobes and on ventropleural region. Intersegmental depression between segment IX and segment X with small slope. Segment X weakly pigmented, quadrangular in lateral view; with rounded apex longer than gonocoxites; in dorsal view, central ridge separating lateral concavities delineated by 2 long, dark, parallel-sided,

slightly narrowing, lines running to near apex of segment. Apicoventral setose lobes with few subapical setae, below glabrous concavities. Apicodorsal setose areas not discernible. Apex of segment X filled, dorsal interlobular gap minute, triangular. Preanal appendages long, filiform in lateral and dorsal view. Each coxopodite and harpago together slightly shorter than segment X and longer than preanal appendages; coxopodites straight, almost parallel-sided in lateral view; slightly curving in ventral view; harpagones narrowing apically, packed with small, cone-shaped setae in ventral view. Phallic apparatus 2-partite in lateral view. Sclerotized part of phallosome with sigmoid dorsum in lateral view. Endotheca and phallicata indiscernible from each other. Phallosomal sclerite small, not clearly visible.

Holotype male: LAOS PDR: Luang Phrabang Prov.: Nam Sat stream, 50 m upstream Hoi Sat Village, 336 m, UTM 48Q0220672, 2260175, 28.iv–2.v.2005, Malaise trap, loc 16 [N. Jönsson, T. Malm & B. Viklund] – (NRM).

Distribution: Laos.

Etymology: *Jonssoni*, named after Mr. Niklas Jönsson (NRM), one of the collectors of the species.



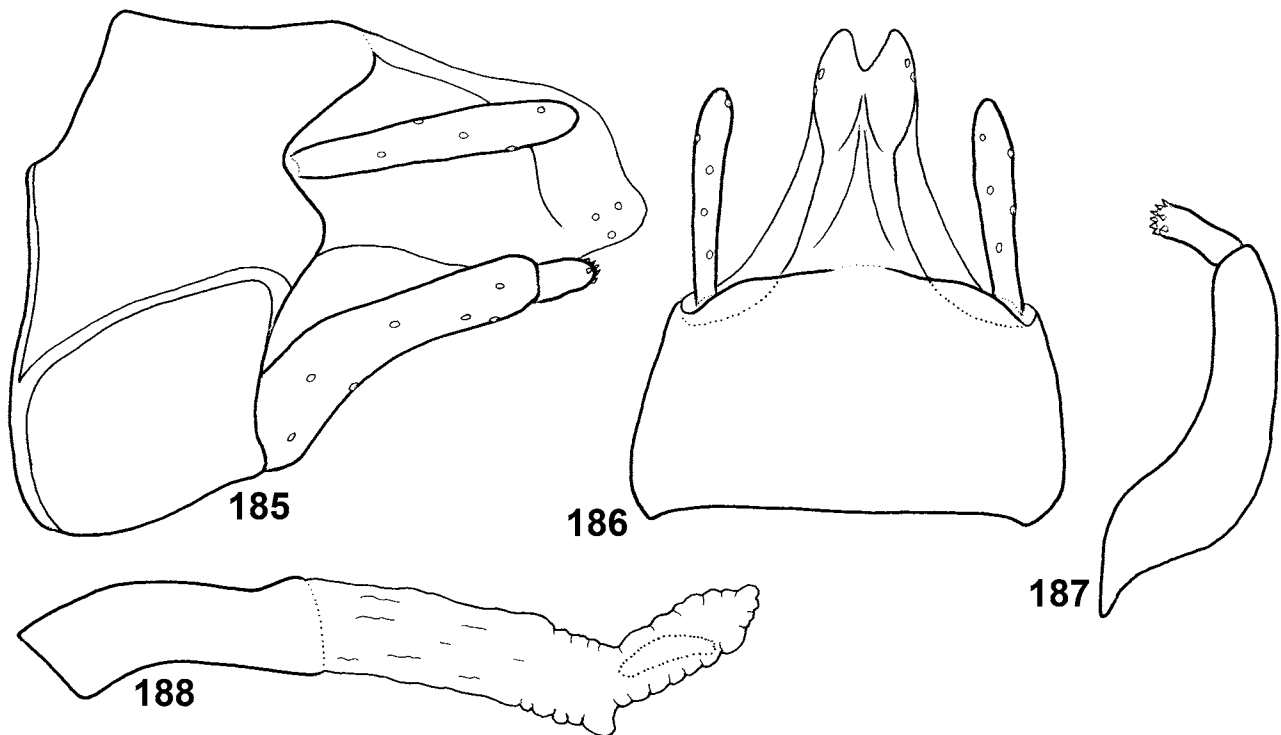
FIGURES 181–184. *Marilia jonssoni*, new species, holotype. 181 — genitalia, lateral; 182 — genitalia, dorsal; 183 — gonocoxite, ventral; 184 — phallus, lateral.

***Marilia katakaha*, new species**

Figs 185–188

The extremely narrow vertex is similar to that of *M. mendolonga*, new species. *Marilia katakaha* is separated from *M. mendolonga* in being larger. In addition, the vertexal lateroantennal compact setal warts of *M. kat-*

akaha are larger, more rounded, with lateral part more elevated and supplied with larger alveoli compared to on the lower mesal part; while those of *M. mendolonga* are smaller and extremely elongate. *Marilia katakaha* has a ridge pattern on segment X being more strongly developed, particularly the lateral longitudinal ridges running to the marginal ridges of the depression are more pronounced.



FIGURES 185–188. *Marilia katakaha*, new species, holotype. 185 — genitalia, lateral; 186 — genitalia, dorsal; 187 — gonocoxite, ventral; 188 — phallus, lateral.

Male (in alcohol). Body medium-sized; light brown; legs, antennae and palps light brown; wings uniformly light brown, without pattern in alcohol. Eyes faded brown, extremely large. Vertex forming narrow strip; interocular distance about 1/10th the eye width, almost 12 times longer than broad. Ocelli absent. Tentorium slender, with short, filiform vestigial dorsal arm; posterior arms robust, ending in pair of large posterior tentorial pits; tentorial bridge separating anterior and posterior tentorial arms very slender, without anteromesal or posteromesal protuberance; posterior half of anterior tentorial arms thin; anterior half robust, with strongly developed median lamellate lobes. Facial groove pattern reduced; short, narrow, frontal lateral compact setose wart and narrow, long, frontogenal compact setose wart, together with large antennal sockets dominating on frons. Anterior remnant of frontal grooves branching from coronal grooves invisible at ventral margin of antennal sockets. Frontogenal vertical groove invisible. Clypeogenal vertical grooves located ventrally of anterior tentorial pits; long, running obliquely laterad, reaching subgenal process. Subantennal grooves running vertically in narrow strips between ocellar grooves and frontogenal compact setose wart; subocular groove indiscernible, merging to anterior clypeogenal grooves. Vertex forming narrow strip. Vertexal groove pattern simple; coronal groove ending in deep posterior cleft. Postoccipital groove encircling *foramen magnum* forming pair of postoccipital setal lobes. Labrum elongate, with short setae on hanging, freely movable anterior apical area. Mandibles almost indiscernible; laciniae broad. Pair of short, narrow compact frontal lateral setal warts present on face beside elongate, narrow pair of frontogenal compact setal warts running from antennal sockets along subantennal groove of pregenae. Pair of large, rounded vertexal lateroantennal compact setal warts visible on broad anterior section of narrow strip of vertex; lateral part elevated, supplied with large alveoli compared to on lower mesal part. Pair of vertexal mediantennal compact

setose warts separated by septa. Occipital compact setose warts small, triangular. Pair of *sensilla basiconicae* present along end of coronial grooves, isolated from anteromesal corner of occipital warts. Vertically elongated postgenal compact warts curving along posterior section of ocular grooves, narrow strip pressed to ocular groove. Postgenal surface glabrous, postgenal surface hidden by eyes. Maxillary palps broken, 1 paratype has single basal segment present, with no setose subapicomeres nodule. Each scape slightly shorter than head. Each pedicel shorter than first segment of each antennal flagella. One pair pronotal warts present, transversely elongate, located on posterior half of pronotum, almost touching mesally, narrowest laterally; lateral ends almost separated into lateral, second pair setal warts. One pair mesoscutal diffuse setose warts present, represented by few alveoli visible on brown mesoscutal surface. Nearly entire surface of mesoscutellar area covered by diffuse setal warts represented by few alveoli. Each proepisternum with ovoid setose wart much smaller than setose wart on precoxale. Large, compact, setal wart present anteriorly on cervical sclerites; apparently forming sclerotized surface on membranous part of neck, touching anterior cervical sclerite. Lateral cervical sclerites forming narrow anterior arm articulating anteriorly to back of head with occipital condyle above posterior tentorial pits, fused to posterior cervical sclerites. Posterior cervical sclerite forming posterad broadening plate reaching prothoracic episternum, articulating to weakly sclerotized anteromedian band of prothoracic eusternum by ventral intercervical sclerites; dark pattern of cervical sclerite complex clearly visible on pale membranous neck. Legs claws symmetrical; spur formula 2, 4, 4; foreleg spurs almost equal; midleg posterior subapical spurs half as long as foreleg spurs; midleg posteroapical spurs 1/4th as long as foreleg spurs; hind leg posterior spurs half as long as anterior spurs. Forewings: length 9.5 mm; forewing membrane light brown, without visible pattern, termen straight; R1 confluent with R2 shortly before C; base of discoidal cell located proximally of mid-length of wing; fork I longer than fork II; forks III–V absent; fork I sessile, fork II short petiolate, nearly sessile. Hind wings: R1 long, running to R2 near append of C; fork I slightly longer than fork II; long setae in brush present on basal lobe.

Male genitalia. Abdominal segment IX fused annularly, ventral longitudinal grooves pronounced, separating ventral and dorsal half in lateral view, running nearly to apex of apical lobes; tergum IX slightly longer than venter; anterior margins straight vertical, with small triangular projection at end of antecostal sutures; posterior margins with rounded apical lobes; with deep excision at preanal appendages. Lateroapical corners of tergum IX forming short, narrow, transverse plate over articulation of preanal appendages. Antecosta on anterior margins of segment IX well developed, forming dark marginal rims connected to longitudinal ventral grooves. Ventral longitudinal grooves turning ventrad, forming short posterior grooves on segment IX; spine rows absent on posterior margins of segment IX; setose areas absent on apicopleural and apicoventral areas. Intersegmental depression between segment IX and segment X sloping gently. Segment X weakly pigmented, in lateral view forming quadrangular plate with slightly excised apex, ventral corner longer than preanal appendages and gonocoxites; central ridge long, triangular in dorsal view; additional pair of lateral ridges running to lateral depression; lateral depression half as long as segment X. Apicoventral setose lobes with few alveoli on lateral lobes. Apicodorsal setose area not discernible. Apex of segment X excavated, with V-shaped, dorsal interlobular gap. Preanal appendages long, filiform, almost parallel-sided in lateral and dorsal view. Gonocoxites shorter than segment X; coxopodites curved, with apical half narrow in lateral and ventral view; harpagones small. Phallic apparatus with basal half of phallosoma sclerotized; apical half of endotheca membranous; phallicata present. Sclerotized phallosoma curving basally, slightly constricted before apex. Phallosomal sclerite small, elongate, located at start of phallicata, U-shaped in ventral view.

Holotype male: MALAYSIA: O. Borneo: Songri Boh. [Mjöberg] – (NRM).

Paratypes: same data as holotype – 1 male (NRM); O. Borneo, Long Navang [Mjöberg] – 2 male (NRM).

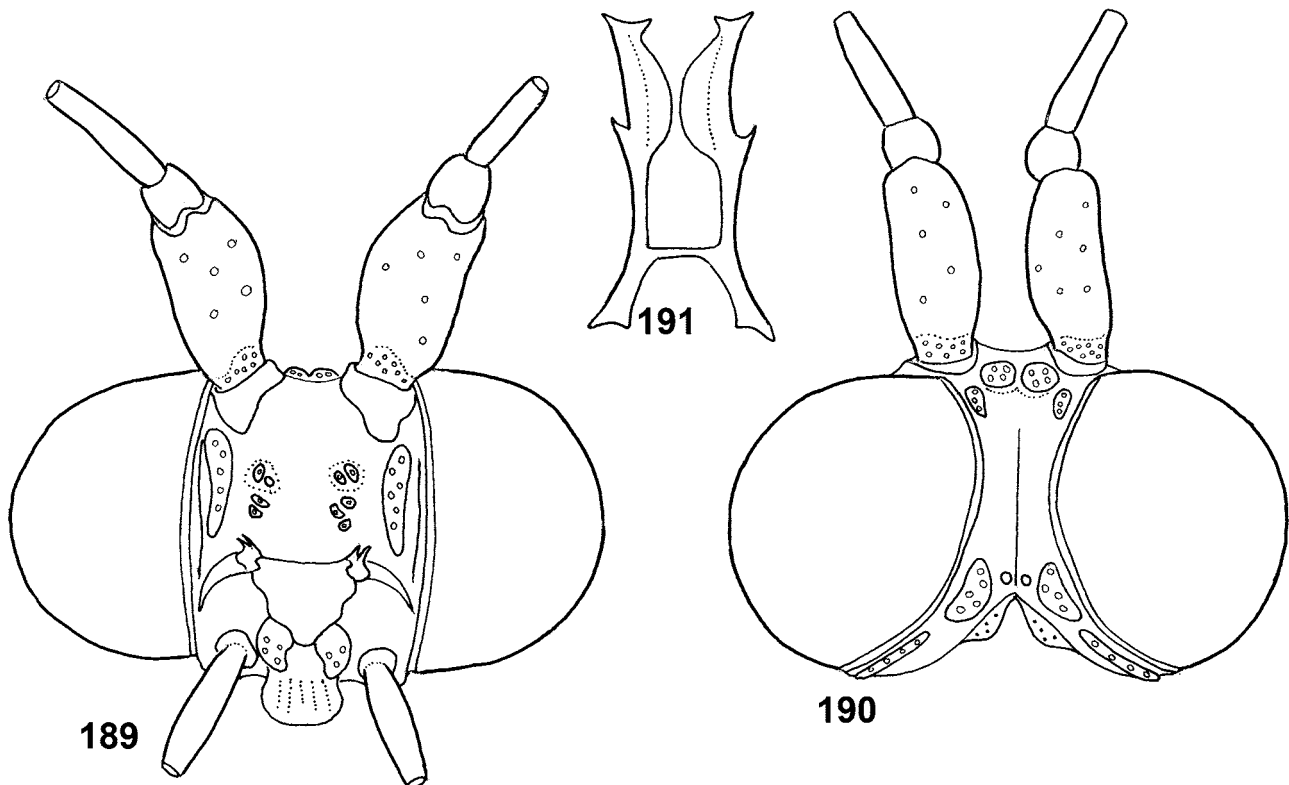
Distribution: Malaysia (Borneo).

Etymology: *Katakaha*, ridge in Sanskrit; named after the complex system of dorsal ridges on segment X.

Marilia malickyi, new species

Figs 189–196

Marilia malickyi, new species is separated from most species in the genus by having light-spotted forewing membrane and light spots on the anterior costal band of the hind wings. Also *M. mogtiana* Malicky from Thailand has light spotted forewings but *M. malickyi* is easily separated from that species in having different forewing venation, i.e. R4, R5 and M1+2 not meeting at one point as they do in *M. mogtiana*. The genitalia of *M. malickyi* has the apicolateral corner of tergum IX formed into a large triangular plate above the articulation of the preanal appendages, while in *M. mogtiana* this plate is absent; and *M. malickyi* has no dorsal longitudinal sutures on segment IX, which is well developed in *M. mogtiana*.

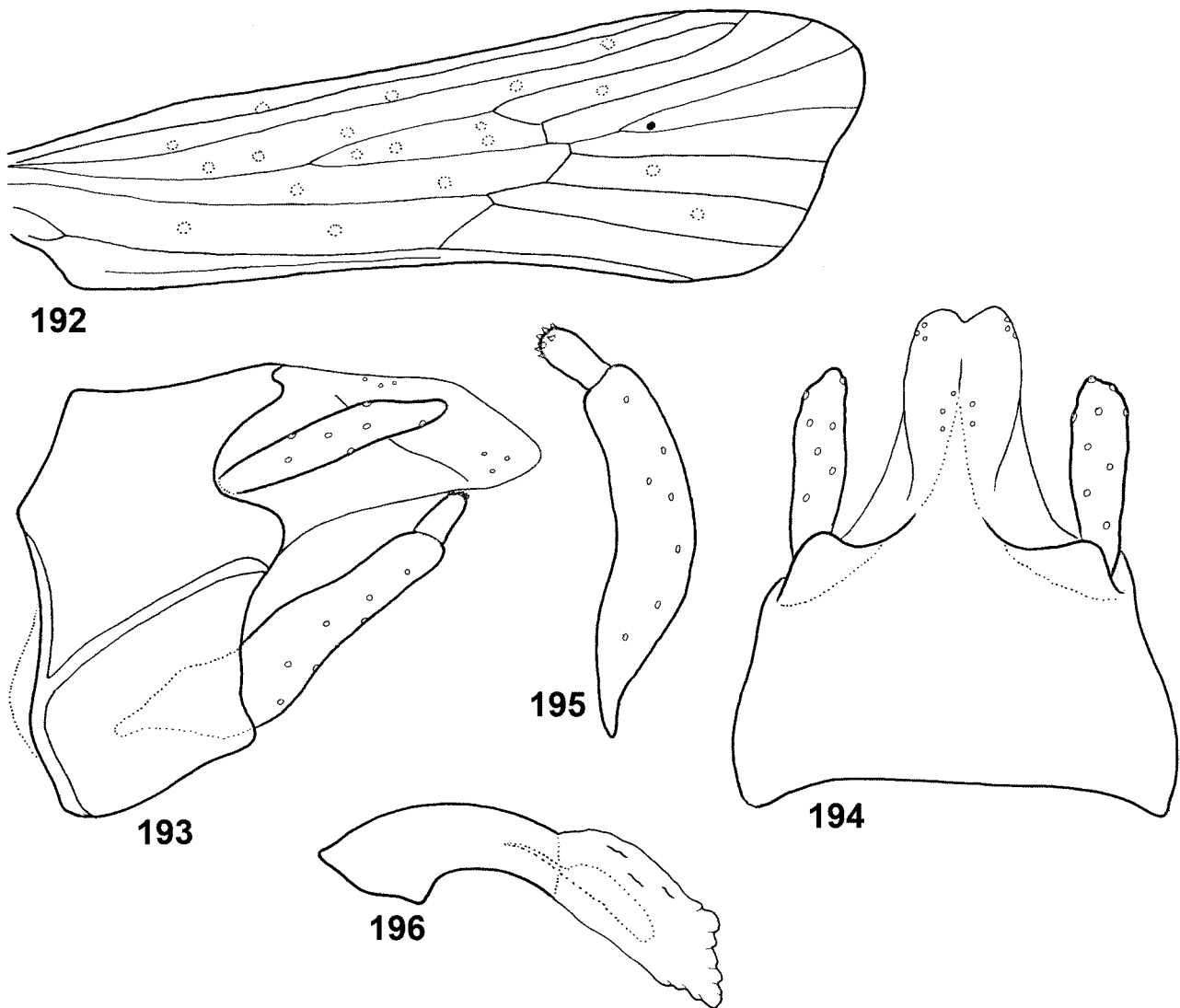


FIGURES 189–191. *Marilia malickyi*, new species, holotype. 189 —head, frontal; 190 —head, dorsal; 191 — tentorium, dorsal.

Male (in alcohol). Body medium-sized; dark; legs, antennae and palps slightly paler than body; cephalic and thoracic setal warts brown; forewing membranes brown, light spotted; hind wings with light spotted anterior costal area. Eyes black, large. Vertex constricted; interocular distance varying between 1/3rd and 1/2 the eye width; about 3 times longer than broad. Ocelli absent. Tentorium slender, with short vestigial dorsal arm; posterior arms robust, ending in pair of large posterior tentorial pits; tentorial bridge separating anterior and posterior tentorial arms slender, without anteromesal or posteromesal protuberances; posterior half of anterior tentorial arms thin, anterior half more robust than posterior half, with well-developed median lamellate lobes. Facial groove pattern simple. Frons with pair of short, wide, laterally fragmented brown setose wart with whitish alveoli, or setal theca, and enlarged antennal sockets. Anterior remnant of frontal grooves invisible. Frontogenal vertical groove invisible. Frontogenal compact warts long, brown, vertically elongated. Clypeogenal vertical grooves located ventrally of anterior tentorial pits; running obliquely laterad, not reaching subgenal process. Subantennal grooves running vertically in narrow strip between ocellar groove and frontogenal compact setose warts; subocular groove not visible. Vertexal groove pattern simple, constricted; coronal

groove almost complete, forming straight line in middle of vertex, anterior end vestigial [specimens from Perak (Malaysia) have complete coronal groove]. Postoccipital grooves encircling *foramen magnum* and postoccipital lobes. Labrum small, short, with median setal area; anterior part movable, freely hanging. Mandibles almost indiscernible; lacinia broad, setose. Pair of rounded vertexal lateroantennal warts present on vertex, slightly compressed, elongate, drop-shaped, widest anteriorly. Vertexal mediantennal compact setose warts separate. Occipital compact setose warts large, triangular at posterior end of coronal grooves. Pair of *sensilla basiconicae* rounded, located at end of coronal groove, close to occipital warts. Pair of postgenal compact warts present along postgenal areas, curving along posterior part of ocular grooves; narrow strips pressed to ocular grooves. Postgenal surfaces glabrous, postgenal surfaces hidden by eyes. Maxillary palp formula V-(II, III, IV)-I; subapicomesal nodule absent on basal segment. Scapes shorter than head. Each pedicel shorter than each first flagellar segment; flagellae almost 2 times longer than forewings. Pair of pronotal warts present, with chestnut brown surface and dark setae; transversely elongate, occupying entire pronotum; almost touching mesally; narrowest laterally. Pair of mesoscutal setose warts diffuse, composed of few light alveoli arranged in longitudinally elongating, short, narrow, irregular patch on middle of dorsal surface of mesoscutum; mesoscutal setose warts separated by median notal groove. Almost entire surface of mesoscutellar area chestnut brown, with few large alveoli; diffused warts scattered among numerous small light dots. Each proepisternum with small-sized, ovoid setose warts, smaller than setose wart on each precoxale. Large, compact, setal wart present anteriorly on cervical sclerites; apparently forming sclerotized surface on membranous part of neck, touching only anterior cervical sclerite. Lateral cervical sclerites forming narrow anterior arm articulating anteriorly to back of head, with occipital condyle above posterior tentorial pits, fused to posterior cervical sclerites. Posterior cervical sclerite forming posterad broadening plate reaching prothoracic episternum, articulating to weakly sclerotized anteromedian band of prothoracic eusternum by ventral intercervical sclerites; dark pattern of cervical sclerite complex clearly visible on pale membranous neck. Legs claws symmetrical; spur formula 2, 4, 4; foreleg spurs almost equally long; midleg posteroapical spurs 2 times longer than anteroapical and anterosubapical spurs; posterior spurs 1/4th as long as anterior spurs. Hind leg posterior spurs half as long as anterior spurs. Forewings: length 8.0 mm; narrow with concave termen; membrane brown, light-spotted; setae darker, not forming visible pattern; R1 confluent with R2 shortly before C; base of discoidal cell located proximally of mid-length of wing; fork I longer than fork II; forks I and II present; fork I sessile, fork II short petiolate; crossveins *s*, *r-m* and *m-cu* present; postanal vein present. Hind wings: R1 long, running to R2 near wing apex; fork I slightly longer than fork II; long setal brush absent.

Male genitalia. Abdominal segment IX fused annularly, with 1 longitudinal groove running apicad, reaching distal margin of apical lobes at dorsum of articulation of gonocoxites; dorsal longitudinal grooves absent; tergum IX slightly longer than venter; anterior margins straight, vertical, with small lobe at confluence of ventral sutures; posterior margins with rounded apical lobe, deeply excised at preanal appendages; lateroapical corners of tergum IX forming large triangular plate over articulation of preanal appendages. Antecostae well developed, lacking on dorsum, forming dark marginal rim connected to longitudinal grooves; spine rows absent on posterior margins of segment IX; setose areas absent on apicopleural and apicoventral areas. Intersegmental depression between segment IX and segment X slightly sloping. Segment X weakly pigmented, forming quadrangular plate with rounded apex, slightly longer than gonocoxites in lateral view; in dorsal view with central longitudinal ridge separating lateral concavities; long triangular running nearly to apex of segment. Apicoventral setose lobes represented by few subapical setae. Apicodorsal setose area not discernible. Apex of segment X filled; dorsal interlobular gap minute. Preanal appendages long, filiform in lateral and dorsal view; with apicodorsal margins directed slightly ventrad in lateral view. Gonocoxites slightly shorter than segment X; longer than preanal appendages; coxopodites straight curving basally, almost parallel-sided both along their length in lateral and ventral view; harpagones slightly clavate, with small cone-shaped setae in ventral view. Phallic apparatus forming basally curving phallosome and apically membranous endotheca. Phallicata indiscernible. Phallosomal sclerites small.



FIGURES 192–196. *Marilia malickyi*, new species, holotype. 192 — right forewing; 193 — genitalia, lateral; 194 — genitalia, dorsal; 195 — gonocoxite, ventral; 196 — phallus, lateral.

Holotype male: LAOS PDR: Luang Namtha Prov.: Nam Ha NBCA, Lakkhammai Village, Nam Leung stream, 749 m, UTM 47Q0744602, 2339873, 30.iv.2005, light trap, loc 29 [N. Jönsson, T. Malm & B. Viklund] – (NRM).

Paratypes: same data as holotype – 17 males (15 males NRM, 2 males OPC); Nam Ha NBCA, Nam Gngang stream, 300 m upstr. Namngnen Village, 558 m, UTM 47Q0746256, 2321311, 29.iv–1.v.2005, Malaise trap, loc 24 [N. Jönsson, T. Malm & B. Viklund] – 1 male (NRM); Tong Om Village, 552 m, UTM 47Q0750111, 2321825, 1.v.2005, light trap, loc 30 [N. Jönsson, T. Malm & B. Viklund] – 8 males, 4 females (NRM). **Vientiane Prov.:** Vang Vieng, Nam Xong River, upstream bamboo footbridge, 363 m, UTM 48Q0223506, 2115465, 26.iv.2005, light trap, loc 10 [N. Jönsson, T. Malm & B. Viklund] – 3 male (OPC). **MALAYSIA:** Perak, Halong stream IX–X. 1993 light [G. S. Robinson] – 25 males, 3 females (NHML); ditto, except – 25 males, 8 females (NHML). **MALAYSIA:** West-Malaysia, Belum Expedition, Lichtfang Falle 1, 27.xii.1993 [M. Erle] – 1 male (OPC). **VIETNAM:** Quang Tri Province, Da Krong Nature Reserve, near HQ, loc. No. 119, centered at 16°36'N 106°52'E, 13.xi.2007, at light [G. Csorba] — 1 male (OPC). **VIETNAM:** Quang Tri Province, Huong Hoa District, Huong Hoa Nature Reserve, near Cup Village, 400 m, loc. No. 92, centered at 16°56'15N 106°34'52E, 7–10.xi.2007, at light [G. Csorba] — 1 male (OPC).

Distribution: Laos, Vietnam, Malaysia.

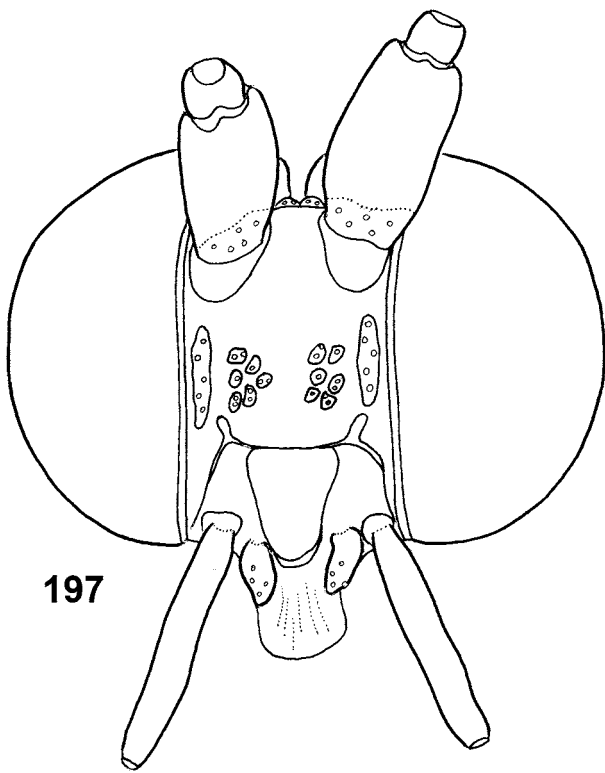
Etymology: *Malickyi*, named after Dr. Hans Malicky in recognition of his great contributions to caddisfly taxonomy, and for his invaluable assistance during this study.

***Marilia mendolonga*, new species**

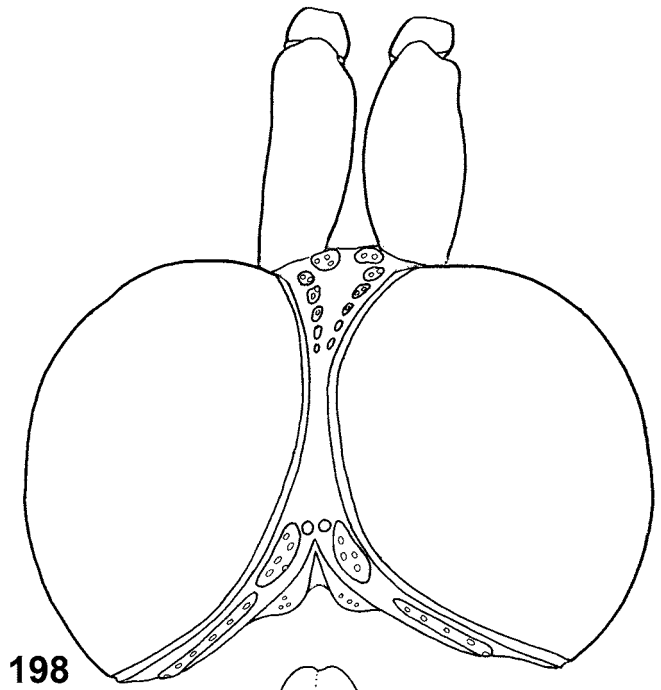
Figs 197–203

Having a strongly constricted, narrow vertex, this species strongly resembles *M. katakaha*, new species. *Marilia mendolonga* is separated from *M. katakaha* in being smaller, and the vertexal lateroantennal compact setal warts are smaller and more elongate. The ridge pattern on segment X of *M. katakaha* is weaker, like the almost indiscernible lateral longitudinal ridges. The apicolateral corners of tergum IX are short, narrow, and obliquely set, not forming transverse plates over the articulation of the preanal appendages.

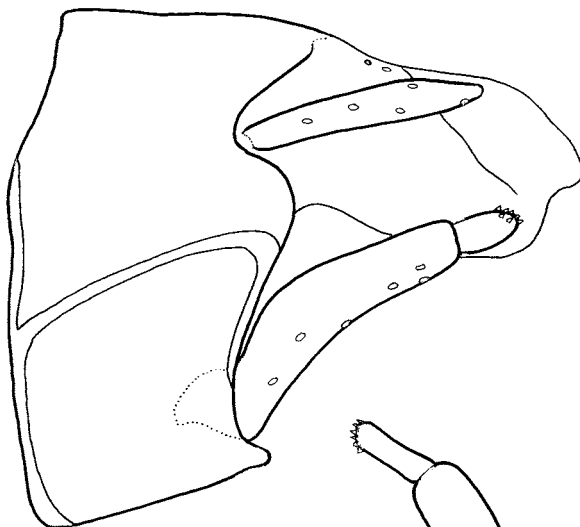
Male (in alcohol). Body medium-sized; dark brown; legs, antennae and palps light brown; wings uniformly light brown, without pattern. Eyes black, extremely large; vertex constricted to narrow strip; interocular distance about 0.1 times the width of each eye, almost 12 times longer than broad. Ocelli absent. Tentorium slender, with short, vestigial dorsal arm; posterior arms robust, ending in pair of large posterior tentorial pits; tentorial bridge slender, without protuberances; posterior half of anterior tentorial arms thin, anterior half more robust, with strongly developed median lamellate lobes; anterior tentorial arms with lateral widening on anterior half. Facial groove pattern modified, shortened frontal, laterally fragmented setose wart and large antennal sockets dominating on frons. Anterior remnant of frontal grooves branching from coronal groove invisible at ventral margin of antennal sockets. Frontogenal vertical grooves invisible between frontal lateral fragmented setose warts and vertically elongate, narrow, frontogenal compact setose warts. Clypeogenal vertical grooves located ventrally of anterior tentorial pits; long, running obliquely laterad, reaching subgenal process. Subantennal grooves running vertically in narrow stripe between ocellar groove and frontogenal compact setose wart. Subocular groove indiscernible, merging to anterior clypeogenal grooves. Vertex forming narrow strip; vertexal groove pattern simplified; coronal groove at posterior cleft invisible. Postoccipital groove encircling *foramen magnum*. Labrum pyriform, with short setae on freely hanging and movable anterior apical area. Mandibles almost indiscernible; lacinia broad. Pair of short, fragmented frontal lateral setal warts present on face beside frontogenal compact setal warts. Frontogenal compact setal warts running from antennal sockets along subantennal groove of pregenae. Narrow vertex with pair of elongate, posteriorly narrowing, fragmenting vertexal lateroantennal compact setal warts, having almost indiscernible posterior ending. Vertexal mediantennal compact setose warts separate. Occipital compact setose warts small, broad, elongated. Pair of *sensilla basiconicae* present along end of coronial groove, tangential with anteromesal corner of occipital warts. Vertically elongate postgenal compact warts curving along posterior section of ocular grooves, narrow strip pressed to ocular groove. Postgenal surface glabrous, postgenal surface hidden by eyes. Maxillary palps paler than legs and antennae; maxillary palp formula V-IV-III-II-I; each basal maxillary palp segments significantly longer than each second maxillary palp segments, without setose subapical nodule. Each scape slightly shorter than head. Each pedicel shorter than first segment of each antennal flagella. Single pair pronotal warts transversely elongated, located on posterior 1/3rd of segment, almost tangential mesally, narrowest laterally. Pair of diffuse mesoscutal setose warts present, represented by few pale alveoli on dark mesoscutal surface. Almost entire surface of mesoscutellar area covered by diffuse setal warts separated by median notal groove, represented by few setal alveoli. Each proepisternum with small-sized, ovoid, setose warts, much smaller than setose warts on precoxale. Large, compact, setal wart present anteriorly on cervical sclerites; apparently forming sclerotized surface on membranous part of neck, touching only anterior cervical sclerite. Lateral cervical sclerites forming narrow anterior arm articulating anteriorly to back of head, with occipital condyle above posterior tentorial pits, fused to posterior cervical



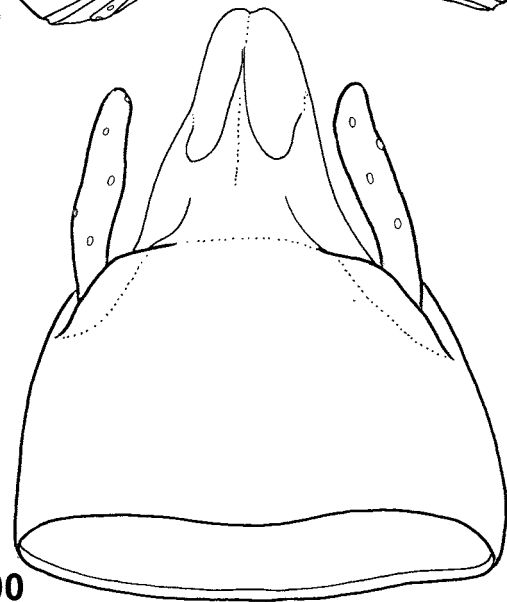
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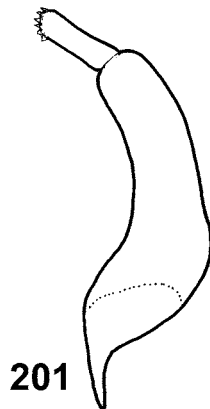
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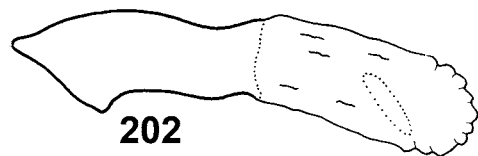
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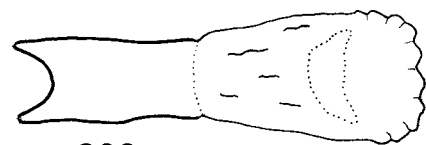
200



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202



203

FIGURES 197–203. *Marilia mendolonga*, new species, holotype. 197 — head, frontal; 198 — head, dorsal; 199 — genitalia, lateral; 200 — genitalia, dorsal; 201 — gonocoxite, ventral; 202 — phallus, lateral; 203 — phallus, ventral.

sclerites. Posterior cervical sclerites forming posterad broadening plates reaching prothoracic episternum, articulating to weakly sclerotized anteromedian band of prothoracic eusternum by ventral intercervical sclerites; dark pattern of cervical sclerite complex, clearly visible on pale membranous neck. Legs claws symmetrical; spur formula 2, 4, 4; foreleg spurs almost equally long; each midleg posterior subapical spur half as long as foreleg spurs; posteroapical spur 1/4th as long as foreleg spurs; each hind leg posterior spurs half as long as anterior spurs. Forewings: length 8.0 mm; membrane brown, without visible pattern; termen straight; R1 confluent with R2 shortly before C; base of discoidal cell located proximally of mid-length of wing; fork I longer than fork II; forks III–V absent; fork I sessile, fork II short petiolate, almost sessile. Hind wings: R1 present, long, running to R2 near distal part of C; fork I slightly longer than fork II; long brush present.

Male genitalia. Abdominal segment IX fused annularly, ventral longitudinal grooves present; largest groove separating ventral and dorsal halves in lateral view, running to end of apical lobes; tergum IX slightly longer than venter; anterior margins straight, vertical, slightly convex; apical lobes rounded, with deep excision near preanal appendages. Apicolateral corners of tergum IX forming short, narrow, oblique plates over articulation of preanal appendages. Antecosta on anterior margins of segment IX forming dark, marginal rims connected to broad longitudinal ventral grooves. Ventral longitudinal grooves turning ventrad, forming posterior grooves on ventral half of segment IX; spine rows absent on posterior margins of segment IX. Apicopleural and apicoventral setose areas absent. Intersegmental depression between segment IX and segment X sloping gently. Segment X weakly pigmented, forming quadrangular plate with slightly excised apex; longer than gonocoxites in lateral view; in dorsal view central ridge almost indiscernible on basal half, well developed on apical half; separating lateral concavities. Apicoventral setose lobes represented by few alveoli on lateral lobe before apex. Apicodorsal setose area not discernible. Apex of segment X filled; dorsal interlobular gap absent. Preanal appendages long, filiform in lateral and dorsal view; almost parallel-sided in dorsal view. Gonocoxites shorter than segment X; coxopodites curving, parallel-sided in lateral and ventral view; harpagones small, not clavate or narrowing apicad. Phallic apparatus with phallosome being sclerotized at basal half and membranous at apical half. Phallicata difficult to separate. Sclerotized phallosome curving basad, slightly constricted before apex. Small, elongate, poorly visible phallosomal sclerite present at phallicata base, U-shaped in ventral view.

Holotype male: MALAYSIA: Borneo: Sabah: Sipitang, Mendolong Nursery, 28.iv.1988, at light [Stig Adebratt] – (NRM).

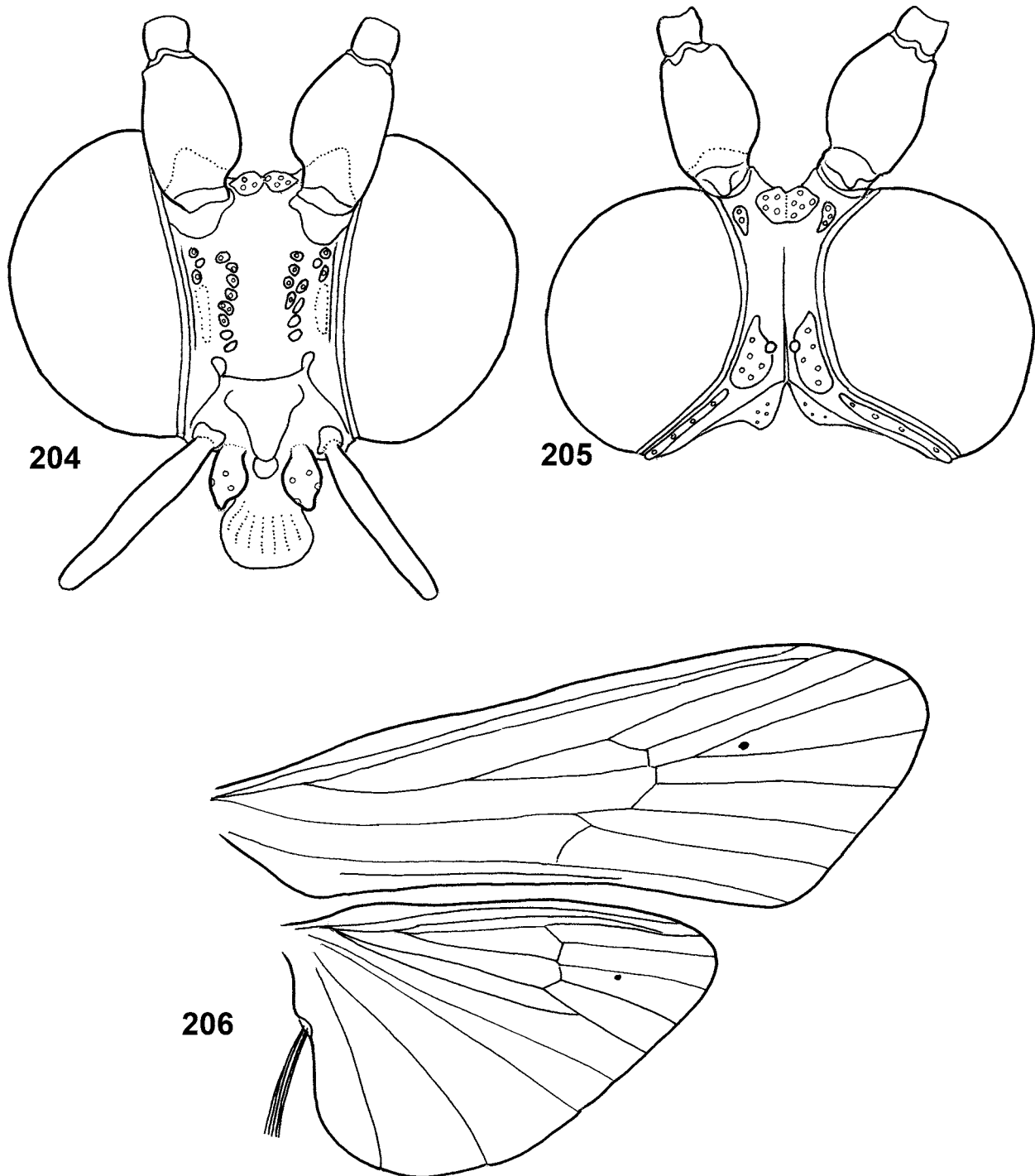
Distribution: Malaysia (Sabah).

Etymology: *Mendolonga*, named after the type locality, Mendolong Nursery.

***Marilia namha*, new species**

Figs 204–210

This species resembles *M. tuyetmira*, new species from which it is easily separated by the presence of a single group of dark setae around the forewings nygma instead of numerous small groups of darker setae scattered over entire forewing surfaces. Another distinguishing character is presence of large, narrow and oblique lateroapical corners of tergum IX, which form plates overhanging the articulations of the preanal appendages. These plates are short in *M. tuyetmira*. *Marilia namha* represents the only examined species having the anterior sutures produced into a complete ring formed by the tergal parts. Compared to *M. tuyetmira*, the distance between the eyes is much shorter and the vertexal medioantennal compact setal wart are fused with the septa and are heart-shaped; and the occipital setal warts are drop-shaped, not rounded triangular as in *M. tuyetmira*.



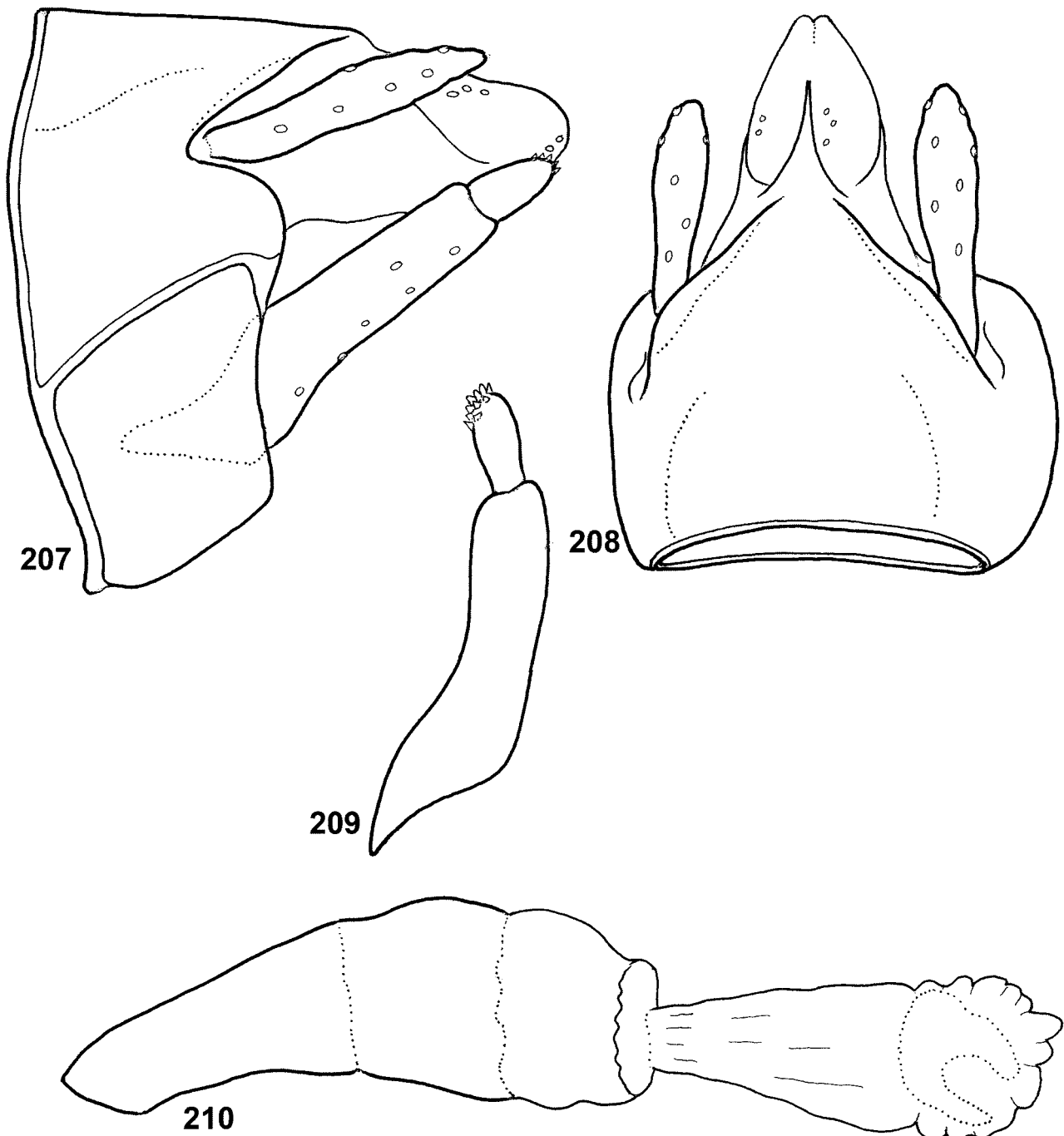
FIGURES 204–206. *Marilia namha*, new species, holotype. 204 —head, frontal; 205 —head, dorsal; 206 — right wings.

Male (in alcohol). Body medium-sized; pale brown; legs, antennae and palps light brown, almost yellowish; cephalic and thoracic setal warts white; forewings uniformly whitish hyaline, with white setae, small patch of black setae present around nygma. Eyes black, large. Vertex constricted; width of interocular area about $\frac{2}{5}$ ths that of eye diameter; 3 times longer than broad. Ocelli absent. Tentorium unknown. Facial groove pattern, including pair of long, narrow frontal lateral diffuse setose wart with large, white alveolus and enlarged antennal sockets dominating on frons. Anterior part of frontal grooves invisible. Frontogenal vertical groove invisible between frontal lateral diffuse warts and vertical, narrow but short frontogenal diffuse setose warts. Frontogenal diffused warts present on posterior region, below antennal sockets, represented by 4 to 5

white alveoli. Clypeogenal vertical grooves located ventrally of anterior tentorial pits; running obliquely laterad, reaching subgenal process. Subantennal grooves running vertically in narrow strip between ocellar grooves and frontogenal diffuse setose warts. Subocular grooves merging to anterior clypeogenal grooves. Vertexal groove pattern simple, constricting. Coronal grooves almost complete, forming straight line in middle of vertex, anteriorly vestigial. Postoccipital grooves encircling *foramen magnum* and postoccipital lobes. Labrum small, short, without setal warts, with movable anterior part, freely hanging. Mandibles almost indiscernible on uncleared head; lacinia broad, setose. Pair of long frontal lateral diffuse setal warts present on face beside short, narrow pair of frontogenal diffuse setal warts below antennal sockets along subantennal groove of pregenae. Pair of rounded vertexal lateroantennal warts on vertex forming compact setal warts; compressed, elongate, drop-shaped, with narrow posterior end, following pattern of compressed vertex. Vertexal mediantennal compact setose warts fused, septum of joining skeletal rings of compressed warts visible, heart-shaped. Occipital compact setose warts large, drop-shaped at posterior end of coronal groove, following ocular groove. Pair of *sensilla basiconicae* rounded, located at end of coronal groove, tangential with occipital warts. Pair of postgenal compact warts following postgenal area, curving along posterior part of ocular grooves; narrow strip pressed to ocular groove. Postgenal surface glabrous; postgenal surface hidden by eyes. Maxillary palps darker than legs and antennae; maxillary palp formula (I,III,V)-IV-II; each basal segment without setose subapicomesal nodule. Scapes shorter than head. Pedicels shorter than first segment of flagellae. Median pair of pronotal warts with white surface, covered by long, white setae; transversely elongated, occupying entire pronotum, almost tangential mesally, narrowest laterally; lateral pair of pronotal warts small, ovoid, visible on extreme lateroapical side behind lateral end of mesal pronotal warts. White mesoscutal diffuse pair of setose warts arranged in longitudinally elongate, short, narrow, irregular patch on middle of dorsal surface of mesoscutum; separated by median notal groove; median notal groove also white; narrow pair of lateral and slightly oblique white band continuing on apical half of mesoscutum. Almost entire surface of mesoscutellar area white, covered by diffuse setal warts separated by median notal groove, almost indiscernible on white surface. Each proepisternum with small-sized, ovoid setose wart being smaller than setose wart on precoxale. Large, compact, setal wart present anteriorly on cervical sclerites; forming sclerotized surface on membranous part of neck, touching anterior cervical sclerite. Lateral cervical sclerites forming narrow anterior arms articulating anteriorly to back of head with occipital condyle above posterior tentorial pits, fused to posterior cervical sclerites. Posterior cervical sclerite forming posterad broadening plate reaching prothoracic episternum; articulating to weakly sclerotized anteromedian band of prothoracic eusternum by ventral intercervical sclerites. Dark cervical sclerite complex clearly visible on pale membranous neck. Leg claws symmetrical; spur formula 2, 4, 4; foreleg spurs almost equally long; midleg and hind leg posterior spurs half as long as anterior spurs. Forewings: length 8.5 mm; membrane whitish hyaline, with white setae; without pattern, except black setae around nygma; termen straight; R1 confluent with R2 shortly before C; base of discoidal cell located proximally of mid-length of wing; fork I longer than fork II; forks I and II present; fork I sessile; fork II short petiolate, almost sessile; crossveins *s*, *r-m* and *m-cu* present; postanal vein present. Hind wings: R1 long, running to R2 near apical part of C; fork I slightly longer than fork II; long basal brush present on small anal lobe.

Male genitalia. Abdominal segment IX fused annularly, with 1 longitudinal groove, widening into sclerotized plate on distal margin of apical lobes above articulation of gonocoxites; dorsal longitudinal grooves absent; vestigial path forming fold in lateral and dorsal view; tergum IX much longer than venter; anterior margins straight, vertical, slightly convex at middle; posterior margins each with rounded apical lobe, deeply excised at preanal appendages; lateroapical corners of tergum IX forming long, narrow, oblique plates over articulation of preanal appendages. Antecostae well developed, forming complete ring and dark marginal rim connecting to longitudinal grooves; spine rows absent on posterior margins of segment IX; setose areas absent on apicopleural and apicoventral areas; few setal alveoli scattered around apical lobes and on ventropleural region. Depression between segment IX and segment X slightly sloping. Segment X weakly pigmented, forming quadrangular plate with rounded apex as long as gonocoxites in lateral view; in dorsal view central ridge separating lateral concavities long triangular, running to subapical end of segment. Apicoventral setose lobes representing few subapical setae. Apicodorsal setose area not discernible. Apex of segment X filled; dorsal

interlobular gap absent. Preanal appendages long, filiform in lateral and dorsal view. Gonocoxites as long as segment X; longer than preanal appendages; coxopodites straight almost parallel-sided in lateral and ventral view; harpagones slightly clavate, with small cone-shaped setae in ventral view. Phallic apparatus 3-partite in lateral view. Sclerotized phallosome widening apicad. Endotheca and phallicata indiscernible; longitudinal section after phallosome possibly representing endophallus; apex with phallosomal sclerites and transverse marginal strips possibly representing phallicata. Enlarged phallosomal sclerite widely V-shaped in ventral view; forming single dorsal arm in lateral view.



FIGURES 207–210. *Marilia namha*, new species, holotype. 207 — genitalia, lateral; 208 — genitalia, dorsal; 209 — gonocoxite, ventral; 210 — phallus, lateral.

Holotype male: LAOS PDR: Luang Namtha Prov.: Nam Ha NBCA, Nam Mat Noi stream, 600 m upstr. Don Sai Village, 100 m upstream junction to Nam Mat Ngai, 719 m, UTM 47Q0744378, 2333774, 30.iv–2.v.2005, Malaise trap, loc 28 [N. Jönsson, T. Malm & B. Viklund] – (NRM).

Distribution: Laos.

Etymology: *Namha*, named after the type locality, Nam Ha.

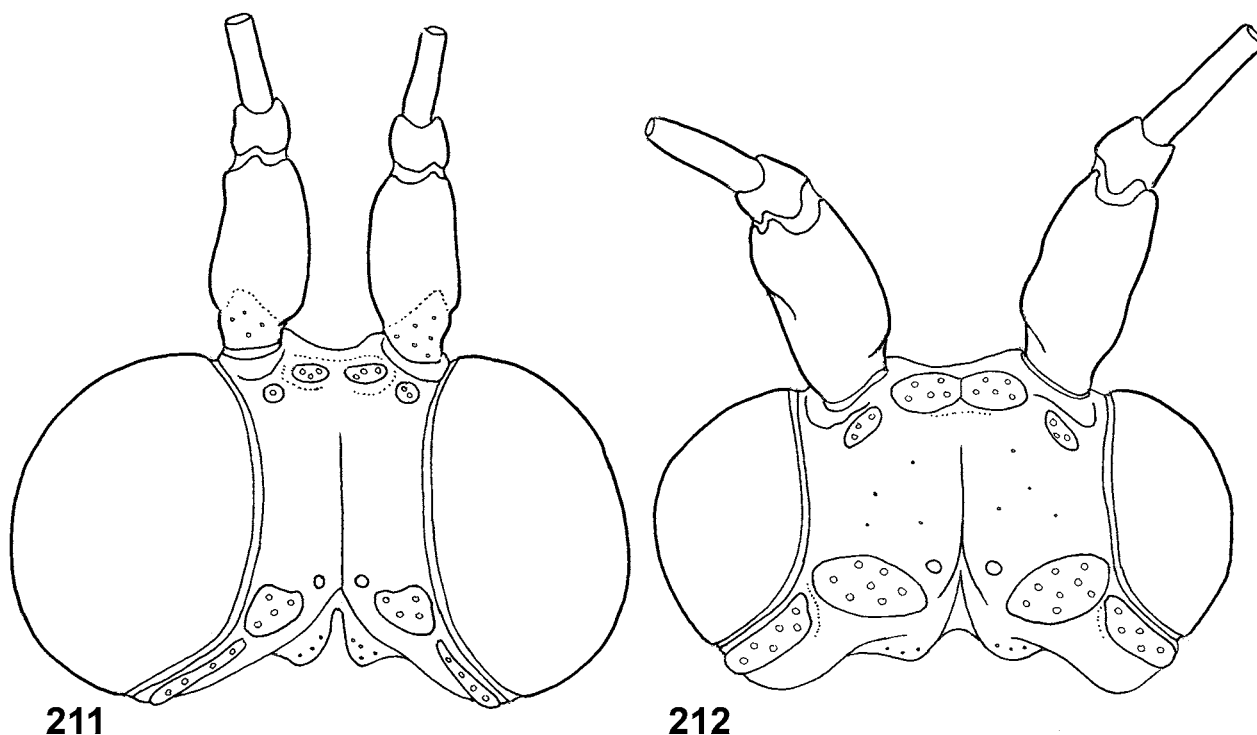
***Marilia sumatrana* Ulmer**

Figs 211–216

Marilia sumatrana Ulmer, 1951: 11.

Type locality: Indonesia (Sumatra).

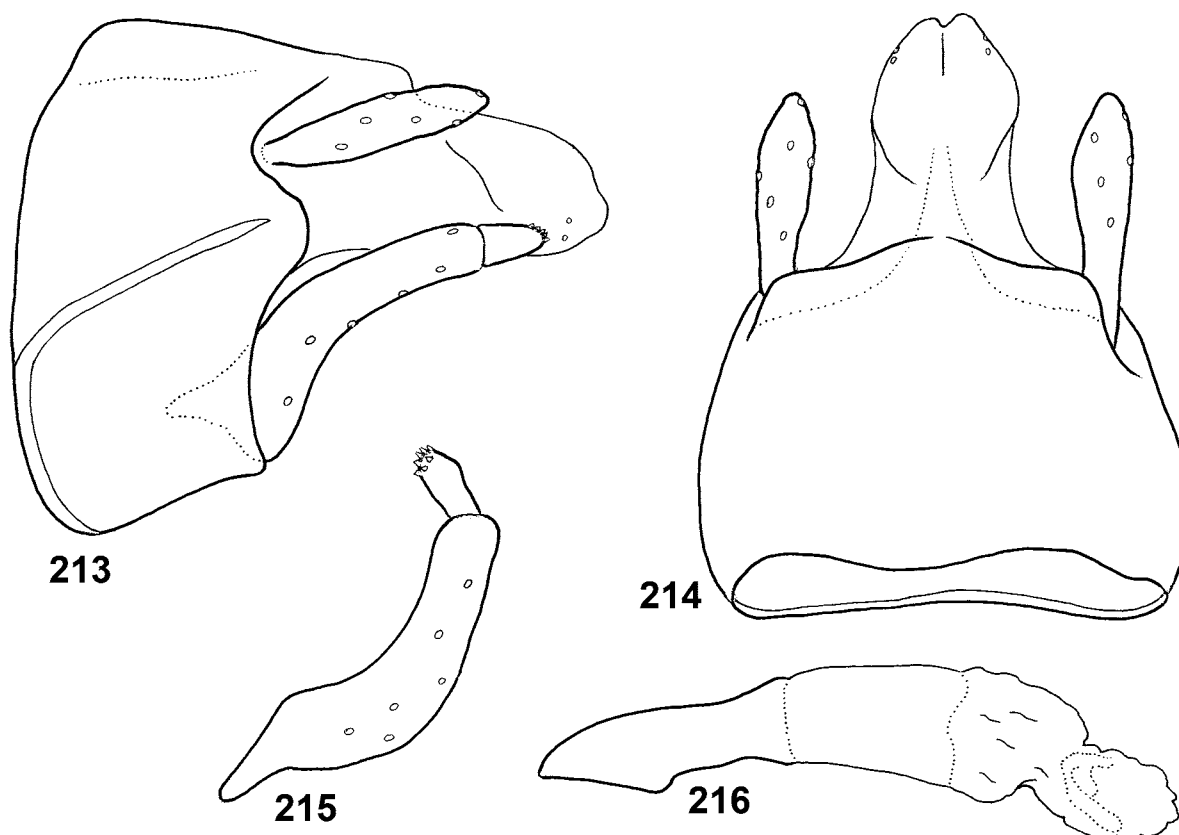
New records: LAOS PDR: Luang Namtha Prov.: Nam Ha NBCA, Lakkhammai Village, Nam Leung stream, 749 m, UTM 47Q0744602, 2339873, 30.iv.2005, light trap, loc 29 [N. Jönsson, T. Malm & B. Viklund] – 3 males (NRM); Tong Om Village, 552 m, UTM 47Q0750111, 2321825, 1.v.2005, light trap, loc 30 [N. Jönsson, T. Malm & B. Viklund] – 1 male (NRM). **Vientiane Prov.:** Vang Vieng, Nam Xong River, upstream bamboo footbridge, 363 m, UTM 48Q0223506, 2115465, 26.iv.2005, light trap, loc 10 [N. Jönsson, T. Malm & B. Viklund] – 1 male (OPC). **VIETNAM: Bac Thai Province:** Quang Chu, 24–25.v.1987, light [J. Oláh] – 5 males, 9 females (OPC). **Cuc Phuong:** 13.x.1963 [T. Pócs] – 1 male (OPC).



FIGURES 211–212. *Marilia sumatrana* Ulmer, from Vietnam: Bac Thai Province, Quang Chu. 211 — male head, dorsal; 212 — female head, dorsal.

This whitish animal with snow-white abdomen and whitish-hyaline wings belongs to the diagnostic species-group characterized by having whitish colour on some of their body parts, i.e. *M. lata* Ulmer, 1926, *M. simulans* Forsslund, 1936; *M. javana* Ulmer, 1951, *M. parallela* Hwang, 1957, and *M. albofusca* Schmid, 1959. *Marilia tuyetmira*, new species is easily distinguished from the other species by the presence of a long, narrow and oblique lateroapical corner of tergum IX, and there is no complete anterior suture on tergum IX.

The distance between the eyes in dorsal view is longer compared to in *M. namha*; the vertexal medioantennal compact setal wart are separate, rounded; and the occipital setal warts are rounded triangular, not drop-shaped. *Marilia tuyetmira* is distinguished from *M. lata* as the latter species has a convex termen on the forewings; genitalia with broad, filiform preanal appendages; basally very broad coxopodites in ventral view; and the maxillary palp formula is I-(IV,V)-II-III. *Marilia simulans* is separated from *M. tuyetmira* in having a convex termen; the forewing venation is different, like the shorter M1+2; and segment X is more pointed in dorsal view. *Marilia javana* has curved coxopodites and very narrow segment X in dorsal view. *Marilia parallela* is distinguished by its forewing venation. *Marilia albofusca* is distinguished by genitalic characters, i.e. having ventral part of segment X more sclerotized, and with produced apicoventral corners



FIGURES 213–216. *Marilia sumatrana* Ulmer, from Vietnam: Bac Thai Province, Quang Chu. 213 — genitalia, lateral; 214 — genitalia, dorsal; 215 — gonocoxite, ventral; 216 — phallus, lateral.

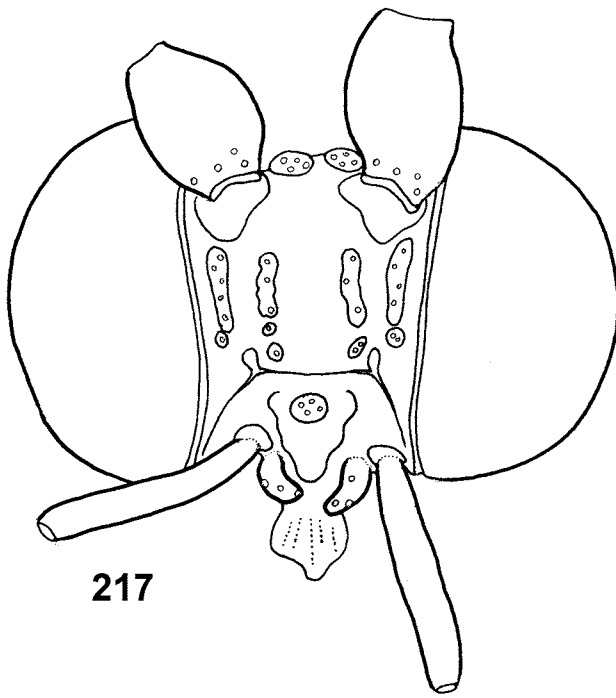
***Marilia tuyetmira*, new species**

Figs 217–223

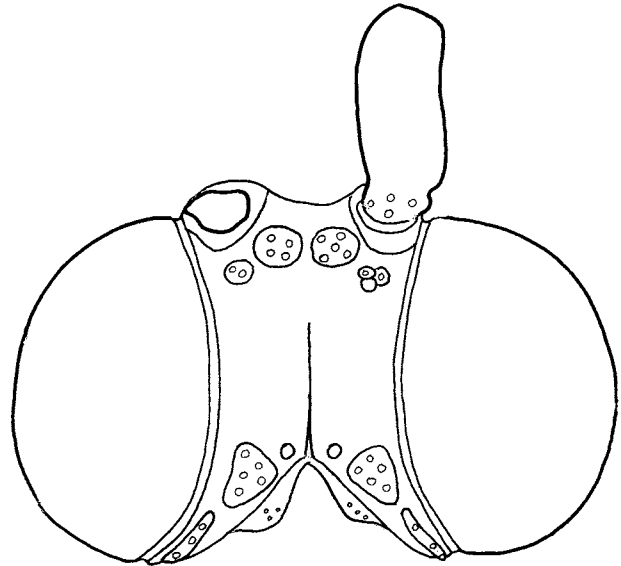
Male (in alcohol). Body medium-sized; brown; legs, antennae and palps slightly lighter than body; abdomen, cephalic and thoracic setal warts white; forewing membrane whitish hyaline. Eyes black; moderately large; vertex slightly constricted, eyes; distance between eyes equal to eye diameter, and 2 times longer than broad. Ocelli absent. Tentorium slender, with short, vestigial dorsal arm; posterior arms robust, ending in pair of large, posterior tentorial pits; tentorial bridge slender, without protuberances; posterior half of anterior tentorial arms very thin, anterior half more robust, with strongly developed median lamellate lobes. Facial groove pattern simple. Pair of short, narrow, brown, fragmented frontal lateral setose wart with white alveoli, and enlarged antennal sockets dominating on frons. Anterior part of frontal grooves absent. Frontogenal vertical grooves invisible. Frontogenal, fragmented warts long, brown, vertically elongated. Clypeogenal vertical grooves located ventrally of anterior tentorial pits; running obliquely laterad, reaching subgenal process. Sub-antennal grooves nearly indiscernible; vertical, forming narrow strip between ocellar groove and frontogenal compact setose warts; subocular groove not visible. Vertexal groove pattern simple; coronal groove almost

complete, forming straight line in middle of vertex; anterior part vestigial. Postoccipital grooves encircle *foramen magnum* and postoccipital lobes. Labrum forming small, short, triangular structure with median setal area; anterior part movable, freely hanging. Mandibles almost indiscernible; lacinia visible, broad, setose. Head dorsum with small, rounded vertexal lateroantennal compact setal warts. Vertexal mediantennal compact setal warts well separated, large, round. Occipital compact setose warts large; triangular at posterior end of coronal groove. Pair of *sensilla basiconica* rounded, located along end of coronal groove, near occipital warts. Pair of postgenal compact warts following shape of elongate postgenal area, curving along posterior part of ocular grooves; forming narrow strip near ocular groove. Postgenal surface glabrous. Maxillary palps light brown; maxillary palp formula V-IV-III-II-I; each basal segment without setose subapicomeres nodule. Each scape shorter than head. Each pedicel shorter than first segment of each flagellum; flagellae almost 2 times longer than forewings. Pronotum with 1 pair white warts with white setae; transversely elongate, occupying entire segment, almost touching mesally, narrowest laterally. Mesoscutal diffuse pair of setose warts composed of few light alveoli arranged in 2 longitudinally elongate, short, narrow, irregular patch on middle of dorsal surface of mesoscutum, separated by white median notal groove. Almost entire surface of mesoscutellar area white, with few, nearly indiscernible alveoli; few diffuse warts scattered among numerous small dots. Each proepisternum with small-sized, ovoid setose wart, smaller than setose wart on precoxale. Large, compact, setal wart present anteriorly on cervical sclerites; forming sclerotized surface on membranous part of neck, touching only anterior cervical sclerite. Lateral cervical sclerites forming narrow anterior arm articulating anteriorly to back of head with occipital condyle above posterior tentorial pits, fused to posterior cervical sclerites. Posterior cervical sclerite forming posterad broadening plate reaching prothoracic episternum, articulating to weakly sclerotized anteromedian band of prothoracic eusternum by ventral intercervical sclerites; dark pattern of cervical sclerite complex clearly visible on pale membranous neck. Leg claws symmetrical; spur formula 2, 4, 4; foreleg spurs almost equally long; midleg posteroapical spurs 2 times longer than foreleg spurs; midleg posterior subapical spurs 1/4th as long as anterior spurs. Hind leg posterior spurs half as long as anterior spurs. Forewings: 8.0 mm; narrow, with concave termen; membrane whitish hyaline, with whitish setal pattern by groups of darker setae; R1 confluent with R2 shortly before C; base of discoidal cell located proximally of mid-length of wing; fork I longer than fork II; forks III–V absent; fork I sessile, fork II short petiolate; crossveins *s*, *r-m* and *m-cu* present; postanal vein present. Hind wings: R1 present, long, fusing with R2 near apicalmost part of C; fork I slightly longer than fork II; with long basal brush. First and second axillary sclerites enlarged on both forewings and hind wings.

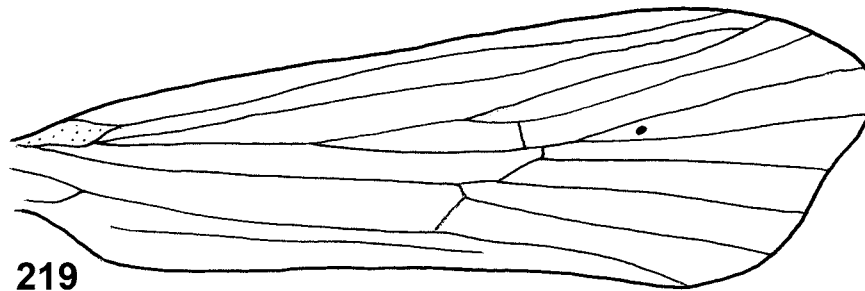
Male genitalia. Abdominal segment IX fused annularly, with 1 longitudinal groove running apicad, not reaching distal margin of apical lobes; dorsal longitudinal grooves absent; tergum longer than venter; anterior margins convex, with 2 small projections; each dorsal projection triangular, located at end of antecostal sutures and ventrally at confluence of ventral sutures; posterior margins with flat apical lobe deeply excised at preanal appendages. Apicolateral corners of tergum IX forming short, narrow, oblique plate over articulation of preanal appendages. Antecostae well developed, lacking on dorsum, forming dark marginal rims connected to longitudinal grooves; spine rows absent on posterior margins of segment IX; setose areas absent on apicopleural and apicoventral areas. Intersegmental depression between segment IX and segment X slightly sloping. Segment X weakly pigmented, forming quadrangular plate with rounded, narrowing apex in lateral view; longer than gonocoxites; 2 central longitudinal ridges separating lateral concavities in dorsal view, running to subapical end of segment; pair of lateral ridges running to apicolateral depressions. Apicoventral setose lobes with few subapical setae. Apicodorsal setose area represented by few dorsal setae. Apex of segment X filled; dorsal interlobular gap minute. Preanal appendages long, filiform in lateral and dorsal view. Gonocoxites shorter than segment X; coxopodites straight, with curved dorsal margin, resulting in narrowing apical half in lateral view. Harpagones slightly clavate in ventral view, with small, cone-shaped setae. Phallic apparatus forming basally curving, subapically constricted phallosome and membranous apical portion of endothena. Phallicata indiscernible. Phallosomal sclerites small.



217



218



219

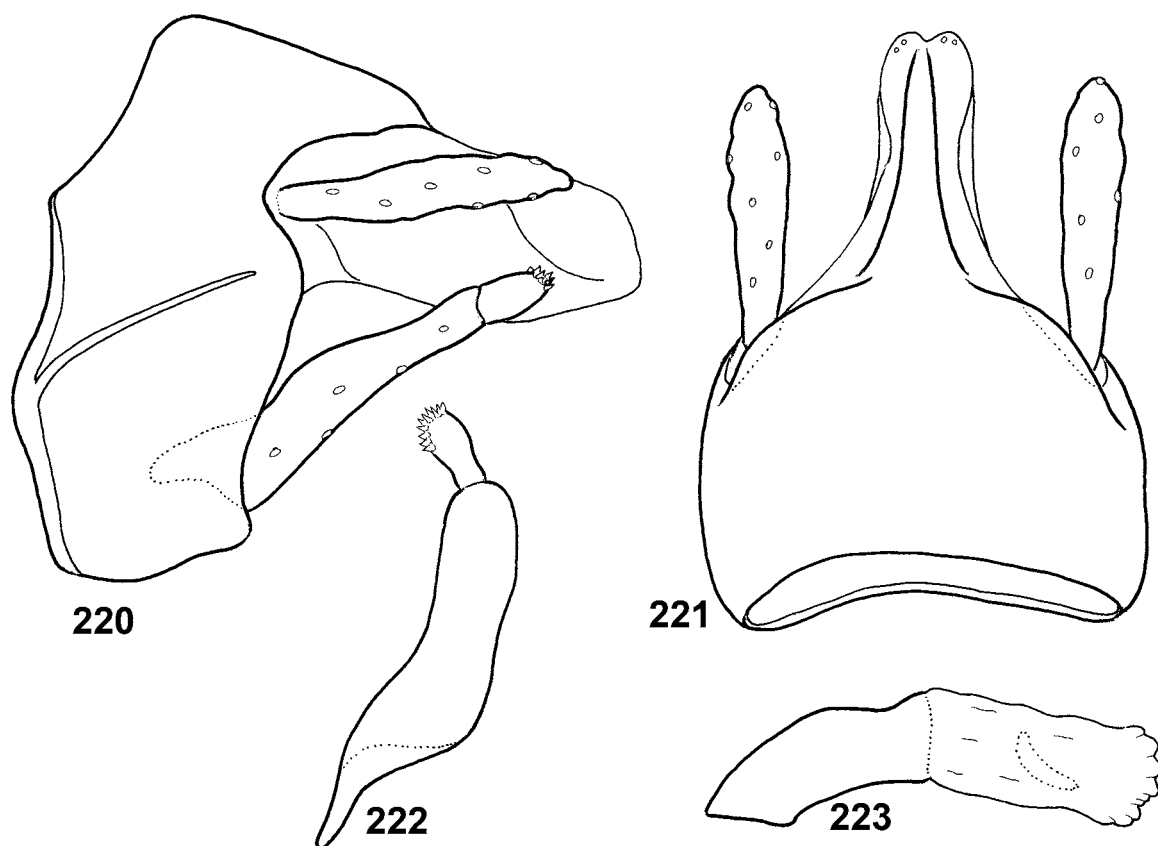
FIGURES 217–219. *Marilia tuyetmira*, new species, holotype. 217 —head, frontal; 218 —head, dorsal; 219 — right forewing.

Holotype male: LAOS PDR: **Vientiane Prov.:** Vang Vieng, Nam Xong River, upstream bamboo foot-bridge, 363 m, UTM 48Q0223506, 2115465, 26.iv.2005, light trap, loc 10 [N. Jönsson, T. Malm & B. Viklund] – (NRM).

Paratypes: same data as holotype - 1 male (OPC). **Luang Namtha Prov.:** Nam Ha NBCA, Lakkhammai Village, Nam Leung stream, 749 m, UTM47Q0744602, 2339873, 30.iv.2005, light trap, loc 29 [N. Jönsson, T. Malm & B. Viklund] – 1 male paratype (NRM). **Odomxai Prov.:** Odomxai Town, Nam Ko River, just upstr. bridge, 28.iv.2005, light trap, loc 21 [N. Jönsson, T. Malm & B. Viklund] – 1 male paratype (NRM).

Distribution: Laos.

Etymology: *Tuyetmira*, from “mira tuyet”, snowy in Vietnamese, referring to the snow-white colour of the abdomen.



FIGURES 220–223. *Marilia tuyetmira*, new species, holotype. 220 — genitalia, lateral; 221 — genitalia, dorsal; 222 — gonocoxite, ventral; 223 — phallus, lateral.

Psilotreta Banks

Psilotreta Banks, 1899: 213.

Inthanopsyche Malicky, 1989, **new synonym**.

When describing the genus *Inthanopsyche*, Malicky (1989) emphasized that it is similar to the genus *Psilotreta*. A main distinguishing character for *Inthanopsyche* is the presence of a long apical fork I in the forewings. An additional distinguishing character represents mesally located harpagones of the genitalia, which separated species of this genus from species in *Psilotreta* which have apically located harpagones. We have observed variously elongated forewing apical fork I in several *Psilotreta* species, and the length of fork I appears to vary between species in the same diagnostic species-groups. Beside *P. trimeresuri* diagnostic species-group, *P. jaroschi* Malicky in the *P. japonica* diagnostic species-group has a long fork I in the male forewings, but being short in the females. The mesal position of the harpagones appears to represent a synapomorphy for the *Psilotreta* species that are otherwise characterized by having elongated forewing fork I. We have compared all *Psilotreta* species having mesally located harpagones with species having variously elongate fork I and found that *Inthanopsyche* is a diagnostic species-group inside *Psilotreta*, and *Inthanopsyche* is therefore synonymised with *Psilotreta*. Thamsenanupap *et al.* (2005) also demonstrated that there are no clear difference between the larvae of *Psilotreta* and the larvae of *Inthanopsyche*.

The genus *Psilotreta* includes 3 diagnostic species-groups, being distinguished on the following genitalic characters: (1) the position of the harpago on the coxopodites; (2) the number and size of apical spines on the harpagones; and (3) the presence or absence of phallic parameres.

***Psilotreta japonica*, new diagnostic species-group**

This diagnostic species-group includes species characterized by the following characters: harpagones originating from the apex of the coxopodites; numerous small spines on the apex of the harpagones; and presence of phallic parameres, represented by a single pair besides the variously formed sclerotized phallotremal sclerites inside the endotheca. An exception is observed in *P. abudeb* Malicky & Chantaramongkol, having a pair of phallic parameres in the holotype, and 2 pairs of phallic parameres in a single specimen from Myanmar, a specimen also having large spines on each harpago. Regarding the phallic parameres in the latter individual, the pair located basally in the endotheca may represent the parameres being homolog with parameres in related species, while the apical pair is associated with the phallotremal sclerite complex. Some species, like *P. lobopennis* Hwang from China, has complex gonocoxites, with ventrad and dorsad producing lobes on the coxopodites, but with apically originating harpagones. This diagnostic species-group is the most species rich group in the genus and includes the following 31 species in the (eastern) Palaearctic and Oriental Regions: *P. abudeb* Malicky & Chantaramongkol, 1991 (Myanmar), *P. aello* Malicky & Chantaramongkol, 1996 (Thailand), *P. aidoneus* Malicky, 1997 (Nepal), *P. albogera* Mey, 1997 (Vietnam), *P. androconiata* Mey, 1997 (Vietnam), *P. assamensis* Parker & Wiggins, 1987 (India), *P. baurea* Malicky, 1989 (Thailand), *P. bidens* Mey, 1995 (Vietnam), *P. chinensis* Banks, 1940 (China: Sichuan), *P. daidalos* Malicky, 2000 (China: Hennan), *P. daphnis* Malicky, 2000 (China: Zhejiang), *P. daktylos* Malicky, 2000 (China: Hennan), *P. dardanos* Malicky, 2000 (China: Zhejiang), *P. enikoeae*, new species (Vietnam) *P. falcula* Botosaneanu, 1970 (Korea), *P. frigida* Mey, 1997 (Vietnam), *P. illuan* Malicky, 1989 (Thailand), *P. japonica* Banks, 1906 (Japan), *P. jaroschi* Malicky, 1995 (Vietnam), *P. kisoensis* Iwata, 1928 (Japan), *P. kwantungensis* Ulmer, 1925 (China: Guangdong), *P. lobopennis* Hwang, 1957 (China: Fujian), *P. locumtenens* Botosaneanu, 1970 (Korea), *P. ochina* Mosely, 1942 (China: Fujian), *P. orientalis* Hwang, 1957 (China: Fujian), *P. papaceki* Malicky, 1995 (Vietnam), *P. pyonga* Oláh, 1985 (Korea), *P. quadrata* Schmid, 1959 (China: Yunnan), *P. quinglingshanensis* Mey & Yang, 2001 (China: Sichuan), *P. quinlani* Kimmins, 1964 (Nepal), *P. schmidi* Parker & Wiggins, 1987 (India), and *P. trispinosa* Schmid, 1965 (China: Zhejiang).

***Psilotreta abudeb* Malicky & Chantaramongkol**

Psilotreta abudeb Malicky & Chantaramongkol, 1991: 87.

Type locality: Myanmar.

New records. MYANMAR: North East, Kambaiti 2000 m, 4.iv.1934 [R. Malaise] — 6 males, 3 females; ditto, except 18.v.1934 — 3 males (NHML, Malaise B.M. 1938-258).

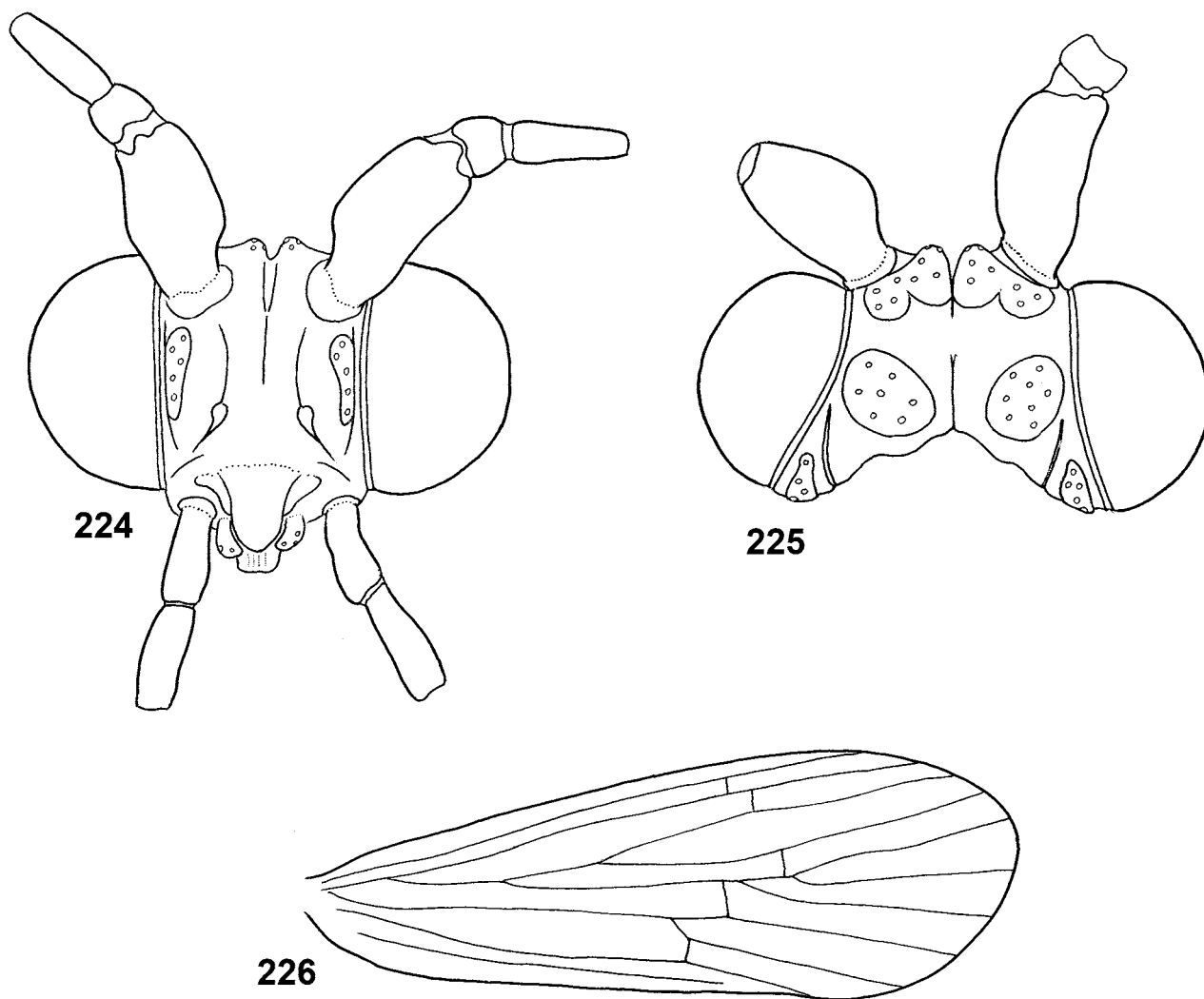
Remarks. There are characters in the new-recorded individuals that vary from characters in the holotype: they have 2 pairs of large, heavily sclerotized spines, both arising from the endotheca; the apical spines in the protruded phallicata have very broad bases; and a small, stepwise depression seen in the drawings of the holotype is absent.

***Psilotreta enikoeae*, new species**

Figs 224–231

This medium-sized species with dark gray forewing has all characters characteristic for the species in the *P. japonica* diagnostic species-group. The species resembles *P. papaceki* Malicky from Vietnam in the absence of intermediate appendages in the genitalia. It is easily separated from *P. papaceki* in the dorsal view of the

genitalia by the presence of a broad dorsomedian setose process, which is very narrow in *P. papaceki*; the arched shape of segment IX, the cylindrical coxopodites, and the digitiform harpagones.



FIGURES 224–226. *Psilotreta enikoeae*, new species, holotype. 224 —head, frontal; 225 —head, dorsal; 226 — right forewing.

Male (in alcohol). Body medium-sized; light brown; legs, antennae and palps light yellowish; forewings dark cinereous. Head rectangular in dorsal view, about 2 times broader than long. Ocelli absent. Facial groove pattern modified by depressed indentation dominating on frons; frontal groove, facial arms branching from coronal groove fused, forming pronounced mesal vertical groove running along centre of depressed indentation; pronounced vertical line of frontal groove forming continuation of deep fissure separating vertexal medi-antennal pair of compact setose warts. Frontogenal vertical groove present in narrow fossulae. Clypeogenal vertical grooves located ventrally of anterior tentorial pits; short, oriented obliquely laterad. Subantennal grooves orienting vertically, close to ocellar grooves, slightly turning mesad anteriorly, almost confluent to clypeogenal grooves. Subocular grooves merged to anterior meeting point of subantennal and clypeogenal grooves. Vertexal groove pattern simple; coronal groove starting from deep fissure, interrupted, conspicuous on posterior half of vertex; occipito-postgenal groove partly merging anterad, tangential with occipital compact setose warts. Labrum elongate, without setal warts; anterior part movable, freely hanging. Mandibles small, weakly pigmented; laciniae broad. Frontal setal warts absent on face. Elongate, narrow pair of frontogenal compact setal warts present from antennal sockets along subantennal groove of pregenae; anteriorly nar-

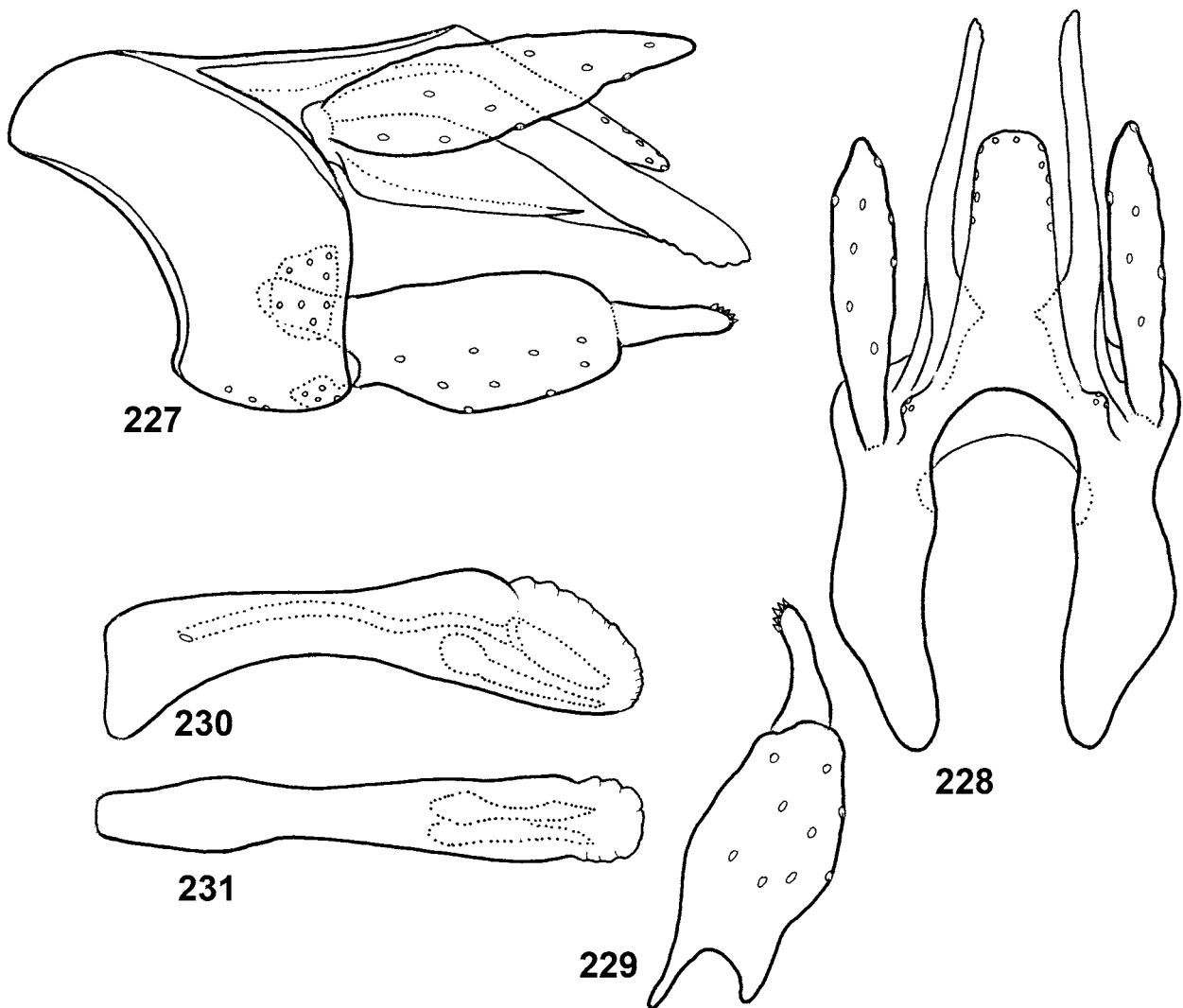
rowing; representing only compact warts visible on face. Vertexal lateroantennal compact setal warts fused with vertexal mediantennal compact setose wart, forming large, setose wart on interantennal elevated hump, separated by deep fissure. Occipital compact setose warts rounded, slightly ovoid obliquely. Vertically elongated postgenal compact warts curving along posterior section of ocular grooves. Maxillary palps darker than body; maxillary palp formula I-II-IV-III-V; each basal segment without setose subapicomeres nodule. Each scape as long as head. Each pedicel much shorter than first segment of each flagellum. Pronotum with 1 pair of warts dominating on dorsum; warts transversely elongate, broad, rounded, mesally tangential, slightly narrowing laterally. Pair of rounded, longitudinally elongated mesoscutal compact setose warts present. Pair of mesoscutellar, diffused setal warts visible in linear, narrow bands. Each proepisternum with large, ovoid setose wart. Precoxiale each with small setal wart. Small, compact setal wart present on anterior section of each cervical sclerites, almost hidden by head and pronotum. Lateral cervical sclerites forming narrow anterior arms articulating anteriorly to back of head with occipital condyle above posterior tentorial pits, fusing to posterior cervical sclerites; posterior cervical sclerites forming rounded, posteriad broadening plates, reaching prothoracic episternum, articulating to weakly sclerotized anteromedian band of prothoracic eusternum by ventral intercervical sclerites. Cervical sclerite complex dark, clearly visible on pale, membranous background. Leg claws symmetrical; spur formula 2, 4, 4; posterior spurs on all legs slightly shorter than anterior spurs. Forewings: length 7.0 mm; membrane dark cinereous, without pattern; R1 running separately to C, not confluent with, or recurrent into R2; base of discoidal cell located proximally of mid-length of wing; fork I about 2 times longer than fork II; forks III and IV absent; fork I, petiolate, fork II almost sessile, crossveins *sc-r*, *r*, *s*, *r-m* and *cu-a* present, crossveins *m* and *cu* absent; postanal vein present. Hind wings: R1 running separate before C; fork I about 2 times longer than fork II.

Male genitalia. Abdominal segment IX fused annularly, with longitudinal groove separating small dorsum from rest of segment; tergum IX reduced to complex of narrow strips; tergum IX not reduced; posterior margins of segment IX straight oblique from gonocoxites to preanal appendages. Antecostae well developed, forming dark marginal rims on ventral, concave section. Tergum IX with complex of dark strips protruding posterad to segment X, forming 3 dark groove strips and internal ridges meeting anteriorly: longitudinal grooves separating tergum from rest of segment IX; second grooves reinforcing lateral plates of segment X; third grooves present along upper margin of tergum. Spine rows on posterior margins of segment IX absent, 2 well-defined setose areas on apicopleural and apicoventral parts. Intersegmental depression between segment IX and segment X filled. Segment X forming dorsomedian, broad, almost parallel-sided body in dorsal view; slightly broadening basad; straight and narrow in lateral view; marginated or fringed by sparsely packed setae. Pair of lateral processes on segment X forming vertically flattened plates, dark, dorsal strip parallel-sided in lateral view; slightly toothed ventroapically. Broad basal plates weakly pigmented, almost indiscernible, except ventral margins with long, dark spine. Apicoventral setose lobes represented by apical 1/3rd of dorso-median body. Apicodorsal setose area forming pair of elevated setose warts at dorsal base of segment X; apex of segment X rounded, without dorsal interlobular area. Preanal appendages long, filiform in lateral view; digitiform, with tapering apices in dorsal view. Gonocoxites as long as preanal appendages and lateral processes of segment X; cylindrical, slightly broadening at midway. Harpagones narrow, long, straight in lateral; curving mesad in ventral view. Phallic apparatus straight constricted at mid-length; dorsum and venter concave in lateral view. Phallosome sclerotized, forming ventrad-curving lobe. Endotheca short, with 2 pairs long, tangential spines, easily seen inside phallosome in ventral view. Small, elongated, weakly discernible phallosomal sclerite visible at basis of phallosome, above parameres, seen in retracted phallic apparatus.

Holotype male: VIETNAM: **Quang Tri Province:** Da Krong Nature Reserve, 2 km SE of HQ, 16.v.2007 light trap at forest stream [G. Csorba] – (OPC).

Distribution: Vietnam.

Etymology: *Enikoe*, named after Enikő Julia Oláh, the daughter of János Oláh, born few days after this species was collected.



FIGURES 227–231. *Psilotreta enikoeae*, new species, holotype. 227 — genitalia, lateral; 228 — genitalia, dorsal; 229 — gonocoxite, ventral; 230 — phallus, lateral; 231 — phallus, ventral.

***Psilotreta falcula* Botosaneanu**

Psilotreta falcula Botosaneanu, 1970: 314.

Psilotreta pyonga Oláh, 1985, **new synonym**.

New records: KOREA: Kangwon Province: Mt. Kungang-San, 28.v.1985, light [A. Vojnits & L. Zombori] – 1 male, 2 females (NHMB); ditto, except 13.vi.1991, light [L. Ronkay & A. Vojnits] – 1 male (NHMB).

***Psilotreta jaroschi* Malicky**

Psilotreta jaroschi Malicky, 1995: 871.

Type locality: Vietnam.

New records. VIETNAM: Tamdao: 200 m, 12.x.1986, light [J. Oláh] – 1 female (OPC); 1200 m, 11.v.1987, light [J. Oláh] – 3 males (OPC). **Hoabinh:** towards Dabac, 21.x.1986, sweep net and light [J. Oláh] – 13 females (OPC); **Hoabinh Hotel:** 23.x.1986, sweep net [J. Oláh] – 3 females (OPC).

***Psilotreta locumtenens* Botosaneanu**

Psilotreta locumtenens Botosaneanu, 1970: 313.

Ganonema odaenum Kobayashi, 1989, **new synonym**.

Type locality: Democratic People's Republic of Korea.

***Psilotreta papaceki* Malicky**

Psilotreta papaceki Malicky, 1995: 872.

Type locality: Vietnam.

New Records. VIETNAM: Tamdao: sweep net along spring brook and main stream, 10.v.1987 [J. Oláh] – 4 males, 2 females (OPC); ditto, except sweep net at waterfall, 11.v.1987 [J. Oláh] – 1 male (OPC).

***Psilotreta trimeresuri*, new diagnostic species-group**

This diagnostic species-group covers the species having the following combination of genitalic characters: harpagones originate mesally on coxopodites; numerous small spines present on the apex of the harpagones; and presence of parameres in the phallic apparatus. In addition, there are 2 pairs of spines in the phallic apparatus. The species in the group differ from species in the *P. japonica* diagnostic species-group that is characterized by having 1 pair of parameres. Both pairs of spines originate from the endotheca. Some species has an extremely elongate forewing fork I. In segment X there is no intermediate appendages, except *P. spitzeri* Malicky from Vietnam, which has the segment X with lateral plates armed with spine like processes. The 6 known species are recorded from Oriental Region, i.e. between Vietnam and Myanmar: *P. angkangensis* Malicky & Chantaramongkol, 1993 (Thailand), *P. quin* Malicky & Chantaramongkol, 1991 (Thailand), *P. malickyi*, new species (Myanmar), *P. spitzeri* Malicky, 1995 (Vietnam), *P. trimeresuri* (Malicky, 1989) (Thailand), and *P. watananikorni* Malicky & Chantaramongkol, 1995 (Thailand).

***Psilotreta malickyi*, new species**

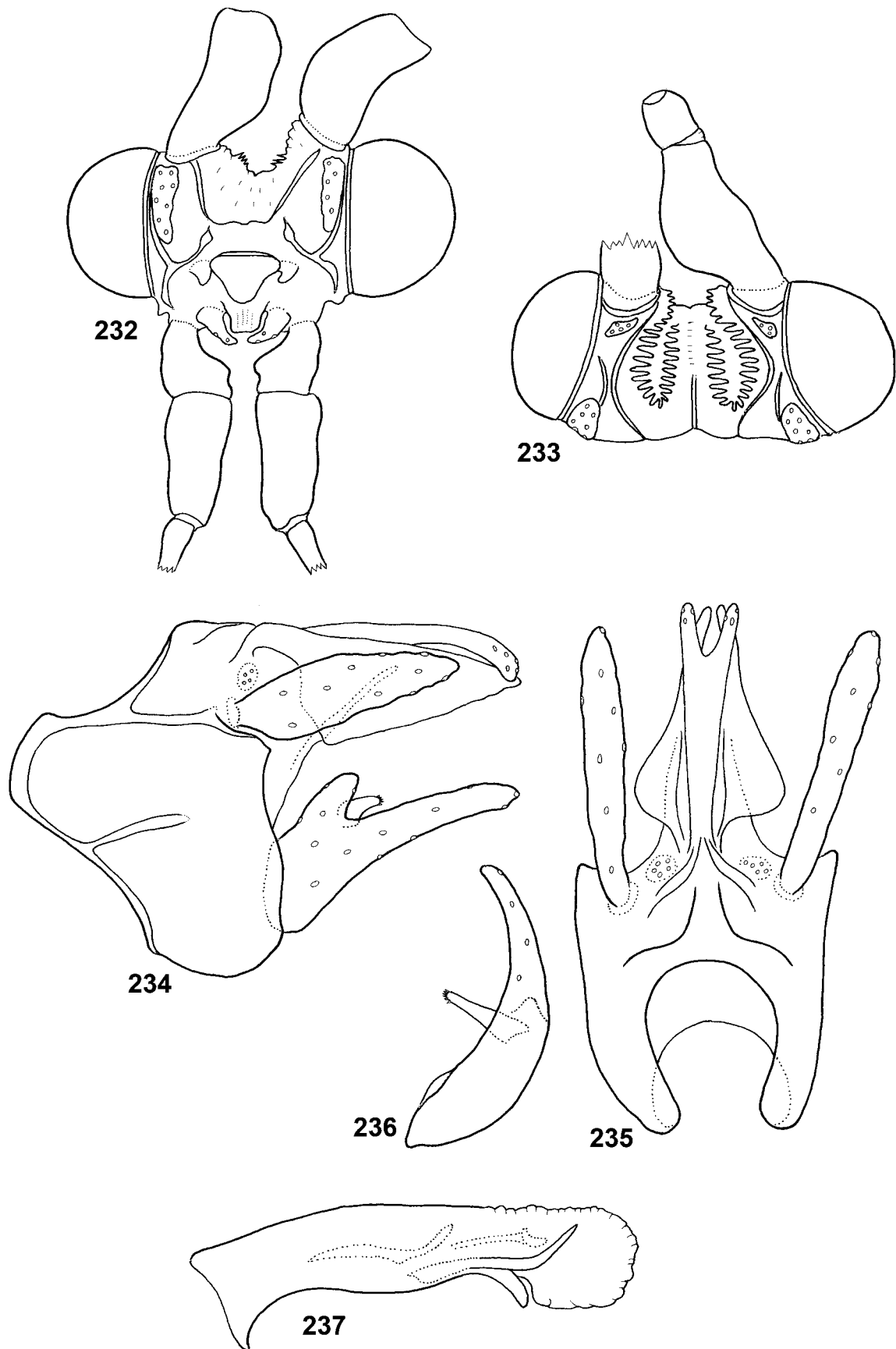
Figs 232–237

This species closely resembles *P. trimeresuri* (Malicky) from Thailand. *Psilotreta malickyi* is separated from *P. trimeresuri* by having shorter preanal appendages, i.e. not longer than the end of the central body of segment X; by its dorsal interlobular gap being deep and widely triangular, not U-shaped; by the glabrous lateral plate that is long triangular in lateral view, reaching apex of the median bifid process of segment X; and by the presence of a basally broad, deltoid processes at the lateral face of segment X.

Male (in alcohol). Body large; light brown; legs, antennae and palps lighter than body; forewings pale brown. Head rectangular in dorsal view, about 2 times broader than long. Ocelli absent. Tentorium slender, with short, tapering dorsal arm; posterior arms short, thick in dorsal view, ending in pair of large posterior tentorial pits; with thick tentorial bridge with small anteromesal protuberance, without posteromesal hump; anterior tentorial arms slender, with small median lamellate process; slightly broadening before anterior apices. Facial groove pattern with deep indentation dominating on frons, continuing and broadening on vertex. Frontogenal vertical groove very short, almost reduced. Clypeogenal vertical grooves located ventrally of anterior tentorial pits; short, running obliquely laterad. Subantennal grooves running vertically, close to ocellar grooves, slightly turning mesad; each with anterior part apparently confluent to oblique, almost horizontal

clypeogenal groove. Subocular grooves merging to anterior meeting point of subantennal and clypeogenal grooves. Vertexal groove system with large indentation almost dominating on vertex, surrounded by frontal groove on face and by large, elongated lateral vertexal groove on vertex. Depression containing 4 rows of elongated, scaloid setae on bottom; stem of epicranial groove vestigial; visible posteriorly in depression; occipito-postgenal grooves partly merging anterad; tangential with lateral vertexal groove. Labrum small, rounded, without setal warts; long, narrow anterior part movable, freely hanging. Mandibles small, weakly pigmented, laciniae narrowly elongate. Frontal setal and frontal interantennal warts absent. Pair of narrow, elongate frontogenal compact setal warts present from antennal grooves, orienting anterad along subantennal groove of pregenae, representing only compact warts visible on face. Deep indentation nearly occupying entire vertex; vertexal lateroantennal compact setal warts slightly elongate obliquely, touching antennal grooves. Vertically elongate postgenal compact wart curving along posterior section of ocular grooves. Maxillary palp formula I-II-III-V-IV, each basal segment with small, well-defined setose subapicomesal nodule; each second segment very robust, covered by long setae, especially on apicodorsal half. Each scapes slightly longer than head. Pedicels shorter than first segment of flagellae. Pronotum with 1 pair transversely elongate, broad warts dominating on entire dorsum. One pair mesoscutal, rounded, compact setose warts present. Mesoscutellar warts absent. Each proepisternum with large, ovoid, setose wart. Precoxal warts small. Large, compact setal wart present on membranous part of cervix, touching anterior arm of cervical sclerites. Lateral cervical sclerites forming narrow anterior arms articulating anteriorly with back of head at occipital condyle above posterior tentorial pits; fusing with posterior cervical sclerites; posterior cervical sclerite forming large, quadrangular plate reaching prothoracic episternum, articulating to weakly sclerotized anteromedian band of prothoracic eusternum by ventral intercervical sclerites. Leg claws symmetrical; spur formula 2, 4, 4, foreleg posteroapical spur shorter than anteroapical spur; midleg anterior spurs smaller than posterior spurs; hind leg spurs equally long. Forewings: length 14.5 mm; membrane light brown without visible pattern; R1 running separately to C, not confluent with, or recurrent into R2; base of discoidal cell located proximally of mid-length of wing, originating near wing base; fork I almost twice as long as fork II; forks III and IV absent; forks I and II petiolate; crossveins *r*, *s*, *r-m* and *cu-a* present; crossveins *m* and *cu* absent; M reduced to single longitudinal vein with base drawn to R4+5 by short crossvein *r-m*, merging to base of fork V; postanal vein present. Hind wings: R1 running separate to C, fork I about 2 times longer than fork II.

Male genitalia. Abdominal segment IX fused annularly, with 2 incomplete longitudinal grooves separating dorsal, mesal and ventral parts; upper grooves straight; lower grooves slightly oblique dorsally; both grooves distrofied posteriorly on both sides; tergum straight, flat, with dorsad oblique rim in lateral view; half as long as convex venter in lateral view. Anterior margins of segment IX produced into large, subquadrangular lobe in; posterior margins straight vertical below segment X, with small flat lobe on ventral half. Antecostae weakly developed, each forming slender marginal rim, thicker on anterior lobes, without external grooves of antecostal sutures. Tergum with lateral, transverse rims continuing anteriorly, forming triangular in dorsal view; spine rows absent on posterior margins of segment IX; segment smoothly glabrous. Intersegmental depression between segment IX and segment X filled by basis of lateral plates of segment X. Segment X long, triangular, with long, median, dorsal process and setose, bifid apex; lateral plates glabrous; segment X constricted at base, continuing to long, narrow median process. Lateral plates deltoid. Apicoventral setose lobes present at apex of bifid median body. Apicodorsal setose lobes forming pair of rounded setose warts dorsally at very base of segment X, easily seen in dorsal view. Dorsal interlobular gap wide, deeply triangular. Superior appendages long, filiform in lateral view; digitiform in dorsal view. Coxopodites slightly shorter than apex of segment X; produced into long ventral and short dorsal branch. Harpagones small, originating mesally on point of bifurcation of each coxopodite; surface glabrous, with short, stout apical setae. Phallic apparatus large, straight; basal part slightly curving ventrad. Phallosome produced ventrad. Endotheca short, with 2 pairs long spines visible inside phallosome; apical half of spines curving dorsad. Small, curving phallosomal sclerite visible at proximal part of phallosome.



FIGURES 232–237. *Psilotreta malickyi*, new species, holotype. 232 — head, frontal; 233 — head, dorsal; 234 — genitalia, lateral; 235 — genitalia, dorsal; 236 — gonocoxite, ventral; 237 — phallus, lateral.

Holotype male: MYANMAR: North East, Kambaiti, 2000 m, 12.v.1934, Malaise trap (Malaise B.M. 1938-258) — (NHML).

Paratype: same data as holotype — 1 female.

Distribution: Myanmar.

Etymology: *Malickyi*, named after Dr. Hans Malicky for his great contribution by describing the first species in this diagnostic species-group.

Psilotreta spitzeri Malicky

Psilotreta spitzeri Malicky, 1995: 871.

Type locality: Vietnam.

New record: VIETNAM: Tamdao: sweep net at spring brook, 10.v.1987 [J. Oláh] – 1 male (OPC).

Psilotreta frontalis, new diagnostic species-group

The species in this diagnostic species-group are characterized by possessing a combination of genitalic characters, i.e. each harpago originates from the apex of the coxopodites; the apex of the harpagones each with few and large spines; and the absence of parameres in the phallic apparatus.

The 6 species of this diagnostic species-group occur in eastern North America: *P. amera* Ross, 1939 (USA), *P. frontalis* Banks, 1899 (USA), *P. indecisa* Walker, 1852 (Canada), *P. labida* Ross, 1944 (USA), *P. rossi* Wallace, 1970 (USA), and *P. rufa* Hagen, 1861 (USA).

Lannapsyche Malicky

Lannapsyche Malicky, 1989: 11.

Type species: *Lannapsyche chantaramongkolae* Malicky, 1989, original designation by monotypy.

Type locality: Thailand.

The species in this genus are characterized by having almost completely reduced preanal appendages (superior appendages), and a pair of sclerotized hairy pads located near the caudal margin of tergite IX. Segment X sometimes with other lobes and processes, like intermediate appendages that are not homolog with the primary segmental appendages. The preanal appendages form concave or convex setal surfaces. The mesal nodule on the first segment of the maxillary palps is present in all examined species of the genus. This nodule was not recognized and not described in the original genus diagnosis but was considered representing one of the main diagnostic characters for the Philorheithridae by Mosely (1936). The cephalic groove pattern, as well as the cephalic and thoracic setose wart pattern, appear almost identical at all examined species. The genus thus contrasts the genus *Phraepsyche* characterized by including species with completely different groove and wart pattern.

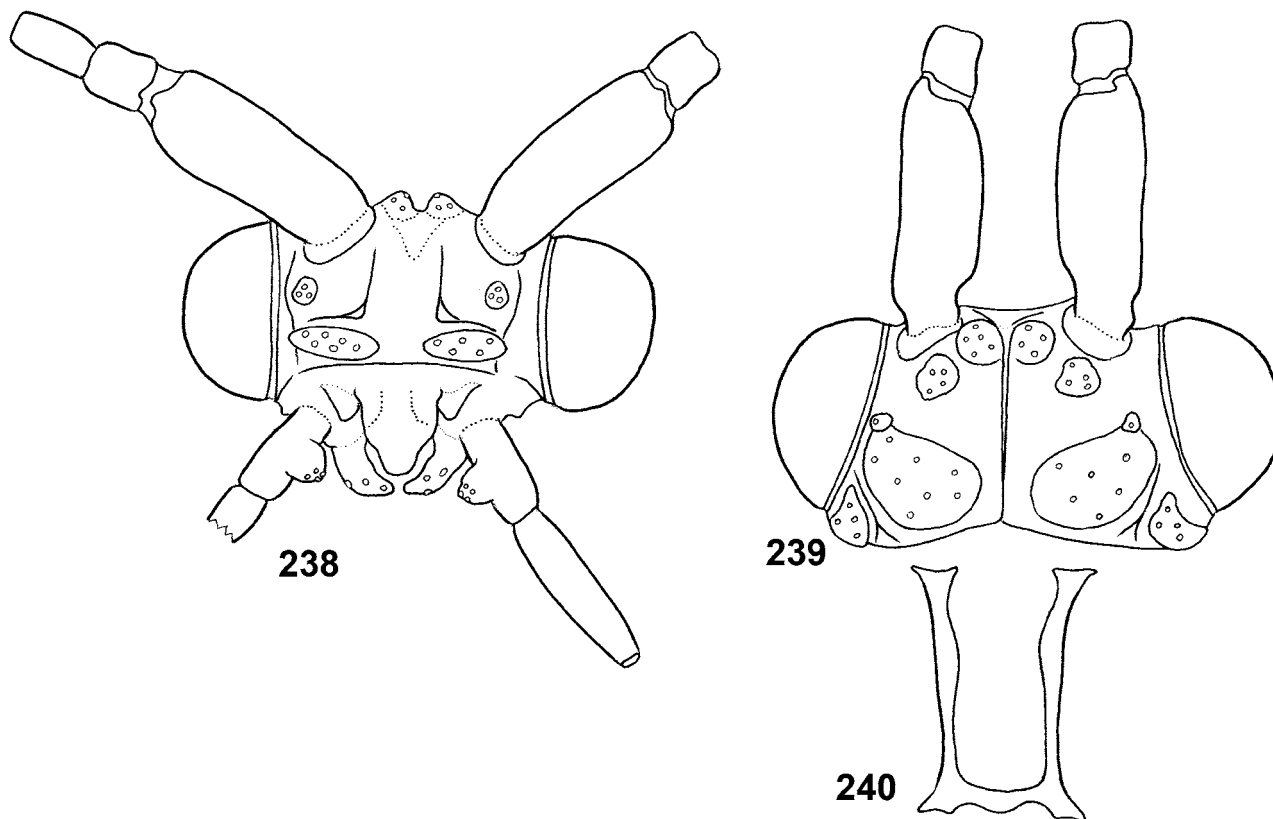
Lannapsyche species rarely come to light, but can be collected at daytime along small brooks or spring-fed streams.

Lannapsyche bachoi Malicky

Lannapsyche bachoi Malicky, 1995: 871, Figs 238–240

Type locality: Vietnam (Tam Dao Mt.).

New records: VIETNAM: Tam Dao: 1400 m, 13.x.1986, sweep net, in deep valley along spring-fed small stream [J. Oláh] — 3 males (OPC); 1400 m, 10.v.1987, sweep net along left tributary of main stream [J. Oláh] — 2 males (OPC); ditto, except along spring brook of main stream — 1 male, 1 female (OPC); 1300 m, 12.v.1987, sweep net 2 km from hotel along medium-sized stream in forest [J. Oláh] — 1 male, 3 females (OPC).



FIGURES 238–240. *Lannapsyche bachoi* Malicky, from Vietnam: Tam Dao Mt. 238 —head, frontal; 239 —head, dorsal; 240 — tentorium dorsal.

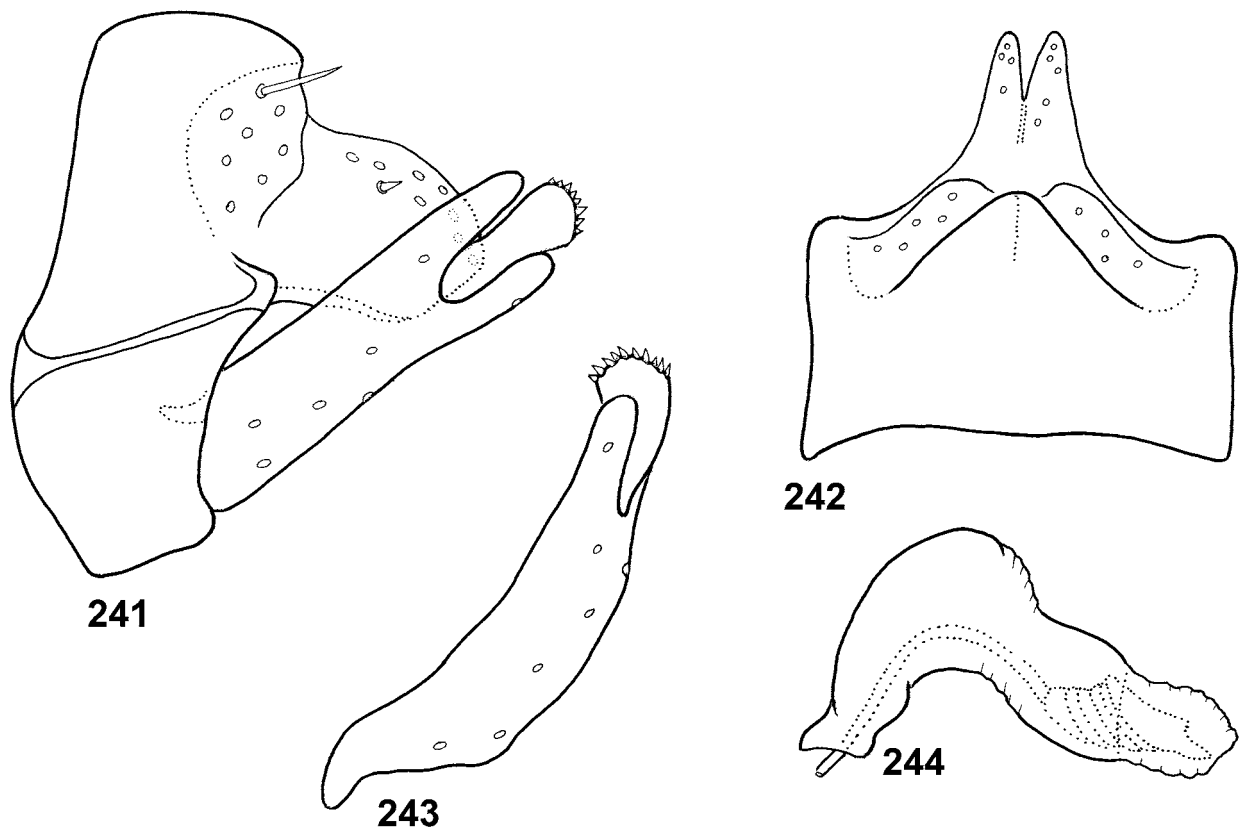
Re-description of head: Male (in alcohol). Head rectangular in dorsal view, about 2 times broader than long. Ocelli absent. Tentorium slender, without dorsal arm; posterior arms short, robust in dorsal view, ending in pair of large posterior tentorial pits with strong tentorial bridge; without anteromesal protuberance; with posteromesal hump; anterior tentorial arms slender, without median lamellate process, slightly broadening before anterior apex. Facial groove pattern simple. Frontogenal vertical groove forming long, dorsad continuation from anterior tentorial pits. Clypeogenal vertical grooves located ventrally of anterior tentorial pits; short, running obliquely laterad. Subantennal grooves vertical, slightly mesad-turning anteriorly, not confluent to clypeogenal groove. Vertexal groove system simple, with thick rim of compact warts; stem of epicranial grooves, or coronal grooves, complete, dominating on vertexal area; occipito-postgenal groove partly merging anterad with skeletal ring of occipital setal warts. Labrum spherical, without setal warts, narrow anterior part and weakly pigmented part movable, freely hanging. Frontal setal warts absent; frontal interantennal warts lacking or represented by pair of rounded, compact, setal warts located on elevated humps posteriorly on vertex. Pair of rounded frontogenal posterior compact setal warts present dorsally on pregenae, between vertical frontogenal and subantennal grooves. Pair of large, transversely elongate, setose warts present below almost horizontally running clypeogenal grooves; representing dominating setal warts on facial area. Vertexal, lateroantennal, compact wart rounded, located below antennal grooves; pair of vertexal medioantennal compact setose warts rounded, visible at anterior end of coronal groove, elevated, separated by deep cleft. Paired fron-

tal grooves nearly invisible. Large pair of occipital compact warts present on posterior half of head dorsum, almost integrating vertexal ocellar compact setal warts. Vertically elongate postgenal compact wart curving along posterior section of ocular grooves.

***Lannapsyche birathena*, new species**

Figs 241–244

This species resembles *L. chantaramongkolae*, from which it is easily separated by the presence of elevated setose surfaces at the border between segment IX and segment X, these structures are concave in *L. chantaramongkolae*. Furthermore, segment X is more deeply cleft in dorsal view, and the harpagones are broader in lateral and ventral view. The phallic apparatus is more complex in *L. birathena* than in *L. chantaramongkolae*.



FIGURES 241–244. *Lannapsyche birathena*, new species, holotype. 241 — genitalia, lateral; 242 — genitalia, dorsal; 243 — gonocoxite, ventral; 244 — phallus, lateral.

Male (in alcohol). Body medium sized; brown; legs, antennae and palps light brown; wings pale brown with paler setae. Head rectangular in dorsal view, about 2 times broader than long. Ocelli absent. Tentorium slender, without dorsal arm; posterior arms short and robust in dorsal view, ending in pair of large posterior tentorial pits with strong tentorial bridge without anteromesal protuberance; posteromesal hump present; anterior tentorial arms posteriorly and anteriorly slender, without median lamellate process; slightly widening immediately before apex. Facial groove pattern simple. Frontogenal vertical grooves forming long, dorsal continuation of anterior tentorial pits. Clypeogenal vertical grooves located ventrally of anterior tentorial pits; short, running obliquely, almost horizontally laterad. Subantennal grooves running vertically, anteriorly slightly turning mesad, not confluent to horizontal clypeogenal groove. Vertexal groove system simple, rim of compact warts thick; stem of epicranial grooves complete, dominating over entire vertexal area; other groove

visible on vertex is only occipito-postgenal groove being partly merged anterad, with skeletal ring of occipital setal warts. Labrum semicircular-shaped, without setal warts; anterior, narrow, little pigmented part movable, freely hanging. Frontal setal warts absent. Frontal interantennal warts absent or possibly homolog with pair of rounded, compact setal warts located on elevated humps posteriorly on vertex. Pair of round frontogenal posterior compact setal warts present at dorsum of pregenae, between vertical frontogenal and subantennal grooves. Pair of large, transverse, elongate setose warts present below horizontal clypeogenal grooves; representing dominating setal warts on facial area. Lateroantennal vertexal compact warts rounded, located below each antennal groove. Pair of vertexal medioantennal compact setose warts rounded, visible at anterior end of coronal grooves, elevated, separated by deep fissure. Paired frontal grooves nearly invisible. Pair of large, occipital compact warts cover posterior half of head dorsum, almost fusing with vertexal ocellar compact setal warts. Vertically elongate, postgenal compact warts curving along posterior section of ocular grooves. Maxillary palp formula I-V-(II,III,IV); all segments covered by long setae; each basal segment with subapical nodule with setose apex; base of nodules somewhat membranous, indicating flexibility to eversion. Each scape slightly longer than head. Each pedicel shorter than first segment of each flagellum. Pronotum with 2 pairs setal warts. Mesal pronotal pair compact, slightly obliquely elongate, occupying entire top of dorsal elevated area, elevated area separated by wide gap. Lateral pronotal warts small, rounded. Mesoscutum with pair of fragmented warts arranged in 2 longitudinal lines, each with 4 to 5 wart fragments. Each proepisternum with large, ovoid setose wart. Each precoxae with a small wart. Large, compact setal wart present on membranous part of cervix, tangential with narrow anterior arm of each cervical sclerite. Lateral cervical sclerites forming narrow anterior arms articulating anteriorly with occipital condyle above posterior tentorial pits; fused with posterior cervical sclerites; each posterior cervical sclerite forming large, quadrangular plate reaching prothoracic episternum, articulating to weakly sclerotized anteromedian band of prothoracic eusterium by ventral intercervical sclerite. Leg claws symmetrical; spur formula 2, 4, 4; posterior spurs on forelegs, and anterior spurs on midlegs and hind legs half as long as posterior spurs. Forewings: length 7.2 mm; membrane light brown, without visible pattern, with pale setae; R1 confluent with R2 shortly before C; base of discoidal cell located proximally of mid-length of wing; forks I, II, III and V present; forks I, II and V sessile, fork III petiolate; crossveins *r*, *s*, *r-m* and *m-cu* present; crossvein *m* absent; crossveins arranged in an almost regular line of anastomosis; postanal vein present. Hind wings: R1 confluent with R2 well before C.

Male genitalia. Segment IX fused annularly; longitudinal groove separating dorsal and ventral parts, continuing along ventral margin of segment X as dark rim; tergum concave, slightly longer than sternum; anterior margins of segment IX ventrally concave; posterior margins triangular, with small, triangular at end of longitudinal groove. Antecostae weakly developed as marginal rims, thick ventrally of longitudinal groove; external grooves of antecostal suture unclear; tergum produced into central, triangular lobe in dorsal view; spine rows on posterior margins of segment IX reduced, merged with setae of preanal appendages. Intersegmental depression between segment IX and segment X well developed, stepwise. Segment X forming broad lobe, nearly parallel-sided, apex narrowing into small hump in lateral view. Segment X gradually narrowing from broad base in dorsal view; with bifid apex. Apicoventral setose lobes and apicodorsal setose lobes fused into integrated setose area on dorsum; composed of very short, stout setae. Dorsal interlobular gap triangular, deep, narrow. Superior appendages reduced into abbreviated, convex elevation covered by long setae. Each coxopodite longer than apex of segment X; parallel-sided, stout, straight. Harpagones broad, embedded into deep apical gap of coxopodites, widening apex covered by stout, black and short, triangular setae. Phallic apparatus as long as coxopodites; basal part long, curving ventrad, continuing into membranous part, possibly representing endotheca, followed by slightly sclerotized tube and membranous phallicata; ejaculatory duct conspicuous, running into circular, heavily striped endophallus. Phallosomal sclerites large, elongated, slightly bifid in lateral view.

Holotype male: MYANMAR: Kambaiti: 1800 m, 23.vi.1934, Malaise trap (Malaise B.M. 1938-258) — (NHML).

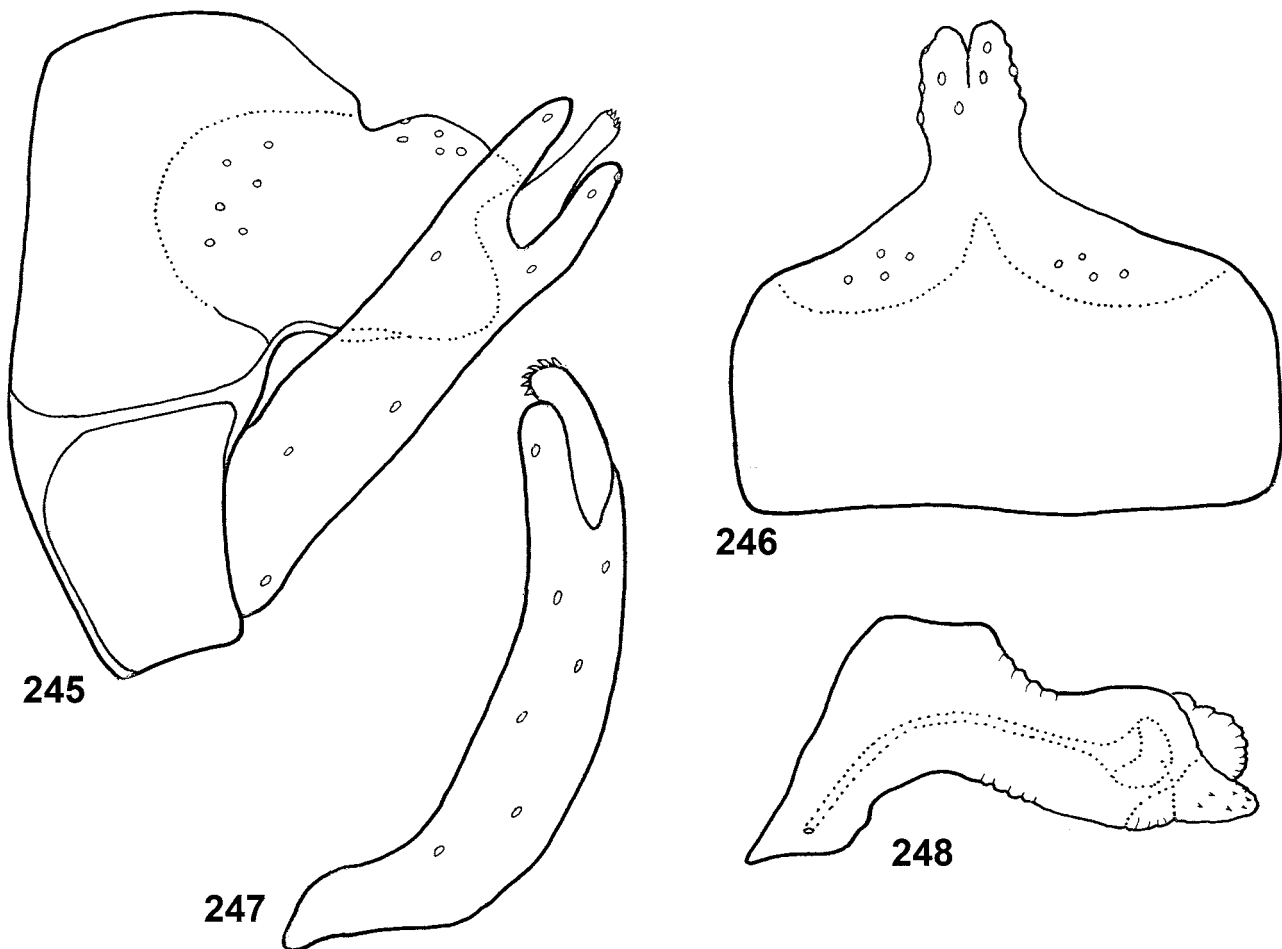
Distribution: Myanmar.

Etymology: *Birathena*, broad in Sanskrit, name referring to the broad harpagones of this species.

***Lannapsyche suksma*, new species**

Figs 245–248

This species is most close to *L. chantaramongkolae*, especially in having narrow harpagones. The reduced preanal appendages form a similarly concave setose surface on the border of segments IX and X. *Lannapsyche suksma* is distinguished from *L. chantaramongkolae* having larger body size; longer dorsum of segment IX; and non-tapering, elongate and bilobed segment X.



FIGURES 245–248. *Lannapsyche suksma*, new species, holotype. 245 — genitalia, lateral; 246 — genitalia, dorsal; 247 — gonocoxite, ventral; 248 — phallus, lateral.

Male (in alcohol). Body medium; brown; legs, antennae and palps light brown; wings pale brown with paler setae. Head rectangular in dorsal view; about 2 times wider than long. Ocelli absent. Tentorium slender, without dorsal arm; posterior arms short and robust in dorsal view, ending in pair of large posterior tentorial pits; tentorial bridge strong, without anteromesal protuberance, with posteromesal hump; anterior tentorial arms slender, without median lamellate process, slightly broadening immediately before anterior apex. Facial groove pattern simple. Frontogenal vertical groove forming long dorsad continuation from anterior tentorial pits. Clypeogenal vertical grooves located ventrally of anterior tentorial pits; short, running obliquely, almost horizontally laterad; subantennal grooves vertical, each with slightly mesad-turning anterior end, apparently

not confluent to clypeogenal grooves. Vertexal grooves with thick rim of compact warts; stem of epicranial groove complete, dominating on vertex; occipito-postgenal groove anteriorly partly merging with skeletal ring of occipital setal warts. Labrum semi-circular, without setal warts; narrow anterior, weakly pigmented part movable, freely hanging. Frontal setal warts absent; frontal interantennal warts absent, or represented by rounded compact, elevated, posterior setal warts. Pair of rounded frontogenal, posterior, compact, setal warts present dorsally on pregenae, between vertical frontogenal and subantennal grooves. Pair of large, transverse, elongate, setose warts present below clypeogenal grooves, representing largest setal warts on facial area. Vertexal, lateroantennal compact wart rounded, located below antennal grooves; pair of vertexal medioantennal compact setose warts rounded, elevated on anterior ending of coronal groove, separated by deep cleft. Paired frontal grooves nearly invisible. Pair of large, occipital compact warts cover posterior half of head dorsum, almost fusing with vertexal ocellar compact setal warts. Vertically elongated postgenal compact wart curving along posterior section of ocular grooves. Maxillary palp formula I-V-IV-II-III; covered by long setae; each basal segment with subapicomesal nodule with setose apex; base of nodules somewhat membranous, indicating flexibility to eversion. Each scape slightly longer than head. Each pedicel shorter than first segment of each flagellum. Pronotum with 2 pairs setal warts. Mesal pronotal pair compact, slightly elongate obliquely, occupying top of dorsally elevated area; elevated area separated by wide gap. Lateral pronotal warts small, rounded. Pair of mesoscutal warts arranged in longitudinal lines composed of 4 to 5 fragments. Pair of mesoscutellar diffuse warts forming longitudinal patch. Each proepisternum with large, ovoid setose wart. Each precoxal wart small. Large, compact setal wart present on membranous part of cervix, tangential with narrow anterior arm of each cervical sclerite. Lateral cervical sclerites forming narrow anterior arms articulating anteriorly with occipital condyle above posterior tentorial pits on head; fusing with posterior cervical sclerites; each posterior cervical sclerite forming large, quadrangular plate reaching prothoracic episternum, articulating to weakly sclerotized anteromedian band of prothoracic eusternum by ventral intercervical sclerite. Leg claws symmetrical; spur formula 2, 4, 4; foreleg posteroapical half as long as anteroapical spur; midleg and hind leg posterior spurs 2 times longer than anterior spurs. Forewings: length 9.9 mm; membrane light brown without visible pattern, with pale setae; R1 confluent with R2 short before C; base of discoidal cell located proximally of mid-length of wing; forks I, II, III, V present; forks I, II, and V sessile, fork III petiolate, crossveins *ic*, *r*, *s*, *r-m* and *m-cu* present; crossvein *m* absent; crossveins arranged in regular vertical line of anastomosis; postanal vein present. Hind wings: R1 confluent with R2 well before C.

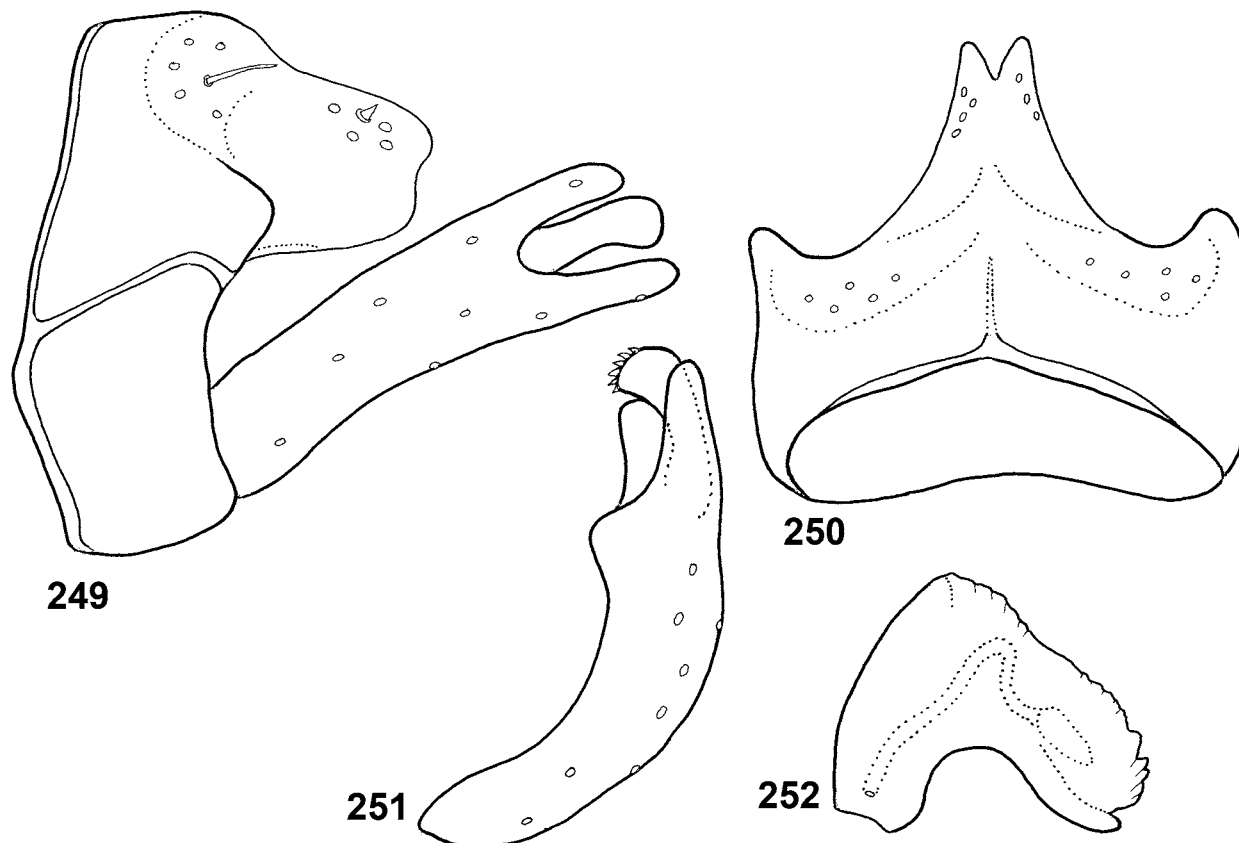
Male genitalia. Segment IX fused annularly, longitudinal groove separating dorsal and ventral parts, continuing along ventral margin of segment X as dark rim; tergum concave, descending posteriad, about 2 times longer than sternum; anterior margins of segment IX slightly concave; posterior margins almost straight, with small triangular at end of longitudinal grooves. Antecostae forming weak marginal rims; thick ventrally of longitudinal grooves; external groove of antecostal sutures difficult to discern; tergum produced into central, sharp triangular in dorsal view, delineating concave surface of reduced preanal appendages; spine rows on posterior margins of segment IX reduced, merged with, or replaced by setae of preanal appendages. Intersegmental depression between segment IX and segment X visible, represented by rounded excision in lateral view. Segment X forming broad lobe in lateral view; with bilobed apex, dorsal lobe smaller in lateral view. Segment X with constricted base in dorsal view; apex bifid. Apicoventral setose lobes and apicodorsal setose lobes fused into integrated setose area on dorsum; composed of short, stout setae. Dorsal interlobular gap shallow, narrow. Superior appendages reduced into large circular, concave surface dominating on genitalia, covered by long setae. Each coxopodite longer than apex of segment X; parallel-sided, stout, straight. Harpagones slender, embedded into deep apical gap of coxopodites, apex covered with black stout and short triangular setae. Phallic apparatus forming inverted V; dorsal margin nearly straight in lateral view; almost as long as each coxopodite; sclerotized basal section long, curving ventrad, continuing into obscurely membranous part, possibly representing endotheca; more strongly sclerotized dorsally; ending in short, dorsal membranous phallicata being slightly narrower than preceding sclerotized part, and ventrally into ventral lobe being

densely packed by microtrichia. Ejaculatory duct ending in circular phallotremal sclerites in endophallus. Strongly pigmented structure of phallic apparatus curving verticad in lateral view.

Holotype male: MYANMAR: North East: Kambaiti, 2000 m, 15.v.1934, Malaise trap (Malaise B.M. 1938-258) — (NHML).

Distribution: Myanmar.

Etymology: *Suksma*, slender in Sanskrit, name referring to the slender harpagones.



FIGURES 249–252. *Lannapsyche kamba*, new species, holotype. 249 — genitalia, lateral; 250 — genitalia, dorsal; 251 — gonocoxite, ventral; 252 — phallus, lateral.

Lannapsyche kamba, new species

Figs 249–252

In the genitalia, the shape of the harpagones of *L. kamba* are intermediate between the slender ones in *L. suksma* and the wide ones in *L. birathena*. The coxopodites of *L. kamba* are different from those in the 2 other species in that they have an apicomasal, lobe-like, broadening at the base of the bifurcation, as seen in ventral view,. The phallic apparatus is much reduced in size, but with the same V-shaped, configuration in lateral view.

Male (in alcohol). Body medium sized; light brown; legs, antennae and palps lighter than body; forewings pale brown, with pale setae. Head rectangular in dorsal view, about 2 times broader than long. Ocelli absent. Tentorium slender, without dorsal arm; posterior arms short, robust in dorsal view, ending in pair of large posterior tentorial pits; strong tentorial bridge without anteromesal protuberance, but with posteromesal hump; anterior tentorial arms slender, without median lamellate process; slightly broadening immediately before anterior apex. Facial groove pattern simple. Frontogenal vertical grooves forming long, dorsad orienting continuation from anterior tentorial pits. Clypeogenal vertical grooves located ventrally of anterior tentorial pits;

short, running obliquely, almost horizontally laterad; subantennal grooves running vertically, with slightly mesad turning anterior end, apparently not confluent to clypeogenal groove. Vertexal grooves with thick rim of compact warts; stem of epicranial groove complete, dominating vertex; occipito-postgenal grooves partly merging anterad with skeletal ring of occipital setal warts. Labrum semi-circular, without setal warts; narrow, weakly pigmented anterior part movable, freely hanging. Frontal setal warts absent; frontal interantennal warts absent, or represented by rounded compact, elevated, posterior setal warts. Pair of round frontogenal, posterior, compact, setal warts present dorsally on pregenae, between vertical frontogenal and subantennal grooves. Pair of large, transverse, elongate, setose warts present below clypeogenal grooves, representing main setal warts on facial area of head. Vertexal, lateroantennal compact warts rounded, located below antennal grooves; pair of vertexal medioantennal compact setose warts rounded, elevated on anterior ending of coronal groove, separated by deep cleft. Paired frontal grooves nearly invisible. Pair of large, occipital compact warts covering posterior half of head dorsum, almost fusing with vertexal ocellar compact setal warts. Vertically elongate, postgenal compact warts curving along posterior section of ocular grooves. Maxillary palps broken, first and second segments intact; each with basal segment with subapicomeresal nodule with setose apex; base of nodule somewhat membranous, indicating flexibility to eversion. Each scape slightly longer than head. Each pedicel shorter than first segment of each flagellum. Pronotum with 2 pairs setal warts. Mesal warts compact, slightly elongated obliquely, occupying entire top of dorsally elevated area; elevated area separated by wide gap. Lateral warts small, rounded. One pair mesoscutal, fragmented warts arranged in longitudinal lines composed of 4 to 5 fragments. One pair mesoscutellar diffuse warts forming longitudinal patch. Each proepisternum with large, ovoid setose wart. Precoxal warts small. Pair of large, compact setal warts present on membranous part of cervix, tangential with anterior arm of each cervical sclerite. Each lateral cervical sclerite forming narrow anterior arm articulating anteriorly with occipital condyle above posterior tentorial pits of head; fusing with posterior cervical sclerite; each posterior cervical sclerite forming large, quadrangular plate reaching prothoracic episternum, articulating to weakly sclerotized anteromedian band of prothoracic eusternum by ventral intercervical sclerites. Leg claws symmetrical; spur formula 2, 4, 4; foreleg posterior spur half as long as anterior spur; midleg and hind leg anterior spurs half as long as posterior spurs. Forewings: length 8.9 mm; membrane light brown without visible pattern, with pale setae; R1 confluent with, or recurrent into, R2 short before C; base of discoidal cell located proximally of mid-length of wing; forks I, II, III, V present; forks I, II, and V sessile, fork III petiolate, crossveins *ic*, *r*, *s*, *r-m* and *m-cu* present; crossvein *m* absent; crossveins arranged in an almost regular vertical line of anastomosis; postanal vein present. Hind wings: R1 confluent with R2 well before C.

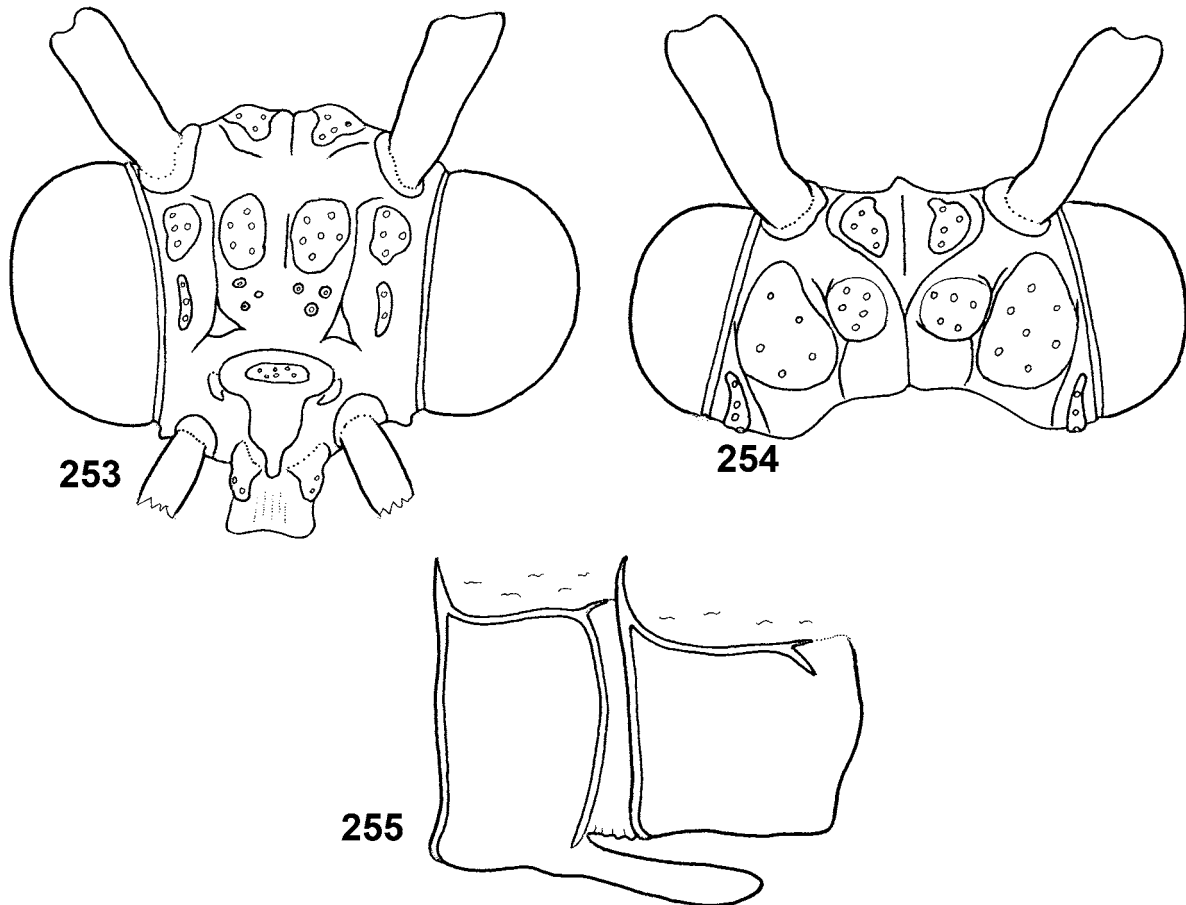
Male genitalia. Abdominal segment IX fused annularly, with longitudinal groove separating dorsal and ventral parts; groove straight oblique, ventrad curving at posterior margins, continuing further along ventral margin of segment X as dark rim; tergum straight, flat, descending posterad, in lateral view, as long as venter. Anterior margins of segment IX straight, concave at venter; posterior margins concave, with pronounced triangular above end of longitudinal groove. Antecostae forming weak marginal rims, being thick ventrally of longitudinal grooves; external groove of antecostal sutures weak; each tergum with central line only in dorsal view, separating concave surface of reduced preanal appendages; spine rows on posterior margins of segment IX reduced, merged with, or replaced by, long setae of abbreviated preanal appendages. Intersegmental depression between segment IX and segment X visible as rounded step in lateral view. Segment X forming broad lobe in lateral view, with slightly excised apex; in dorsal view with broad base and with bifid apex. Apicoventral setose lobes and apicodorsal setose lobes fusing into integrated setose area on dorsum; with very short, stout setae. Dorsal interlobular gap shallow, and narrowly triangular. Superior appendages reduced into large, circular, concave surface dominating on dorsum of genitalia, with long setae. Each coxopodite much longer than apex of segment X, parallel-sided, stout, straight, slightly ventrad curving, slightly broadening apically; harpagones as broad as apical process of coxopodites, capitate, emerging from deep apical gap of each coxopodite; each with capitate apex covered by black, stout, short triangular setae. Phallic apparatus

small, forming inverted V in lateral view; about half as long as each coxopodite; most sclerotized basal section tuboid, curving ventrad, continuing into obscurely membranous section, possibly representing part of endotheca; ventrally followed by more sclerotized part; dorsally ending in membranous phallicata. Ejaculatory duct running into circular, heavily striped endophallus and phallosomal sclerites. Most pigmented part of phallus elongate in lateral view.

Holotype male: MYANMAR: North East: Kambaiti, 2000 m, 26.v.1934, Malaise trap (Malaise B.M. 1938-258) — (NHML).

Distribution: Myanmar.

Etymology: *Kamba*, name derived from Kambaiti, the type locality of the species.



FIGURES 253–255. *Phraepsyche danaos* Malicky & Sompong, male paratype 253 — head, frontal; 254 — head, dorsal; 255 — abdominal sternum VI with ventral process, and VII, lateral.

***Phraepsyche* Malicky & Chantaramongkol**

Phraepsyche Malicky & Chantaramongkol in Malicky *et al.* 2000: 865.

Type species: *Phraepsyche danaos* Malicky & Sompong in Malicky *et al.* 2000. Original designation by monotypy.

Type locality: Thailand.

Malicky *et al.* (2000) described this genus based on a single species from Thailand. We describe 2 more species below, as well as give the following 2 additional characters to the genus diagnosis: (1) pectination of the antennae; and (2) presence of a sternal projection on the posterior margins of abdominal segment VI. All 3 species known in the genus have relatively uniform genitalia. There are significant differences among the species both in the groove and setal wart patterns on the head and on the thorax. The genitalia generally resemble

those of species in the genera *Marilia* and *Odontocerum*, from which *Phraepsyche* species are easily distinguished mostly by forewing venation characters and presence of mesally claw-like and subapically located harpagones. The pectinate antennae being characteristic for this genus are present also in the Australian philorheithrid genus *Ramiheithrus* Neboiss, 1974. However, each antennal pecten of *Ramiheithrus* is directed mesad while in *Phraepsyche* it is directed laterad; and each pecten unit appears being of epidermal origin, not setal origin as in *Ramiheithrus*. The pectinate antennae were not mentioned in the original genus description of *Phraepsyche*, probably because they were lost. Pectination possibly developed from elongated setae because all branches originate from alveoli formed by a skeletal ring and rim, and from setal theca. Similarly to setae, this antennal pectination can be easily detached, but the alveoli remain visible. The pectinal branches on the first and second segments of the flagellae are very short. The well-developed, long and robust sternal projection (hammer) on the posterior margin of segment VI is only present in the males. In other families, like Rhyacophilidae, Glossosomatidae, Hydroptilidae and Philopotamidae, this structure might be used for substrate-born vibration communication. Such behaviour has previously not been reported for any leptoceroid species.

***Phraepsyche danaos* Malicky & Sompong**

Phraepsyche danaos Malicky & Sompong in Malicky *et al.*, 2000: 865, Figs 253–255

Type locality: Thailand.

This species is distinguished from the other 2 species in the genitalia by having preanal appendages reaching the fused hump of the apicodorsal setose lobes, and presence of 2 steps in the intersegmental depression between segment IX and segment X. In *P. pectinata*, new species only 1 step is present, and in *P. yitungshana*, new species no steps are present. There are significant differences among the 3 species also in the groove and setal wart patterns both on the head and on the thorax. Examination of a male paratype revealed that the species has a setal theca, the alveoli on the basolateral part, present on the first 13 segments of each flagellum, indicating presence of pecten. On the abdomen, a sternal projection (hammer) is present on the posterior margin of segment VI, forming an elongated, robust, rod reaching the segment margin. This sternal projection is reinforced by the ventrad curving internal ridge of the longitudinal suture, possibly giving attachment surface for muscles operating the hammer. The sternal process, especially the ventral surface, is densely covered by closely-set microtrichia.

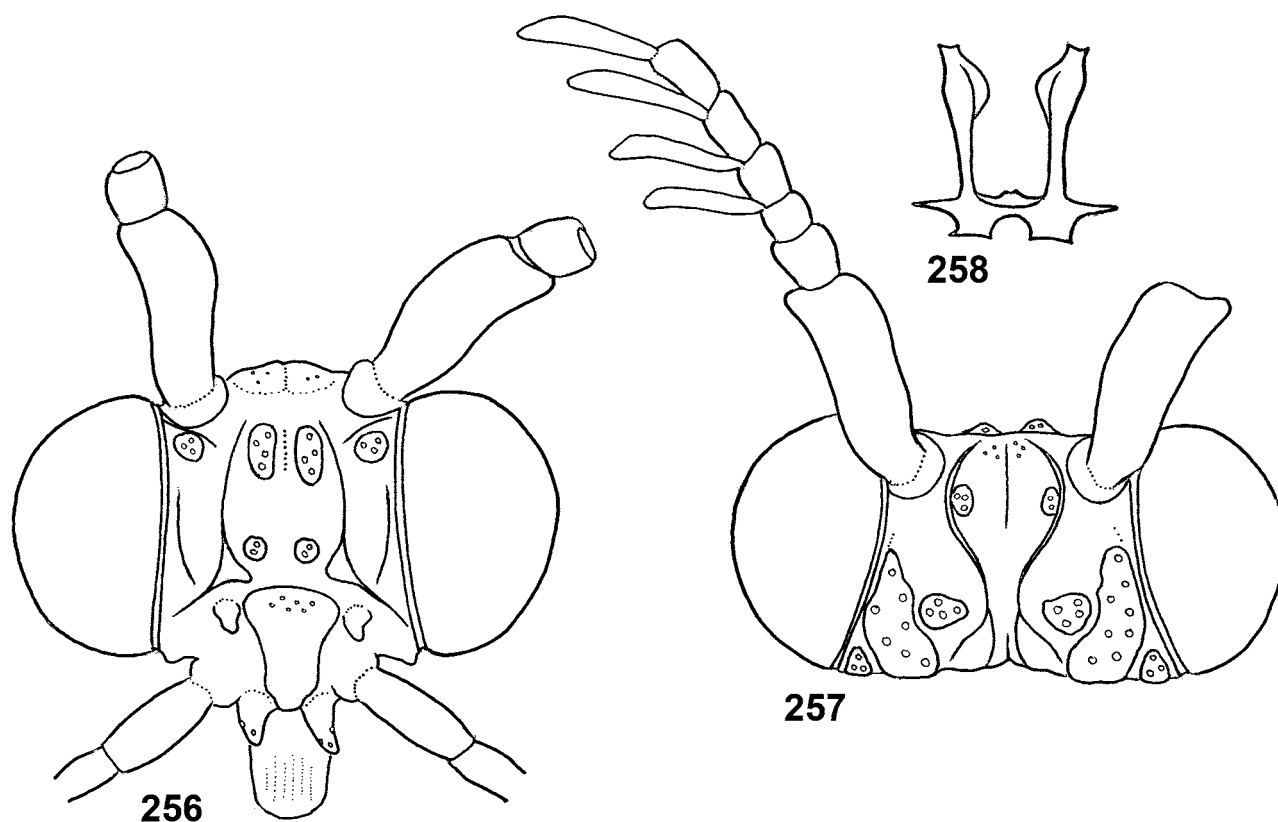
***Phraepsyche pectinata*, new species**

Figs 256–263

This new species is distinguished from the other 2 species in the genus in the genitalia, by the intersegmental depression between segment IX and segment X having 1 deep step in lateral view, not with 2 steps as in *P. danaos* or without steps as in *P. yitungshana*. The phallic apparatus has a subapical bulbous broadening that is absent in *P. yitungshana*, and the apicoventral setose lobes on segment X are not widening before apex in dorsal view, as they do in *P. danaos*. The pronotum has 2 separated pairs of setal warts, while in the other species the lateral pair has fused with the mesal pair. There are also significant differences in the groove and setal wart patterns on the head.

Male (in alcohol). Body medium sized; light brown; forewings light brown. Head rectangular, almost 2 times broader than long. Ocelli absent. Tentorium without dorsal arm; posterior arms short, robust in dorsal view, ending in pair of large posterior tentorial pits, with strong tentorial bridge armed with small, 2-rayed anteromesal protuberance; anterior tentorial arms posteriorly slender, anteriorly broad, with additional median

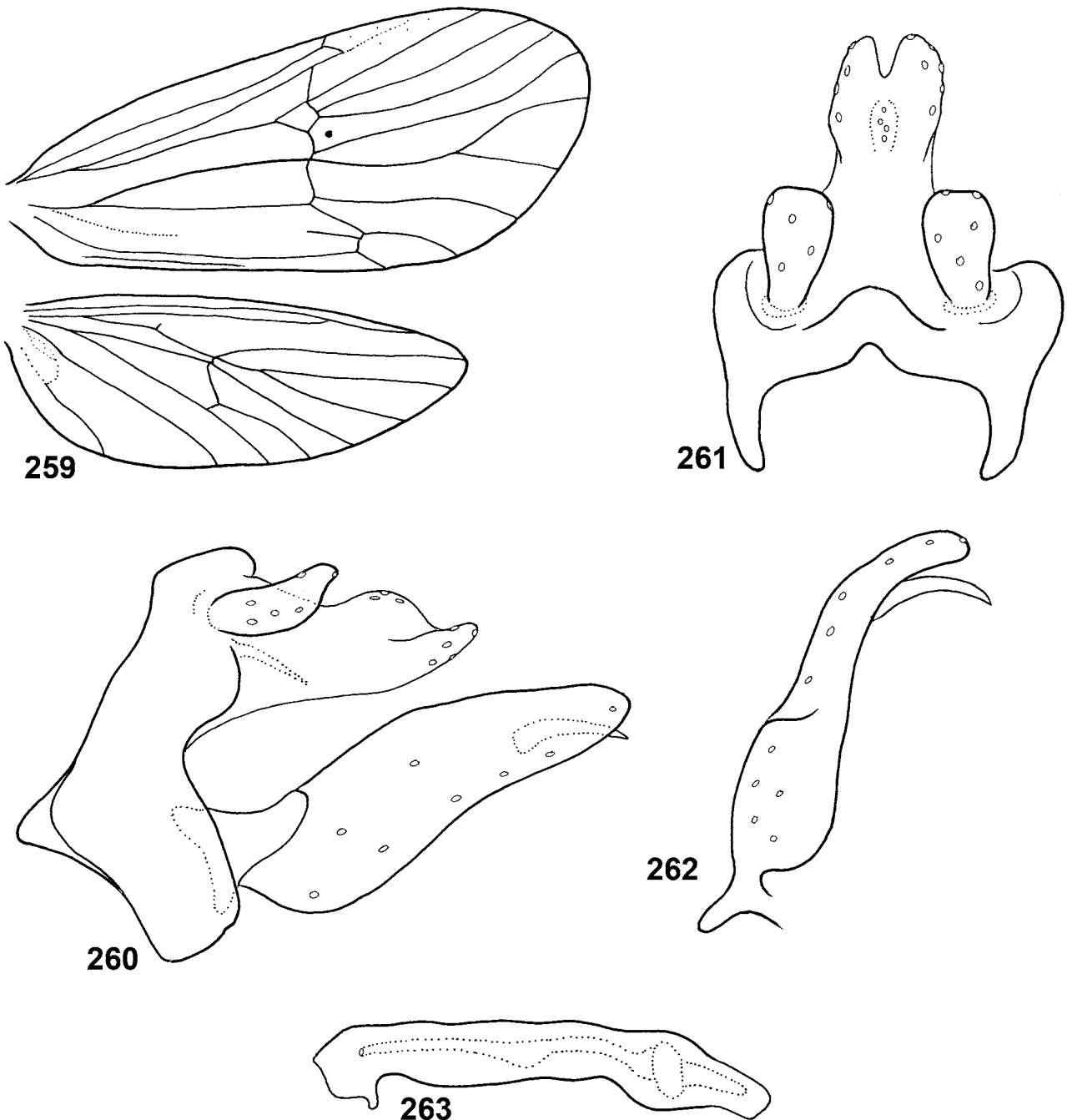
lamellate process. Facial groove pattern complex. Frontogenal vertical grooves long. Clypeogenal vertical grooves located ventrally of anterior tentorial pits; short, running obliquely laterad; subantennal grooves running oblique mesad, confluent to vertical frontogenal grooves; additional lateral grooves present, between mid-way of ocular groove and clypeogenal groove. Vertexal groove system with thick rim of compact warts;



FIGURES 256–258. *Phraepsyche pectinata*, new species, holotype. 256 —head, frontal; 257 —head, dorsal; 258 —tentorium dorsal.

stem of epicranial groove intermittent in middle, anteriorly long, posteriorly short; most pronounced pair of grooves on vertex are lateral, sigmoid vertexal grooves in middle section; occipito-postgenal grooves partly merging with skeletal ring of occipital setal warts, running along ocular grooves. Labrum semi-circular, weakly pigmented anterior part narrow, movable, freely hanging. Broad posterior, basal sclerite of labrum bearing transversely elongate, compact setal wart. Two pairs frontal, lateral, compact setal warts present on frons, anterior warts small, vertically elongate posterior pair large; frontal interantennal warts absent, or represented by anterior warts. Pair of rounded frontogenal, posterior, compact setal warts present on dorsum of pregenae, tangential with subantennal grooves. Vertexal, lateroantennal compact wart small, rounded, located mesally of lateral vertexal groove. Pair of vertexal, medioantennal, diffuse setose warts divided by coronal groove. Large pair of occipital compact warts spreading over posterior half of head dorsum, almost integrating smaller vertexal ocellar setal warts. Vertically elongate, postgenal compact warts curving along posterior section of ocular grooves. Maxillary palps digitiform; maxillary palp formula (I,II)-III-V-IV; each first segment more robust and broader than other segments, without subapicomeseal nodule, each 4th segment significantly longer than each 5th segment. Each scape almost as long as head. Each pedicel slightly longer than first segment of each flagellum; basilateral part of first 13 segments of flagellum bearing long branch-like processes, giving pectinated antennae. Pronotum with 2 pairs setal warts. Mesal pronotal compact warts narrow, elongate, transverse, occupying almost entire dorsum; lateral warts small, transverse, oval. Mesoscutal pair of compact warts small, longitudinally elliptical. Pair of mesoscutellar compact warts elongated. Each proepis-

ternum with large, ovoid setose wart. Precoxal warts small. Small, elevated protuberance-like, compact setal wart present on each cervical sclerites. Claws symmetrical. Spur formula 1, 4, 4; midlegs with anterior spur half as long as posterior spurs; hind leg spurs almost equally long. Forewings: length 6.0 mm, broad; membrane light brown, without visible pattern; Sc and R1 meeting in callosity as both veins are thick, fusing, forming broad diffusion area at pterostigma; apical forks III and IV absent; fork I and fork II tangential at short, pentagonal discoidal cell; crossvein *m* short; M reduced; fork V wide; Cu2 vestigial in holotype, absent in paratype; postanal vein present. Hind wings: Sc and R1 confluent apically of middle of wing; RS reduced, with stem running into M. Abdominal sternum VI with projection (hammer) on posterior margin; forming elongate, robust rod reaching length of segment margin. Sternal hammer reinforced by ventrad curving internal ridge of longitudinal suture.



FIGURES 259–263. *Phraepsyche pectinata*, new species, holotype. 259 — right wings; 260 — genitalia, lateral; 261 — genitalia, dorsal; 262 — gonocoxite, ventral; 263 — phallus, lateral.

Male genitalia. Abdominal segment IX fused annularly, short; tergum slightly shorter than sternum; anterior margins of segment IX triangular with sharply angled process located sub-centrally; posterior margin concave. Antecostae well developed only on sharply angled process; external groove of antecostal sutures well developed; tergum produced into central, triangular lobe in dorsal view; spine rows on posterior margins of segment IX reduced, with 2 to 3 setae near gonocoxites. Intersegmental depression between segment IX and segment X well developed, stepwise. Segment X long in lateral and dorsal views, nearly parallel-sided; slightly triangular in lateral view; in dorsal view slightly broadening from midway. Apicoventral setose lobes with 2 to 3 stout apical spines. Apicodorsal setose lobes located subapically, fused into medial hump. Dorsal interlobular gap between apicoventral setose lobes deep, narrow. Superior appendages 2 times broader in dorsal view than in lateral view, short, not reaching medial hump of apicodorsal setose lobes. Each coxopodite longer than apex of segment X, forming long, stout, leaf-like process with broad basal half; slightly ventrad curving in lateral view; curving mesad in ventral view. Harpagones slender, claw-like, arising before apex of each coxopodite. Phallic apparatus as long as coxopodites, basal section well-sclerotized, short, ventrad curving, with short flange articulating with base of gonocoxites. Tubular phallosome straight, continuous with membranous phallicata; less pigmented continuation of phallosome obscure. Endotheca indistinct, forming straight tube, bulbous subapically, with ventrad curving apex. Gonopore indistinct. Ejaculatory duct ending at circular, well-pigmented anterior part of phallosomal sclerite; dorsum of apex excavated. Posterior, narrow elongation of circular phallosomal sclerites exposed in apicodorsal cavity.

Holotype male: VIETNAM: Lamdong: Baoloc, Duchma Stream, 23.x.1988, light [J. Oláh] — (OPC).

Paratypes: VIETNAM: Lamdong: Dalat, Atangla Waterfall, 15.x.1988, light [J. Oláh] — 3 males (OPC).

Distribution: Vietnam.

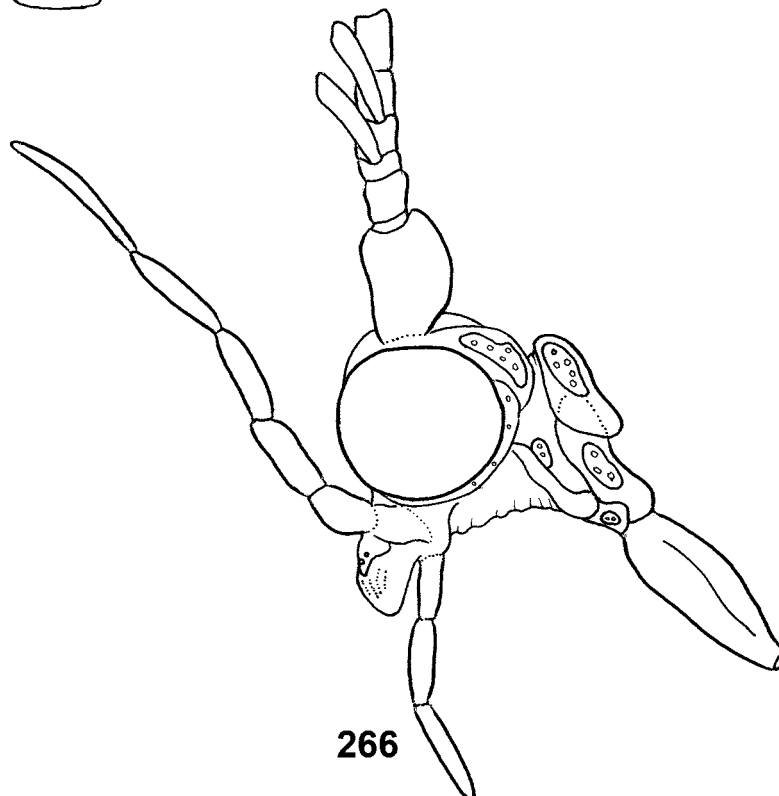
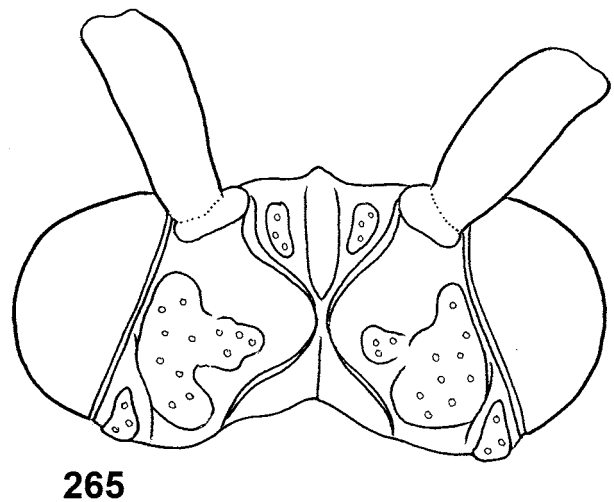
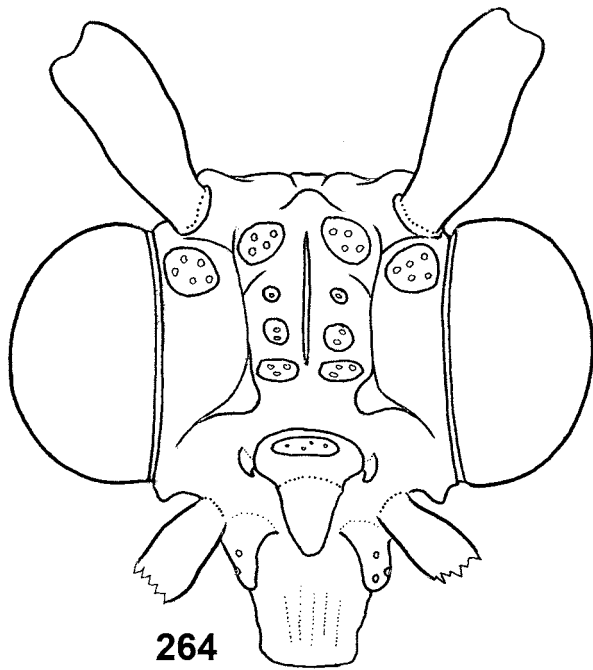
Etymology: *Pectinata*, name referring to the pectinated antennae.

***Phraepsyche yitungshana*, new species**

Figs 264–271

This species is easily distinguished from the other 2 species in the genus in the forewings, particularly by the presence of a diffuse-spotted marginal and submarginal area; and in the genitalia by the intersegmental depression between segments IX and X without steps in lateral view. The phallic apparatus has a subapical, bulbous broadening being absent in the other 2 species. The apicoventral setose lobes on segment X are not widening laterally before apex in dorsal view, as in *P. danaos*; some widening present at mid-length. The pronotum has only 1 pair of setal warts, and there are significant differences between the species also in the groove and setal wart patterns on the head.

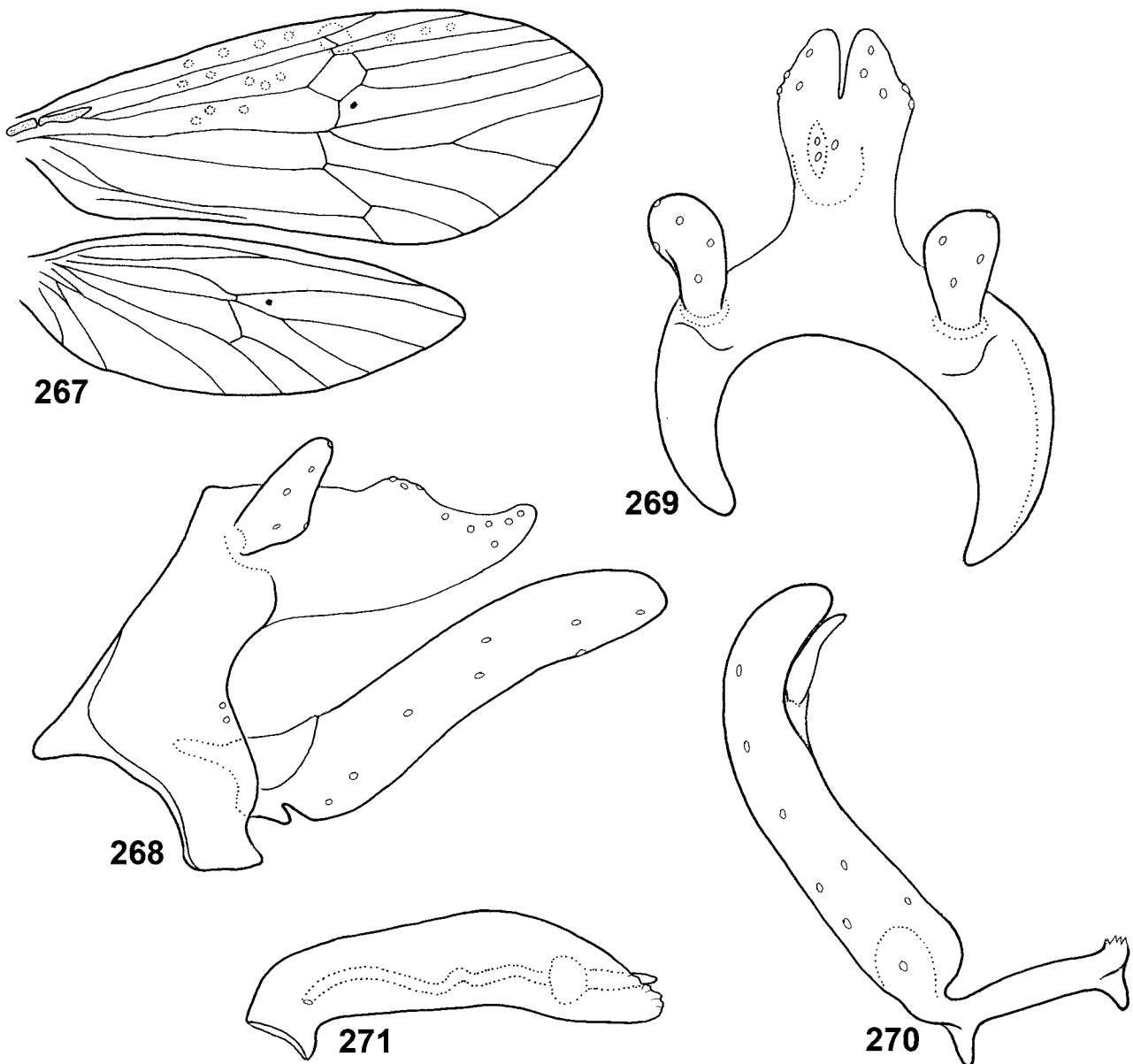
Male (in alcohol). Body medium sized; light brown or yellowish; forewings light brown, with small spots on marginal and submarginal area. Head rectangular, almost 2 times broader than long. Ocelli absent. Tentorium without dorsal arm; posterior arms short, robust in dorsal view, ending in pair of large posterior tentorial pits, with strong tentorial bridge armed with small, 2-rayed anteromesal protuberance; anterior tentorial arms slender posteriorly, broadening anteriorly, with additional median lamellate process. Facial groove pattern complex. Frontogenal vertical groove long, with additional small arm running obliquely dorsomesad. Clypeogenal vertical grooves located ventrally of anterior tentorial pits; short, running obliquely laterad. Subantennal grooves weak, running obliquely mesad, confluent to vertical frontogenal groove. Additional lateral grooves absent. Vertexal groove system with thick rim of compact warts; stem of epicranial grooves clearly visible on posterior margin of vertex. Paired groove running along middle of anterior part of vertex; most pronounced pair of grooves on vertex are sigmoid lateral vertexal grooves, nearly tangential in middle. Occipito-postgenal groove partly merging with skeletal ring of occipital setal warts, running along and reaching ocular grooves.



FIGURES 264–266. *Phraeopsyche yitungshana*, new species, holotype. 264 —head, frontal; 265 —head, dorsal; 266 —head, lateral.

Labrum almost double-circuloid, with anterior, narrow, less pigmented part movable, freely hanging. Broad posterior, basal, sclerite of labrum bearing transversely elongate, compact setal wart. Pair of large frontal, lateral compact setal warts present on posterior end of frons; small pair of frontal, lateral, fragmented setose warts present on lower anterior end, comprising of 2 to 3 small warts; frontal interantennal warts absent, or possibly represented as larger anterior pair of warts. Pair of rounded frontogenal, posterior, compact setal warts present on dorsum of pregenae, tangential with subantennal grooves. Pair of frontogenal, lower, anterior, diffused setose warts present, with 4 to 5 individual setae. Vertexal, lateroantennal, compact setal warts

elongated longitudinally, located mesally of lateral vertexal groove. Vertexal medioantennal diffuse setose warts absent. Pair of large occipital compact setal warts cover posterior half of head dorsum, almost integrating vertexal ocellar compact setal warts. Vertically elongated postgenal compact wart curving along posterior section of ocular grooves. Maxillary palps digitiform; maxillary palp formula I-II-(III,IV)-V, each with first segment more robust and broader than other segments, without subapicomeral nodule. Each scape almost as long as head. Each pedicel slightly longer than first segment of each flagell; basilateral part of first 13 segments of flagellae bearing long, branch-like processes. One pair pronotal warts present; lateral pronotal warts possibly fused with mesal warts; warts narrow, transversely elongate, occupying almost entire dorsum. Pair of mesoscutal compact, small, longitudinally elliptical warts present. Pair of longitudinally elongate, mesoscutellar compact warts present. Each proepisternum with large, ovoid setose wart. Precoxal warts small. Small, elevated protuberance-like compact, setal wart present on each cervical sclerite. Claws symmetrical. Spur formula 1, 4, 4; midleg anterior spurs half as long as posterior spurs; hind leg spurs almost equally long. Forewings: broad, 5.0 mm; membrane light brown, with diffuse pattern of small spots on costal, subcostal, radial, sub radial and first apical cell; Sc and R1 meeting in callosity as both veins thickening and fusing into broad,



FIGURES 267–271. *Phraepsyche yitungshana*, new species, holotype. 267 — right wings; 268 — genitalia, lateral; 269 — genitalia, dorsal; 270 — gonocoxite, ventral; 271 — phallus, lateral.

diffusion area at pterostigma; slightly elevated and translucent; forks III and IV absent; fork I and fork II long; meeting at pentagonal discoidal cell; M reduced; fork V wide; Cu2 absent; postanal vein present. Hind wings: Sc and R1 confluent at middle of wing; RS reduced, with stem running into M. Abdomen with sternal projection present on posterior margins of segment VI; forming elongated, robust rod (hammer) reaching segment margin. Hammer reinforced by ventrad curving internal ridge of longitudinal sutures.

Male genitalia. Abdominal segment IX fused annularly, short; tergum as long as sternum; anterior margins triangular, with sharply angled process located sub centrally; posterior margins concave. Antecostae well developed on sharply angled process; external groove of antecostal sutures well-developed; tergum without central triangular lobe in dorsal view; spine rows on posterior margins of segment IX highly reduced, with 2 to 3 setae near gonocoxites. Intersegmental depression between segment IX and segment X absent; tergum of segment IX continuing into segment X, without visible intersegmental step in lateral view. Segment X long in lateral and dorsal views, nearly parallel-sided; slightly triangular in lateral view; narrowing apically. Segment X slightly broadening from midway in dorsal view. Apicoventral setose lobes with several stout apical spines. Apicodorsal setose lobes not reaching middle of segment, fused into medial hump. Dorsal interlobular gap between apicoventral setose lobes deep, narrow. Superior appendages as broad in dorsal view as in lateral view; almost reaching medial hump of apicodorsal setose lobe. Coxopodites longer than apex of segment X, forming long, broad rods, slightly sigmoid in lateral view; curving mesad in ventral view. Harpagones slender, claw-like, both arising mesally, well before apex of coxopodites. Phallic apparatus shorter than each coxopodite, basal section sclerotized, short, curving ventrad, with short flange articulating with base of gonocoxites. Tubular phallosome straight, with slightly convex dorsum, continuous with nearly membranous, spine-free phallicata. Weakly pigmented continuation of phallosome obscure. Endotheca indistinct, straight, apex triangular. Gonopore indistinct, ejaculatory duct conspicuous, ending in circular and well pigmented anterior part of phallosomal sclerite. Dorsum of apex excavated, concave; posterior, narrow elongation of circular phallosomal sclerites visible, exposed in apicodorsal cavity.

Holotype male: CHINA: HONG KONG: Lantau South Country Park, stream 1.3 km E Yi Tung Shan Mt., Malaise trap, loc. 3, 20–27.v.2005 [A. Olsson & E. Ohlsson] — (NRM).

Paratypes: same data as holotype — 1 male, 1 female (NRM).

Distribution: Hong Kong.

Etymology: *Yitungshana*, name derived from the local name of the type locality.

Philorheithridae Mosely

Philorheithridae Mosely, 1936: 413.

The wing venation of species in this family is more complete and persistence compared to in the Odontoceridae. The presence of a postanal vein in the forewings (*sensu* Schmid 1998) forms a potential synapomorphy for Philorheithridae + Odontoceridae (Weaver *et al.* [submitted]). A well developed sclerotized anal lobe with microtrichia is present on each forewing base. The wing venation has usually sexual dimorphism. The female venation is more complete than the male venation. Forks I, II, III, V are present in the male forewings whereas forks I, II, III, IV, V are present, or vary, in the female forewings. The male forewing discoidal cell is closed; the median cell is open; and the thyridial cell is closed. The mesoscutellar setal warts are usually paired, small, or absent. The apicomeral nodule on the first segment of the maxillary palps is usually but not always present. The front pilifers are usually present, but absent in genera of *Austrheithrus*, *Ramiheithrus* and *Psilopsyche*.

***Tasmanthrus angustipennis* Mosely**

Tasmanthrus angustipennis Mosely, 1936: 414.

Type locality: Australia (Tasmania).

New record: AUSTRALIA: Tasmania: Lake St Clair NP, Derwent River, 2 km dstr lake St Clair, 740 m, 42°07.768'S, 146°13.224'E, 21.ii.2006, light trap, loc 10 [N. Jönsson, T. Malm & D. Williams] — 7 males, 1 female (NRM).

***Austrheithrus glymma* Neboiss**

Austrheithrus glymma Neboiss, 1977: 118.

Type locality: Australia (Tasmania).

New record: AUSTRALIA: Tasmania: Mt Field NP, Russel Falls Creek, near track 200 m dstr. Russel Falls, 140 m, 42°40.769'S, 146°42.747'E, 19.ii.2006, light trap, loc 4 [N. Jönsson, T. Malm & D. Williams] — 5 males, 1 female (NRM).

***Aphilorheithrus stepheni* Mosely**

Aphilorheithrus stepheni Mosely, 1936

Type locality: Australia (Tasmania).

New record: AUSTRALIA: Tasmania: Hellyer Gorge State Reserve, Hellyer River, 200 m upstr bridge on A10, 221 m, 41°16.363'S, 145°36.883'E, 3.iii.2006, light trap, loc 24 [N. Jönsson, T. Malm & D. Williams] — 1male, 1female (NRM).

***Aphilorheithrus decoratus* Neboiss**

Aphilorheithrus decoratusi Neboiss, 1977: 122.

Type locality: Australia (Tasmania).

New records: AUSTRALIA: Tasmania: Mt Hartz NP, Arve Creek, 40 m from parking at end of road, 851 m, 43°13.039'S, 146°46.199'E, 18–28.ii.2006, Malaise trap, loc 1 [N. Jönsson, T. Malm & D. Williams] — 1male (NRM).

***Psilopsyche* Ulmer**

Psilopsyche Ulmer, 1907a: 7.

Type species: *Psylopsyche kolbiana* [originally in Odontoceridae, transferred to Philorheithridae by Schmid 1964: 327].

***Psilopsyche kolbiana* Ulmer**

Psilopsyche kolbiana Ulmer, 1907a: 8.

Psilopsyche blanchardi Navás, 1926; Navás (1928: 127, to synonym of *P. ruiziana* Navás).

Psilopsyche ruiziana Navás, 1926; Flint *et al.* (1999: 80).

Type locality: Chile.

New records: CHILE: Region del Biobio (VIII): ca 20 km WSW Arauco, stream crossing road at Puento Caripilum, 37°18.141'S, 73°30.633'W, 20 m (loc#06), light trap 2.i.2006 [K.A. Johanson] — 2males (NRM). **Region del Biobio (VIII):** river above Salto del Laja, 30 km N Los Angeles, 37°13.026'S, 72°22.010'W, 120 m (loc#09), light trap 4.i.2006 [K.A. Johanson] — 9 males, 1 female (NRM). **Region de la Araucania (IX):** stream ca 15 km E Pucón, along road to PN Huerquehue, 39°18.295'S, 71°53.528'W (loc#23), light trap [K.A. Johanson] — 1 male, 8 females (NRM); about midway between Contulmo and Purén, El Salto Rayén, 38°01.105'S, 73°09.873'W, 209 m (loc#24), light trap [K.A. Johanson] — 40 females (NRM).

Psilopsyche molinai Navás

Psilopsyche molinai Navás, 1926: 334.

Psilopsyche macqueeni Navás 1935; Flint *et al.* (1999: 80).

Type locality: Chile.

New records: CHILE: Region del Maule (VII): stream ca 2.5 km SE Pont Chovellén, ca 10 km S Curanipe, 35°56.343'S, 72°42.934'W, 36 m (loc#02), light trap 17–18.i.2006 [K.A. Johanson] — 2 males (NRM). **Region de la Araucania (IX):** about midway between Contulmo and Purén, El Salto Rayén, ca 38°01.105'S, 73°09.873'W, 209 m (loc#24), light trap [K.A. Johanson] — 4 males, 8 females (NRM).

Psilopsyche granda, new species

Figs 272–282

This species resembles *P. molinai* Navás from Chile. *Psilopsyche granda* is distinguished from *P. molinai* in having large body size; in the genitalia segment X is more slender in lateral view; and the dorsal gap between the preanal appendages are wider and more U-shaped.

Male (in alcohol). Body large, light brown, ventral part of body and dorsal warts ochraceous; forewing membrane light brown, with darker spots and reticulation (in alcohol). Ocelli absent. Tentorium slender in dorsal view, without vestigial dorsal arm; anterior arms narrow at middle; posterior arms short, ending in pair of large posterior tentorial pits; tentorial bridge separating anterior and posterior tentorial arms slender, slightly arching anterad; anterior tentorial arms producing into well developed frontogenal septum in lateral view, forming internal fold extending dorsally into circumantennal sclerite; wide extension present below each anterior tentorial pits. Internal fold of frontogenal septa visible on facial surface as frontogenal sutures above anterior tentorial pits, and clypeogenal sutures below tentorial pits. Facial groove pattern dominated by surface grooves of frontogenal septa near tentorium; frontogenal vertical grooves running closely posterad. Clypeogenal vertical grooves located ventrally of each anterior tentorial pit; running obliquely laterad, near, but not reaching subgenal processes. Clypeolabral groove visible as line separating freely hanging, smooth labrum and clypeus; with single, dominating clypeal mesal compact setose wart. Subantennal groove running vertically in narrow stripe between ocellar grooves and frontogenal compact setose wart invisible. Subocular grooves indiscernible. Vertex 2 times wider than long. Epicranial groove complete; frontal branch present, vestigial, forming short Y-shape suture in dorsal view just anteriorly of vertexal interantennal compact setose warts. Coronal groove complete, clearly visible along entire length of vertex. Antennal sockets located on elevated humps with antennal grooves. Occipito-postgenal grooves visible on vertex between occipital and postgenal setal warts. Postoccipital groove encircling foramen magnum, or occipital foramen, producing pair of postoccipital smooth lobes. Labrum apparently freely hanging, membranous, movable, pyriform, without vis-

ible setae. Mandibles membranous, almost indiscernible; lacinia forming short, broad, mesad-curving setose lobe. Pair of large, ovoid, frontogenal compact setose warts located obliquely, dominating on faces; other warts visible on face is ovoid, horizontally located, clypeal mesal compact setose wart below anterior tentorial pits, between clypeogenal grooves. Anterior area of vertex with pair of enlarged, nearly triangular, well separated vertexal medioantennal compact setal warts. Vertexal lateroantennal compact setose warts absent. Occipital compact setose warts representing largest setal structure on vertex, located obliquely, dominating on entire surface of vertex. Vertically elongate postgenal compact warts curving along posterior section of ocular grooves. Postgenal surface glabrous. Maxillary palp formula (I-V-III-IV-II); first segments bearing apicomeresal nodule with erect apical setae. Scapes longer than head. Pedicels much shorter than first flagella segment. Pronotum with 2 pairs setal warts; mesal pair elevated, circular, well separated by deep depression; lateral pair weakly elevated, nearly triangular. Mesoscutum with pair of small, drop-shaped, diffuse setose warts present on middle of segment, at end of median notal suture. Mesoscutum with pair of small, rounded setose warts located on middle of segment. Each proepisternum with medium-sized, vertically elongate, ovoid, setose warts. Precoxale with large, nearly round wart. Large, compact, setal wart present anteriorly on cervical sclerites; forming sclerotized surface on membranous part of neck, anteriorly tangential with cervical sclerite. Lateral cervical sclerites forming narrow anterior arm articulating anteriorly to back of head with occipital condyle above posterior tentorial pits, fusing to posterior cervical sclerites; posterior cervical sclerites forming large, triangular plate broadening posterad, reaching prothoracic episternum by posterior apex; articulated with mesad-directed rods, articulating to weakly sclerotized anteromedian band of prothoracic eusternum by thin ventral intercervical sclerites fused to posterior sclerites. Dark cervical sclerite complex visible on pale, membranous neck. Leg claws symmetrical; spur formula 2, 4, 4; foreleg anterior spur 2 times longer than posterior spur; midleg posterior spurs 2 times longer than anterior spurs; hind leg anterior spurs 3 times longer than posterior spurs; all spurs with fine, serrated mesal edge; surfaces with microsculpture with few vestitural setae; spurs on all legs ochraceous. Legs covered by thin, short, light brown, vestitural setae, more densely on ventral surfaces, interspersed by erect and spine-like setae only on tarsal segments of mid and hind legs. Forewing narrow, length 22.0 mm; membrane light brown with spotted, reticulated darker pattern; termen slightly concave posteriorly; posterior margin concave; basal lobe covered by microtrichia; Sc running free before C; R1 running to R2 before C; postanal vein running near posterior wing margin.

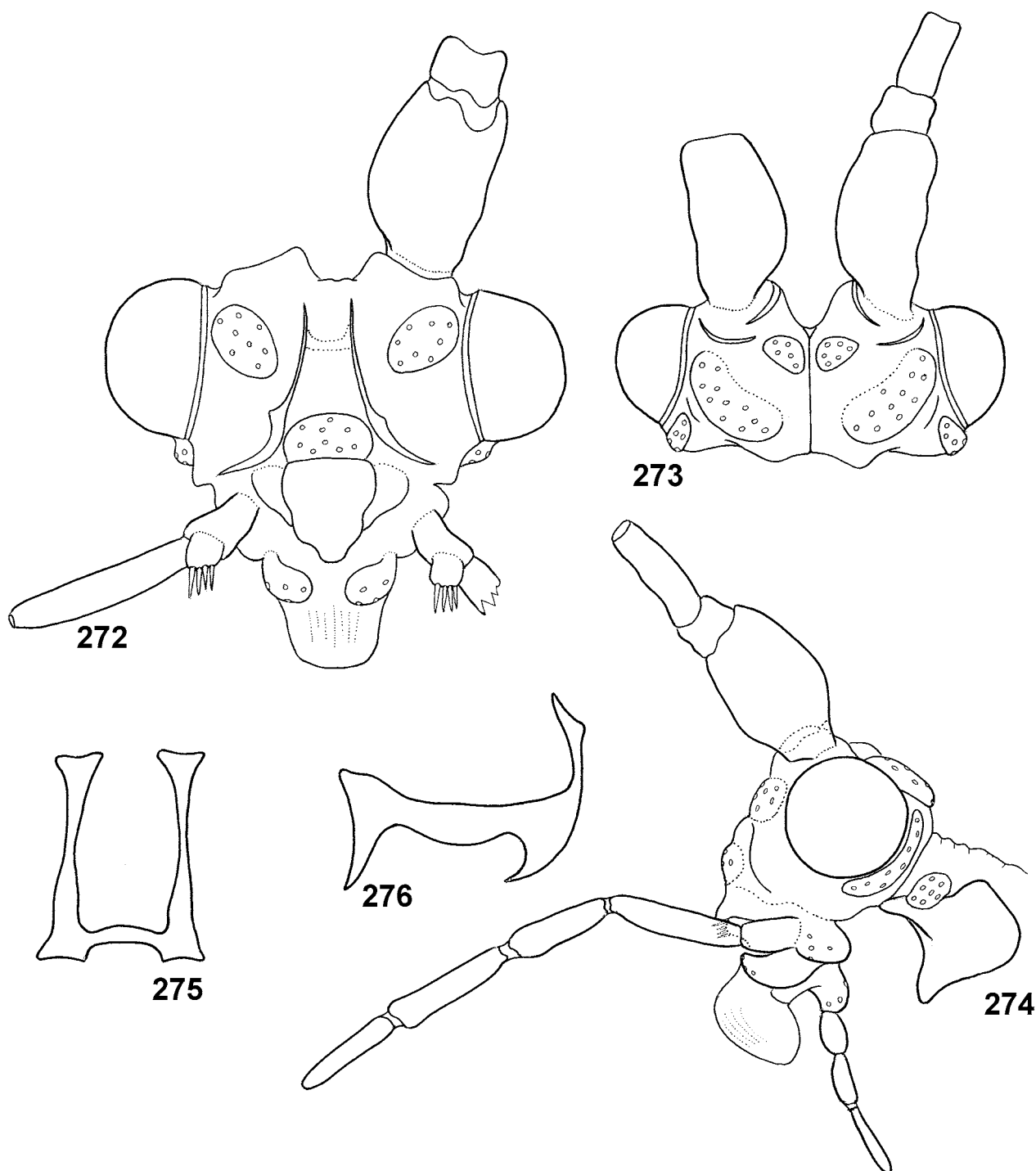
Male genitalia. Abdominal Segment IX fused annularly; short in lateral view; tergum almost as long as venter; anterior margin slightly convex, almost straight; posterior margin concave, without apical lobe; antecosta and antecostal suture on anterior margin narrow, forming dark marginal rim running evenly along margin; entire surface of segment IX glabrous; spine row absent on posterior margins of segment IX; setose areas absent from apicopleural and apicoventral regions. Intersegmental depression between segment IX and segment X deep, stepwise. Segment X sunk deep to middle of segment IX, visible in lateral view. Segment X slender in lateral view, with 2 mesal, triangular apical lobes in dorsal view. Apicoventral setose lobes forming blunt ventral corner. Apicodorsal setose lobes long, tapering, obliquely directed dorsad; setose surface expanding over almost entire dorsal and ventral parts of segment. Apex of segment X deeply cleft; dorsal interlobular gap long, parallel-sided. Large preanal appendages dominating over phallic apparatus; horizontally posterad oriented lobes fused to dorsum of segment IX. Fused seam, or borderline between segment IX and preanal appendages, hardly visible; in lateral view, dorsum slightly convex, apex triangular. In dorsal view mesal margins of appendages running parallel in dorsal view. Coxopodites producing into elongate apicodorsal corners. Harpagones clavate in ventral view; with dark, short, conical spines on apical surfaces. Phallic apparatus forming sclerotized phallosome with ventral lobe and of membranous apical endotheca and retracted phallicata. Sclerotized phallosomal sclerites complex, retracted basad, consisting of basoventral, single tube-like elongate vesicle, and apicodorsal paired wing-shaped sclerites. Thin ejaculatory duct forming entering vesicle.

Holotype male: CHILE: Region del Araucania (IX): PN Nahuelbuta, camp site, Estero Cabreria, cross-point between streams draining Mts Pichimanquemáhuída and Pichinahuel, 37°49.647'S, 73°00.691'W, 1100 m (loc#07), light trap 3.i.2006 [K.A. Johanson] — (NRM).

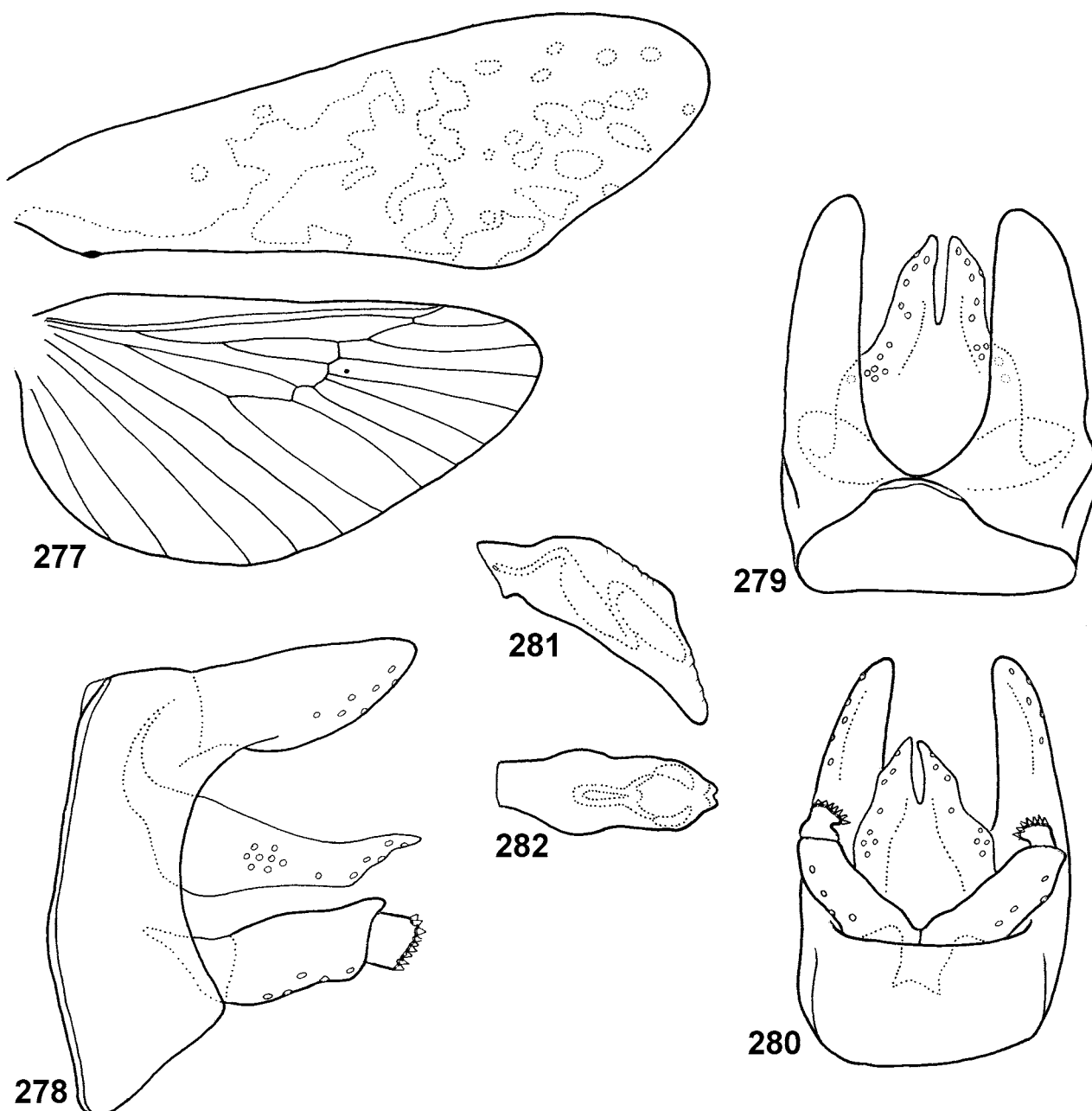
Paratypes: same data as holotype — 6 males (NRM), 2 males (OPC).

Distribution: Chile.

Etymology: *granda*, from Latin, large, referring to the large size of this species.



FIGURES 272–276. *Psilopsyche granda*, new species, holotype. 272 — head, frontal; 273 — head dorsal; 274 — head, lateral; 275 — tentorium, dorsal; 276 — tentorium, lateral.



FIGURES 277–282. *Psilopsyche granda*, new species, holotype. 277 — right wings; 278 — genitalia, lateral; 279 — genitalia, dorsal; 280 — genitalia, ventral; 281 — phallus, lateral; 282 — phallus, ventral.

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