#### On the Trichoptera of Vietnam, with description of 52 new species

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Abstract – 139 Trichoptera species have been determined from the material collected in Vietnam by the author and by the scientists of the Hungarian Natural History Museum. 52 new species are described in the following genera: *Stenopsyche* (2), *Dolophilodes* (2), *Kisaura* (1), *Tinodes* (1), *Diplectrona* (6), *Hydromanicus* (2), *Macrostemum* (2), *Pseudoleptonema* (2), *Himalopsyche* (1), *Rhyacophila* (5), *Agaputus* (4), *Glossosma* (1), *Nepaloptila* (1), *Lepidotoma* (12), *Oecetis* (8), *Trichosetodes* (2). 87 new records are presented. With 221 figures.

Key words - caddisflies, new species, Trichoptera, Vietnam

# INTRODUCTION

Scientific co-operation was elaborated and an agreement was signed by the Hungarian Academy of Sciences and the Scientific Centre of Vietnam on biodiversity research with regular exchanges of researchers between the two countries. The research project on Vietnamese Trichoptera is a component of this bilateral contract existing between Hungary and Vietnam. By making use of this framework a schedule aiming to explore the animal communities and the invertebrate fauna of the various waters and soils of Vietnam was worked out (MAHUNKA & OLÁH 1986). Here new caddisfly species are described and species records are presented from Vietnam. The material was collected mostly by the author during the years of 1986–1988 in four collecting trips (MAHUNKA & OLÁH 1986, MAHUNKA *et al.* 1989, MATSKÁSI *et al.* 1989, MÉSZÁROS *et al.* 1987).

# MATERIALS AND METHODS

The present study is based mostly on animals preserved in 70–80% alcohol. Dry pinned specimens were relaxed and transferred to alcohol for 12–16 hours after pre-treatment in 1% solution of  $Na_3PO_4$ . In order to observe details in the genitalia, the entire abdomen was removed and placed in a small glass beaker of 25 cm<sup>3</sup> volume in 10% KOH solution and boiled for 5–15 minutes. Treatment du-

ration depends on the effectiveness of the clearing process, checked under transmission light. The abdomen was subsequently transferred to distilled water and the macerated tissue removed using fine-tipped forceps and needles. The cleared abdomen was transferred to 80% ethyl alcohol, and then to glycerine for microscopic examination. Different sized pins with ringed basal part were introduced into the abdomen and used to hold and stabilise the genitalia in lateral, dorsal and ventral positions for drawing. Here we have to emphasise the extreme importance of the plain and angle of view, which may change considerably the form and ratio of structural elements in the final drawings as was clearly demonstrated by MALICKY (1988).

The plain of view is never perfect, and we used no special procedures of grid, matrix or reflection to produce absolute mirror symmetry in the drawings. Instead, the genital structures are drawn exactly as seen in the microscope. Usually a complete genital drawing is prepared in left lateral view with separate drawing of the phallic organ in lateral view as well as separate drawings of the left gonopod in ventral view and separate drawing of Xth segment, cerci and paraproct in dorsal view. The intention for isolated presentation of the appendicular and functional elements of the genitalia forced us to detect and to draw as much as possible the entire profile of the structural units. The genital structure was traced in pencil on white paper using a drawing tube mounted on a WILD M3Z microscope at between 260× and 416× magnification. Final illustrations were prepared by enlarging the original pencil drawings and then were redrawn on transparent paper with Black India Ink. The inked illustrations were scanned on an Epson expression 1680 Pro scanner in grayscale and 800 dpi resolution. The plates were arranged, and brightness and contrast edited in Adobe Photoshop 8.0 on a Macintosh G5.

Studies on the maxillary palps, groove and wart pattern, cervical sclerites, episternal warts or other head and thoracic characters, leg claws and spurs, were carried out in deep glycerine column applying different sized pins with supporting basal ring to establish and stabilise the appropriate views. As in the case of the genital drawings the head or thoracic drawings are also drawn exactly as seen in the microscope. In addition to the spur formula, we have introduced a maxillary palp formula in order to simplify the presentation of the length ratio of the 5 palpal segments. The segment sequence represents the increasing segmental length, with equally long segments given in parentheses. When segment I is the shortest, segments II and IV equally long, but longer than segment I, segment III shorter than II and IV, and segment V the longest, the maxillary palp formula is I-III-(II, IV)-V. Careful studies of wing venation were carried out on the right wings mounted on dry permanent slides or on freshly cut right wings if a permanent preparation was not available. The cut and denuded right wings were carefully

manipulated under cover slips in a glycerine solution for perfect extension. 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 membrane or setal origin. If pattern was not contrasting the dotted line was set on the middle on the density transition.

Species descriptions were standardised to ensure consistently formatted and comparable description in general accord with EVENHUIS's (2007) template principle. We used our functional appendicular terminology and not the conventional anatomical directional terminology to describe the genital structures in species description (OLÁH & JOHANSON 2008a). We have standardised also the terminology to describe space extensions of variously formed structural elements. The following terms were used to qualify the dimensions and extensions of genital structural elements: (1) short or long for length dimension on the longitudinal direction of coronal plane along the anteroposterior axis; (2) low or high (traditionally shallow or deep especially for excisions) for height dimension on the vertical direction of the sagittal plane along the dorsoventral axis and (3) narrow or wide (broad) for width dimension on the lateral direction of the transversal plane along the mediolateral or left-right axis. The three dimensional Cartesian coordinate system provides theoretical possibility to quantify by measurements the three physical dimensions of length, width and height of each structural element. However, this quantification is very seldom used in species descriptions. Here we quantify only the length of forewing.

Specimen depositories – The material is deposited in the following collections: HNHM = Hungarian Natural History Museum, Budapest, Hungary; OPC = Oláh Private Collection, Debrecen, presently under protection of the HNHM.

# NEW SPECIES AND NEW RECORDS

#### Stenopsychidae

#### Stenopsyche angustata Martynov, 1930

Material examined – Lao Cai Province, Fansipan Mts, 14 km NW Sapa, 22°20.9'N 103°46.06'E, 5.XII.1997, leg. L. Peregovits & T. Vásárhelyi (1 male, HNHM). Lao Cai Province, Fansipan Mts, 14 km NW Sapa, 1,900–2,000 m, 22°20.9'N 103°46.06'E, 24–27.I.1999, leg. Peregovits & Vásárhelyi (4 males, 4 females, HNHM).

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#### Stenopsyche conthienga Oláh et Malicky, 2010

Material examined – Lao Cai Province, Fansipan Mts, Sin Chai, Hoang Lien NP, Tram Ton, 1,900 m, 22.20941°N 103.46197°E, 16–17.XII.2008, at light, leg. L. Peregovits & T. Vásárhelyi (1 male, 1 female, HNHM). Nghe An Province, Que Phong District, Ban Khom, Pu Hoat Mts, 280 m, 19°40.5'N 104°54.1'E, 21.I.1999, leg L. Peregovits & L. Ronkay (1 male, 1 female, HNHM).

# Stenopsyche egyenes sp. n. (Figs 1-2)

*Diagnosis* – This new species belongs to the *Stenopsyche pubescens* species group and forms a species complex with the closely related species of *S. uncinata* Navas, 1930, *S. variabilis* Kumanski, 1992, and *S. ivalak* sp. n. Most close to *S. uncinata*, but differs by having ventrum of segment IX rounded in lateral view, not tapering; vestigial paraproctal process more developed into wide lateral angles or shoulders; apex of dorsal arm of the gonopod turning exactly laterad in right angle, not dorsolaterad in rounded hook; turning straight, not rounded; apex blunt, not aviform. In this species complex the phallic organ has endotheca with a large number of short and less number of longer spines; however endotheca usually is in various stages of erection, therefore illustration is hardly comparable. Similarly the comparative position of membranous segment X and the highly



**Figs 1–2.** *Stenopsyche egyenes* sp. n., male holotype: 1 = genitalia, left lateral view, 2 = genitalia, dorsal view

sclerotised dorsal arms of gonopod is relative depending on the actual position of the phallic organ.

Description - Male (in alcohol). Medium-sized, reticulate-patterned brown animal. Forewing length 21 mm, almost evenly reticulated.

Male genitalia. Segment IX rounded ventrad and with long triangular pointed apical lobe on its posterolateral margin. Segment X less sclerotised wide shouldered. Dorsal arm of gonopod directed laterad straight, in right angle.

Material examined - Holotype: Vinh Phuc Province, Tam Dao, 7.X.1963, leg. T. Pócs (1 male, OPC).

Etymology - Egyenes, from "egyenes", straight in Hungarian, refers to the curving arc-shaped apex of the dorsal arm of gonopod.

# Stenopsyche ivalak sp. n. ۍ ر (Fi

Diagnosis - This new species belongs to the Stenopsyche pubescens group, and most close to S. uncinata Navas, 1930, but differs by having apical lobe on posterolateral margin of segment IX short and blunt, not long and pointed; vestigial paraproctal process more developed into lateral angles or shoulders; dorsolaterad turning apex of dorsal arm of the gonopod more slender, long, arc-shaped, not stout, short aviform.

Description - Male (in alcohol). Medium-sized, reticulate-patterned brown animal. Forewing length 22 mm, almost evenly reticulated.



Figs 3-5. Stenopsyche ivalak sp. n., male holotype: 3 = genitalia, left lateral view, 4 = genitalia, dorsal view, 5 = phallic organ, left lateral view

Male genitalia. Segment IX tapering ventrad and with short triangular blunt apical lobe on its posterolateral margin. Segment X less sclerotised wide shouldered. Dorsal arm of gonopod slender and directed dorsolaterad in arc-shape.

Material examined – Holotype: Vinh Phuc Province, Tam Dao, 20.I.1986, light, leg. J. Oláh (1 male, OPC). Paratypes: Vinh Phuc Province, Tam Dao, 9–14.X.1986, light, one male was found daytime as hiding on a tree trunk, others on stone wall leg. J. Oláh (3 males, 3 females, OPC). Vinh Phuc Province, Tam Dao, 10–12.V.1987, light, leg. J. Oláh (1 male, 1 female, OPC).

*Etymology – Ivalak*, from "ivalakú", arc-shaped in Hungarian, refers to the curving arc-shaped apex of the dorsal arm of gonopod.

#### Stenopsyche himalayana Martynov, 1926

*Material examined* – Nghe An Province, Frontier-Vietnam, 800 m, 19°42.798'N, 104°46.015'E, 8–9.XI.1999, leg. F. Kassai (1 male, HNHM).

#### Stenopsyche ulmeri Navas, 1932

*Material examined* – Lao Cai Province, Hoang Lien NP, Tram Ton, forest edge, 1,915 m, 22.3493723°N 103.7704565°E, 10.IV.2010, at light, leg. L. Papp, L. Peregovits & Z. Soltész (3 males, 1 female, HNHM).

#### Stenopsyche uncinata Navas, 1930

*Material examined* – Quang Tri Province, Huang Hoa District, Huang Hoa Nature Reserve, near Cup Village, centered at 16°56'15"N 106°34'52"E, 400 m, 7–10.XI.2007, collected at light, leg. G. Csorba (1 male, HNHM).

*Remarks* – The segment X without any lateral angle or shoulder of the vestigial paraproct as well as the short, stout, dorsolaterad directed head of the dorsal arm of gonopods on male specimen from Central Vietnam is almost identical with the structures of the type specimen from Lao Cai Province. Specimens from Tam Dao, earlier determined as *S. uncinata* by OLÁH & MALICKY (2010) are described here as *S. ivalak* sp. n.

#### Philopotamidae

#### Chimarra lahuorum Chantaramongkol et Malicky, 2008

Material examined – Lao Cai Province, Fan Si Pan Mts, 16 km NW Sa Pa, 16–17.III.1998, leg. L. Peregovits & T. Vásárhelyi (2 males, HNHM).

#### Chimarra okuihorum Mey, 1998

Material examined – Nghe An Province, Po Phuong village, 280 m, 19°38.442'N, 104°58.302'E, 21–22.X.1999, leg. F. Kassai (7 males, HNHM).

## Chimarra uncula Mey, 1998

Material examined – Lao Cai Province, Fansipan Mts, Sin Chai, Hoang Lien NP, Tram Ton, 1,900 m, 22.20941°N 103.46197°E, 16–17.XII.2008, at light, leg. L. Papp, L. Peregovits & T. Vásárhelyi (1 male, HNHM).

## Dolophilodes bicolor Kimmins, 1955

*Material examined* – Lao Cai Province, Sin Chai, Hoang Lien NP, Tram Ton, 1,900 m, 22.20941°N 103.46197°E, 16–17.XII.2008, at light, leg. L. Papp, L. Peregovits & L. Ronkay (1 male, HNHM).

# Dolophilodes karmos sp. n. (Figs 6-8)

*Diagnosis* – This new species is very close to *D. erysichthon* Sun et Malicky, 2002, but differs by having apex of segment X gradually tapering in dorsal view, not constricted subapicad; gonopods lower with less rounded apex in lateral view; endotheca with different spine pattern.

*Description* – Male (in alcohol). Small, brown animal. Appendages lighter. Maxillary palp formula is I-IV-II-III-V. Forewing length 5 mm.



Figs 6–8. Dolophilodes karmos sp. n., male holotype: 6 = genitalia, left lateral view, 7 = genitalia, dorsal view, 8 = phallic organ, left lateral view

Male genitalia. Segment IX bending, uniformly long with dorsoapical plate covering laterally part of segment X and cerci. Segment X with capitate apex in lateral and gradually tapering apex in dorsal view. Cerci long digitiform in lateral and clavate in dorsal view. The coxopodite of the gonopods long quadrangular with concave ventrum; harpagones similarly long with roundly truncate apex and concave ventral margin in lateral view. Phallotheca less sclerotised; endotheca with a pair of strongly curving claw-shaped, a less curving short and a straight longer spines.

Material examined – Holotype: Lao Cai Province, Sin Chai, Hoang Lien NP, Tram Ton, 1,900 m, 22.20941°N 103.46197°E, 16–17.XII.2008, at light, leg. L. Peregovits & T. Vásárhelyi (1 male, HNHM). Paratypes: Lao Cai Province, Fan Si Pan Mts, 14 km NW Sa Pa, 1,900–2,000 m, 22°20.9'N 103°46.06'E, 29.XI.2007, at light, leg. G. Kósa (2 males, HNHM). Lao Cai Province, Fansipan Mts, 14 km NW Sapa, 22°20.9'N 103°46.06'E, 5.XII.1997, leg. L. Peregovits & T. Vásárhelyi (2 males, HNHM). Lao Cai Province, Fansipan Mts, 1,900–2,000 m, 14 km NW Sapa, 22°20.9'N 103°46.06'E, 24–27.I.1999, leg. L. Peregovits & L. Ronkay (1 male, HNHM).

*Etymology – Karmos*, from "karmos", supplied with claws in Hungarian, refers to the characteristic pair of claws in the endotheca of the phallic organ.

# **Dolophilodes orias** sp. n. (Figs 0, 12)

(Figs 9–12)

*Diagnosis* – This new species distinguishes from all the known species by its large size. Its genital structure is very close to *D. japonicus* (Banks, 1906), but differs by having circular shape of cerci both in lateral and dorsal view, not only in lateral view; apex of harpagones truncate, not narrowing in lateral view and capitate, not excised in ventral view.

*Description* – Male (in alcohol). Large, dark brown animal. Appendages lighter. Maxillary palp formula is I-II-IV-III-V. Forewing length 14 mm, its membrane brown irrorated and light maculated mostly along costa and around pterostigma.

Male genitalia. Segment IX bending, uniformly long. Segment X rather high in lateral view, with capitate lateral lobes in dorsal view, apicomesal excision short and rounded. Cerci circular, cup-like. Vestigial more sclerotised paraproct present basolaterad under the cover of segment IX, as a pair of downward directed short straps. The coxopodite of the gonopods long quadrangular with subapical constriction; harpagones long with truncate apex and concave ventral margin in lateral view and with capitate apex in ventral view. Phallotheca less sclerotised enlarged with a single long spine.



Figs 9–12. *Dolophilodes orias* sp. n., male holotype: 9 = genitalia, left lateral view, 10 = genitalia, dorsal view, 11 = gonopod, ventral view, 12 = phallic organ, left lateral view

Material examined – Holotype: Lao Cai Province, Fan-si-pan Mts, 7 km W Sa Pa, 2,550 m, 22°18.9'N 103°46'E, 19.XI.1999, leg. A. Kun & L. Ronkay (1 male, HNHM). Paratypes: same as holotype (1 male, HNHM). Lao Cai Province, Fansi-pan Mts, 6 km W Sa Pa, 2,100 m, 22°17.9'N 103°48'E, 17–20.XI.1999, leg. A. Kun & L. Ronkay (1 male, HNHM).

*Etymology* – *Orias*, from "óriás", giant in Hungarian, refers to its large size with forewing length of 14 mm compared to the size range of 5-9 mm of the other described species.

Remarks – Comparing Dolophilodes orias sp. n. I have examined several specimens of *D. ornata* Ulmer, 1909 (OLÁH 2010) and *D. dharmakala* Schmid, 1960 (OLÁH 1994) synonymised by IVANOV (1991) and found the lateral shape of harpagones very stable and reliable to separate them according to the original description. *D. dharmakala* Schmid, 1960: **bona species**.

#### Dolophilodes torrentis Kimmins, 1955

Material examined – Lao Cai Province, Fansipan Mts, 14 km NW Sapa, 22°20.9'N 103°46.06'E, 5.XII.1997, leg. L. Peregovits & T. Vásárhelyi (1 male, 1 associated female, HNHM). Lao Cai Province, Fansipan Mts, 1,900–2,000 m, 14 km NW Sapa, 22°20.9'N 103°46.06'E, 24–27.I.1999, leg. L. Peregovits & L. Ronkay (1 male, HNHM).

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# Kisaura darda sp. n. (Figs 13–15)

*Diagnosis* – This new species is very close to *K. maia* Malicky, 2007 from Bhutan but differs by having shorter and higher segment IX and segment X with lanceolated, hastate apex, not acuminate well visible both from lateral and dorsal view.

*Description* – Male (in alcohol). Small brown animal. Appendages lighter. Maxillary palp formula is I-IV-II-III-V. Forewing length 6 mm, its membrane brown with some irrorated area visible on the mostly denuded forewing.

Male genitalia. Segment IX almost as high as long. Segment X reaching to apex of coxopodite with lanceolated apex. Cerci clavate as long as segment IX and paraproct. The coxopodite of the gonopods short subquadrangular with apicoventral lobe bearing a group of stout setae; harpagones longer than coxopodite with rounded triangular apex. Phallotheca elongated with indistinct phallotremmal sclerite.

Material examined – Holotype: Lao Cai Province, Hoang Lien NP, Tram Ton, forest edge, 1,915 m, 22.3493723°N 103.7704565°E, 10.IV.2010, at light, leg. L. Papp, L. Peregovits & Z. Soltész (1 male, HNHM). Paratypes: same as holotype (4 males, HNHM). Lao Cai Province, Sin Chai, Hoang Lien NP, Tram Ton, 1,900 m, 22.20941°N 103.46197°E, 16–17.XII.2008, at light, leg. L. Peregovits & T. Vásárhelyi (2 males, HNHM). Lao Cai Province, Fan Si Pan Mts, 16 km NW Sa Pa, 16–17.III.1998, leg. L. Peregovits & T. Vásárhelyi (5 males, HNHM).

*Etymology – Darda*, from "dárda", lance in Hungarian, refers to the lanceolated apex of segment X.



**Figs 13–15.** *Kisaura darda* sp. n., male holotype: 13 = genitalia, left lateral view, 14 = genitalia, dorsal view, 15 = phallic organ, left lateral view

#### Kisaura fansipana Oláh et Johanson, 2010

Material examined – Lao Cai Province, Sin Chai, Hoang Lien NP, Tram Ton, forest edge, 1,915 m, 22.3493723°N 103.7704565°E, 10.IV.2010, at light, leg. L. Papp, L. Peregovits & Z. Soltész (2 males, HNHM). Lao Cai Province, Hoang Lien NP, Tram Ton, forest edge, 1936 m, 22.21155°N 103.46480°E, 13.XII.2008, at light, leg. L. Papp, L. Peregovits & L. Ronkay (1 male, HNHM). Lao Cai Province, Fan Si Pan Mts, 16 km NW Sa Pa, 16–17.III.1998, leg. L. Peregovits & T. Vásárhelyi (1 male, HNHM).

#### Kisaura longaria Mey, 1996

Material examined – Lao Cai Province, Fansipan Mts, 14 km NW Sapa, 22°20.9'N 103°46.06'E, 5.XII.1997, leg. L. Peregovits & T. Vásárhelyi (1 male, HNHM). Lao Cai Province, Fansipan Mts, 1,900–2,000 m, 14 km NW Sapa, 22°20.9'N 103°46.06'E, 24–27.I.1999, leg. L. Peregovits & L. Ronkay (1 male, HNHM).

#### Wormaldia clavella Mey, 1995

Material examined – Lao Cai Province, Sin Chai, Hoang Lien NP, Tram Ton, 1,900 m, 22.20941°N 103.46197°E, 16–17.XII.2008, at light, leg. L. Peregovits & T. Vásárhelyi (1 male, HNHM). Lao Cai Province, Fan Si Pan Mts, 14 km NW Sa Pa, 1,900–2,000 m, 22°20.9'N 103°46.06'E, 29.XI.2007, at light, leg. G. Kósa (1 male, HNHM). Lao Cai Province, Fansipan Mts, 1,900–2,000 m, 14 km NW Sapa, 22°20.9'N 103°46.06'E, 24–27.I.1999, leg. L. Peregovits & L. Ronkay (1 male, HNHM).

# Dipseudopsidae

#### Dipseudopsis oliveri Oláh et Malicky, 2010

Material examined – Nghe An Province, Que Phong District, Ban Khom, Pu Hoat Mts, 280 m, 19°40.5'N 104°54.1'E, 21.I.1999, leg F. Kassai (2 males, HNHM).

Psychomyiidae

# Tinodes bunkos sp. n. (Figs 16–19)

*Diagnosis* – This new species, having simple lobe-like harpago, is close to *T. prithulavi* Schmid, 1972 from India, but differs by having segment X elongated

with narrowing apicomesal lobe; paraproct with 5 pairs of megasetae, not with 1 pair; phallic organ with enlarged capitate apex in lateral view. Western Palaearctic, Pakistan, Afghanistan and India are well represented by species with simple lobe-like harpagones, however this is the first species found in Southeast Asia.

Description – Male (in alcohol). Small light brown animal. Sclerites, setal warts both on head and thorax including grooves light. Appendages pale yellow. Maxillary palp formula is I-IV-II-III-V. Forewing length 4 mm, its membrane pale brown densely covered with hairs.

Male genitalia. Segment X small, triangular in lateral view. Segment X apronshaped with narrowing apicomesal lobe. Fulcrum complex where segment IX and X as well as the cerci meet is located near articulation of segment IX and praraproct. Cerci setose and low. Paraproct is represented by a pair of slender paraproctal process embracing the phallic organ; paraprocts armed with 4 pairs of magasetae The coxopodite of the gonopods subquadrangular; harpagones lobe-like; the basal plate of gonopods with long curving pair of distal spines and with a single apodeme with clavate anterior end. Phallic apparatus with dorsal bifid and capitate ventral branches, ejaculatory duct with upward curving free terminal section.

*Material examined* – Holotype: Gia Lai Contum Province, Lo Xo Pass, 1,100 m, 25.II.2007, light, leg G. Simay (1 male, OPC).

*Etymology – Bunkos*, coined from "bunkós", clavate in Hungarian, refers to the clavate anterior end on the apodeme of the basal palet of gonopods.



Figs 16–19. *Tinodes bunkos* sp. n., male holotype: 16 = genitalia, left lateral view, 17 = gonopod, ventral view, 18 = phallic organ, left lateral view, 19 = phallic organ, dorsal view

#### Polycentropodidae

# Plectrocnemia forcipata Schmid, 1965

*Material examined* – Lao Cai Province, Hoang Lien NP, Tram Ton, forest edge, 1,915 m, 22.3493723°N 103.7704565°E, 10.IV.2010, at light, leg. L. Papp, L. Peregovits & Z. Soltész (2 males, HNHM).

# Plectrocnemia kamba Oláh et Johanson, 2008

Material examined – Lao Cai Province, Fan Si Pan Mts, 16 km NW Sa Pa, 16–17.III.1998, leg. L. Peregovits & T. Vásárhelyi (1 male, HNHM). *Remarks* – Described and recorded only from Myanmar, new to Vietnam.

#### Arctopsychidae

# Maesaipsyche mekongensis Mey, 2001

Material examined – Holotype: Nghe An Province, Frontier-Vietnam, 750 m, 19°40.879'N, 104°49.444'E, 3.XI.1999, leg. F. Kassai (1 male, HNHM).

Remarks – M. serrulata Sun et Yang, 2009 has been described from China (Guangxi) with paraproct having only a short dorsal process  $\frac{1}{4}$  distance from the apex as compared to the triple long process  $\frac{1}{2}$  distance from the apex at M. mekongensis Mey. M. serrulata has a row of fine teeth on the lateral margin of each paraproct, but these lateral margins are smooth in M. mekongensis probably reported by SUN et al. (2009) from drawings. This specimen from Vietnam has paraproct with triple long dorsal process at  $\frac{1}{2}$  distance from apex, but the dorsal margin of paraproct is serrulated, having very fine row of teeth. This fine serrulation on the dorsal ridge of paraproct visible only at higher magnification and it was probably undetected during description.

Parapsyche intawitschajanon Malicky et Chantaramongkol, 1992

*Material examined* – Lao Cai Province, Sa Pa District, Cat Cat village, Frontier Vietnam Base Camp, 22.19364°N 103.49461°E, 29.XI.1997, light trap, leg L. Peregovits (1 male, HNHM). J. Oláh

# Hydropsychidae Diplectroninae

#### Diplectrona Westwood, 1840

Remarks - In Diplectrona species the genital structure is rather blunt, often lack conspicuous characters and exhibits minor differences in the particular genital components. The genitalia based determination requires careful examination of several specimens to recognise the ranges of variability and to search apparent stability in different genital structural units. Fortunately there is a rule at least in caddisflies that seems to appear general: if the genitalia monotonous other body characters help to separate species. For instance eye enlargement in Marilia Müller, 1880, or forewing pattern in Nectopsyche Müller, 1879. Here in Diplectrona we apply the combination of the following additional body characters to differentiate among species having very similar genital structures: magnitude of eye enlargement; presence or absence of setae on eye; maxillary palp formula; suture and setal wart pattern on head; length of lateral filament, a cuticular structure associated with the opening of sternum V gland; presence or absence and the number of reticulated sacs in abdominal segments; presence or absence of fork I on hindwing. The combination of these characters can be used effectively to distinguish taxa in Diplectrona species complex of closely related species having similar genital structure. At this stage we do not know how stable some of these additional body character are.

The modification of suture and wart pattern especially on head dorsum offers additional combinational characters to distinguish among taxa. Types of modification: (1) extent of the abbreviation of the epicranial (midcranial or mediocranial) groove, the main suture of the ecdysial cleavage line on vertex; (2) curving pattern of lateral vertexal grooves; (3) fusion and separation magnitude of vertexal ocellar and vertexal lateroantennal compact setose warts; (4) wart elongation, especially that of the occipital compact setose warts due to eye enlargement.

# Diplectrona aligmada sp. n. (Figs 20–25)

*Diagnosis* – This species is close to *D. mada* sp. n. but differs by having epicranial suture complete, not abbreviated; maxillary palp formula different; tergite IX long flat in lateral view, not short with hump; paraproct differently shaped; coxopodite slender; harpago less bird-head shaped; phallotheca with strong constriction in lateral view and with rounded apex in ventral view.

*Description* – Male (in alcohol). Light brown animal. Eyes setaless, not enlarged. Maxillary palp formula I-IV-III-II-V. Cephalic warts are represented on the face by a pair of frontal lateral compact setose warts rounded and horizontally elon-



Figs 20–25. *Diplectrona aligmada* sp. n., male holotype: 20 = head, dorsal view, 21 = genitalia, left lateral view, 22 = genitalia, dorsal view, 23 = gonopod, ventral view, 24 = phallic organ, left lateral view, 25 = phallic organ, ventral view

gated, by a single clypeal median compact setose warts, and by a single labral anteromedian compact setose wart; on head dorsum two pairs of setose warts visible (1) large egg-shaped compact occipital setose warts (2) vertexal ocellar compact setose warts, as well as a single vertexal medioantennal compact setose wart; epicranial suture complete, not abbreviated; curves of lateral vertexal grooves subtriangular; ending posterad far from epicranial groove. Anterodorsal filament on sternite V 1.4X as long as the sternite, there are no internal reticulated sacs present in the abdomen. Forewing length 8 mm, apical fork I present on hindwing.

Male genitalia. Segment IX convex anteriad,dorsum long and flat. Segment X fused to the tergum IX. The dorsoapical setose lobes (inner lobes) of segment X well-developed, rounded broad, protruded posteriad; its posterior third separated by narrow and deep dorsal interlobular gap; the ventroapical setose area distinct. Cerci setose, high and short in lateral view. Unsetose paraproct (outer lobes or lateral plates of segment X) subquadrangular flat plate in lateral view, laterad curving in dorsal view. Gonopods slender straight and its harpago with tapering slightly bird-head shaped apex. Phallic apparatus with down curving and broadening basal section and with a slightly longer tube-forming horizontal apical half with rounded obliquely cut apex in lateral view; two pairs of endothecal processes visible, both with blunt apices in lateral and tapering triangular in ventral view; dorsal endothecal process larger and more pigmented, ventral endothecal processes almost hyaline on the cleared holotype; phallotremal sclerite less distinct.

Material examined – Holotype: Lam Dong Province, Dalat, Ta Nung Valley, 13. II. 2006, light, leg. J. Oláh jr. (1 male, OPC).

*Etymology – Aligmada*, coined from "alig madár", hardly bird in Hungarian, refers to the hardly bird-head shaped apex of harpagones.

#### Diplectrona eurydike Malicky et Chantaramongkol, 2002

*Material examined* – Hoa Binh Province, Hoabinh, 20 km Tanlac, small waterfall, 31.I.1986, singled, leg. J. Oláh (1 male, 1 female, OPC). Quang Tri Province, Huong Hoa District, Huon Hoa Nature Reserve, near Cup village, 16°56'15"N 106°34'52"E, 400 m, at light, 7–10.XI.2007, leg. G. Csorba (1 male, OPC).

*Remarks* – Specimen from Hoa Binh Province has a pair of reticulated sacs in abdominal segment VIII, but specimen from Quang Tri Province with identical genital structure has no reticulated sacs present in abdominal segments.

# Diplectrona hasada sp. n. (Figs 26-31)

*Diagnosis* – Having bilobed paraproct the genital structure of *Diplectrona* hasada sp. n. is close to *D. dimagaha* Oláh et Johanson, 2010 from Sumatra, but differs by having dorsoapical setose lobes (inner lobes) longer than paraproct and protruding long posterad, not shorter; both lobes on paraproct pointed, not only the dorsal lobe; pointed lobes on paraproct almost adhering to each other separated by narrow split in lateral view, not far from each other; phallotheca constricted midway with capitate apex, not parallel-sided.

*Description* – Male (in alcohol). Light brown animal. Eyes setaless, not enlarged. Maxillary palp formula I-IV-III-II-V. All the setal warts are present both on face and dorsum, vertexal ocellar and vertexal lateroantennal compact setose warts partially fused; epicranial suture not abbreviated; curves of lateral vertexal grooves subtriangular; almost meeting posterad at epicranial groove. Anterodorsal filament on sternite V 1.6X as long as the sternite, there are no internal reticulated sacs present in the abdomen. Forewing length 6.6 mm, apical fork I present on hindwing.

Male genitalia. Segment IX short, convex anteriad. Segment X fused to the tergum IX. The dorsoapical setose lobes (inner lobes) of segment X well-developed, rounded broad, protruded posteriad, longer than paraproct (lateral plate); its posterior third separated by narrow and deep dorsal interlobular gap; the ventroapical setose lobe distinct. Cerci setose, high and long in lateral view. Unsetose paraproct (outer lobes or lateral plates of segment X) short with pointed almost adhering lobes in lateral view. Gonopods with straight coxopodite; harpago digitate. Phallic apparatus with down curving and broadening basal section and with a slightly longer tube-forming horizontal apical half constricted midway and capitate apicad in lateral view; one pair of triangular endothecal processes visible in ventral view; a second pair visible indistinct inside in ventral view; phallotremal sclerite less distinct.



**Figs 26–31.** *Diplectrona hasada* sp. n., male holotype: 26 = head, dorsal view, 27 = genitalia, left lateral view, 28 = genitalia, dorsal view, 29 = gonopod, ventral view, 30 = phallic organ, left lateral view, 31 = phallic organ, ventral view

*Material examined* – Holotype: Lam Dong Province, Baoloc, Duchma stream, spring area, 26.X.1988, singled, leg. J. Oláh (1 male, OPC). Allotype: same as holotype (1 female associated, OPC).

*Etymology – Hasada*, coined from "hasadt", split in Hungarian, refers to narrow gap between the two pointed lobes on paraproct.

# Diplectrona kismada sp. n. (Figs 32–37)

*Diagnosis* – Having pointed bilobed and closely set paraproct the genital structure of *Diplectrona kismada* sp. n. is close to *D. hasada* sp. n., but differs by having dorsoapical setose lobes (inner lobes) longer; cerci shorter and lobiform; both lobes on paraproct pointed, but directed anterad and laterad; coxopodite robust, high and wide, not slender; harpago birdhead-shaped, not digitate; phallotheca constricted midway with less capitate apex.

Description – Male (in alcohol). Light brown animal. Eyes setaless, not enlarged. Maxillary palp formula I-IV-III-II-V. All the setal warts are present both on face and dorsum, vertexal ocellar and vertexal lateroantennal compact setose warts partially fused; epicranial suture abbreviated; curves of lateral vertexal grooves semicircular, ending posterad far from epicranial groove, not triangular and ending near to epicranial groove. Anterodorsal filament on sternite V 1.8X as

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J. Oláh
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**Figs 32–37.** *Diplectrona kismada* sp. n., male holotype: 32 = head, dorsal view, 33 = genitalia, left lateral view, 34 = genitalia, dorsal view, 35 = gonopod, ventral view, 36 = phallic organ, left lateral view, 37 = phallic organ, ventral view

long as the sternite, there are no internal reticulated sacs present in the abdomen. Forewing length 7 mm, apical fork I present on hindwing.

Male genitalia. Segment IX short, convex anteriad. Segment X fused to the tergum IX. The dorsoapical setose lobes (inner lobes) of segment X well-developed, rounded broad, protruded posteriad long; its posterior third separated by narrow and deep dorsal interlobular gap; the ventroapical setose lobe distinct. Cerci short and lobiform. Unsetose paraproct (outer lobes or lateral plates of segment X) short with pointed almost adhering lobes in lateral view; pointed apices turning anterad and laterad. Gonopods with robust coxopodite; harpago with minute, birdhead shaped apex. Phallic apparatus with down curving and broadening basal section and with a slightly longer tube-forming horizontal apical half constricted midway and slightly dilated apicad in lateral view; apices of two pairs of triangular endothecal processes visible in ventral view; phallotremal sclerite less distinct.

Material examined – Holotype: Lam Dong Province, Baoloc, Baco stream, 26.X.1988, light, leg. J. Oláh (1 male, OPC). Paratypes: Lam Dong Province, Baoloc, Duchma stream, 23.X.1988, light, leg. J. Oláh (4 males, OPC).

*Etymology – Kismada*, coined from "kis madár", small bird in Hungarian, refers to the small bird head shaped apex of harpagones.

# Diplectrona mada sp. n. (Figs 38-43)

*Diagnosis* – This species was drawn and determined as *Diplectrona burha* Schmid, 1961 by MALICKY (2002) based on specimens collected along the same

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habitats in Tam Dao, Vietnam. The species *D. burha* was established by SCHMID (1961) from Pakistan as possible alternative name for *D. marginata* (Betten, 1909), which is a dubious species described poorly from female as *Hydromanicus* Brauer, 1865. It was transferred to *Diplectrona*, associated with male by venation and properly described and drawn by MARTYNOV (1935). The Vietnamese specimens from Tam Dao are definitely not *D. marginata* or *D. burha* having characteristic bird-head shaped, not tapering apex on harpagones, as well as in ventral view simple, not dilated apex on phallotheca.

Description – Male (in alcohol). Light brown animal. Eyes setaless, not enlarged. Maxillary palp formula I-IV-(II,III)-V. Cephalic warts are represented on the face by a pair of frontal lateral compact setose warts rounded and horizontally elongated, by a single clypeal median compact setose warts, and by a single labral anteromedian compact setose wart; on head dorsum three pairs of setose warts are present (1) narrow elongated postgenal compact setose warts (2) large egg-shaped compact occipital setose warts (3) vertexal ocellar compact setose warts, as well as a single vertexal medioantennal compact setose wart; epicranial suture abbreviated; curves of lateral vertexal grooves semicircular; ending posterad far from epicranial groove. Anterodorsal filament on sternite V 2X as long as the sternite, there are no internal reticulated sacs present in the abdomen. Forewing length 8.8 mm, apical fork I present on hindwing.

Male genitalia. Segment IX short, regularly convex anteriad. Segment X fused to the tergum IX. The dorsoapical setose lobes (inner lobes) of segment X characteristic for the genus well-developed, rounded broad, protruded pos-



**Figs 38–43.** *Diplectrona mada* sp. n., male holotype: 38 = head, dorsal view, 39 = genitalia, left lateral view, 40 = genitalia, dorsal view, 41 = gonopod, ventral view, 42 = phallic organ, left lateral view, 43 = phallic organ, ventral view

teriad; its posterior third separated by narrow and deep dorsal interlobular gap; the ventroapical setose lobe indistinct. Cerci setose, high and long in lateral view. Unsetose paraproct (outer lobes or lateral plates of segment X) short with small hook-shaped dorsal tooth in lateral view. Gonopods with slightly down and mesad curvin coxopodite and its harpago with bird-head shaped apex. Phallic apparatus with down curving and broadening basal section and with a slightly longer tube-forming horizontal apical half with rounded obliquely cut apex in lateral view; two pairs of endothecal processes visible, both with blunt apices in lateral and tapering triangular in ventral view; dorsal endothecal process larger and more pigmented, ventral endothecal processes almost hyaline on the cleared holotype; phallotremal sclerite less distinct.

Material examined – Holotype: Tam Dao National Park, Tam Dao City, 1,300 m, 14.X.1986, light, leg. J. Oláh (1 male, OPC).

*Etymology – Mada*, coined from "madár", bird in Hungarian, refers to the bird head shaped apex of harpagones.

# Diplectrona romada sp. n. (Figs 44-49)

*Diagnosis* – The genital structure of *Diplectrona romada* sp. n. is close to *D. keto* Malicky, 2002 from Taiwan, but differs by having harpago short, not long and its apex bird-head shaped, not digitiform. Morover eye is greatly enlarged and as a result the setal warts greatly elongated longitudinally due to space limitation on the narrowed vertex.

*Description* – Male (in alcohol). Light brown animal. Eyes setaless, highly enlarged. Maxillary palp formula I-(III,IV)-II-V. All the setal warts are present both on face and dorsum, but highly elongated on the compressed head dorsum. epicranial suture not abbreviated; curves of lateral vertexal grooves narrow; ending posterad far from epicranial groove. Anterodorsal filament on sternite V 1.7X as long as the sternite, there are no internal reticulated sacs present in the abdomen. Forewing length 7 mm, apical fork I present on hindwing.

Male genitalia. Segment IX short, regularly convex anteriad. Segment X fused to the tergum IX. The dorsoapical setose lobes (inner lobes) of segment X characteristic for the genus well-developed, rounded broad, protruded posteriad, longer than paraproct (lateral plate); its posterior third separated by narrow and deep dorsal interlobular gap; the ventroapical setose lobe indistinct. Cerci setose, high and long in lateral view. Unsetose paraproct (outer lobes or lateral plates of segment X) short without any tooth in lateral view. Gonopods with slightly upward and mesad curvin coxopodite; harpago with short bird-head shaped apex. Phallic apparatus with down curving and broadening basal section and with a slightly longer tube-

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**Figs 44–49.** *Diplectrona romada* sp. n., male holotype: 44 = head, dorsal view, 45 = genitalia, left lateral view, 46 = genitalia, dorsal view, 47 = gonopod, ventral view, 48 = phallic organ, left lateral view, 49 = phallic organ, ventral view

forming horizontal apical half constricted midway slightly tapering apicad in lateral view; one pair of triangular endothecal processes visible in ventral view; a second pair visible indistinct inside in ventral view; phallotremal sclerite less distinct.

Material examined – Holotype: Lam Dong Province, Dalat, Prenn waterfall, 19.X.1988, light, leg. J. Oláh (1 male, OPC). Paratype: Lam Dong Province, Dalat, Ta Nung Valley, 17.II.2007, light, leg. G. Simay (1 male, OPC).

*Etymology – Romada*, coined from "rövid madár", short bird in Hungarian, refers to the short bird head shaped apex of harpagones.

# Diplectrona sotet sp. n. (Figs 50-55)

*Diagnosis* – Most close to *Diplectrona romada* sp. n., but differs by having cerci shorter and lobiform; paraproct with mesal excision in lateral view; coxopodite straight; harpago simply pointed, not birdhead-shaped; phallotheca strongly constricted midway; eyes not enlarged.

*Description* – Male (in alcohol). Dark animal when alive. Eyes setaless, not enlarged. Maxillary palp formula I-IV-III-II-V. All the setal warts are present both on face and dorsum, vertexal ocellar and vertexal lateroantennal compact setose warts partially fused; epicranial suture abbreviated; curves of lateral vertexal grooves semicircular, ending posterad far from epicranial groove and touching occipital warts. Anterodorsal filament on sternite V 1.5X as long as the sternite, there are no internal reticulated sacs present in the abdomen. Forewing length 7.2 mm, apical fork I present on hindwing.

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**Figs 50–55.** *Diplectrona sotet* sp. n., male holotype: 50 = head, dorsal view, 51 = genitalia, left lateral view, 52 = genitalia, dorsal view, 53 = gonopod, ventral view, 54 = phallic organ, left lateral view, 55 = phallic organ, ventral view

Male genitalia. Segment IX short, convex anteriad. Segment X fused to the tergum IX. The dorsoapical setose lobes (inner lobes) of segment X well-developed, rounded broad, protruded posteriad long; its posterior third separated by narrow and deep dorsal interlobular gap; the ventroapical setose lobe distinct. Cerci short. Unsetose paraproct (outer lobes or lateral plates of segment X) short without pointed lobes in lateral view. Gonopods with straight coxopodite; harpago with pointed apex. Phallic apparatus with down curving and broadening basal section and with a slightly longer tube-forming horizontal apical half constricted strongly midway in lateral view; apices of a pairs of triangular endothecal processes visible in ventral view; phallotremal sclerite less distinct.

Material examined – Holotype: Lam Dong Province, Baoloc, Baco stream, 26.X.1988, light, leg. J. Oláh (1 male, OPC). Paratypes: Lam Dong Province, Baoloc, Duchma stream, 23.X.1988, light, leg. J. Oláh (2 males, OPC).

*Etymology* – *Sotet*, coined from "sötét", dark in Hungarian, refers to the rather dark colour of the freshly collected specimens.

# Diplectrona tamdaophila Mey, 1998

Material examined – Tam Dao National Park, Tam Dao City, along the main stream, 1,300 m, 14.X.1986, light and singled, leg. J. Oláh (13 males, 6 females, OPC). Tam Dao National Park, Tam Dao City, along spring brook of the main stream, 1,300 m, 10.V.1987, singled, leg. J. Oláh (2 males, OPC). Tam Dao National Park, 1994, No. 802 (1 male, HNHM).

#### Hydropsychinae

# Hydromanicus hullamos sp. n. (Figs 56–59)

Diagnosis – Belongs to Hydromanicus luctuosus species group. It was described as *H. truncatus* species group (OLÁH & JOHANSON 2008*a*), however *H. truncatus* has been synonymised with *H. luctuosus* Ulmer, 1905 by MALICKY (2009). Close to *H. punctosalis* Mey, 1996, but differs by having segment X narrow triangular in dorsal view, not with lateral triangular hump; cerci broad foliform, not narrow; harpagones long slender and undulating in ventral view, not short, stout and without undulation.

*Description* – Male (in alcohol). Brown animal. Maxillary palp formula I-III-(II, IV)-V. Forewing length 9 mm, brown membrane colour spotted with white.

Male genitalia. Segment IX short both ventrad and dorsad, convex anteriad and posteriad, anterior margin with broad antecostal suture; posterior margin with long setae. Segment X triangular in dorsal and with birdhead shaped apex in lateral view. Cerci long broad foliform particularly in dorsal view. Coxopodite long, stout, straight; harpagones long with undulating mesal and lateral margin in ventral view. Phallic organ with high and rounded subapical mesoventral keel.

Material examined – Holotype: Nghe An Province, Frontier-Vietnam, 750 m, 19°40.879'N, 104°49.444'E, 3.XI.1999, leg. F. Kassai (1 male, HNHM).

*Etymology – Hullamos*, from "hullámos", waving in Hungarian, refers to the waving mesal and lateral margin of harpagones in ventral view.



Figs 56–59. *Hydromanicus hullamos* sp. n., male holotype: 56 = genitalia, left lateral view, 57 = genitalia, dorsal view, 58 = gonopod, ventral view, 59 = phallic organ, left lateral view

# Hydromanicus paros sp. n. (Figs 60–64)

*Diagnosis* – Belongs to *Hydromanicus spatulatus* species group, close to *H. diomedes* Malicky, 2000 from Nepal, but differs by having harpagones and phallic apex differently formed.

*Description* – Male (in alcohol). Brown animal. Maxillary palp formula I-III-(II, IV)-V. Forewing length 12 mm, brown membrane colour spotted with light.

Male genitalia. Segment IX very short dorsad and constricted ventrad and dorsad, convex anteriad and posteriad, anterior margin with broad antecostal suture; posterior margin with two triangular lobes bearing long setae. Segment X elongated and long cleft in dorsal view; pointed middle in lateral view. Cerci composed of long filiform and two short branching setose processes. Coxopodite dilated from middle; harpagones bilobed. Phallic organ with bilobed endothecal sclerites and bilobed ventroapical tip of phallotheca.

Material examined – Holotype: Lao Cai Province, Fan Si Pan Mts, 16 km NW Sa Pa, 16–17.III.1998, leg. L. Peregovits & T. Vásárhelyi (1 male, HNHM).

*Etymology – Paros*, from "páros", paired in Hungarian, refers to the paired lobes developed in all genital structures: cerci, segment X, harpagones, endothecal process, apicoventral tip of phallotheca; however most characteristic and unique is the deep cleft dividing harpagones into two lobes.



**Figs 60–64.** *Hydromanicus paros* sp. n., male holotype: 60 = genitalia, left lateral view, 61 = genitalia, dorsal view, 62 = gonopod, ventral view, 63 = phallic organ, left lateral view, 64 = phallic organ, ventral view

#### Hydromanicus tabernaemontanus Mey, 1996

*Material examined* – Lao Cai Province, Hoang Lien NP, Tram Ton, forest edge, 1,915 m, 22.3493723°N 103.7704565°E, 10.IV.2010, at light, leg. L. Papp, L. Peregovits & Z. Soltész (4 males, HNHM).

#### Hydropsyche appendicularis Martynov, 1931

*Material examined* – Lao Cai Province, Hoang Lien NP, Tram Ton, forest edge, 1,915 m, 22.3493723°N 103.7704565°E, 10.IV.2010, at light, leg. L. Papp, L. Peregovits & Z. Soltész (4 males, HNHM).

## Hydropsyche cerva Li et Tian, 1990

Material examined – Lao Cai Province, Sa Pa District, Cat Cat village, Frontier Vietnam Base Camp, 22.19364°N 103.49461°E, 4.XII.1997, light trap, leg A. Kun (1 male, HNHM). Lao Cai Province, Sa Pa District, Cat Cat village, Frontier Vietnam Base Camp, 22.19364°N 103.49461°E, 29.XI.1997, light trap, leg L. Peregovits (1 male, HNHM). Lao Cai Province, Fan Si Pan Mts, 16 km NW Sa Pa, 16–17.III.1998, leg. L. Peregovits & T. Vásárhelyi (1 male, HNHM).

#### Hydropsyche effusa Mey, 1996

*Material examined* – Lao Cai Province, Hoang Lien NP, Tram Ton, forest edge, 1,915 m, 22.3493723°N 103.7704565°E, 10.IV.2010, at light, leg. L. Papp, L. Peregovits & Z. Soltész (1 male, HNHM).

# Hydropsyche uvana Mey, 1995

*Material examined* – Lao Cai Province, Sa Pa District, Cat Cat village, Frontier Vietnam Base Camp, 22.19364°N 103.49461°E, 14.III.1998, light trap, leg L. Peregovits (1 male, HNHM). Lao Cai Province, Fan Si Pan Mts, 16 km NW Sa Pa, 16–17.III.1998, leg. L. Peregovits & T. Vásárhelyi (4 males, HNHM).

# Macronematinae Polymorphanisini

#### Polymorphanisus astictus Navas, 1923

*Material examined* – Quang Tri Province, Da Krong Nature Reserve, 2 km SE of HQ, light trap at small forest stream, 16.V.2007, leg. G. Csorba (2 males, OPC).

#### Macronematini

#### Amphipsyche gratisoa Navas, 1922

Material examined – Lam Dong Province, Baoloc, Loc Chau stream, 24. X. 1988, at light, leg. J. Oláh (1 female, OPC). Nam Bai Cat Tien National Park, 9. II. 2006, light, leg. J. Oláh jr. (9 males, OPC).

## Amphipsyche meridiana Ulmer, 1909

*Material examined* – Nam Bai Cat Tien National Park, 9.II.2006, light, leg. J. Oláh jr. (9 males, 8 females, OPC). Bac Thai Province, Quang Chu, 24.V.1987, found sitting lonely in shadow on a timber fallen along stream, leg. J. Oláh (2 females, OPC). Lam Dong Province, Baoloc, Loc Chau stream, 24.X.1988, at light, leg. J. Oláh (1 female, OPC).

## Macrostemum bacham Hoan, Tanida et Bae, 2005

*Material examined* – Hoa Bihn Province, Hoa Bihn Reservoir, 22.I.1991, light, leg. S. Andrikovich (1 female, OPC). Quang Tri Province, Da Krong Nature Reserve, near HQ, light trap at small forest stream, 15.V.2007, leg. G. Csorba (1 female, OPC). Quang Tri Province, Huong Hoa District, Huon Hoa Nature Reserve, near Cup village, 16°56'15"N 106°34'52"E, 400 m, at light, 7–10. XI.2007, leg. G. Csorba (1 female, OPC).

# Macrostemum buzoganos sp. n.

(Figs 65–72)

*Diagnosis* – Most close to *M. junolah* sp. n., but differs by having different forewing pattern; suture between tergite and sternite IX lost, present and well developed at *M. junolah* sp. n.; excision between lateral lobes of tergite IX wide, not narrow; lateral lobes of segment X slender, laterad curving S-shaped, not stout and capitate; harpagones with clavte apex, not digitate; phallic apex less capitate.

Description – Male (in alcohol) (Figs 65–70). Head and prothorax yellow, other sclerites castanean brown; appendages brownish. First 6 antennal segment brown, others light. Maxillary palp formula is I-II-IV-III-V. Forewing length 12 mm, dark with light pattern of 5 patches: transversally pterostigmal patch, triangular subpterostigmal with short costal patch, transversally elongated patch on arculus, small rounded patch on crossvein cu1-cu2, elongated patch on basal section of cubital region.

Male genitalia. Segment IX short, slightly S-shaped; its dorsum with truncate lateral lobes, separated by wide and shallow quadrangular excision. Segment X triangular in lateral view; diverging with slightly S-shaped apices in dorsal view; cerci located middle and represented by setal protuberance. Vestigial paraproct emarginating segment X ventrolaterad and forming more sclerotised phallic guide. Coxopodite and harpago almost equal in diameter, harpagones clavate. Phallobase right angled to the stem; phallic apex capitate with mesal lobe rounded in ventral and knob-shaped in lateral view.

Female genitalia (Figs 71–72). Tergite VIII without lateroapical lobes. Low and long pleurosternum present; sternite quadrangular both in lateral and ventral view. Tergite IX short with marginal row of setae; sternite IX mostly membranous forming the lower lip of vagina. Segment X forming the upper lip of the genital chamber with 3 pairs of digitiform processes, 2 pairs of papillae robust, 1 pair, the cercus slender.

*Material examined* – Holotype: Quang Tri Province, Da Krong Nature Reserve, 2 km SE of HQ, light trap at small forest stream, 16.V.2007, leg. G. Csorba (1 male, OPC). Allotype: same as holotype (1 female, OPC).

*Etymology – Buzoganos*, coined from "buzogányos", clavate in Hungarian, refers to the clavate apex of the harpagones.



**Figs 65–72.** *Macrostemum buzoganos* sp. n., male holotype: 65 = Forewing venation and pattern, 66 = genitalia, left lateral view, 67 = genitalia, dorsal view, 68 = gonopod, ventral view, 69 = phallic organ, left lateral view, 70 = phallic organ, ventral view, female allotype: 71 = genitalia, lateral view, 72 = genitalia, ventral view

#### Macrostemum centrotum (Navas, 1998)

Material examined – Tam Dao National Park, Tam Dao City, 1,300 m, 2.III.2006, light, leg. J. Oláh jr. (1 male, OPC).

*Remarks* – Forewing has only 2 wedge-shaped costal white patches and anal patch reduced to a small dot. Dorsum of phallic organ perfectly straight in lateral view, not concave.

## Macrostemum dohrni (Ulmer, 1905)

*Material examined* – Hoa Bihn Province, Hoa Bihn Reservoir, 22.I.1991, light, leg. S. Andrikovich (1 female, OPC).

#### Macrostemum fastosum (Walker, 1852)

*Material examined* – Tam Dao National Park, Tam Dao City, 1,300 m, 10– 12.V.1987, light, leg. J. Oláh jr. (5 males, 42 females, OPC). Bac Thai Province, Phu Luong District, Quang Chu village, 24.V.1987, light, leg. J. Oláh jr. (1 male, 8 females, OPC). Quang Tri Province, Huong Hoa District, Huon Hoa Nature Reserve, near Cup village, 16°56'15"N 106°34'52"E, 400 m, at light, 7–10. XI.2007, leg. G. Csorba (5 females, OPC). Quang Tri Province, Da Krong Nature Reserve, near HQ, 16°36'N 106°52'E, 170 m, at light, 13.XI.2007, leg. G. Csorba (1 female, OPC).

#### Macrostemum fenestratum (Albarda, 1987)

*Material examined* – Lam Dong Province, Dalat, Dathien Reservoir, outhflow, 18.X.1988, at light, leg. J. Oláh (1 male, 91 females, OPC). Lam Dong Province, Baoloc, Loc Chau stream, 24.X.1988, at light, leg. J. Oláh (2 males, 4 females, OPC). Hoa Binh Province, Hoa Binh Reservoir, 22.I.1991, light, leg. S. Andrikovichi (1 male, 2 females, OPC). Phong Na, 19.II.2006, light, leg. J. Oláh jr. (1 female, OPC). Dalat, Da Nung valley, 13.II.2006, light, leg. J. Oláh jr. (1 female, OPC). Nam Bai Cat Tien National Park, 9.II.2006, light, leg. J. Oláh jr. (41 females, OPC). Quang Tri Province, Huong Hoa District, Huon Hoa Nature Reserve, near Cup village, 16°56'15"N 106°34'52"E, 400 m, at light, 7–10.XI.2007, leg. G. Csorba (1 female, OPC). Binh Tri Thien Province, Bach Ma National Park, 100 m, 22.II.2007, UV light trap, leg. G. Simay (4 males, 8 females, OPC).

#### Macrostemum floridum (Navas, 1929)

Material examined – Moc Chau, 25.X.1986, light, leg. J. Oláh (1 female, OPC). Hoa Binh Province, towards Dabac, 21.X.1986, light, leg. J. Oláh (5 fe-

males, OPC). Hoa Binh Province, Hoa Binh Hotel, 23–24.X.1986, light, leg. J. Oláh (5 females, OPC). Bac Thai Province, Quang Chu, 24–25.V.1987, light, leg. J. Oláh (1 male, OPC). Quang Tri Province, Da Krong Nature Reserve, 2 km SE of HQ, light trap at small forest stream, 16.V.2007, leg. G. Csorba (1 male, OPC).

## Macrostemum indistinctum (Banks, 1911)

*Material examined* – Hanoi, West Lake, 7.V.1987, light, leg. J. Oláh (1 females, OPC). Lam Dong Province, Baoloc, Loc Chau stream, 24.X.1988, at light, leg. J. Oláh (1 females, OPC). Lam Dong Province, Baoloc, Dai Binh River, 22.X.1988, at light, leg. J. Oláh (1 females, OPC). Quang Tri Province, Huong Hoa District, A Xoc village, 16°53'11"N 106°34'15"E, 310 m, 15.V.2007, at light, leg. G. Csorba (1 female, OPC). Quang Tri Province, Da Krong Nature Reserve, near HQ, 16°36'N 106°52'E, 170 m, at light, 13.XI.2007, leg. G. Csorba (1 male, OPC).

# Macrostemum junolah sp. n. (Figs 73–78)

*Diagnosis* – Most close to *M. uncatum* Li et Tian, 1991 from China (Hainan), but differs by having details in forewing pattern different; lateral lobes of segment X capitate in dorsal view, not tapering; phallobase 90° angled, not 120°; phallic apex more capitate, bulged both ventrad and dorsad, not only ventrad; protruding lobe located middle in coronal plane visible in lateral view.

Description – Male (in alcohol). Dorsum of head, the entire mesothorax and metatrorax, as well as coxaand the first tibiae are castanean brown; head ventrum, setal warts and appendages pale yellow. Maxillary palp formula is I-II-IV-III-V. Forewing length 12 mm, dark with light pattern composed of 4 patches: triangular pterostigmal patch, transversally elongated quadrangular patch on arculus, irregular costal patch and horizontally elongated anal patch along Cu2, A1 and A2.

Male genitalia. Segment IX short, slightly S-shaped; its dorsum without any lateral lobes, almost truncate. Segment X triangular in lateral view; diverging with capitate apices in dorsal view; cerci located middle and represented by setal protuberance. Vestigial paraproct emarginating segment X ventrolaterad and forming more sclerotised phallic guide. Coxopodite and harpago almost equal in diameter. Phallobase right angled to the stem; phallic apex capitate with mesal lobe.

Material examined – Holotype: Binh Tri Thien Province, Bach Ma National Park, 750 m, 18.II.2006 UV light trap leg. J. Oláh jr. (1 male, OPC). Paratypes:

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J. Oláh
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**Figs 73–78.** *Macrostemum junolah* sp. n., male holotype: 73 = Forewing venation and pattern, 74 = genitalia, left lateral view, 75 = genitalia, dorsal view, 76 = gonopod, ventral view, 77 = phallic organ, left lateral view, 78 = phallic organ, ventral view

same as holotype (1 male, OPC). Binh Tri Thien Province, Bach Ma National Park, 850 m, 17.II. 2006, UV light trap, leg. J. Oláh jr. (3 teneral males, OPC).

*Etymology – Junolah*, coined from the collector's name, J. Oláh junior. Patronym in honor of the collector, who has paid attention and energy to install light traps while leading challenging bird surveys in remote regions.

#### Macrostemum seba Malicky et Prommi, 2009

*Material examined* – Quang Tri Province, Da Krong Nature Reserve, near HQ, light trap at small forest stream, 15.V.2007, leg. G. Csorba (3 males, 3 females, OPC). Quang Tri Province, Da Krong Nature Reserve, 2 km SE of HQ, light trap at small forest stream, 16.V.2007, leg. G. Csorba (1 male, 1 female, OPC).

#### Pseudoleptonema Mosely, 1933

*Pseudoleptonema* Mosely, 1933: 8 (type species: *Macronema ceylanicum* Hagen, 1871, monobasic, original designation).

Trichomacronema Schmid, 1964: 838-840 (type species: Trichomacronema shanorum Schmid, 1964, original designation), syn. n.

Macrostemum genus complex has rather similar genital architecture; mostly wing venation offers characters to distinguish among genera. Wing venation of *Pseudoleptonema* (s. l. including *Trichomacronema*) is most close to *Macrostemum* 

Kolenati, 1859 but differs by having Sc and R on forewing running both free into C and connected only by crossvein sc-r, not fused and running together to C; discoidal cell on forewing minute, not small; Sc and R on hindwing connected by crossvein sc-r and Sc running separately to C, as well as R running separately to the petiole of fork I, not fused and running together to RS2+3; hindwing with fork I, not without fork I.

These are the architectural venation differences in *genus proximus* between genera *Pseudoleptonema* s. l. and *Macrostemum*, however deviations or specific differences may modify this pattern. Some species of *Pseudoleptonema* (s. str. excluding *Trichomacronema*) has A1 on forewing not reaching to A2, but ending well before on midway with terminal curving or plaque-like circling: *P. hoiden* sp. n., *P. quinquefasciatum* (Martynov, 1935), *P. supalak* Malicky et Chantaramongkol, 1998, and some species has crossvein subapicad between C and Sc, appearing as bifid Sc: *P ceylanicum* (Hagen, 1858), *P. godapitigama* Schmid, 1958, *P. kalukan-dama* Schmid, 1958, *P. quinguefasciatum* (Martynov, 1935).

According to SCHMID (1964) the genus *Trichomacronema* is very similar to *Pseudoleptonema*, and differs mostly by habitus and by the dense body and leg pilosities as well as by the flatness of tibiae. I have compared the known and new species in both genera and these differences proved to be gradual, not discrete. Moreover in wing venation I have found only a single character consistently differing in the two genera. In *Trichomacronema* the basal section of vein Rs is obsolete and connected to R by an additional crossvein. It is supplementary because the genuine crossvein r connecting R and Rs is present subapicad. However this character is also gradual, the remaining vein fringing free of this supplementary crossvein, representing the vestigial basal part of RS is present, but in various length. In *Pseudoleptonema egena* sp. n. it is almost invisible.

Single characters like obsolete Rs on forewing at *Trichomacronema* does not verify its generic state. Similarly bifid Sc and A1 with terminal curving on forewing in some species of *Pseudoleptonema* are not enough to establish new genera.

# Pseudoleptonema egena sp. n. (Figs 79–83)

*Diagnosis* – This new species is similar to *P. tamdao* (Malicky, 1998) but differs by having straight apical margin on dorsum of segment IX in dorsal view, not with lateral lobes; bulging apex of the phallic organ short, not long; forewing pattern with only slight differences on holotype, most of the paratypes collected in light trap in all mountains are probably in teneral adult stage, newly emerged, light coloured and soft, sclerites are already fully pigmented, but wings are not fully flexed along the flexion lines and not fully pigmented.

J. Oláh

Description – Male (in alcohol). Dorsum of head, the entire mesothorax and metatrorax, the first tibiae are castanean brown; head ventrum, setal warts and appendages pale yellow. Maxillary palp formula is I-IV-II-III-V. Scape with black ventral spot. Forewing length 13 mm; pattern similar to *P. tamdao*, except there is a long costal patch anterad of the triangular pterostigmal patch; excision on termen (outer margin) at M1 not pronounced; Sc and R on forewing running both free into C and connected by crossvein sc-r; Sc not bifid; A1 joining to A2; discoidal cell on forewing minute; basal part of Rs obsolete, its vestigial fringe very small, almost lacking at one paratype; Sc and R on hindwing connected by crossvein sc-r and Sc running separately to C, as well as R running separately to the petiole of fork I; hindwing with fork I.

Male genitalia. Segment IX short, its dorsum without lateral lobes. Segment X short; cerci represented by setal area apicolaterad. Vestigial paraproct emarginating segment X ventrolaterad and forming more sclerotised phallic guide. Mesal margin of coxopodite and harpago armed with strong spines. Phallic apparatus with enlarged vertical basal and slender horizontal section; phallic apex bulging both in lateral and dorsal view.

Material examined – Holotype: Binh Tri Thien Province, Bach Ma National Park, 700 m, 22.II.2006 UV light trap, leg. J. Oláh jr. (1 male, OPC). Paratypes: same as holotype (4 males, 1 female, OPC). Quang Tri Province, Da Krong Nature Reserve, 2 km SE of HQ, light trap at small forest stream, 16.V.2007,



**Figs 79–83.** *Pseudoleptonema egena* sp. n., male holotype: 79 = genitalia, left lateral view, 80 = genitalia, dorsal view, 81 = gonopod, ventral view, 82 = phallic organ, left lateral view, 83 = phallic organ, ventral view

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leg. G. Csorba (5 males, OPC). Gia Lai Contum Province, Lo Xo Pass, 1,100 m, 25.II.2007, light, leg G. Simay (1 male, 2 females, OPC).

*Etymology – Egena*, coined from "egyenes", straight in Hungarian, refers to the straight truncate apical margin of dorsum on segment IX.

# Pseudoleptonema maganos sp. n. (Figs 84–86)

*Diagnosis* – This medium-sized female has unique forewing pattern and wing venation with some modification, differing from all the known species offering possibility to establish a new species based upon this single female specimen.

Description – Female (in alcohol). Sclerites, appendages and wings are brownish on this specimens stored during 25 years. Freshly collected animal had dark forewing with bright white marginal patch. Maxillary palp formula I-(II,III,IV)-V, second segment wedge-shaped apicomesad. Spur formula 1–4–4. Forewing venation without any unusual modification: obsolete Rs, bifid Sc and curving A1; Sc terminal joining C indiscernible both on forewing and hindwing; on forewing the single vertically elongated subquadratic patch present on costal margin only little apicad of the middle.

Female genitalia. Tergite VIII with pronounced lateroapical setose lobes; entire apical part is covered with minute microtrichiae. Low and long pleurosternum present; sternite ovoid both in lateral and ventral view. Tergite IX with marginal row of setae; sternite IX mostly membranous forming the lower lip of



Figs 84–86. *Pseudoleptonema maganos* sp. n., female holotype: 84 = forewing venation, 85 = genitalia, lateral view, 86 = genitalia, ventral view

the vagina. Segment X with 3 pairs of digitiform processes, 2 pairs of robust papillae, 1 pair, the cercus slender.

*Material examined* – Holotype: Bac Thai Province, Quang Chu, 24.V.1987, found sitting lonely in shadow on a timber fallen along stream, leg. J. Oláh (1 female, OPC).

*Etymology – Maganos*, coined from "magányos", lonely in Hungarian, refers to the single female found sitting daytime alone on a timber.

#### Pseudoleptonema supalak Malicky et Chantaramongkol, 1998

Material examined – Hoa Binh Province, Hoabinh to Tanlak, 20 km, 27.X.1986 leg. J. Oláh (1 male, OPC). ). Quang Tri Province, Da Krong Nature Reserve, 2 km SE of HQ, forest sream, light trap, 16.V.2007, leg. G. Csorba (1 female, OPC).

#### Pseudoleptonema tamdao (Malicky, 1998) comb. n.

Trichomacronema tamdao Malicky, 1998: 779.

Material examined – Tam Dao National Park, Tam Dao City, 1,300 m, 11.V.1987, light, leg. J. Oláh (1 male, 1 female, OPC).

#### Hydrobiosidae

Appendicular and functional genital orismology (terminology) (OLÁH & JOHANSON 2008b) was used to study the genital structure of Hydrobiosidae. Proctiger, filiform-filicerci-filipod and paracerci-parapod proposed for hydrobiosid male genitalic structures (TILLYARD 1926, MCFARLANE 1939, ROSS & KING 1951, ROSS 1956, SCHMID 1989) are all unjustified innovations. No any special neoformations developed in Hydrobiosidae. Proctiger is present, but not always much developed, in all forms of caddisflies and combined usually with segment X. Additional processes associated with segment X and with the cerci are all of paraproctal origin. The poorly defined segmentation behind segment IX is an apparent complex formed by abdominal segments X and XI with appendages of cerci, paraproct and the telson.

#### Apsilochorema hrasvam Schmid, 1970

*Material examined* – Lao Cai Province, Hoang Lien NP, Tram Ton, forest edge, 1,915 m, 22.3493723°N 103.7704565°E, 10.IV.2010, at light, leg. L. Papp, L. Peregovits (1 male, HNHM). Lao Cai Province, Sa Pa District, Cat Cat village, Frontier Vietnam Base Camp, 22.19364°N 103.49461°E, 29.XI.1997, light trap, leg L. Peregovits (2 males, HNHM). Lao Cai Province, Fan Si Pan Mts, 16 km NW Sa Pa, 16–17.III.1998, leg. L. Peregovits & T. Vásárhelyi (3 males, HNHM).

#### Apsilochorema vaneyam Schmid, 1970

*Material examined* – Lao Cai Province, Sa Pa District, Cat Cat village, Frontier Vietnam Base Camp, 22.19364°N 103.49461°E, 4.XII.1997, light trap, leg A. Kun (1 male, HNHM).

#### Rhyacophilidae

# Himalopsyche dombora sp. n. (Figs 87–90)

*Diagnosis* – This new species is similar to *H. navasi* Banks, 1940, *H. japonica* Morton, 1900 and *H. trifurcula* Sun et Yang, 1994, but differs by having coxopodite short, high and convex ventroapicad, not low, long and concave; parameres short.

*Description* – Body light brown, appendages even more pale; maxillary palp formula I-II-V-IV-III; spur formula 344; tarsal claws symmetric; forewing marbled irrorated with faint maculation of linear arrangement; forewing length 15 mm.

Male (in alcohol). Segment IX rectangular. Segment X membranous; cerci stout, tapering setose process, almost straight both in lateral and dorsal view;



**Figs 87–90.** *Himalopsyche dombora* sp. n., male holotype: 87 = genitalia, left lateral view, 88 = genitalia, dorsal view, 89 = phallic organ, left lateral view, 90 = phallic organ, ventral view

anal sclerite heavily sclerotised structure with downward curving hooked apex in lateral view and with subapical dark transversal band in dorsal view. Gonopod bisegmented, coxopodite high, short and convex ventroapicad, slightly excised dorsoapicad with mesal lobe; harpago with mesad curvin tapering apex. Phallic organ composed of phallotheca, endotheca, aedeagus and parameres; phallothecal tenon and gonopodal tendon well developed; aedeagus with strong lateral spine like upward curving processes; parameres highly abbreviated.

*Material examined* – Holotype: Gia Lai Contum Province, Lo Xo Pass, 1,100 m, 25.ii.2007, light, leg G. Simay (1 male, OPC).

*Etymology – Dombora*, coined from "domború", convex in Hungarian, refers to the convex ventroapical margin of gonopod in lateral view.

#### Himalopsyche sylvicola Mey, 1996

Material examined – Lao Cai Province, Fansipan Mts, 6 km W Sapa, 22°17.9'N 103°48.5'E, 17–20.XI.1999, leg. A. Kun & L. Ronkay (1 male; HNHM).

Remark – A similar species from China (MEY 1996) is Himalopsyche triloba (Hwang, 1958) comb. n., described as Rhyacophila triloba HWANG, 1958: 279–280, 284.

#### Rhyacophila arefinae Oláh et Malicky, 2010

*Material examined* – Binh Tri Thien Province, Bach Ma National Park, 700 m, 22.II.2006, UV light trap, leg. J. Oláh jr. (1 male, OPC).

#### Rhyacophila armitagei Oláh et Malicky, 2010

*Material examined* – Binh Tri Thien Province, Bach Ma National Park, 750 m, 18.II.2006, UV light trap, leg. J. Oláh jr. (2 males, OPC).

# Rhyacophila domba sp. n.

(Figs 91–93)

Diagnosis – The holotype of this new species from Tam Dao National Park was determined earlier as *Rhyacophila scissa* Morton, 1900 (OLÁH 1987, OLÁH & MALICKY 2010). *R. scissa* was also reported and illustrated from Fan Si Pan Mountains (ARMITAGE & AREFINA 2003). Comparision with other closely related species (MALICKY & SUN 2002) revealed that this single specimen from Tam Dao and specimens from Fan Si Pan Mountains represent two new species, suggesting that the so called widely distributed and highly varying species of *Rhyacophila scissa* is a species complex inside the small *R. scissa* species group. This group comprised of *R. scissa* new species complex (*R. domba* sp. n., *R. fides*
Malicky et Sun, 2002, R. homora sp. n., R. niyampa Schmid, 1970, stat. n., R. scissa Morton, 1900), R. scissoides species complex (R. scissoides Kimmins, 1953, R. thailandica Schmid, 1970 stat. n.), and five more species described from China: R. eurystheus Malicky et Sun, 2002, R. euterpe Malicky et Sun, 2002, R. flora Malicky et Sun, 2002, R. morsei Malicky et Sun, 2002 and R. schismatica Sun et Yang, 1995. To separate taxa in R. scissa species complex of closely related species I have found the complex of segment X, epiproct and paraproct being very stable and reliable in lateral view; caudal view is also very productive to examine, but this view is highly angle-view sensitive to draw. However, the lateral profile of segment X, epiproct (anal sclerite) and paraproct (apical band and dorsal strap together) complex strongly depends on the erectile or relaxed state of the genitalia. The pivot-joint between ventral tip of segment X and the dorsal tip of the U-shaped apical band functions like fulcrum. It is positioned posterad in relaxed and anterad in erectile state, changing significantly the vertical profile of the entire complex. Therefore, it is adviced to push the complex into a relaxed comparable state by fine-tipped forcepts or needles. Rhyacophila dombora sp. n. differs from other taxa of the complex by having convex dorsoapical margin of segment X, two pairs of short digitate processes on the ventroapical margin and more slender paraproct in lateral view.

*Description* – Male (in alcohol). Small animal. Body, appendages and wings brown, forewing length 5 mm.

Male genitalia. Segment IX with subventral constriction in lateral view. Segment X convex dorsoapicad, with two pairs of small digitate processes ventroapicad; small rounded epiproct (anal sclerite) present; paraproct composed of dorsally striated tergal strap and sclerotised U-shaped apical band. Gonopod bisegmented; coxopodite with dorsal digitate and long clavate dorsoapical arm; harpago sagittate. Phallic organ composed of phallobase (short phallotheca and



Figs 91–93. *Rhyacophila domba* sp. n., male holotype: 91 = genitalia, left lateral view, 92 = segment X, dorsal view, 93 = gonopod, right lateral view

most developed endotheca), aedeagus and parameres; parameres stout erectile processes, capitate by short dorsal and long ventral setae; phallothecal tenon and gonopodal tendon well developed; aedeagus with dorsal and ventral arms; dorsal arm short, ventral arm long with vertically flattened clavate mesal lobe accompanied with lateral spines; ejaculatory duct between dorsal and ventral arms.

Material examined – Holotype: Tam Dao National Park, Tam Dao City, 1,300 m, 14.X.1986, light, leg. J. Oláh (1 male, OPC).

*Etymology – Domba*, from "domb", hump-like convex in Hungarian, refers to the convex apical margin of segment X in lateral view.

# Rhyacophila egyenes sp. n. (Figs 94–97)

*Diagnosis* – This new species belongs to the *Rhyacophila castanea* species group and most close to *R. tamdaoensis* Malicky, 1995, but differs by having harpagones with obliquely straight cut apical margin, not excised; dorsal lobe of aedeagus differently shaped; parameres clavate, not digitate.

*Description* – Male (in alcohol). Body, appendages and wings brown, forewing length 7 mm.

Male genitalia. Segment IX highly constricted subventrad in lateral view. Segment X vertical with mesal tooth in lateral view; cerci lacking; pair of epiproct (anal sclerite) small rounded without any root; paraproct (U-shaped or



**Figs 94–97.** *Rhyacophila egyenes* sp. n., male holotype: 94 = genitalia, left lateral view, 95= segment X, dorsal view, 96 = segment X epiproct and paraproct complex, caudal view, 97 = phallic organ, left lateral view

wishbone-shaped apical band and tergal strap or band) present. Gonopod bisegmented, coxopodite high, short and with hump ventroapicad; harpago with straight apical margin and mesal spinose relief pattern specific. Phallic organ composed of phallobase (short phallotheca and most developed endotheca), aedeagus and parameres; phallothecal tenon and gonopodal tendon well developed; aedeagus with dorsal and ventral arms; ventral arm with lateral filiform processes; parameres strongly clavate.

*Material examined* – Holotype: Binh Tri Thien Province, Bach Ma National Park, 750 m, 18.II.2006, UV light trap, leg. J. Oláh jr. (1 male, OPC).

*Etymology – Egyenes*, from "egyenes", straight in Hungarian, refers to the very regularly straight apical margin of the harpagones, that is more or less excised or rounded in all species of the group.

#### Rhyacophila fansipana Mey, 1998

*Material examined* – Lao Cai Province, Fan-si-pan Mts, 14 km NW Sa Pa, 1,900–2,000 m, 22°20.9'N 103°46.06'E, 4–6.XII.1997, leg. L. Peregovits (1 male, OPC).

### Rhyacophila homora sp. n. (Figs 98–100)

*Diagnosis – Rhyacophila homora* sp. n. is most close to *R. scissa* but differs by having concave dorsoapical margin of segment X, one pair of digitate processes on the ventroapical margin directed ventrad and more robust paraproct in lateral view.

*Description* – Male (in alcohol). Large animal. Body, appendages and wings brown, forewing length 11 mm.

Male genitalia. Segment IX longer dorsad than ventrad. Segment X concave dorsoapicad, with one pair of small digitate processes directed ventrad; small rounded epiproct (anal sclerite) present; paraproct composed of dorsally striated tergal strap and robust sclerotised U-shaped apical band. Gonopod bisegmented; coxopodite with dorsal digitate and long clavate dorsoapical arm; harpago sagittate. Phallic organ composed of phallobase (short phallotheca and most developed endotheca), aedeagus and parameres; parameres stout erectile processes, capitate by short dorsal and long ventral setae; phallothecal tenon and gonopodal tendon well developed; aedeagus with dorsal and ventral arms; dorsal arm short, ventral arm long with vertically flattened clavate mesal lobe accompanied with lateral spines; ejaculatory duct between dorsal and ventral arms.

Material examined – Holotype: Lao Cai Province, Fan-si-pan Mts, 14 km NW Sa Pa, 1,900–2,000 m, 22°20.9'N 103°46.06'E, 4.XII.1997, light, leg. L. Peregovits (1 male, OPC). Paratype: Lao Cai Province, Hoang Lien NP, Tram J. Oláh



Figs 98–100. *Rhyacophila homora* sp. n., male holotype: 98 = genitalia, left lateral view, 99 = segment X, dorsal view, 100 = phallic organ, left lateral view

Ton forest edge, 1,915 m, 22.3493723°N 103.7704565°E, 8–11.IV.2010, at light, leg. L. Peregovits (1 male, OPC).

*Etymology – Homora*, from "homorú", concave in Hungarian, refers to the concave apical margin of segment X in lateral view.

Rhyacophila laposka sp. n. (Figs 101–103)

Diagnosis – This new species belongs to the divaricata branch and divaricata arm having segment X vestigial, dorsoapical lobe on segment IX, cerci and epiproct present, paraproct absent represented only by membranous just discernible tergal strap. These characters relate it to *khimbarpa* species group, however this group has lost the parameres of the phallic organ. The presence of well-developed parameres brings this new species close to *chematangpa*, the most primitive species group of the *divaricata* arm of SCHMID (1970). *Rhyacophila laposka* differs from *R. chematangpa* Schmid, 1970 by the differently shaped cerci and epiproct, by the longer dorsoapical lobe of segment IX, by the shape of aedeagus and by having enlarged parameres.

*Description* – Male (in alcohol). Small animal. Body, appendages and wings brown, forewing length 8 mm.

Male genitalia. Segment IX with long and low dorsoapical lobe; narrow and tapering in dorsal view. Segment X vestigial membranous, reduced to house cerci and epiproct; cerci paired oval lobes; epiproct oval, located anterad of cerci, epio-proctal root rounded directed dorsoanterad; paraproct (apical band) absent, ter-gal trap membranous almost indiscernible. Gonopod bisegmented; coxopodite long, narrowing quadrangular; harpago oval. Phallic organ composed of phallobase (short phallotheca and endotheca), aedeagus and parameres; phallothecal tenon long, gonopodal tendon short; parameres enlarged, subquadrangular and



Figs 101–103. Rhyacophila laposka sp. n., male holotype: 101= genitalia, left lateral view, 102 = segment X, dorsal view, 103 = phallic organ, left lateral view

flattened in sagital plane, covered with short setae and fringed ventrally with long setae; aedeagus long filiform hooked upward; ventral plate of aedeagus membranous granulosed and doubled with a smaller dorsal plate.

*Material examined* – Holotype: Lao Cai Province, Fan-si-pan Mts, 7 km W Sa Pa, 2,550 m, 22°18.9'N 103°46'E, 19.XI.1999, leg. A. Kun & L. Ronkay (1 male, HNHM).

*Etymology – Laposka*, from diminutive form of "lapos", flat in Hungarian, refers to the enlarged parameres highly flattened in sagittal plane.

### Rhyacophila malayana Banks, 1931

*Material examined* – Binh Tri Thien Province, Bach Ma National Park, 700 m, 22.II.2006, UV light trap, leg. J. Oláh jr. (1 male, OPC).

#### Rhyacophila multispinomera Sun et Yang, 1998

*Material examined* – Lao Cai Province, Hoang Lien NP, Tram Ton forest edge, 1,915 m, 22.3493723°N 103.7704565°E, 8–11.IV.2010, at light, leg. L. Peregovits (1 male, HNHM).

### Rhyacophila veforma sp. n. (Figs 104–106)

*Diagnosis* – This new species belongs to *Rhyacophila khimbarpa* species group and most close to *R. khimbarpa* Schmid, 1970 but differs by having harpagones with V-shaped, not simple quadratic; epiproctal root more developed; dorsal lobe of phallotheca reduced; dorsal arm of aedeagus differently shaped.

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J. Oláh
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Figs 104–106. *Rhyacophila veforma* sp. n., male holotype: 104 = genitalia, left lateral view, 105 = segment X, dorsal view, 106 = phallic organ, left lateral view

*Description* – Male (in alcohol). Body, appendages and wings dark brown, forewing length 7 mm.

Male genitalia. Segment IX with long dorsum. Segment X reduced to vestigium holding pair of triangular cerci, pair of rounded large epiproct and its unpaired internal root; paraproct present as mostly membranous tergal strap and just discernible weakly sclerotised U-shaped apical band. Gonopod bisegmented, harpago broadly V-shaped. Phallic organ composed of phallobase of short phallotheca and most developed endotheca and of aedeagus; parameres indistinct; phallothecal tenon and gonopodal tendon well developed; aedeagus with dorsal and ventral arms; dorsal arm composed of a pair of spine-like S-forming lateral processes with mesad turning apices and of a median tripartite complex with short lateral lobes and slender median ejaculatory duct; ventral arm paired foliform with pointed apices in ventral view.

*Material examined* – Holotype: Binh Tri Thien Province, Bach Ma National Park, 700 m, 22.II.2006, UV light trap, leg. J. Oláh jr. (1 male, OPC).

*Etymology – Veforma*, from "véforma", V-shaped in Hungarian, refers to the V-formed harpago, unusual shape in all species groups of *Rhyacophila* genus.

Glossosomatidae Agapetinae

Agapetus aranytalan sp. n. (Figs 107–111)

Diagnosis – There are some species with slight asymmetry in Agapetus genus: A. excisus Kimmins, 1953, A. caimoc Oláh, 1988, A. kongcanxing Oláh, 1988,

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**Figs 107–111.** *Agapetus aranytalan* sp. n., male holotype: 107 = genitalia, left lateral view, 108 = genitalia, right lateral view, 109 = genitalia, dorsal view, 110 = IX segment and gonopods, ventral view, 111 = phallic organ, left lateral view

however this new species exhibits rather high asymmetry in all periphallic organs: cerci, paraproct, gonopod.

*Description* – Male (in alcohol). Light brown animal, with legs and venter slightly lighter. Maxillary palp formula I-II-IV-V-III, second segment with globular mesolateral projection. Wing membrane brown; forewing length 3.2 mm; on hindwing Fork I absent R1 vestigial. Hook-shaped cuticular ridge on the dorsal margin of sternite V present; ventral process on sternite VI long.

Male genitalia. Segment IX synsclerotised, dorsum short, ventrum long. Segment X with fused paraproct asymmetric, right large, left smaller and sunken downward under phallic organ; right cerci enlarged. Gonopods long, slightly clavate with bifid apex in lateral view. Phallic organ less sclerotised with indistinct phallocrypt and and spine-like paramere.

*Type material* – Holotype: Gia Lai Contum Province, Lo Xo Pass, 600 m, 15.II.2006, light, leg J. Oláh jr. (1 male, OPC).

*Etymology – Aranytalan*, from "aránytalan", asymmetrical in Hungarian, refers to the asymmetry of segment X complex, including cerci and paraproct.

# Agapetus fesus sp. n. (Figs 112–114)

*Diagnosis* – Very close to *A. gotgian* Oláh, 1988, but differs by having ventroapical mesal process on sternite VI with tapering rounded apex, not with truncate apex; cerci triangulat, not tending to digitiform; comb of dendate line shorter; basal heel of gonopods differently formed.

*Description* – Male (in alcohol). Brown animal, with legs and venter slightly lighter. Maxillary palp formula I-II-IV-III-V, second segment with globular mesolateral projection. Wing membrane brown; forewing length 3 mm; on hindwing

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Figs 112–114. Agapetus fesus sp. n., male holotype: 112 = genitalia, left lateral view, 113 = gonopod, ventral view, 114 = phallic organ, left lateral view

short Fork I absent R1 vestigial. Blister-like protuberance on the dorsal margin of sternite V present detached from the ridge; ventral process on sternite VI with tapering rounded apex.

Male genitalia. Segment IX synsclerotised, quadrangular with short ventroapical mesal process. Segment X discernible as a pair of lateral less sclerotise elongated plate with up and laterad turning pointed apex. Cerci high triangular in lateral view. Paraproct filiform with anterad turning apical third. Gonopods with ronded basoventral heel and apical comb of short dentate line. Phallic organ with long fused or indistinct paramere and aedeagus.

*Type material* – Holotype: Lam Dong Province, Baoloc, Baco stream, 26.X.1988, singled, leg. J. Oláh (1 male, OPC). Paratypes: Lam Dong Province, Baoloc, Duchma stream, 22.X.1988, singled along a side spring brook, leg. J. Oláh (1 male, OPC). Lam Dong Province, Baoloc, Baco stream, 26.X.1988, singled, leg. J. Oláh (3 males, OPC). Lam Dong Province, Dalat, Vang River, side stream, 17.X.1988, singled, leg. J. Oláh (5 males, OPC). Lam Dong Province, Dalat, Datangla waterfall, 15.X.1988, singled, leg. J. Oláh (5 males, 1 associated female, OPC).

*Etymology – Fesus*, from "fésüs", supplied with comb in Hungarian, refers to the short comb of dentate oblique line on the apical margin of gonopods.

# Agapetus fogas sp. n. (Figs 115–118)

*Diagnosis* – Close to *A. halong* Oláh, 1988, but differs by having dorsum and ventrum of segment IX almost of the same length; gonopods more robust; mesal pair of projectons on gonopod apex pointed dentate, not blunt plate-like.

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Figs 115–118. Agapetus fogas sp. n., male holotype: 115 = genitalia, left lateral view, 116 = genitalia, dorsal view, 117 = gonopod, ventral view, 118 = phallic organ, left lateral view

*Description* – Male (in alcohol). Brown animal, with legs and venter slightly lighter. Maxillary palp formula I-II-IV-V-III, second segment with globular mesolateral projection. Wing membrane brown; forewing length 3.2 mm; on hindwing short Fork I present R1 vestigial. Blister-like protuberance on the dorsal margin of sternite V present detached from the ridge; ventral process on sternite VI long.

Male genitalia. Segment IX synsclerotised, subquadrangular with long pointed triangular anterolateral apodeme in lateral view. Segment X membranous, indistinct, but discernible high and deeply excised in dorsal view. Cerci downward and laterad directed setose lobe. Paraproctal lateral vertical plates (lateral lobe of segment X) narrowing and projecting on their apical half. Gonopods with concave ventrum and slightly tapering apex in lateral view; their apex mesally oblique and truncate in ventral view. Phallic organ indistinct basally; a pair of downward directed spines and a single mesal straight spines discernible apically.

*Type material* – Holotype: Binh Tri Thien Province, Bach Ma National Park, 100 m, 22.II.2007, UV light trap, leg. G. Simay (1 male, OPC).

*Etymology* – *Fogas*, from "fogas", supplied with teeth in Hungarian, refers to the dentate mesal processes on gonopod heads.

# Agapetus otoldal sp. n. (Figs 119–121)

*Diagnosis* – Has some resemblance to *A. abimelech* Malicky et Mey, 2009, but differs by having very regular pentagonal shape of segment IX in lateral view; cerci quadrangular with truncate apex, not digitiform and downward directed; gonopods with different shape both in lateral and ventral view.

*Description* – Male (in alcohol). Light brown animal, with legs and venter slightly lighter. Maxillary palp formula I-II-IV-V-III, second segment with globu-





**Figs 119–121.** *Agapetus otoldal* sp. n., male holotype: 119 = genitalia, left lateral view, 120 = gonopod, ventral view, 121 = phallic organ, left lateral view

lar mesolateral projection. Wing membrane brown; forewing length 3 mm; on hindwing short Fork I absent R1 vestigial. Blister-like protuberance on the dorsal margin of sternite V present detached from the ridge; ventral process on sternite VI with slightly capitate apex.

Male genitalia. Segment IX synsclerotised, pentagonal. Segment X discernible as a pair of lateral less sclerotise plate. Cerci quadrangular, truncate. Paraproct indistinct, discernible as a more sclerotised mesal band on the ventrum of segment X. Gonopods long with higher almost rectangular basal half. Phallic organ indistinct with a spine-like paramere.

*Type material* – Holotype: Lam Dong Province, Dalat, Prenn waterfall, 19.X.1988, light, leg. J. Oláh (1 male, OPC).

*Etymology – Otoldal*, from "ötoldalú", pentagonal in Hungarian, refers to the lateral shape of segment IX.

### Glossosomatinae

Glossosoma (Muroglossa) atestas Malicky et Chantaramongkol, 1992

Material examined – Lao Cai Province, Fan Si Pan Mts, 16 km NW Sa Pa, 16–17.III.1998, leg. L. Peregovits & T. Vásárhelyi (1 male, HNHM).

### Glossosoma (Glossosoma) caudatum Martynov, 1931

*Material examined* – Lao Cai Province, Sin Chai, Hoang Lien NP, Tram Ton, 1,900 m, 22.20941°N 103.46197°E, 16–17.XII.2008, at light, leg. L. Peregovits & T. Vásárhelyi (1 male, HNHM).

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Glossosoma (Glossosoma) jentumar Malicky et Chantaramongkol, 1992

Material examined – Lao Cai Province, Sa Pa, 23.IX.1963, leg. T. Pócs (1 male, HNHM).

#### Glossosoma (Glossosoma) malayanum Banks, 1934

*Material examined* – Lao Cai Province, Hoang Lien NP, Tram Ton, forest edge, 1,915 m, 22.3493723°N 103.7704565°E, 10.IV.2010, at light, leg. L. Papp, L. Peregovits & Z. Soltész (1 male, HNHM).

# Glossosoma (Lipoglossa) rovidul sp. n. (Figs 122–125)

*Diagnosis* – This new species has resemblance to *G. adunatum* Yand et Morse, 2002 from China, but differs by having abdominal sternite VI process large, not small; segment IX short, not long; parameres strongly asymmetric, cerci and gonopods differently shaped.

*Description* – Male (in alcohol). Small, dark brown animal. Maxillary palp formula is II-I-IV-V-III, segment 2 strongly globose. Abdominal sternite process VI large, horizontal liguliform, process VII oblique vertical pointed. Forewing length 6 mm, veins A not thickened.

Male genitalia. Segment IX short, longer dorsad, very short ventrad, its anterior margin triangular. Segment X membranous, reduced to hold cerci and epiproct (lateral lobes of tergum X) and possibly to erect lateral strips for phallocryp; epiproct fused to ventroapical lobes of cerci; paraproct is represented by membranous tergal strap connecting to the dorsum of phallobase. Gonopods



Figs 122–125. *Glossosoma rovidul* sp. n., male holotype: 122 = genitalia, left lateral view, 123 = genitalia, dorsal view, 124 = gonopod, ventral view, 125 = phallic organ, left lateral view

symmetric, elongated with trifid apical third. Phallocryp is formed ventrally by elongated basal plate of gonopods and laterally by less sclerotised strips produced possibly by vestigial segment X and connected to basodorsal margin of gonopods; phallocrypt and phallobase partially overlapping and confusing. Phallic organ composed of phallobase, well-developed asymmetric parameres and composed aedeagus; aedeagus comprised of granulosed ventral lobe, erectile dorsal lobe with slender terminal spine.

*Material examined* – Holotype: Lao Cai Province, Sin Chai, Hoang Lien NP, Tram Ton, 1,900 m, 22.20941°N 103.46197°E, 16–17.XII.2008, at light, leg. L. Papp, L. Peregovits & L. Ronkay (1 male, HNHM).

*Etymology – Rovidul*, from "rövidült", abbreviated in Hungarian, refers to short segment IX.

#### Protoptilinae

# Nepaloptila elvala sp. n. (Figs 126–129)

Diagnosis - Easily distinguished from all the known Nepaloptila Kmmins, 1964 species by the bifurcated apices present on the phallic organ and on the lateral processes on segment IX. These lateral processes are homogenous outgrowth without any suture, seam or any other tissue modifications, they are not gonopods as suggested by MALICKY & CHANTARAMONGKOL (1992). Higher magnification reveals that gonopods turned anterad in the form of more sclerotised straps, adhering to and forming the phallocrypt inside the ventrolateral region of sternum IX. These highly modified gonopods visible in lateral view through the overlapping apical margin of segment IX as dark band or in caudal view in form of a double inner layer subtending the phallic organ. Probably the gonopods together with their basal plate help in pivoting the phallic organ. Gonopods in most genera of protoptilids are frequently unidentifiable, declared absent, vestigial, lost or represented by some of processes associated with the ventral articulation of the aedeagus (Ross 1956), or apparently fused with phallic organ (MORSE 1988). In genus Itauara gonopods, if present fused to phallobase (ROBERTSON & HOLZENTHAL 2011) forming together a "phallic ensemble". At Campsiophora Flint, 1964, Cariboptila Flint, 1964, Cubanoptila\_Sykora, 1973, Culoptila Mosely, 1954, Mortoniella Woodson, 1939 and Protoptila Banks, 1904 the sternum IX and/or the gonopods are also modified to form a phallic capsule. The genera of Protoptilinae evolved these unique departures of rather complex fusions and modifications of structures to fit together in a very specific way in order to generate stimulatory and sensory mechanisms in sexual selection processes.

Description – Male (in alcohol). Small, brown animal. Maxillary palp formula is II-IV-I-III-V, segment II strongly globose. Mesoscutellar warts absent, small rounded pair of setose warts present on mesoscutum. Spur formula 044. The cuticular structure of lateral filament, associated with the opening of sternum V gland long with backward directed hooked apex; glands large globular embedded inside by spines. Abdominal sternite process VI short and stout, process VII small and pointed. Forewing length 2.5 mm, forks I, II, III, IV and V present.

Male genitalia. Segment IX triangular in laeral view, ventrum abbreviated produced trilobed, lateral lobes with bilobed apex. Segment X retracted inside the dorsum of segment IX as membranour hood. Setose cerci reduced to small fingered highly sclerotised lobe on apical margin of segment IX. Gonopods turned anterad inside the sternum IX, its position and structure discernible only with careful examination under higher magnification. Phallic organ enlarged seems composed of phallotheca with bilobed apex and endotheca with 8 slender spines of similar size.

*Material examined* – Holotype: Gia Lai Contum Province, Lo Xo Pass, 600 m, 15.II.2006, light, leg J. Oláh jr. (1 male,OPC). Paratype: same as holotype (1 male, OPC).

*Etymology – Elvala*, from "elváló", bifurcated in Hungarian, refers to the bilobed, bifurcated, excised apex both on the lateral processes of segment IX and on the phallic organ.



Figs 126–129. Nepaloptila elvala sp. n., male holotype: 126 = abdominal segments V-VIII and genitalia, left lateral view, 127 = genitalia, ventral view, 128 = phallic organ, left lateral view, 129 = phallic organ, ventral view

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# Apataniidae Moropsychinae

#### Moropsyche circumflexa Mey, 1997

Material examined – Lao Cai Province, Sa Pa District, Cat Cat village, Frontier Vietnam Base Camp, 22.19364°N 103.49461°E, 4.XII.1997, light trap, leg A. Kun (1 male, HNHM).

### Moropsyche limacodes Malicky, 1995

*Material examined* – Tam Dao National Park, Tam Dao City, 1,300 m, 15.X.1986, singled along a small tributary of the main stream, leg. J. Oláh (1 male, OPC). Tam Dao National Park, Tam Dao City, 1,300 m, 10.V.1987, singled along a small stream in rainforest, leg. J. Oláh (1 male, 1 associated female, OPC).

### Moropsyche primigena Mey, 1997

*Material examined* – Lao Cai Province, Sa Pa District, Cat Cat village, Frontier Vietnam Base Camp, 22.19364°N 103.49461°E, 4.XII.1997, light trap, leg A. Kun (1 male, HNHM).

### Limnephilidae Dicosmoecinae

# Nothopsyche nigropedaria Mey, 1996

*Material examined* – Lao Cai Province, Sa Pa District, Cat Cat village, Frontier Vietnam Base Camp, 22.19364°N 103.49461°E, 4.XII.1997, light trap, leg A. Kun (4 males, HNHM). Lao Cai Province, Sa Pa District, Cat Cat village, Frontier Vietnam Base Camp, 22.19364°N 103.49461°E, 29.XI.1997, light trap, leg L. Peregovits (5 males, HNHM).

#### Phryganeidae

#### Eubasilissa maclachlani (White, 1862)

Material examined – Lao Cai Province, Hoang Lien NP, Tram Ton, forest edge, at light, 1,915 m, 22.3493723°N, 103.7704565°E, 10.IV.2010, leg. L. Papp, L. Peregovits & Z. Soltész (3 females, HNHM).

#### Phryganopsychidae

### Phryganopsyche latipennis (Banks, 1906)

Material examined – Lao Cai Province, Hoang Lien NP, Fan Si Pan Mts., 1,915 m, 22.3493723°N 103.7704565°E, 10.IV.2010, at light, leg. L. Papp, L. Peregovits & Z. Soltész (1 male, HNHM). Lao Cai Province, Fan Si Pan Mts, 2,100 m, 22°17.9'N 103°48.5'E, 17–20.XI.1999, at light, leg. A. Kun, L. Ronkay (2 males, HNHM).

# Lepidostomatidae Lepidostoma Lepidostoma ferox branch

### Lepidostoma egenes sp. n. (Figs 130–135)

Diagnosis – This species with monolobed gonopod apex, mesally excavated scape and abbreviated dorsal complex of segment X, cerci and gonopods is a member of a closely related species complex, here named as *Lepidostoma picea* (Ulmer, 1913) species complex. Included species in the area: *L. augustus* (Malicky et Chantaramongkol, 1994), *L. brevipenne* (Oláh, 1991), *L. egenes* sp. n., *L. ives* sp. n., *L. longipenis* (Weaver, 1989), *L. martius* (Malicky et Chantaramongkol, 1994), *L. septembrius* (Malicky et Chantaramongkol, 1994), *L. spicea* (Ulmer, 1913), *L. septembrius* (Malicky et Chantaramongkol, 1994), and *L. tungyawensis* (Malicky et Chantaramongkol, 1994). Most close to *L. longipenis*, but



**Figs 130–135.** *Lepidostoma egenes* sp. n., male holotype: 130 = left scape, dorsal view, 131 = genitalia, left lateral view, 132 = genitalia, dorsal view, 133 = gonopod, ventral view, 134 = phallic organ, left lateral view, 135 = phallic organ, dorsal view

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differs by having scape excised short in dorsal view, not long; harpagones excised mesad in subapical region, shorter parameres waving in dorsal view, not straight.

*Description* – Male (in alcohol). Medium-sized dark brown animal. Vertexal antennal compact setal wart large ovoid, occipital compact setal wart large rounded triangular. First and second segments of maxillary palp equal wide, flat in transversal plane bearing mixture of long scales and setae held adjacent to frons; second segment with false joint, distal broadening of first segment with dense tuft of long setae. Scape with mesal cavity and basal process. Forewing length 7 mm.

Male genitalia. Segment IX fused annular, dorsum and venter with nearly equal length. Dorsal complex of segment X, cerci and paraproct abbreviated forming a pair of medial processes triangular and lateral processes triangulat, slightly mesad turning point. Gonopods in lateral view with short basodorsal process, extended vertically, in ventral view basal portion straight with small mesal projection; harpago fused to coxopodit, setaless. Phallicata curving with parameres straight in lateral and waving in dorsal view.

*Material examined* – Holotype: Hoa Binh Province, Hoa Binh, 8 km to Dabac, 31.I.1986, light, leg. J. Oláh (1 male, OPC). Associated allotype: same as holotype (1 female, OPC). Paratypes: Moc Chau, 25.X.1986, light, leg. J. Oláh (1 male, OPC).

*Etymology – Egenes*, coined from "egyenes", straight in Hungarian, refers to parameres straight in lateral view.

#### Lepidostoma esban Malicky, 2008

*Material examined* – Tam Dao National Park, Tam Dao City, 1,300 m, 13.X.1986, singled along spring in deep dark forested valley, leg. J. Oláh (2 males, OPC). Tam Dao National Park, Tam Dao City, 1,300 m, spring brook, 10.V.1987, singled, leg. J. Oláh (1 male, OPC).

# Lepidostoma fura sp. n.

(Figs 136–140)

*Diagnosis* – This species with strange dorsal complex is differentiated from all the known species of the genus by a pair of unique strongly sclerotised structures almost suspending free apicad on the complex connected only by slender stalk. This setaless structure may function as stimulatory or holding organ.

*Description* – Male (in alcohol). Medium-sized dark brown animal. Vertexal antennal compact setal wart small rounded; occipital compact setal wart large, rounded triangular. First segment of maxillary palp longer and wider than second and held adjacent to frons, surrounded and concealed by thick pile of long setae. Scape with mesal cavity and subbasal processes mesally. Forewing length 6 mm.



Figs 136–140. *Lepidostoma fura* sp. n., male holotype: 136 = head with appendages, frontal view, 137 = genitalia, left lateral view, 138 = genitalia, dorsal view, 139 = gonopod, ventral view, 140 = phallic organ, left lateral view

Male genitalia. Segment IX fused annular, dorsum and venter with nearly equal length. Dorsal complex of segment X, cerci and paraproct forming a pair of medial setose plate, a pair of elongated lateral processes and a pair of triangular units articulating to the complex by short stalk. Gonopods long slender with short basodorsal process, basal portion straight and narrowing in ventral view, apex bifid. Phallicata curving, apex clavate, parameres spine-shaped with crossing apices.

Material examined – Holotype: Cucphuong National Park, forested karstic spring brook, 18. X. 1986, singled, leg. J. Oláh (1 male, OPC).

*Etymology – Fura*, coined from "fura", strange in Hungarian, refers to the additional heavily sclerotised and setaless structure present in the dorsal complex of segment X, cerci and paraprocts.

### Lepidostoma gomer Malicky, 2009

Material examined – Tam Dao National Park, 200 m, 13.X.1986, singled along a small tributary, leg. J. Oláh (1 male, OPC). Lamdong, Baoloc, Duchma stream, 26.X.1988, singled, leg. J. Oláh (1 male, OPC). Gia Lai Contum Province, Lo Xo Pass, 1,100 m, 15.II.2006, light, leg. J. Oláh Jr. (1 male, OPC). Quang Tri Province, Da Krong Nature Reserve, 2 km SE of HQ, forest sream, light trap, 16.V.2007, leg. G. Csorba (1 male, OPC).

> Lepidostoma horgos sp. n. (Figs 141–145)

Diagnosis – This species with apical megasetae completely fused on gonopods is very close to Lepidostoma moschoceros Weaver, Arefina-Armitage et

Armitage, 2010, but differs by hooked apex of segment X; vertically directed lateral lobes; clavate parameres. Scape and wing venation similar.

*Description* – Male (in alcohol). Medium-sized dark brown animal. Vertexal antennal compact setal wart lacking; occipital compact setal wart large, rounded triangular Scape cylindrical with shallow mesal cavity. Second segment of maxillary palp small, reduced to minute lobe. Forewing length 6 mm.

Male genitalia. Segment IX fused annular, venter longer than dorsum. Dorsal complex of segment X, cerci and paraproct forming a pair of hooked mesal lobes and a pair of vertically directed digitiform lateral lobes. Gonopods composed of broad-based coxopodite with apical fused megasetae and mesad, subapically articulated S-forming harpago. Phallicata has equal length of parameres, paramere clavate subapically.

*Material examined* – Holotype: Binh Tri Thien Province, Bach Ma National Park, 850 m, 17.II.2006, UV light trap, leg. J. Oláh jr. (1 male, OPC).

*Etymology – Horgos*, from "horgos", hooked in Hungarian, refers to the hooked apex of segment X.

### Lepidostoma ives sp. n. (Figs 146–151)

Diagnosis – This species belongs to Lepidostoma picea species complex and close to Lepidostoma picea (Ulmer, 1913), L. longipenis (Weaver, 1898), and L. brevipenne (Oláh, 1993), but differs by having modified structures of dorsal com-



**Figs 141–145.** *Lepidostoma horgos* sp. n., male holotype: 141 = genitalia, left lateral view, 142 = genitalia, dorsal view, 143 = gonopod, ventral view, 144 = phallic organ, left lateral view, 145 = parameres, dorsal view

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plex and gonopods; moreover well differentiated by the regularly arching parameres, not straight sword-like (*L. longipenis*), not short serrated (*L. brevipenne*), not thin with basal 2/3 straight (*L. picea*). Scape and wing venation similar.

Description – Male (in alcohol). Medium-sized dark brown animal. Vertexal antennal compact setal wart small rounded, occipital compact setal wart large oblong. First segment of maxillary palp spatulate, fully packed of setae, second segment with false joint, both surrounded and concealed by thick pile of long slender setae mixed with long scales. Scape with shallow mesal cavity and basal process. Forewing length 7 mm.

Male genitalia. Segment IX fused annular, dorsum and venter with nearly equal length. Dorsal complex of segment X, cerci and paraproct abbreviated and forming a pair of median processes (with varying shapes among paratypes) fringed by variously developed alveoli and triangular lateral processes packed by setae. Gonopods in lateral view with short basodorsal process, extended vertically, in ventral view basal portion straight with mesal projection; harpago fused to coxopodit, setaless. Phallic organ curving with similarly arching pair of parameres.

Material examined – Holotype: Lamdong, Baoloc, Duchma stream, 26.X.1988, singled, leg. J. Oláh (1 male, OPC). Paratypes: Lamdong, Baoloc, Duchma stream, 23.X.1988, ligh, leg. J. Oláh (14 males, OPC). 26.X.1988, singled, leg. J. Oláh (7 males, OPC). Binh Tri Thien Province, Bach Ma National Park, 850 m, 17.II.2006, UV light trap, leg. J. Oláh jr. (1 male, OPC). Quang Tri



Figs 146–151. *Lepidostoma ives* sp. n., male holotype: 146 = head with appendages, left lateral view, 147 = left scape, dorsal view, 148 = genitalia, left lateral view, 149 = genitalia, dorsal view, 150 = gonopod, ventral view, 151 = phallic organ, left lateral view

Province, Da Krong Nature Reserve, near HQ, 16°36'N 106°52'E, 170 m, at light, 13.XI.2007, leg. G. Csorba (1 male, OPC).

*Etymology – Ives*, coined from "ives", curved in Hungarian, refers to the arching shape of the parameres.

# Lepidostoma madaras sp. n. (Figs 152–155)

*Diagnosis* – This species has some resemblance to *Lepidostoma crepusculum* Weaver, Arefina-Armitage et Armitage, 2010, but differs by having the canine tooth-like basomesal process on scape reduced to protuberance; all details of dorsal complex and gonopod different.

*Description* – Male (in alcohol). Medium-sized dark brown animal. Vertexal antennal compact setal wart vestigial; occipital compact setal wart large, round-ed triangular Scape cylindrical with shallow anteromesal cavity. Second segment of maxillary palp small. Forewing length 7 mm.

Male genitalia. Segment IX fused annular, venter longer than dorsum. Dorsal complex of segment X, cerci and paraproct composed of a pair of hooked mesal lobes with dorsal enlarged and scattered alveoli, a pair of curving ventrolateral lobes with aviform (birdhead) apex and a pair of short digitiform lateral loprocesses. Gonopods very comples; coxopodite broad-based with aviform apex,



**Figs 152–155.** *Lepidostoma madaras* sp. n., male holotype: 152 = genitalia, left lateral view, 153 = genitalia, dorsal view, 154 = gonopod, ventral view, 155 = phallic organ, left lateral view

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lateral lobe on midlength and with very thin basomesal filiform long process; harpago with aviform apex. Phallicata shorter than parameres, slightly asymmetric.

*Material examined* – Holotype: Binh Tri Thien Province, Bach Ma National Park, 1,250 m, 1.III.2007, UV light trap, leg. G. Simay (1 male, OPC). Paratype: same as holotype (1 male). Binh Tri Thien Province, Bach Ma National Park, 1,450 m, at very small stream, 2.III.2007, UV light trap, leg. G. Simay (1 male, OPC).

*Etymology – Madaras*, from "madaras", bird-like or bird-connected in Hungarian, refers to the six birdheads, three pairs of birdhead shaped structures present in the genitalia: apices of coxopodite, harpago and of the lateral processes on the dorsal complex.

# Lepidostoma hansmalickyi Weaver, Arefina-Armitage et Armitage, 2010

Material examined – Lao Cai Province, Sa Pa, Fan-si-pan Mts, 14 km NW Sa Pa, 1,900 m, 22°20.9'N 103°46.06'E, 29.11.1997, leg. G. Kósa, L. Peregovits, L. Ronkay (3 males, OPC). Lao Cai Province, Fan-si-pan Mts, 14 km NW Sa Pa, 22° 20.9'N 103°46.06'E, 1,900–2,000 m, 24–27.I.1999, leg. Peregovits & Ronkay (2 males, HNHM). Lao Cai Province, Sin Chai, Hoang Lien NP, Tram Ton, 1,900 m, 22.20941°N 103.46197°E, 16–17.XII.2008, at light, leg. L. Peregovits & L. Ronkay (1 male, HNHM).

### Lepidostoma nyulos sp. n. (Figs 156–159)

*Diagnosis* – This species with apical megasetae on gonopods is close to *Lepidostoma moschoceros* (Ulmer), but differs by blunt apex of segment X; elongated coxopodite of gonopods, bifid apex of harpagones; elongated parameres. Scape and wing venation similar.

Description – Male (in alcohol). Small-sized dark brown animal. Vertexal antennal compact setal wart lacking; occipital compact setal wart large, rounded triangular; small rounded frontogenal compact setal wart present. Second segment of maxillary palp small, reduced to minute lobe. Scape cylindrical with very shallow mesal cavity. Forewing length 5 mm.

Male genitalia. Segment IX fused annular, venter longer than dorsum. Dorsal complex of segment X, cerci and paraproct forming a pair of enlarged mesal lobes and a pair of small digitiform lateral lobes. Gonopods composed of elongated coxopodite with apical megasetae and mesad, subapically articulated harpago. Phallicata shorter than parameres.

Material examined – Holotype: Lamdong, Baoloc, Baco stream, 25.X.1988, singled, leg. J. Oláh (1 male, OPC). Paratypes: Lamdong, Baoloc, Baco stream, 25.X.1988, singled, leg. J. Oláh (7 males, OPC). Lamdong, Baoloc, Baco stream,

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J. Oláh
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**Figs 156–159.** *Lepidostoma nyulos* sp. n., male holotype: 156 = genitalia, left lateral view, 157 = genitalia, dorsal view, 158 = gonopod, ventral view, 159 = phallic organ, left lateral view

26.X.1988, singled, leg. J. Oláh (10 males, OPC). Lamdong, Baoloc, Duchma stream, 26.X.1988, singled, leg. J. Oláh (9 males, OPC).

*Etymology – Nyulos*, coined from "nyúlós", elongating in Hungarian, refers to the elongated structures: gonopods, parameres.

### Lepidostoma hirtum branch

Lepidostoma aranos sp. n. (Figs 160–162)

Diagnosis – This species is a relative of Lepidostoma abruptum (Banks, 1913) distributed in Sumatra and Peninsular Malaysia, but differs by having paraproct slender symmetrical, not stout asymmetrical; apical processes on gonopods stout, not slender, apical setal pattern on apical processes modified compared to *L. abruptum*. Scape and wing similar. Having symmetrical paraproct most close to *L. pseudabruptum* Malicky et Chantaramongkol, 1994 from Thailand, but the shape of paraproct and the construction of phallic organ different both in lateral and dorsal view. However the closely related species in the complex of *Lepidostoma abruptum* need a detailed comparative study.

Description – Male (in alcohol). Medium-sized dark brown animal. Vertexal antennal compact setal wart very small rounded, occipital compact setal wart rounded large. First segment of maxillary palp spatulate, fully packed of setae, second segment with false joint, both surrounded and concealed by thick pile of long slender setae mixed with long scales. Scape with shallow mesal cavity and basal processes tipped with a single capitate megascale. Forewing length 6 mm.

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Male genitalia. Segment IX fused annular, dorsum and venter with nearly equal length. Segment X forming a pair of middorsal slender digitiform processes overlapping each other; cerci or cercal setose area indistinct; paraproct most developed, symmetrical spine-shaped and S-forming with mesad turning apex. Coxopodite complex with basodorsal process capitate, baso-ventromesal process lanceolate, dorsoapical process high with 7 teeth, ventroapical process shorter with 2 long stout setae; harpago fused mesosubapicad aviform with digitate mesal shorter process. Phallic organ without parameres.

*Material examined* – Holotype: Lam Dong Province, Baoloc, Baco stream, 26. X.1988, at light, leg. J. Oláh (1 male, OPC). Paratypes: Lam Dong Province, Baoloc, Duchma stream, 23.X.1988, at light, leg. J. Oláh (5 males, OPC). Gia Lai Contum Province, Lo Xo Pass, 1,100 m, 15.II.2006, light, leg J. Oláh Jr. (4 males, OPC).

*Etymology – Aranos*, coined from "arányos", symmetric or proportional in Hungarian, refers to the slender symmetric paraproct.

### Lepidostoma fedos sp. n. (Figs 163–168)

Diagnosis – This species having long basodorsal sickle-shaped process on gonopods belongs to Lepidostoma inops species group of YANG & WEAVER (2002). Very close to L. propriopalpum (Hwang, 1957) from China (Fujian), but differs in details by the pattern of processes both on the scapes, on the dorsal complex and on the gonopods. However wing venation is similar to that of L. propriopalpum. Lepidostoma fedos sp. n. may have been evolved as a peripatric or parapatric taxon



Figs 160–162. *Lepidostoma aranos* sp. n., male holotype: 160 = genitalia, left lateral view, 161 = genitalia, dorsal view, 162 = phallic organ, left lateral view

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of superspecies *L. propriopalpum*, a form of species complex. Species complex is a group of closely related species, where the exact demarcation between species is often unclear due to their recent or still incomplete reproductive isolation. Their speciaton have occurred recently, or species separation mechanisms have yet to be fully developed. Trial to borrow type material for comparative studies was unsuccessful, however comparison with published drawings produced several differences: first segment of maxillary palp more than double long of the cup-modified second segment; basomesal and apicomesal processes of the scape differently formed in dorsal view; lateral spines on the apices of segment X vertical, not oblique; basodorsal process of gonopod slender and longer than coxopodite, its apical and subapical spike pattern slightly varying in the four paratypes.

*Description* – Male (in alcohol). Large, dark brown animal. Vertexal antennal compact setal wart minute, just discernible; occipital compact setal wart small. Maxillary palp with apical segment modified into a cup which serves as a receptacle to the ventroapical surface of the scape. Forewing length 11 mm.

Male genitalia. Segment IX fused annular, dorsum longer than venter. Segment X, cerci and paraproct fused, difficult to homologize; segment X in upper position birdhead shaped in lateral view; paraproct in lower position composed of a short setose and a long setaless pair of processes and continued anterad into a phallic hood, the dorsal compartment of the phallocrypt. Coxopodite irregular rectangular in lateral view with long basodorsal sickle-shaped process, longer than gonopod and bearing short spike-shaped outgrowths; apex of cox-



Figs 163–168. *Lepidostoma fedos* sp. n., male holotype: 163 = head with appendages, left lateral view, 164 = left scape, dorsal view, 165 = genitalia, left lateral view, 166 = genitalia, dorsal view, 167 = gonopod, ventral view, 168 = phallic organ, left lateral view

opodite with tuft of long S-shaped setae; harpagones forming cup-shaped process articulating mesally subapicad. Phallic organ without parameres.

*Material examined* – Holotype: Lao Cai Province, Fan Si Pan Mts, 14 km NW Sa Pa, 22° 20.9'N 103°46.06'E, 1,900–2,000 m, 24–27.I.1999, leg. L. Peregovits & L. Ronkay (1 male, HNHM). Paratypes: same as holotype (3 males, HNHM); 1998, No. 20, leg. L. Peregovits & L. Ronkay (2 males, HNHM).

*Etymology* – *Fedos*, coined from "fedős", cover-like in Hungarian, refers to the modified cup-shaped second segment of the maxillary palp fitting as cover to the anteroapical surface of the scape, that is full of sensory setae and scales.

# Lepidostoma oblok sp. n. (Figs 169–174)

*Diagnosis* – This species having long basodorsal sickle-shaped process on gonopods belongs to *Lepidostoma inops* species group. Most close to *L. arcuatum* Huang, 1957 from China (Fujian), but differs by the pattern of processes both on the scapes and on the gonopods.

Description – Male (in alcohol). Medium-sized dark brown animal. Vertexal antennal compact setal wart minute, just discernible; occipital compact setal wart large triangular. Maxillary palp broad, extended upward anterad, 2 segmented bearing long setae. Scapes without mesal cavity,cylindrical and bearing slender basomesal and broader antero-subapical short processes. Forewing length 9 mm; M branched; discoidal cell small, thyridial cell longer, anal groove thick extended distad as far as apex of Sc.

Male genitalia. Segment IX fused annular, dorsum and venter with nearly equal length, minimum length of pleuron less than 1/3 that of venter. Segment X, cerci and paraproct fused, difficult to homologize; segment X in upper position bilobed, strongly setose, slightly capitate in dorsal view; cerci forming setose flat dorsolaterad on paraproct; paraproct most developed, spine-shaped with mesad turning apex. Coxopodite irregular rectangular in lateral view with long basodorsal sickle-shaped bifid process and short capitate subapical process; its multilobed mesal margin formed by various sinuous excisions; harpagones fused to dorsoapiocal area and armed with long mesad curving digitiform process. Phallic organ without parameres.

*Material examined* – Holotype: Tam Dao National Park, Tam Dao City, 1,300 m, 13.X.1986, singled along spring in deep dark forested valley, leg. J. Oláh (1 male, OPC). Paratypes: same as holotype (2 males, 2 associated females, OPC).

*Etymology* – *Oblok*, coined from "öblök", bays in Hungarian, refers to the numerous sinuous excavations visible in all views of the gonopods.



**Figs 169–174.** *Lepidostoma oblok* sp. n., male holotype: 169 = head with appendages, left lateral view, 170 = forewing venation, 171 = genitalia, left lateral view, 172 = genitalia, dorsal view, 173 = gonopod, ventral view, 174 = phallic organ, left lateral view

Lepidostoma oblokos sp. n. (Figs 175–178)

*Diagnosis* – This species having long basodorsal sickle-shaped process on gonopods belongs to *Lepidostoma inops* species group. Very close to *L. oblok* sp. n., but differs by the pattern and size of processes present both on the segment X, cerci, paraproct complex and on the gonopods. Scape and wing similar.

*Description* – Male (in alcohol). Medium-sized dark brown animal. Vertexal antennal compact setal wart small rounded, occipital compact setal wart triangular large. Maxillary palp broad, extended upward anterad, 2 segmented bearing long setae. Scapes cylindrical bearing slender basomesal and broader antero-sub-apical short processes.Forewing length 8 mm; M branched; discoidal cell small, thyridial cell longer, anal groove thick extended distad as far as apex of Sc.

Male genitalia. Segment IX fused annular, dorsum longer than venter, minimum length of pleuron less than 1/5 that of dorsum. Segment X, cerci and paraproct fused, difficult to homologize; segment X in upper position bilobed, strongly setose, short subtriangular in dorsal view; cerci forming setose flat ventrolaterad on paraproct; paraproct less developed, spine-shaped with mesad turning apex. Coxopodite irregular rectangular in lateral view with long basodorsal sickle-shaped bifid process and short capitate apical process; its multilobed mesal margin formed by various sinuous excisions; harpagones fused to dorsoapiocal area and armed with long mesad curving digitiform process. Phallic organ without parameres.

*Material examined* – Holotype: Tam Dao National Park, 1,400 m, 2 km from Tam Dao City, 12.V.1987, singled along small sized stream in dark forested valley, leg. J. Oláh (1 male, OPC).

*Etymology – Oblokos*, coined from "öblökös", having bays, bay-like in Hungarian, refers to the numerous sinuous excavations visible in all views of the gonopods in close similarity to *Lepidostoma oblok* sp. n.

#### Lepidostoma pseudabruptum Malicky et Chantaramongkol, 1994

Material examined – Nghe An Province, Frontier-Vietnam, 800 m, 19°42.798' N, 104°46.015'E, 8–9.XI.1999, leg. F. Kassai (1 male, HNHM).

### Lepidostoma rovidiv sp. n. (Figs 179–184)

Diagnosis – This species having long basodorsal sickle-shaped process on gonopods belongs to Lepidostoma inops species group of YANG & WEAVER (2002). Very close to L. arcuatum Yang et Weaver, 2002 from China (Fujian), but differs in details by the pattern of processes both on the scapes, on the dorsal complex and on the gonopods: second segment of maxillary palp double broad than first segment; apicomesal processes of the scape moved anteriad and truncate, not pointed; lateral spines on the apices of segment X turned mesad almost in right angle; basodorsal process of gonopod arching low, not high without any process middway; apical spines differently formed.



Figs 175–178. *Lepidostoma oblokos* sp. n., male holotype: 175 = genitalia, left lateral view, 176 = genitalia, dorsal view, 177 = gonopod, ventral view, 178 = phallic organ, left lateral view

*Description* – Male (in alcohol). Large, dark brown animal. Maxillary palp with apical segment broader then basal segment. Scape elongate cylindrical with short basomesal digitate and anteriad shifted short truncate process little above middle. Forewing length 12 mm.

Male genitalia. Segment IX fused annular, dorsum longer than venter. Segment X, cerci and paraproct fused, difficult to homologize; segment X in upper position bilobed in dorsal view; paraproct in lower position mesad directed and continued anterad into a phallic hood, the dorsal compartment of the phallocrypt. Coxopodite irregular in lateral view with short bifid basodorsal process; harpagones forming bilobed process in lateral view articulating mesally subapicad. Phallic organ without parameres.

Material examined – Holotype: Lao Cai Province, Sa Pa, Fan-si-pan Mts, 14 km NW Sa Pa, 1,900 m, 22°20.9'N 103°46.06'E, 29.11.1997, leg. G. Kósa, L. Peregovits, L. Ronkay (1 male, OPC).

*Etymology – Rovidiv*, coined from "rövid ív", short arc in Hungarian, refers to the short curving basodorsal spines of the gonopods.

# Lepidostoma sarnak sp. n.

(Figs 185-188)

*Diagnosis* – This species is close to *L. cisflavum* Yang et Weaver, 2002 from China (Guizhou), but differs by having paraproct and gonopods of modified shape. Scape and wing similar to *L. cisflavum*.

*Description* – Male (in alcohol). Medium-sized dark brown animal. Vertexal antennal compact setal wart small rounded, occipital compact setal wart rounded



**Figs 179–184.** *Lepidostoma rovidiv* sp. n., male holotype: 179 = head with appendages, left lateral view, 180 = left scape, dorsal view, 181 = genitalia, left lateral view, 182 = genitalia, dorsal view, 183 = gonopod, ventral view, 184 = phallic organ, left lateral view

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large. Second maxillary palp segment small. Scape cylindrical without mesal cavity. Forewing length 6 mm.

Male genitalia. Segment IX fused annular, dorsum and venter with nearly equal length. Segment X forming a pair of middorsal slender digitiform processes accompanied by a pair of intermediate mesal processes with laterad turning wing-shape; cerci or cercal setose area indistinct; paraproct most developed, forming a pair of symmetrical slightly left-turning spines. Gonopods as long as paraproct; coxopodite with capitate basodorsal process, basomesal process lacking, dorsoapical process longest, 2 ventroapical lobes present; harpago clavate, joined mesosubapicad. Phallic organ without parameres.

Material examined – Holotype: Son La Province, Moc Chau, spring area, 26.X.1986, at light, leg. J. Oláh (1 male, OPC).

*Etymology – Sarnak*, coined from "szárnyak", wings in Hungarian, refers to the wing-shaped pattern of the membranous mesal body of segment X.

### Odontoceridae

#### Psilotreta androconiata Mey, 1997

*Material examined* – Lao Cai Province, Hoang Lien NP, Tram Ton, forest edge, 1,915 m, 22.3493723°N 103.7704565°E, 10.IV.2010, at light, leg. L. Papp, L. Peregovits & Z. Soltész (4 males, HNHM).

### Leptoceridae Oecetini Morse, 1981

#### Oecetis asmada Malicky, 1979

Material examined – Lam Dong Province, Baoloc, Loc Chau, 24.X.1988, light, leg. J. Oláh (1 male, OPC).



Figs 185–188. *Lepidostoma sarnak* sp. n., male holotype: 185 = genitalia, left lateral view, 186 = genitalia, dorsal view, 187 = gonopod, ventral view, 188 = phallic organ, left lateral view

#### Oecetis bellula Yang et Morse, 2000

Material examined – Tam Dao, 200 m, 12.X.1986, light, leg. J. Oláh (1 male, OPC).

*Remarks* – This single Vietnamese specimen from Tam Dao has differently formed basodorsal lobe complex on gonopods and the phallic organ is without hooked process on phallotheca. *Oecetis bellula* may represent a species complex of closely related species. As usual in species complexes of closely related species more material is required to differenciate this propably new taxon from Tam Dao by studying the variabilities of the various genital structural elements.

#### Oecetis brachyura Yang et Morse, 1997

*Material examined* – Hoa Binh Province, Hoabinh, 8 km to Dabac, 31.I.1986, light, leg. J. Oláh (1 male, OPC).

### Oecetis raghava new species complex

Having tergum IX short and sternum IX long as well as phallic organ asymmetrical and parameres present, this species complex of closely related taxa belongs to the subgenus Oecetis (Pleurograpta) and to the Oecetis (Pleurogapta) testacea species group. This new species complex has male tergum VII bearing only small patches of paired reticulted honeycomb area; long and clavate cerci; short gonopods without basodorsal branch; large phallic organ. Nonintromittent clasping and holding genital structures are less divergent than inromittent structures. The elongated shape of segment X, a nonintromittent genital structure has stable, but slight differences. Significant divergence has been developed in the shape of parameres, an important stimulatory structure operating in the process of sexual selection. Without a systematic study we have found 4 described species comprising this species complex: Oecetis lakyuga Schmid, 1995 (India), O. rhagava Schmid, 1995 (India), O. caucula Yang et Morse, 2000 (China) and O. laomedon Malicky, 2005 (Indonesia: Borneo-Kalimantan). We have found two new species with overlapping distribution of probable renewed sympatry suggesting historical allopatry of populations: O. kanalas sp. n. and O. koteges sp. n.

### Oecetis kanalas sp. n. (Figs 189–191)

*Diagnosis* – This new species is most similar to *Oecetis caucula* Yang et Morse, 2000 from China, but distinguished by spatulate modified paramere and by the much smaller spine-like paramere of the phallic organ.

*Description* – Male (in alcohol). Light brown, yellowish animal with some faint brown pigmentation on forewing bifurcations, crossveins and longitudinal vein apex, most pronounced on arculus. Maxillary palp formula I-IV-(II, III, V). Spur formula is 022. Forewing length 7 mm.

Male genitalia. Tergum VI normal; tergum VII with pair of thin reticulate pathes; tergum VIII with honeycomb reticulations of complete plates. Segment IX short dorsad long ventrad, pleuron longest. Segment X (upper part of segment X) digitate with downward curving blunt apex, much longer than cerci. Cerci (preanal or superior appendages) strongly clavate. Paraproct (lower part of segment X) narrowing digitate, unpigmented. Gonopods without basodorsal lobes with more pronounced mosoapical corner. Phallic organ consists of less sclerotised phallotheca, indistinct endotheca and single spine-like parameres accompanied by the modified second paramere in the form a spoon-like spatula; basal part of the modified peramere lined with short stout spines; phallothermal sclerite U-shaped.

Material examined – Holotype: Hoa Binh Province, Hoabinh, 12 km to Dabac, 30.I.1986, light, leg. J. Oláh (1 male, OPC). Paratypes: same as holotype (16 males, OPC). Hoa Binh Province, Hoabinh, towards Dabac, 21.X.1986, light, leg. J. Oláh (8 males, OPC). Cucphuong, 400 m, 17.X.1986, light, leg. J. Oláh (6 males, OPC). Moc Chau, 25.X.1986, light, leg. J. Oláh (1 male, OPC). Bac Thai Province, Quang Chu, 24–25.V.1987, light, leg. J. Oláh (2 males, OPC).

*Etymology – Kanalas*, from "kanalas", supplied with spoon in Hungarian, refers to the spoon, or rather spatula shape of the modified paramere.



Figs 189–191. Oecetis kanalas sp. n., male holotype: 189 = genitalia, left lateral view, 190 = gonopod, ventral view, 191 = phallic organ, left lateral view

# Oecetis koteges sp. n. (Figs 192–194)

*Diagnosis* – This new species differs from all the known members of the *Oecetis raghava* new species complex by having parameres subdivided into several spines arranged in truss formation.

*Description* – Male (in alcohol). Light brown, yellowish animal with some fade brown pigmentation on forewing bifurcations, crossveins and longitudinal vein apex, most pronounced on arculus. Maxillary palp formula I-IV-(II, III, V). Spur formula is 022. Forewing length 6 mm.

Male genitalia. Tergum VI normal; tergum VII with pair of thin reticulate pathes; tergum VIII with honeycomb reticulations of complete plates. Segment IX short dorsad long ventrad, pleuron longest. Segment X (upper part of segment X) digitate with downward curving slightly birdhead shaped apex, little longer than cerci. Cerci (preanal or superior appendages) strongly clavate. Paraproct (lower part of segment X) narrowing digitate, unpigmented. Gonopods without basodorsal lobes with less pronounced mosoapical corner. Phallic organ consists of less sclerotised phallotheca, indistinct endotheca and parameres subdivided to several spines appressed into truss; phallothermal sclerite U-shaped.

Material examined – Holotype: Tam Dao, 200 m, 12.X.1986, light, leg. J. Oláh (1 male, OPC). Paratypes: same as holotype (1 male, OPC). Hoa Binh Province, Hoabinh, towards Dabac, 21.X.1986, light, leg. J. Oláh (14 males, OPC). Bac Thai Province, Quang Chu, 24–25.V.1987, light, leg. J. Oláh (12 males, OPC).

*Etymology – Koteges*, from "köteges", arranged in truss or in bunch in Hungarian, refers to the subdivided parameres composed of several appressed spines.



**Figs 192–194.** *Oecetis koteges* sp. n., male holotype: 192 = genitalia, left lateral view, 193 = gonopod, ventral view, 194 = phallic organ, left lateral view

#### Oecetis coomana Navas, 1932

*Material examined* – Ngoclac, Trang Stream, 26.I.1986, singled, leg. J. Oláh (1 male, OPC). Hoa Binh Province, Hoabinh, 12 km to Dabac, 30.I.1986, light, leg. J. Oláh (16 males, OPC). Hoa Binh Province, Hoabinh, 8 km to Dabac, 31.I.1986, light, leg. J. Oláh (1 male, OPC). Hoa Binh Province, Hoabinh, towards Dabac, 21.X.1986, light, leg. J. Oláh (19 males, OPC). Hoa Binh Province, Hoabinh, hotel, 24.X.1986, light, leg. J. Oláh (8 males, OPC). Cucphuong, 400 m, 17.X.1986, light, leg. J. Oláh (6 males, OPC). Moc Chau, 25.X.1986, light, leg. J. Oláh (1 male, OPC). Bac Thai Province, Quang Chu, 24–25.V.1987, light, leg. J. Oláh (11 males, OPC). Hanoi, West Lake, 28.X.1986, light, leg. J. Oláh (1 male, OPC). Tam Dao, 200 m, 12.X.1986, light, leg. J. Oláh (39 males, OPC). Lam Dong Province, Baoloc, Loc Chau, 24.X.1988, light, leg. J. Oláh (17 males, OPC). Lam Dong Province, Baoloc, Dai Binh River, 22.X.1988, light, leg. J. Oláh (4 males, OPC). Lam Dong Province, Baoloc, Da Gna River, 21.X.1988, light, leg. J. Oláh (8 males, OPC).

Oecetis varosi sp. n. (Figs 195–198)

*Diagnosis* – This new species having cerci almost fused to segment X and phallic organ with a single paramere belongs to subgenus *Oecetis* (*Oecetis*) McLachlan, 1877. Closest to *O. ixion* Malicky, 2005, but differs by having gonopod abbreviated, not long.

*Description* – Male (in alcohol). Light brown, yellowish animal with brown pigmentation of large paches on forewing bifurcations. Maxillary palp formula is I-IV-II-V-III. Spur formula is 122. Forewing length 6 mm.



Figs 195–198. Oecetis varosi sp. n., male holotype: 195 = genitalia, left lateral view, 196 = genitalia, dorsal view, 197 = gonopod, ventral view, 198 = phallic organ, left lateral view

Male genitalia. Terga VI, VII and VIII without honeycomb reticulations. Segment IX little shorter dorsad than ventrad. Apex of segment X d rounded triangular in dorsal view. Cerci (preanal or superior appendages) short and rounded in dorsal view. Paraproct vestigial. Gonopods short with specific shape both in lateral and ventral view. Giant phallic organ consists of less sclerotised indistinct phallotheca and a single sinuous parameres.

Material examined – Holotype: Saigon, Than Loc fish ponds, 12. X. 1988, light, leg. J. Oláh (1 male, OPC).

*Etymology – Varosi*, from "városi", city dwelling in Hungarian, refers to the location of locus typicus.

#### Oecetis iros Malicky et Bunlue, 2005

Material examined - Tam Dao, 1,300 m, 14.X.1986, light, leg. J. Oláh (1 male, OPC).

#### Oecetis jacobsoni Ulmer, 1930

Material examined – Lam Dong Province, Baoloc, Dai Binh River, 22.X.1988, light, leg. J. Oláh (3 males, OPC). Lam Dong Province, Baoloc, Da Gna River, 21.X.1988, light, leg. J. Oláh (4 males, OPC).

#### Oecetis kitar sp. n.

### (Figs 199–202)

*Diagnosis* – This new species having honeycomb plates on tergum VI, VII, VIII belongs to *Oecetis testacea* species group. Most similar to *Oecetis scutulata* Martynov, 1936 from India, but distinguished easily by having gonopods differently formed especially visible and pronounced in ventral view.

*Description* – Male (in alcohol). Light brown, yellowish animal with some fade brown pigmentation on forewing bifurcations and most pronounced on arculus. Spur formula is 122. Forewing length 7 mm.

Male genitalia. Terga VI, VII and VIII with honeycomb reticulations of complete plates. Segment IX short dorsad long ventrad, pleuron longest. Segment X (upper part of segment X) digitate, shorter than gonopod. Cerci (preanal or superior appendages) high in lateral and clavate in dorsal view. Paraproct (lower part of segment X) digitate, membranous or unpigmented. Gonopods with short basodorsal and more produced dorsolateral lobes. Phallic organ consists of less sclerotised indistinct phallotheca and a pair of sinuous parameres.

*Material examined* – Holotype: Nghe An Province, Po Phuong village, 280 m, 19°38.442'N, 104°58.302'E, 21–22.X.1999, leg. F. Kassai (1 male, HNHM).

*Etymology – Kitar*, from "kitár", open wide in Hungarian, refers to the shape of gonopods in ventral view, the dorsolateral lobe is widely produced laterad.

#### Oecetis makris Malicky, 2005

Material examined - Tam Dao, 1,300 m, 14.X.1986, light, leg. J. Oláh (1 male, OPC).

#### Oecetis manabat Malicky, 2009

Material examined – Hoa Binh Province, Hoabinh, 12 km to Dabac, 30.I.1986, light, leg. J. Oláh (5 males, OPC). Hoa Binh Province, Hoabinh, 8 km to Dabac, 31.I.1986, light, leg. J. Oláh (1 male, OPC). Hoa Binh Province, Hoabinh, towards Dabac, 21.X.1986, light, leg. J. Oláh (11 males, OPC). Hoa Binh Province, Hoabinh, hotel, 24.X.1986, light, leg. J. Oláh (14 males, OPC). Bac Thai Province, Quang Chu, 24–25.V.1987, light, leg. J. Oláh (47 males, OPC). Bac Thai Province, Phuluong, Dang Dat River, 26.V.1987, light, leg. J. Oláh (1 male, OPC).

### Oecetis oblos sp. n. (Figs 203–206)

*Diagnosis* – This new species having cerci almost fused to segment X and phallic organ with a single paramere belongs to subgenus *Oecetis* (*Oecetis*) McLachlan, 1877. Based on the presence of a less pigmented apicomesal plate on sternite IX this



Figs 199–202. Oecetis kitar sp. n., male holotype: 199 = genitalia, left lateral view, 200 = genitalia, dorsal view, 201 = gonopod, ventral view, 202 = phallic organ, left lateral view



Figs 203-206. Oecetis oblos sp. n., male holotype: 203 = genitalia, left lateral view, 204 = genitalia, dorsal view, 205 = segment X and gonopods, ventral view, 206 = phallic organ, left lateral view

new species is most similar to Oecetis nyx Malicky et Prommi, 2005 from Thailand, but distinguished easily by having sinuous excision in dorsal view on the apex of segment X and on the dorsum and ventrum of gonopods in lateral view.

Description - Male (in alcohol). Light brown, yellowish animal without any pigmentation on forewing bifurcations. Maxillary palp formula is I-IV-III-II-V. Spur formula is 122. Forewing length 6 mm.

Male genitalia. Terga VI, VII and VIII without honeycomb reticulations. Segment IX little shorter dorsad than ventrad; sternum IX produced a large semimembranous mesoapical plate. Apex of segment X excised rounded in dorsal view. Cerci (preanal or superior appendages) are fused to segment X, short and rounded in dorsal view. Paraproct vestigial, having no guiding function for the extremally enlarged phallic organ. Gonopods with pronounced dorsal lobe. Enlarged phallic organ consists of less sclerotised indistinct phallotheca and a single sinuous parameres.

Material examined - Holotype: Tam Dao, 200 m, 12.X.1986, light, leg. J. Oláh (1 male, OPC).

Etymology - Oblos, from "öblös", characterised by deep sinuous excisions in Hungarian, refers to the apex of segment X and to the dorsum and ventrum of gonopods.

### Oecetis pomona Malicky, 2006

Material examined - Hoa Binh Province, Hoabinh, 12 km to Dabac, 30.I.1986, light, leg. J. Oláh (1 male, OPC).

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#### Oecetis purusamedha Schmid, 1995

Material examined – Hoa Binh Province, Hoabinh, 8 km to Dabac, 31.I.1986, light, leg. J. Oláh (1 male, OPC). Hoa Binh Province, Hoabinh, towards Dabac, 21.X.1986, light, leg. J. Oláh (19 males, OPC). Tam Dao, 200 m, 12.X.1986, light, leg. J. Oláh (1 male, OPC). Bac Thai Province, Quang Chu, 24–25.V.1987, light, leg. J. Oláh (2 males, OPC). Lam Dong Province, Dalat, Prenn waterfall, 19.X.1988, light, leg. J. Oláh (2 males, OPC). Lam Dong Province, Baoloc, Da Gna River, 21.X.1988, light, leg. J. Oláh (1 male, OPC).

# Oecetis sima sp. n. (Figs 207–209)

*Diagnosis* – This new species with prominent dorsolateral projection of male segment IX belongs to the subgenus *Oecetis (Quaria)* Milne, 1934 and closest to *O. irad* Malicky, 2009 from Indonesia (East Kalimantan), but differs by having this dorsolateral projection straight, not downwad curving; apical margin below this dorsolateral projection angled, not plane; gonopod without basoventral pointed lobe.

*Description* – Male (in alcohol). Light brown, yellowish animal with some fade brown pigmentation on forewing bifurcations, crossveins and longitudinal vein apex, most pronounced on arculus. Maxillary palp formula I-IV-V-II-III. Spur formula is 122. Forewing length 6 mm.

Male genitalia. Segment IX short both dorsad and ventrad; dorsolatera projection well developed accompanied by angled corner. Segment X (upper part of segment X) downwar curving spine-like process, longer than cerci. Cerci (preanal or superior appendages) elongated foliform. Paraproct (lower part of segment



Figs 207–209. Oecetis sima sp. n., male holotype: 207 = genitalia, left lateral view, 208 = gonopod, ventral view, 209 = phallic organ, left lateral view

X) unpigmented. Gonopods without basodorsal lobes with less pronounced. Phallic organ consists of less sclerotised phallotheca, indistinct endotheca and 2 parameres; both parameres curving, dorsal paramere double long.

Material examined – Holotype: Lam Dong Province, Baoloc, Loc Chau, 24.X.1988, light, leg. J. Oláh (1 male, OPC).

*Etymology – Sima*, from "sima", plane in Hungarian, refers to the flat basoventral region of gonopods in ventral view without pointed lobe.

### Oecetis spatula Chen, 2000

Material examined – Hoa Binh Province, Hoabinh, 12 km to Dabac, 30.I.1986, light, leg. J. Oláh (1 male, OPC). Tam Dao, 1,300 m, 15.X.1986, singled, leg. J. Oláh (1 male, OPC). Bac Thai Province, Quang Chu, 24–25.V.1987, light, leg. J. Oláh (1 male, OPC).

# Oecetis tompa sp. n. (Figs 210–212)

*Diagnosis* – This new species having honeycomb plates on tergum V, VI, VII, VIII belongs to *Oecetis testacea* species group. Most similar to *Oecetis jachin* Malicky et Mey, 2010 from Cambodia, but distinguished easily by having gonopods with blunt apices and abdominal tergite V with honeycomb plate, absent at *O. jachin*.

*Description* – Male (in alcohol). Light brown, yellowish animal with some fade brown pigmentation on forewing bifurcations. Spur formula is 022. Forewing length 6 mm.

Male genitalia. Terga V, VI, VII and VIII with honeycomb reticulations of complete plates. Segment IX short dorsad long ventrad, pleuron longest. Segment X (upper part of segment X) digitate. Cerci (preanal or superior appendages) slender filiform capitate, shorter than segment X. Paraproct (lower part of segment X) digitate, membranous or unpigmented. Gonopods rounded blunt with short basodorsal lobes and with short pointed process mesoapicad in ventral view. Phallic organ consists of less sclerotised indistinct phallotheca and a single spine-like parameres accompanied with a pair of membranous process with more sclerotised spiny apices.

Material examined – Holotype: Bac Thai Province, Quang Chu, 24–25.V.1987, light, leg. J. Oláh (1 male, OPC).

*Etymology – Tompa*, from "tompa", blunt in Hungarian, refers to the rounded blunt apical shape of gonopods both in ventral and dorsal view.



Figs 210–212. Oecetis tompa sp. n., male holotype: 210 = genitalia, left lateral view, 211 = gonopod, ventral view, 212 = phallic organ, left lateral view

### Oecetis tripunctata (Fabricius, 1793)

Material examined – Ngoclac, 25.I.1986, singled, leg. J. Oláh (1 male, OPC). Hoa Binh Province, Hoabinh, 8 km to Dabac, 31.I.1986, light, leg. J. Oláh (3 males, OPC). Cucphuong, 400 m, 17.X.1986, light, leg. J. Oláh (1 male, OPC). Hoa Binh Province, Hoabinh, towards Dabac, 21.X.1986, light, leg. J. Oláh (6 males, OPC). Hoa Binh Province, Hoabinh, towards Dabac, 21.X.1986, singled, leg. J. Oláh (1 male, OPC). Moc Chau, 25.X.1986, light, leg. J. Oláh (2 males, OPC). Bac Thai Province, Quang Chu, 24–25.V.1987, light, leg. J. Oláh (1 male, OPC). Bac Thai Province, Phuluong, Dang Dat River, 26.V.1987, light, leg. J. Oláh (10 males, OPC). Lam Dong Province, Dalat, Prenn waterfall, 19.X.1988, light, leg. J. Oláh (3 males, OPC). Lam Dong Province, Baoloc, Dai Binh River, 22.X.1988, light, leg. J. Oláh (4 males, OPC). Lam Dong Province, Baoloc, Da Gna River, 21.X.1988, light, leg. J. Oláh (2 males, OPC).

# Oecetis tus sp. n. (Figs 213–216)

Diagnosis – This new species having honeycomb plates on tergum VI, VII, VIII belongs to Oecetis testacea species group. Most similar to Oecetis phegeus Malicky, 2005 from Indonesia (Sumatra), however the lateral shape of segment IX different; digitiform segment X shorter than gopopods, cerci not spatulate,

paraproct (lower part of segment X) short; inner margin of right gonopods with basomesal pointed process; parameres almost fused.

*Description* – Male (in alcohol). Light brown, yellowish animal with some fade spotted pattern on forewing bifurcations and most pronounced on arculus. Spur formula is 122. Forewing length 6 mm.

Male genitalia. Terga VI, VII and VIII with honeycomb reticulations of complete plates. Segment IX short dorsad long ventrad, pleuron longest. Segment X (upper part of segment X) digitate, shorter than gonopod. Cerci (preanal or superior appendages) broad digitate both in lateral and dorsal view. Paraproct (lower part of segment X) digitate, membranous or unpigmented. Gonopods with short basodorsal lobe; slightly asymmetric semicircular in ventral view; right gonopod with short basomesal pointed process. Phallic apparatus consist of less sclerotised indistinct phallotheca fused sinuous paramere as long as the phallotheca.

*Material examined* – Holotype: Nghe An Province, Po Phuong village, 280 m, 19°38.442'N, 104°58.302'E, 21–22.X.1999, leg. F. Kassai (1 male, HNHM).

*Etymology – Tus*, from "tűs", armed with needle in Hungarian, refers to the short pointed process on the basomesal margin of right gonopod visible in ventral view.

### Setodini Morse, 1989

### Setodes argentiguttatus Gordon et Schmid, 1987

*Material examined* – Hoa Binh Province, Hoabinh, 8 km to Dabac, 31.I.1986, light, leg. J. Oláh (1 male, OPC).



**Figs 213–216.** *Oecetis tus* sp. n., male holotype: 213 = genitalia, left lateral view, 214 = genitalia, dorsal view, 215 = gonopods, ventral view, 216 = phallic organ, left lateral view

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### Setodes bispinus Yang et Morse, 1989

Material examined – Bac Thai Province, Phuluong, Dang Dat River, 26.V.1987, light, leg. J. Oláh (2 males, OPC). Bac Thai Province, Thain Guyen, Song Cau River, 23.V.1987, light, leg. J. Oláh (1 male, OPC).

# Trichosetodes harmas sp. n. (Figs 217–219)

*Diagnosis* – This new species having segment X as paired straight spines is most close to *Tr. hubertbruckneri* Malicky, 2006 from Indonesia (Sumatra), however the gonopods and the parameres differently formed.

*Description* – Male (in alcohol). Light, yellowish small with a forewing length of 3.6 mm. Maxillary palp formula I-III-III-IV-V. Spur formula is 022.

Male genitalia. Segment IX quadrangular, short dorsad long ventrad; tergum reduced to a transverse anterior band; acrotergite indispensible. Segment X straight spines located laterad. Cerci (preanal or superior appendages) short foliform. Paraproct indispensible. Gonopods with 3 apical processes; mesad turning ventral process setaless. Phallic apparatus consist of fused phallobase, phallotheca and parameres; sinuous left paramere as long as the phallotheca, right paramere short, vestigial spine-like.

*Material examined* – Holotype: Nghe An Province, Po Phuong village, 280 m, 19°38.442'N, 104°58.302'E, 29.X.1999, leg. F. Kassai (1 male, HNHM).

*Etymology – Harmas*, from "hármas", tripled in Hungarian, refers to apical margin of the gonopods having 3 pinted process in lateral view.



Figs 217–219. Trichosetodes harmas sp. n., male holotype: 217 = genitalia, left lateral view, 218 = gonopod, ventral view, 219 = phallic organ, left lateral view

# Trichosetodes sotet sp. n. (Figs 220-221)

*Diagnosis* – This new species is most close to *Tr. palinurus* Malicky et Chantaramongkol, 2006 from Thailand, however the ventral branch of gonopods with bifid apices in lateral view and the single paramere slender and crossing above and right on the aedeagus, not below and left.

*Description* – Male (in alcohol). Dark animal with a forewing length of 4 mm. Maxillary palp formula IV-I-II-III-V. Spur formula is 022.

Male genitalia. Segment IX subtriangular, short dorsad long ventrad; tergum reduced to a transverse anterior band; acrotergite indispensible. Segment X short, transverse band with apical margin slightly produced laterad to a pair of small bumps beneth cerci and articulated with the dorsum of phallobase. Cerci (preanal or superior appendages) short foliform. Paraproct indispensible. Gonopods with 2 apical branches; dorsal branch with trifid ventral branch with bifid apical margin in lateral view. Phallic apparatus consists of fused phallobase, phallotheca and single paramere.

Material examined – Holotype: Lam Dong Province, Baoloc, Da Gna River, 21.X.1988, light, leg. J. Oláh (1 male, OPC). Paratypes: same as holotype (5 males, OPC)

*Etymology* – *Sotet*, from "sötét", dark in Hungarian, refers to the dark colour of the freshly collected specimens.



Figs 220–221. *Trichosetodes sotet* sp. n., male holotype: 220 = genitalia, left lateral view, 221 = phallic organ, left lateral view

### Molannidae

#### Molanna moesta Banks, 1906

Material examined – Nghe An Province, Frontier-Vietnam, 750 m, 19°40.879' N, 104°49.444'E, 3.XI.1999, leg. F. Kassai (1 male, HNHM).

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