

# Records and descriptions of caddisflies from Natma Taung National Park and adjacent localities in the Chin Hills of Myanmar (Insecta, Trichoptera)

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## Abstract

During several excursions to the Chin Hills of Myanmar from 2001 to 2015, rich collections of caddisflies were made which form the basis of the present taxonomic and biogeographic study. A total of 106 species were identified including seven new species. They are described as *Arctopsyche subflava* sp. nov., *Hydromanicus abdominalis* sp. nov., *Cheumatopsyche janosolahi* sp. nov., *Lepidostoma subpanaitos* sp. nov., *Aplatyphylax pumilus* sp. nov., *Adicella natmataungensis* sp. nov. and *Triaenodes mindatensis* sp. nov.

Illustrations of the male genitalia and images of the adults are provided. Two species names were recognised as junior synonyms: *Hydropsyche athamas* Malicky & Chantaramongkol, 2000, = *Hydropsyche januha* Oláh & Barnard, 2008, **syn. nov.**; *Hydropsyche khasigiri* Oláh & Barnard, 2008, = *Hydropsyche kiogupa* Oláh & Scheffer, 2008, **syn. nov.**

In an attempt to determine the biogeographic character of the fauna, the known ranges of all resident species were plotted into three longitudinal transects from 85°–95°E, 95°–98°E and 98°–108°E, ranging from the eastern Himalayas to northern Vietnam. About half of the species have ranges extending over all three transects. The fauna is equally composed of western and eastern species qualifying the Chin Hills as part of a transition zone including palearctic elements. Most of the species, which are widely distributed in south-east Asia, are members of the suborder Annulipalpia. The investigations of the authors yielded 77 autochthonous species, which have been unrecorded from the country including the newly-described taxa. This brings the number of species records from Myanmar to 304.

## Key Words

inventory, new species descriptions, new synonyms, Oriental Faunistic Region, Palearctic Faunistic Region, transition zone

## Introduction

Local inventories are key data resources for measuring insect diversity, recognising ranges of taxa and planning conservation activities. Inventories provide enduring information and are archives of life, assuming that the sampled material is stored and conserved adequately. Many such inventories are needed in each country to reveal the general and unique features of a country's insect fauna and of the biogeographic regions of which the country is a part.

There is only one locality in Myanmar which can be regarded as intensively sampled for Trichoptera, the area around Kambaiti in the Miytkyina District of the Kachin

Province. It is about 5 km from the Yunnan border and situated at an elevation of 2000 m. The collector was René Malaise and his wife Ebba. The couple spent three and a half months at this place in 1934 collecting huge amounts of insects by using traps designed by R. Malaise and later named after him (Vårdal and Taeger 2011). Back in Sweden, the material was sorted to systematic groups and sent out to specialists for identification and description. The Trichoptera were studied first by A. V. Martynov, M. S. Mosely and D. E. Kimmins for material sent to the former British Museum (Natural History), London, today the Natural History Museum, London. They included in their studies additional material from collections made during

the British colonial times in India and Burma. Later on, examination of the Malaise material was continued by F. Schmid, H. Malicky, K. Johanson, J. Oláh and others. A complete list of species was, however, not published by these authors. This task was accomplished by Wityi et al. (2015), who retrieved and compiled all species description from the various publications of Martynov, Mosely, Kimmins, Schmid, Malicky and others. Moreover, they provided the first synopsis of the Trichoptera of Myanmar, not only based on literature, but with the addition of results from their own fieldwork in the Chin Hills in Myanmar from 2012–2014. In recent years, fieldwork in Myanmar was started by P. Laudee from his base in Thailand. He carried out some collecting trips to various localities in eastern Myanmar. The results of his excursions were new species descriptions which were published afterwards in close cooperation with H. Malicky (e.g. Laudee and Malicky 2018).

In 2002, the first author (WM) joined an excursion to the Chin Hills organised by Dr. Stefan Naumann (SN) (Berlin), who travelled to the area the year before in search of Saturniidae and Eupterotidae (Lepidoptera, Macroheterocera), lepidopteran families for which he is one of the world's leading specialists. With the participation of WM, the objectives of the 2002 excursion were extended to include Microlepidoptera and Trichoptera in an effort to gather information from this then largely unexplored mountain range. During this short excursion, adult caddisflies were sampled at several locations and altitudes in the Natma Taung National Park (NTNP) and in adjacent areas. SN visited the Chin Hills repeatedly in subsequent years until 2015 and brought back additional samples of caddisflies that he donated to the Museum für Naturkunde, Berlin (MfN). Examination of the collected material immediately started after returning from Myanmar in 2002, but came to an abrupt stop due to more urgent commitments of the first author. The study of the Trichoptera samples was resumed in 2019 and first results were published by Malicky and Mey (2020). The purposes of the present article are to summarise all data on Trichoptera collected by the author and SN in the Chin Hills including the NTNP and to provide further new taxa descriptions. This information was used as an initial attempt to recognise species distribution patterns in SE Asia and to determine the biogeographic character of the fauna of the Chin Hills.

## The Chin Hills and the Natma Taung National Park

The Natma Taung National Park (NTNP) is one of Myanmar's 43 currently existing protected areas (Beffasti and Galanti 2011). It is situated in the southern Chin Hills, Chin State, in western Myanmar, west of the Ayeyawaddy River (= Irrawaddy River), occupying the higher elevations of this mountain range (Figs 1, 2A, B). The Chin Hills are part of the Burma Arc, a range of mountain systems extending for 700 km from the Eastern Himala-

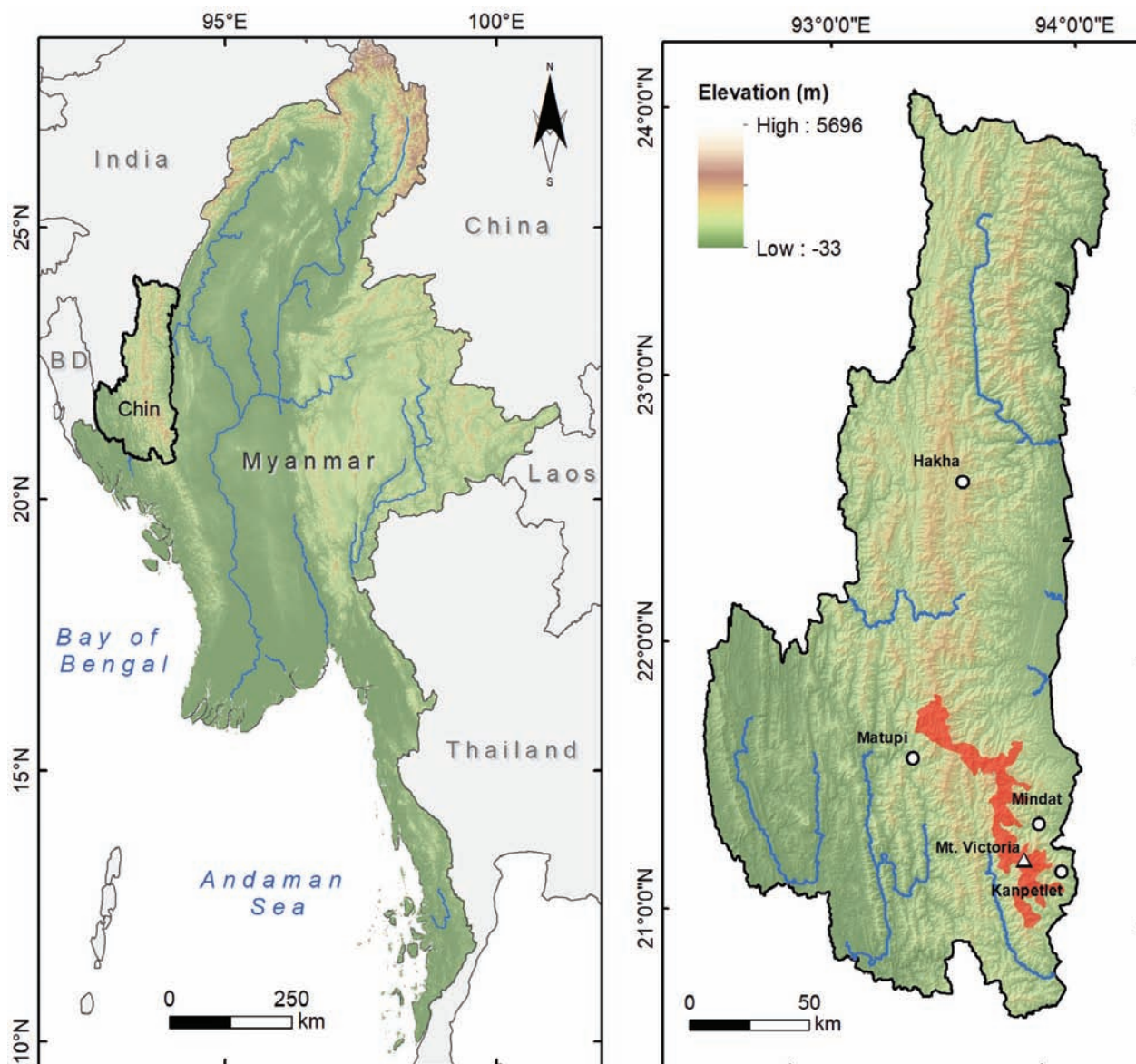
yas in the north to the Arakan-Yoma range in the south. The Andaman and Nicobar Islands in the Gulf of Bengal are geologically the southern prolongation of this arc. The Burma Arc is of early Tertiary origin and was uplifted by the docking of the Indo-Australian Plate to the Asian continent. It is part of the West Burma Block, a continental terrain of Gondwanan origin that was accreted together with other terrains to Asia in the Late Cretaceous (Metcalf 1996). The Park covers an area of 723 km<sup>2</sup> and rises with the summit Natma Taung (= Victoria Peak) (Fig. 2F) to a height of 3051 m (Woo Shin Lee et al. 2016). The monsoon climate is characterised by a long rainy-wet season from May to early December with mean annual rainfall of 1,763 mm. Rain in the dry season and frosts at higher elevations occur regularly. In Kanpetlet, one of the three townships close to the NTNP, the mean annual minimum and maximum temperatures are about 12 °C and 25 °C, respectively. The vegetation of the NTNP was studied by Kingdon-Ward (1958). He differentiated three types of forest: monsoon forest up to 1000 m, subtropical evergreen forest from 1000–2130 m and temperate, semi-evergreen forest above the mist line to the summit. Trees of *Quercus semicarpifolia*, *Pinus kesiya* and *Rhododendron arboretum* dominate the vegetation at high altitudes. NTNP was established in 1997 to preserve plant species endemism, rare birds and to protect the catchments of two large and several smaller rivers on which about 3 million people of the Chin tribe depend. The area is an important reservoir of plant and animal biodiversity. High plant species endemism and a number of different forest communities are outstanding features of the NTNP (Kingdon-Ward 1958; Kang et al. 2017). A first survey on the animal biodiversity was published by Woo Shin Lee et al. (2016) which contains chapters on conspicuous species of selected insect groups (Lepidoptera, Odonata, Coleoptera, Hemiptera, Orthoptera). Trichoptera and most other aquatic groups were not included. The presence of human settlements in the NTNP is increasingly impacting forests and biodiversity. Shifting cultivation, the traditional way of life of the local Chin people and extensions of other agricultural activities are major threats to the National Park (see Fig. 2H).

## Material and methods

Caddisflies were collected during various months in the Chin Hills from 2001 to 2015.

The main sampling sites with coordinates and altitude are as follows:

- Falam, 1 km north-east, 22°54'49"N, 93°40'40"E, 1430–1700 m a.s.l.
- Hakha, 1.5 km west, 22°38'43.94"N, 93°36'18.12"E, 2260 m a.s.l.
- Kanpetlet, 2 miles west, 21°12'N, 94°01'E, 1700 m a.s.l.
- Kanpetlet, 6 miles west, area of Mt. Victoria, 21°12'N, 93°59'E, 2060 m a.s.l., Fig. 2A, F



**Figure 1.** Map of Myanmar with the Chin Province outlined (left) and the position of the NTNP in the Chin State (right)

Kanpetlet, 5 miles west, Myohaung Camp, 21°13'N, 93°58'E, 1950 m a.s.l., Fig. 2C

Kanpetlet, 8 miles camp, way to Mt. Victoria, 21°13'N, 93°55'E, 2500 m a.s.l., Fig. 2D

Mindat, 8 km west, Agricultural Research Station, 21°23.440'N, 93°52.478'E, 1916 m a.s.l.

Mindat-Matupi road, 22 miles camp, 21°26.427'N, 93°47.121'E, 2286 m a.s.l., Fig. 2G

Mindat-Matupi road, 30 miles camp, 21°29.782'N, 93°47.364'E, 2498 m a.s.l.

Mindat, 16 miles west, 16 miles camp, 21°23'N, 93°50'E, 2500 m a.s.l.

Mindat, 2 miles south-west, sign post at border to NTNP, 21°21'N, 93°57'E, 1280 m a.s.l., Fig. 2E

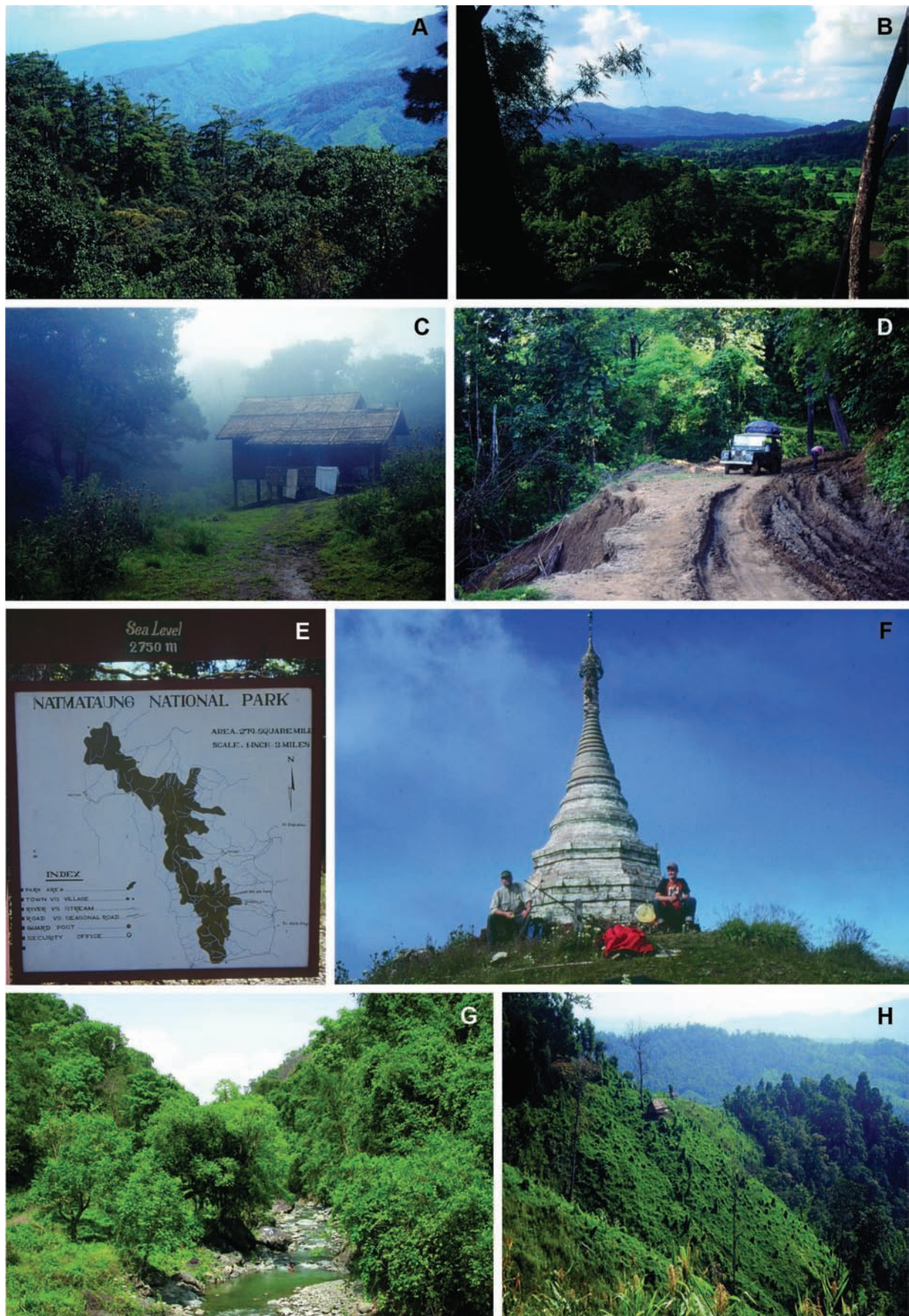
Tiddim (Tedim), environment of Thaing-gnin, 23°22'33"N, 93°39'14"E, 2160–2310 m a.s.l.

The sampling of caddisflies concentrated on adults, which were collected by sweeping the riparian vegetation

along watercourses with hand-nets in the daytime. Collecting at night in 2002 was performed with a 12V battery-operated light-tower (2 × 15 Watt, superactinic light tubes, F. Weber Company, Stuttgart, Germany). The tower was in operation for about 4 hours starting at sunset and finishing, when the temperature dropped below 6 °C and insects ceased arriving. Most of the material, sampled by SN, was gathered at the lights by picking up the insects manually from a white sheet illuminated by a single 160 or 250 W bulb. The lamp was powered by a Honda Ex 350 generator. Most of the imagines were immediately preserved in ethyl alcohol (75%), while others were pinned or micro-pinned and stored dry in small boxes. Dry preserved specimens are indicated as pinned, while the remaining material is preserved in ethyl alcohol. The material is deposited in the Museum für Naturkunde, Berlin (MfN), with voucher specimens in the collection of the second author.

In contrast to the practice for Lepidoptera, the descriptions of new species of Trichoptera are rarely accompa-





**Figure 2.** Views from the NTNP. **A.** View to summit of Natma Taung (Mt. Victoria); **B.** Chin Hills, north of Kanpetlet; **C.** Myohaung Camp; **D.** Road to Mt. Victoria; **E.** Sign post and information table at the entrance to NTNP; **F.** SN and WM on top of Natma Taung; **G.** Stream crossing the road from Mindat to Matupi; **H.** Locality of shifting cultivation.

nied by photos of the adults. Most articles about Trichoptera in south-east Asia go without. We decided to publish images of some species, demonstrating in this way, the diversity of forms and colours of adults, including some types of new species described herein.

Dissection of genitalia was performed according to the procedure described by Robinson (1976). The genitalia of small species were embedded in Euparal on permanent slides. Chlorazol Black was used for staining. The cleared abdomens of the larger species were transferred either into polyethylene vials with glycerine on the pins or placed together with the corresponding specimens into alcohol vials. Prior to embedding on permanent microscope slide or into glycerine vials, genitalia were drawn using a camera lucida attached to a Leica MZ12 compound microscope. The illustrations were scanned and processed in Photo-shop. Photographic documentation of imagines and genitalia were performed with a Nikon Coolpix. Terminology used in the description of the species follows common practice exemplified by Schmid (1998). The treatment of families and species are arranged in systematic order as applied by Malicky (2010).

In order to obtain an idea about the biogeographic character of the Trichoptera fauna of the Chin Hills, distributional data of the registered species were gathered from literature (Mosely 1936, 1942, 1948, 1949; Kimmins 1950, 1953a, b, 1955, 1957; Schmid 1968, 1969, 1970, 1971, 1991a, 1994a, b; Tian et al. 1996; Malicky 2000; Yang and Weaver 2002; Malicky 2005, 2007; Oláh and Johanson 2008a, b, 2010; Malicky 2010; Mattern 2015; Yang et al. 2016; Morse 2020) and plotted into three longitudinal transects from 1) 85°–95°E, 2) 95°–98°E and 3) 98°–108°E. The transects were chosen with respect to the topography of the landscape between India and Vietnam south of China. The median transect covers the watershed area of the Ayeyawaddy River including its extended lowlands, which are suspected by us to represent a distributional barrier between the Indian and Southeast-Asian Subregions.

All identified species of the Chin Hills are listed systematically according to family affiliation and, within those, in alphabetical order. Their known distributions are indicated by using country abbreviations in the three columns of the table representing the three transects. Information about the original description of the species, on bibliographic data and references to synonyms are available from the Trichoptera World Catalogue of Morse (2020). This catalogue was regularly consulted for checking the correct writing of taxonomic names.

The biogeographic affinities of the new species, described from the Chin Hills, were derived from the location or range of their nearest relatives, which are noted and discussed in the diagnoses of the species descriptions. In some cases, the assignment is un-problematical (cf. *Arctopsyche subflava* sp. nov.), whereas in others, a clear assignment to one of the three transects was not possible because closely-related species are present in several transects. The distributions of these species are indicated with an asterisk (\*) that may occur in more than one col-

umn. The comparison of species numbers per transect is thought to provide chorological patterns of Trichoptera species distributed in the area between the Himalayas and northern Vietnam. It is, admittedly, a rough analysis, but in the absence of sufficiently accumulated knowledge of range patterns, the method may provide some useful insights into the biogeographic character of the fauna of the Chin Hills and into the distribution patterns of species in south-east Asia and adjacent areas.

## Results

### Systematics and faunistics

#### Rhyacophilidae

##### *Rhyacophila assimilis* Kimmins, 1953

**Material.** 5 ♂ 1 ♀, Myohaung Camp, 2060 m a.s.l., 3–5.x.2002, leg. W. Mey; 1 ♂ 1 ♀, 16 miles camp, 2500 m a.s.l., 11.x.2002, leg. W. Mey.

##### *Rhyacophila aureomaculata* Schmid, 1970

**Material.** 2 ♂, 16 miles camp, 2500 m a.s.l., 11.x.2002, leg. W. Mey.

##### *Rhyacophila bifida* Kimmins, 1953

**Material.** 1 ♂, 16 miles camp, 2500 m a.s.l., 10.x.2002, leg. W. Mey (pinned).

##### *Rhyacophila chenmo* Schmid, 1970

**Material.** 1 ♂ 1 ♀, 16 miles camp, 2500 m a.s.l., 10.x.2002, leg. W. Mey (pinned).

##### *Rhyacophila curvata* Morton, 1900

**Material.** 1 ♂, Mindat, 1453 m a.s.l., 21.v.2012, leg. S. Naumann (pinned).

##### *Rhyacophila lamael* Malicky & Mey, 2020

**Material.** 4 ♂ (*Holotype and paratypes*), Myohaung Camp, 2060 m a.s.l., 3–5.x.2002, leg. W. Mey.

##### *Rhyacophila manipuri* Schmid, 1970

**Material.** 1 ♂, Myohaung Camp, 2060 m a.s.l., 3–5.x.2002, leg. W. Mey.



***Rhyacophila marae* Malicky & Mey, 2020**

**Material.** 3 ♂ (*Holotype and paratypes*), Myohaung Camp, 2060 m a.s.l., 3–5.x.2002, leg. W. Mey.

***Rhyacophila parva* Kimmins, 1953**

Fig. 3B

**Material.** 1 ♂, Myohaung Camp, 2060 m a.s.l., area of Mt. Victoria, 3–5.x.2002, LF, leg. W. Mey, photo 06/20, (pinned).

***Rhyacophila scissa* Morton, 1900**

**Material.** 2 ♂, 9 miles west of Mindat, 1960 m a.s.l., 9.x.2002, leg. W. Mey, (pinned); 2 ♂, 9 miles west of Mindat, 1960 m a.s.l., LF, 9.x.2002, leg. W. Mey, (pinned).

***Rhyacophila scissoides* Kimmins, 1953**

Fig. 3A

**Material.** 2 ♂, Myohaung Camp, 2060 m a.s.l., area of Mt. Victoria, 3–5.x.2002, LF, leg. W. Mey, photo 02/20 (pinned); 2 ♂, 16 miles camp, 2500 m a.s.l., 10.x.2002, leg. W. Mey (pinned).

***Rhyacophila scotina* Kimmins, 1953**

**Material.** 1 ♂, 16 miles camp, 2500 m a.s.l., 10.x.2002, leg. W. Mey (pinned).

***Rhyacophila* spp.**

**Material.** 1 ♀, Kennedy Peak, 2690 m a.s.l., 18.v.2001, leg. S. Naumann (pinned); 1 ♀, 16 miles camp, 2500 m a.s.l., 10.x.2002, leg. W. Mey (pinned); 1 ♀, Mindat – Matupi Road, 22 miles camp, 2266 m a.s.l., 14–15.v.2012, leg. S. Naumann (pinned).

**Remarks.** The female specimens cannot be assigned to any of the other collected species. They belong to three different species.

***Himalopsyche navasi* Banks, 1940**

**Material.** 1 ♀, Tiddim, Thaing gnin Village, 2100 m a.s.l., 4–5.xi.2015, leg. S. Naumann (pinned)

**Hydrobiosidae*****Apsilochorema annandalei* Martynov, 1935**

**Material.** 3 ♂, Mindat-Matupi road, 22 miles camp, 2286 m a.s.l., 14–15.v.2012, leg. S. Naumann

***Apsilochorema tanum* Schmid, 1970**

**Material.** 1 ♂, 16 miles camp, 2500 m a.s.l., 10.x.2002, leg. W. Mey

***Apsilochorema utchtchunam* Schmid, 1970**

**Material.** 1 ♂, 9 miles west of Mindat, 1960 m a.s.l., LF, 9.x.2002, leg. W. Mey

**Glossosomatidae*****Glossosoma atestas* Malicky & Chantaramongkol, 1992**

**Material.** 2 ♂, Tiddim, 1 km north-west of Thaing-gnin, 2160 m a.s.l., 17.v.2001. leg. S. Naumann; 1 ♂, Myohaung Camp, 2060 m a.s.l., 3–5.x.2002, leg. W. Mey; 3 ♂, 9 miles west of Mindat, 1960 m a.s.l., 9.x.2002, leg. W. Mey, (pinned)

***Glossosoma dentatum* McLachlan, 1875**

**Material.** 1 ♂, Mindat-Matupi Road, 30 miles camp, 2286 m a.s.l., 15.v.2012, leg. S. Naumann

***Glossosoma hamael* Malicky & Mey, 2020**

**Material (Holotype):** 1 ♂, Mindat-Matupi Road, 30 miles camp, 2286 m a.s.l., 15.v.2012, leg. S. Naumann

***Glossosoma hemantajam* Schmid, 1971**

**Material.** 1 ♂, Chin Hills, Natma Taung National Park, 15 km north of Mindat, 4.ii.2005, leg. S. Naumann (pinned).

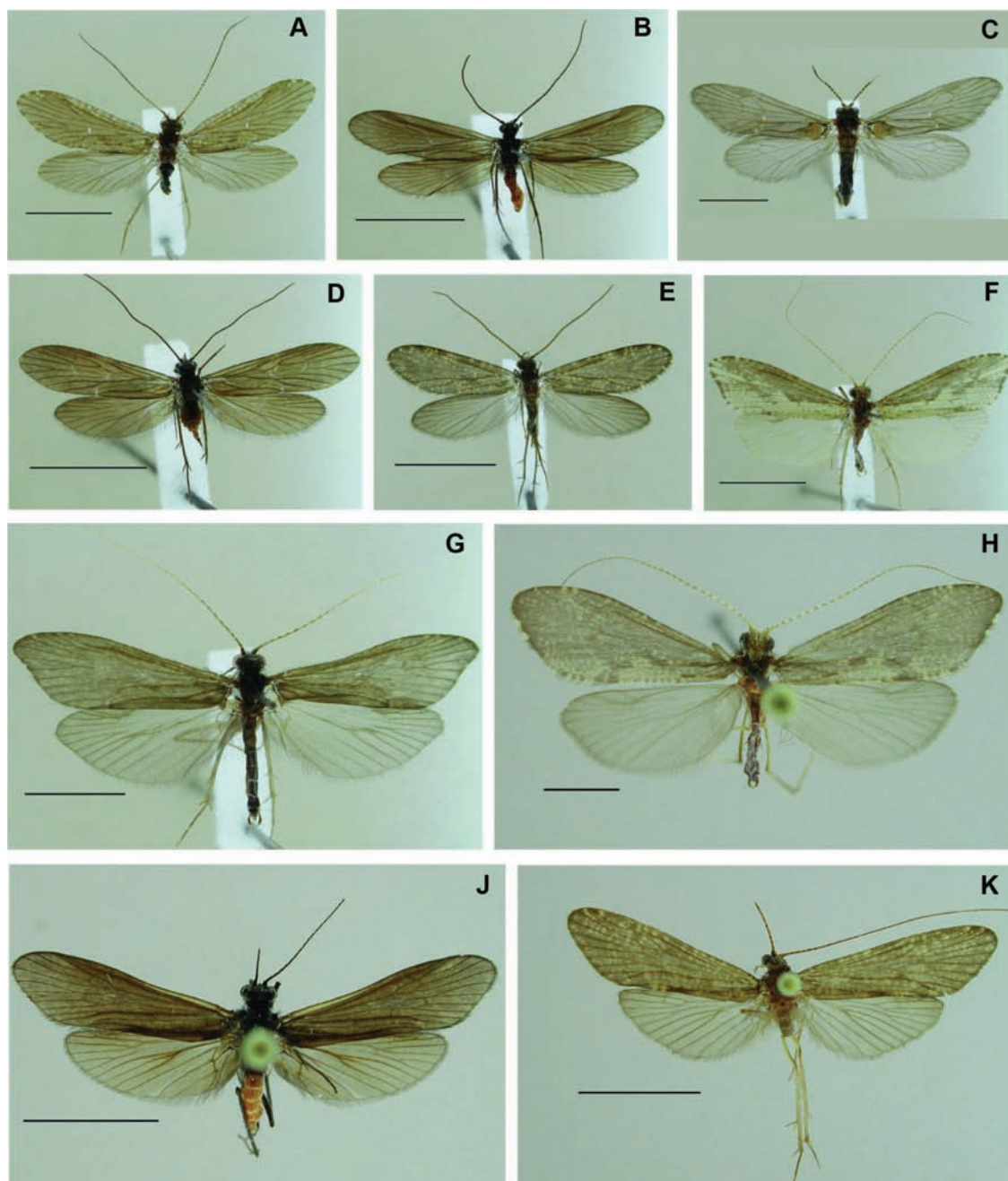
***Glossosoma malayanum* Banks, 1934**

Fig. 3C

**Material.** 1 ♂ 1 ♀, Tiddim, 1 km north-west of Thaing-gnin, 2160 m a.s.l., 17.v.2001. leg. S. Naumann; 2 ♂ 2 ♀, 4 km north-west of Thaing-gnin, 2310 m a.s.l., 25.v.2001, leg. S. Naumann; 2 ♂, Myohaung Camp, 2060 m a.s.l., area of Mt. Victoria, 3–5.x.2002, LF, leg. W. Mey, photo 03/20, (pinned); 1 ♂ 1 ♀, 15 km north of Mindat, 4.ii.2005, leg. S. Naumann (pinned); 6 ♂, path to Mt. Victoria, 2600 m a.s.l., 2.ii.2005, leg. S. Naumann; 1 ♂, Mindat-Matupi Road, 22 miles camp, 2286 m a.s.l., 14–15.v.2012, leg. S. Naumann

***Glossosoma vehuel* Malicky & Mey, 2020**

**Material (type specimens):** 1 ♂, 4 km north-west of Thaing-gnin, 2310 m a.s.l., 25.v.2001, leg. S. Naumann;



**Figure 3.** Images of adult caddisflies from the Chin Hills. **A.** *Rhyacophila scissoides*; **B.** *Rhyacophila parva*; **C.** *Glossosoma malayanum*; **D.** *Chimarra nahesson*; **E.** *Kisaura longispina*; **F.** *Diplectrona aurovittata*; **G.** *Diplectrona burha*; **H.** *Diplectrona sanguana*; **J.** *Hydromanicus abdominalis* sp. nov., ♂ holotype; **K.** *Hydromanicus seth*. Scale bars: 0.2 mm.

2 ♂, Mindat-Matupi Road, 22 miles camp, 2286 m a.s.l., 14–15.v.2012, leg. S. Naumann; 4 ♂, Mindat-Matupi Road, 22 miles camp, 2286 m a.s.l., 15.v.2012, leg. S. Naumann.

#### Philopotamidae

##### *Chimarra aberrans* Martynov, 1935

**Material.** 11 ♂, Tiddim, Thaing gnin Village, 2200 m a.s.l., 17–20.v.2001, leg. S. Naumann (3 ♂ pinned); 21 ♂ 1 ♀, 4 km north-west of Thaing-gnin, 2310 m a.s.l., 25.v.2001, leg. S. Naumann; 17 ♂ 3 ♀, 1.5 km west

of Hakha, 2260 m a.s.l., 24.v.2001, leg. S. Naumann; 1 ♂, west of Kampetlet, 1750 m a.s.l., 23.vi.2008, leg. S. Naumann; 1 ♂, 8 km west of Mindat, 1914 m a.s.l., 30.vi.2008, leg. S. Naumann; 6 ♂ 1 ♀, Mindat-Matupi Road, 22 miles camp, 2286 m a.s.l., 14–15.v.2012, leg. S. Naumann; 2 ♂, Mindat, 1916 m, Agricultural Research Station, 22.v.2012, leg. S. Naumann.

**Remarks.** The male genitalia of this widespread species are variable. In Fig. 5A–C, the male genitalia of a specimen from Mindat are depicted. According to male genitalia, *C. hoangliensis* Mey, 2002 is a related species occurring in northern Vietnam.

***Chimarra areli* Malicky & Mey, 2008**

**Material.** 1 ♂, 16 miles camp, 2500 m a.s.l., 10.x.2002, leg. W. Mey.

***Chimarra argax* Malicky, 1989**

**Material.** 1 ♂, 1.5 km west of Hakha, 2260 m a.s.l., at light, 24.v.2001, at light, leg. S. Naumann (pinned).

**Remarks.** The male genitalia of this species are variable. In Fig. 5D–F, the male genitalia of the single specimens are depicted.

***Chimarra crepidata* Kimmins, 1957**

**Material.** 2 ♂, 2 miles south of Mindat, 1280 m a.s.l., 12.x.2002, LF, leg. W. Mey, (1 ♂ in coll. Malicky).

***Chimarra devva* Malicky & Chantaramongkol, 1993**

**Material.** 1 ♂, Myohaung Camp, 2060 m a.s.l., area of Mt. Victoria, 3–5.x.2002, LF, leg. W. Mey, (pinned); 1 ♂, 9 miles west of Mindat, 1960 m a.s.l., 9.x.2002, leg. W. Mey, (pinned).

***Chimarra nahesson* Malicky & Chantaramongkol, 1993**

Fig. 3D

**Material.** 1 ♂, 1 ♀, Myohaung Camp, 2060 m a.s.l., area of Mt. Victoria, 3–5.x.2002, LF, leg. W. Mey, photo 07/20, (pinned); 1 ♂, 8 miles camp, 2500 m a.s.l., 6–8.x.2002, leg. W. Mey; 1 ♂, 16 miles camp, 2500 m a.s.l., 10.x.2002, leg. W. Mey (pinned); 1 ♂ 1 ♀, 2 miles south of Mindat, 1260 m a.s.l., 12.x.2002, LF, leg. W. Mey (pinned).

***Chimarra okuihorum* Mey, 1998**

**Material.** 2 ♂ 2 ♀, 1 km east of Mindat, 1278 m a.s.l., 9.xi.2015, leg. S. Naumann (pinned).

***Chimarra otiel* Malicky & Mey, 2020**

**Material** (type specimen): 1 ♂, 16 miles camp, 2500 m a.s.l., 10.x.2002, leg. W. Mey.

***Chimarra scopulifera* Kimmins, 1955**

**Material.** 1 ♂, 1 ♀, Myohaung Camp, area of Mt. Victoria, 2060 m a.s.l., 3–5.x.2002, LF, leg. W. Mey, (pinned).

***Wormaldia relictata* (Martynov, 1935)**

**Material.** 1 ♂, 2 km east of Kanpetlet, 1700 m a.s.l., 2.x.2002, LF, leg. W. Mey, photo 08/20, (pinned); 8 ♂, 2 ♀, Myohaung Camp, 2060 m a.s.l., area of Mt. Victoria, 3–5.x.2002, LF, leg. W. Mey, (pinned); 6 ♂, 2 ♀, 9 miles west of Mindat, 1960 m a.s.l., LF, 9.x.2002, leg. W. Mey, cleared abdomen in glycerine vial, (2 ♂ 2 ♀, pinned); 1 ♂, W Hakha, 2260 m a.s.l., 23–24.v.2001, leg. S. Naumann (pinned).

***Wormaldia serrata* (Kimmins, 1955)**

**Material.** 1 ♂, Myohaung Camp, 2060 m a.s.l., 3–5.x.2002, LF, leg. W. Mey, photo 08/20, (pinned).

***Wormaldia simulans* Kimmins, 1955**

**Material.** 1 ♂, 8 miles camp, 2500 m a.s.l., 6–8.x.2002, LF, leg. W. Mey, photo 26/20, (pinned); 2 ♂ 1 ♀, 16 miles camp, 2500 m a.s.l., 10.x.2002, leg. W. Mey (pinned).

***Wormaldia therapion* Schmid, 1991**

**Material.** 7 ♂ 1 ♀, 8 miles camp, 2500 m a.s.l., 6–8.x.2002, LF, leg. W. Mey (4 ♂, 1 ♀, pinned); 4 ♂ 3 ♀, 16 miles camp, 2500 m a.s.l., 10.x.2002, leg. W. Mey (3 ♂, 3 ♀ pinned); 1 ♂, same locality, 11.x.2002, leg. W. Mey; 1 ♂, Mindat-Matupi Road, 30 miles camp, 2498 m a.s.l., 19.v.2012, leg. S. Naumann.

***Wormaldia timoleon* Schmid, 1991**

**Material.** 1 ♂, 9 miles west of Mindat, 1960 m a.s.l., LF, 9.x.2002, leg. W. Mey.

***Kisaura alsuel* Malicky, 2012**

**Material.** 1 ♂, Myohaung Camp, 2060 m a.s.l., 3–5.x.2002, LF, area of Mt. Victoria, leg. W. Mey, genitalia in glycerine vial (pinned); 1 ♂, 8 miles camp, 2500 m a.s.l., 6–8.x.2002, LF, leg. W. Mey (pinned); 2 ♂, 9 miles west of Mindat, 1960 m a.s.l., 9.x.2002, leg. W. Mey, photo 21/20, (pinned); 2 ♂, 2 miles south of Mindat, 1260 m a.s.l., 12.x.2002, LF, leg. W. Mey, (pinned); 1 ♂, Thaing gnin Village, 2100 m a.s.l., 4–5.xi.2015, leg. S. Naumann (pinned).

***Kisaura longispina* (Kimmins, 1955)**

Fig. 3E

**Material.** 2 ♂ 1 ♀, Myohaung Camp, 2060 m a.s.l., 3–5.x.2002, LF, area of Mt. Victoria, leg. W. Mey, genitalia in glycerine vial (pinned); 7 ♂ 3 ♀, 9 miles west



of Mindat, 1960 m a.s.l., 9.x.2002, leg. W. Mey, photo 35/20, (3 ♂ 3 ♀, pinned); 3 ♂, 16 miles camp, 2500 m a.s.l., 10.x.2002, photo 19/20, leg. W. Mey (2 ♂ pinned).

**Remarks.** There is a number of very similar species with a large distribution in south-east Asia displaying a certain variation in male genitalia (Malicky 2018). In some cases, we were not able to discriminate between local variations or different species.

#### *Kisaura moselyi* (Kimmins, 1955)

**Material.** 1 ♂, 8 miles camp, 2500 m a.s.l., 6–8.x.2002, LF, leg. W. Mey, genitalia in glycerine vial, (pinned).

#### *Kisaura sura* Malicky & Chantaramongkol, 1993

**Material.** 1 ♂, 9 miles west of Mindat, 1960 m a.s.l., 9.x.2002, leg. W. Mey, genitalia in glycerine vial (pinned).

#### *Dolophilodes elongata* Kimmins, 1955

**Material.** 1 ♂, 30 miles camp, 2495 m a.s.l., 24–26.vi.2008, leg. S. Naumann (pinned).

#### *Dolophilodes flaviventris* Kimmins, 1955

**Material.** 1 ♂, 9 miles west of Mindat, 1960 m a.s.l., 9.x.2002, leg. W. Mey.

#### *Dolophilodes torrentis* Kimmins, 1955

**Material.** 6 ♂ 3 ♀, 8 miles camp, 2500 m a.s.l., 6–8.x.2002, LF, leg. W. Mey, ♂ genitalia in glycerine vial (6 ♂ 3 ♀ pinned); 3 ♂ 3 ♀, 16 miles camp, 2500 m a.s.l., 10.x.2002, leg. W. Mey (2 ♂ 3 ♀, pinned).

### Stenopsychidae

#### *Stenopsyche benaventi* Navás, 1934

**Material.** 2 ♀, West Hakha, 23–24.v.2001, 2260 m a.s.l., leg. S. Naumann (pinned); 3 ♂, 2 miles south of Mindat, 1260 m a.s.l., 12.x.2002, LF, leg. W. Mey, ♂ genitalia in glycerine vial (pinned); 3 ♀, 15 km north of Mindat, 4.ii.2005, leg. S. Naumann (pinned); 1 ♂, 8 km west of Mindat, 1914 m a.s.l., 30.vi.2008, leg. S. Naumann; 2 ♂, Mindat, 1453 m a.s.l., 21.v.2012, leg. S. Naumann (pinned); 2 ♀, 1 km east of Mindat, 9.xi.2015, 1278 m a.s.l., leg. S. Naumann (pinned).

#### *Stenopsyche brevata* Tian & Zheng, 1989

**Material.** 5 ♂, 2 miles south of Mindat, 1260 m a.s.l., 12.x.2002, LF, leg. W. Mey, ♂ genitalia in glycerine vial

(3 ♂ pinned); 1 ♂ 1 ♀, 15 km north of Mindat, 4.ii.2005, leg. S. Naumann (pinned); 1 ♂, 1 km east of Mindat, 9.xi.2015, 1278 m a.s.l., leg. S. Naumann (pinned); 2 ♂, 14 km west of Mindat, 10.xi.2015, 1910 m a.s.l., leg. S. Naumann (pinned).

#### *Stenopsyche cazul* Malicky & Mey, 2020

**Material (Holotype):** 1 ♂, Mindat, 1916 m a.s.l., Agricultural Research Station, 22.v.2012, leg. S. Naumann.

#### *Stenopsyche himalayana* Martynov, 1926

**Material.** 1 ♀, 2 km east of Kanpetlet, 1700 m a.s.l., 2.x.2002, LF, leg. W. Mey, (pinned); 6 ♂, 1 ♀, Myohaung Camp, 2060 m a.s.l., 3–5.x.2002, LF, area of Mt. Victoria, leg. W. Mey, genitalia in glycerine vial (pinned); 2 ♂, 8 miles camp, 2500 m a.s.l., 6–8.x.2002, LF, leg. W. Mey (pinned); 2 ♂, 9 miles west of Mindat, 1960 m a.s.l., LF, 9.x.2002, leg. W. Mey (pinned); 22 ♂ 1 ♀, 2 miles south of Mindat, 1260 m a.s.l., 12.x.2002, LF, leg. W. Mey (6 ♂ 1 ♀ pinned); 3 ♂, 5 km west of Kampetlet, 1900 m a.s.l., 31.1.2005, leg. S. Naumann (pinned); 2 ♂ 1 ♀, path to Mt. Victoria, 2600 m a.s.l., 2.ii.2005, leg. S. Naumann (pinned).

#### *Stenopsyche similis* Ulmer, 1927

**Material.** 2 ♂ 2 ♀, West Hakha, 23–24.v.2001, 2260 m a.s.l., leg. S. Naumann (pinned); 1 ♂, Kennedy Peak, 2690 m a.s.l., 16.v.2001, leg. S. Naumann (pinned); 8 ♂, 4 ♀, Tiddim, Thang-gnin, 2200 m a.s.l., 17–20.v.2001, leg. S. Naumann (pinned); 1 ♂, 9 miles west of Mindat, 1960 m a.s.l., LF, 9.x.2002, leg. W. Mey (pinned); 1 ♂, west of Kampetlet, 1750 m a.s.l., 23.vi.2008, leg. S. Naumann; 1 ♂, 30 miles camp, 2495 m a.s.l., 24–26.vi.2008, leg. S. Naumann (pinned); 7 ♂ 10 ♀, Mindat-Matupi Road, 22 miles camp, 2260 m a.s.l., 20.v.2012; leg. S. Naumann (pinned); 12 ♂ 9 ♀, Mindat, Agricultural Station, 1916 m a.s.l., 22.v.2012, leg. S. Naumann (pinned).

### Polycentropodidae

#### *Plectrocnemia forcipata* Schmid, 1965

**Material.** 2 ♂, West Hakha, 23–24.v.2001, 2260 m a.s.l., leg. S. Naumann (pinned); 1 ♀, Myohaung Camp, 2060 m a.s.l., area of Mt. Victoria, 3–5.x.2002, LF, leg. W. Mey, (pinned); 1 ♀, 16 miles camp, 2500 m a.s.l., 10.x.2002, leg. W. Mey (pinned).

**Remarks.** The forewings display a conspicuous pattern with three oblique, yellow streaks, two in the thyridial cell and one in the anal loop. The anal wing margin and the postcubital fields are yellow. This pattern is present in males and females and allows the association of sexes.

***Polyplectropus anakempat* Malicky, 1995**

**Material.** 1 ♂, Myohaung Camp, 2060 m a.s.l., area of Mt. Victoria, 3–5.x.2002, LF, leg. W. Mey.

***Polyplectropus musiri* Malicky & Mey, 2020**

**Material (Holotype and paratypes):** 2 ♂, 9 miles west of Mindat, 1960 m a.s.l., 9.x.2002, leg. W. Mey, cleared abdomen in glycerine vial, (1 ♂ pinned).

***Polyplectropus phrixos* Malicky & Changthong, 2007**

**Material.** 1 ♂, Tiddim, Thaing gnin, 2200 m a.s.l., 17–20.v.2001, leg. S. Naumann (pinned); 1 ♂, 2 miles south of Mindat, 1260 m a.s.l., 12.x.2002, LF, leg. W. Mey.

***Polyplectropus sabael* Malicky & Mey, 2020**

**Material (Holotype and paratypes):** 3 ♂, 2 miles south of Mindat, 1260 m a.s.l., 12.x.2002, LF, leg. W. Mey, photo 18/20, (2/0 pinned).

**Psychomyiidae*****Lype atria* Malicky & Chantaramongkol, 1993**

**Material.** 23 ♂, Myohaung Camp, 2060 m a.s.l., 3–5.x.2002, LF, area of Mt. Victoria, leg. W. Mey, (7 ♂ pinned); 7 ♂, 8 miles camp, 2500 m a.s.l., 6–8.x.2002, LF, leg. W. Mey.

**Arctopsychidae*****Arctopsyche tricornis* Schmid, 1968**

Fig. 6A–C

**Material.** 1 ♂, 1 ♀, Myohaung Camp, 2060 m a.s.l., 3–5.x.2002, LF, area of Mt. Victoria, leg. W. Mey (pinned).

**Remarks.** The form of the intermediate and inferior appendages of the male genitalia slightly differs from specimens from India. The male genitalia are depicted in Fig. 6A–C.

***Arctopsyche subflava* sp. nov.**

<http://zoobank.org/8C23AC1C-6E02-4068-B3A8-626F12AAE827>

Figs 4B, 6D, E

**Type material.** *Holotype* ♂ (pinned), Myanmar, Chin, Chin Hills, 9 miles west of Mindat, 21°22'N, 93°55'E, 1960 m a.s.l., 9.x.2002, at light, leg. W. Mey (MfN).

**Etymology.** Latin, *subflavus*, pale yellow (adjective), named after the pale-yellow band along the termen and dorsal margin of forewings.

**Diagnosis.** The new species shares with *A. inaequispinosus* Schmid, 1968 (described from Sikkim) 1) the

pale-yellow band on the forewings and 2) a similar architecture of the male genitalia. The species differ in the form of the bifid intermediate appendages, with longer dorsal branches in *A. subflava* sp. nov. and longer ventral branches in *A. inaequispinosus*. The second segment of the inferior appendages has a prominent ventral keel in the new species, whereas this keel is inconspicuous and flat in *A. inaequispinosus*. Both species form a species pair in the *A. composita* group (sensu Schmid 1968) with allopatric distribution ranges in the Himalayas (*A. inaequispinosus*) and Chin Hills (*A. subflava* sp. nov.).

**Description.** Forewing length 14 mm, wing span 30 mm. Head and antennae pale yellow, eyes large, hemispherical, cephalic dorsal warts with pale yellow hairs, hairs on occipital warts black, labial and maxillary palpi brown; mesonotum dark brown laterally and with median, pale yellow band bearing short, yellow hairs; tegulae of forewings with long, black hairs, fork 4 very long, starting at the base of the median cell, wing membrane grey, sparsely covered with short black hairs, membrane with pale spots along costal and apical margins, dorsal margins with a broad, pale yellow band extending on termen (= outer margin) towards wing apices, termen somewhat concave; hindwings membranous, costal area covered with short brown hairs, fork 1 with short stalk.

Male genitalia (Fig. 6D, E). Segment IX with evenly curved anterior margin, segment X membranous, pre-anal appendages free, large and oval, intermediate appendages with long dorsal and short ventral branches, basal part not broader than pre-anal appendages, inferior appendages with short basal and more elongate apical segments, the latter exhibiting a prominent, slender keel on ventral sides, apical portions slightly bent medially and deeply excised on the median sides subapically; phallic apparatus with tubular phallosome and erectile membranous endotheca, containing long, sickle-shaped phallosomal sclerites.

**Female.** Unknown

**Distribution.** Only known from the Chin Hills, Myanmar.

**Biology.** Mountainous species with flight period in autumn. Adults are attracted by light.

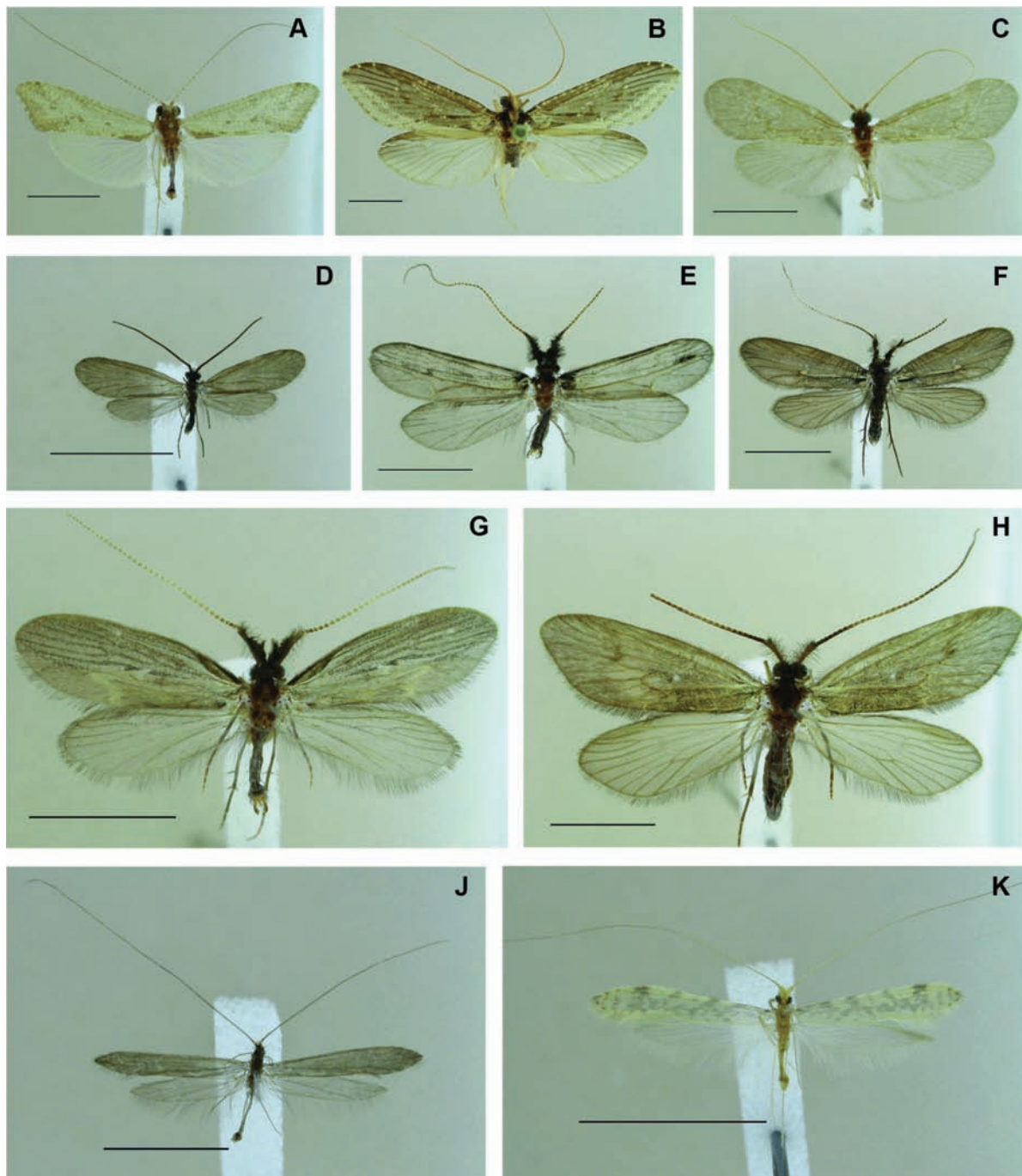
**Hydropsychidae*****Diplectrona aumel* Malicky & Mey, 2020**

**Material** (type specimen): 1 ♂, 8 km west of Mindat, 1914 m a.s.l., 30.vi.2008, LF, leg. S. Naumann

***Diplectrona aurovittata* Ulmer, 1906**

Fig. 3F

**Material.** 2 ♂ 3 ♀, 2 km east of Kanpetlet, 1700 m a.s.l., 2.x.2002, LF, leg. W. Mey, photo 10/20 (pinned); 2 ♂, Myohaung Camp, area of Mt. Victoria, 2060 m a.s.l., 3–5.x.2002, LF, leg. W. Mey; 2 ♂, Mindat, 1453 m a.s.l., 21.v.2012, leg. S. Naumann; 2 ♂, Mindat, 1278 m a.s.l., 9.xi.2015, leg. S. Naumann (pinned).



**Figure 4.** Images of adults from the Chin Hills. **A.** *Hydropsyche pallipenne*; **B.** *Arctopsyche subflava* sp. nov., ♂ holotype; **C.** *Aplatypylax pumilus* sp. nov., ♂ holotype; **D.** *Micrasema turbo*; **E.** *Lepidostoma assamense*; **F.** *Lepidostoma serratum*; **G.** *Lepidostoma ylesomi*; **H.** *Paraphlegopterix aykroydi*; **J.** *Adicella natmataungensis* sp. nov., ♂ paratype; **K.** *Poecilopsyche duhchasana*. Scale bar: 0.2 mm.

#### *Dipletrona burha* Schmid, 1961

Fig. 3G

**Material.** 1 ♀, 2 km east of Kanpetlet, 1700 m a.s.l., 2.x.2002, LF, leg. W. Mey, (pinned); 6 ♂ 4 ♀, Myohaung Camp, area of Mt. Victoria, 2060 m a.s.l., 3–5.x.2002, LF, photo 11/20, leg. W. Mey; 2 ♂ 1 ♀, 8 miles camp, 2500 m a.s.l., 6–8.x.2002, LF, leg. W. Mey (1 ♀ pinned); 4 ♂ 3 ♀, 9 miles west of Mindat, 1960 m a.s.l., LF, 9.x.2002, leg. W. Mey (3 ♂ 3 ♀ pinned); 3 ♂, 2 miles south of Mindat, 1260 m a.s.l., 12.x.2002, LF, leg. W. Mey.

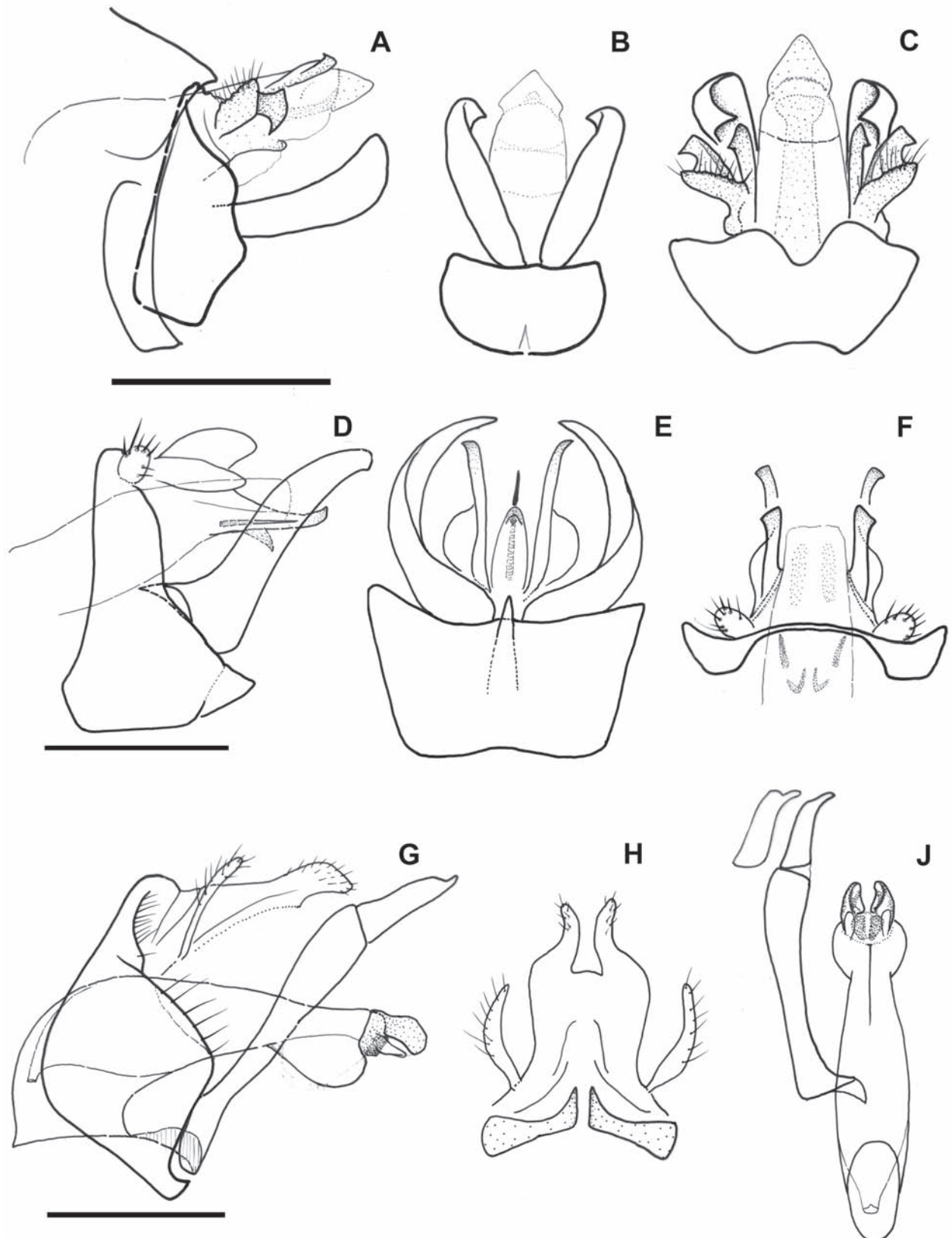
#### *Dipletrona harpyia* Malicky & Chantaramongkol, 1992

**Material.** 2 ♂ 2 ♀, 8 miles camp, 2500 m a.s.l., 6–8.x.2002, LF, leg. W. Mey, genitalia in glycerine (pinned).

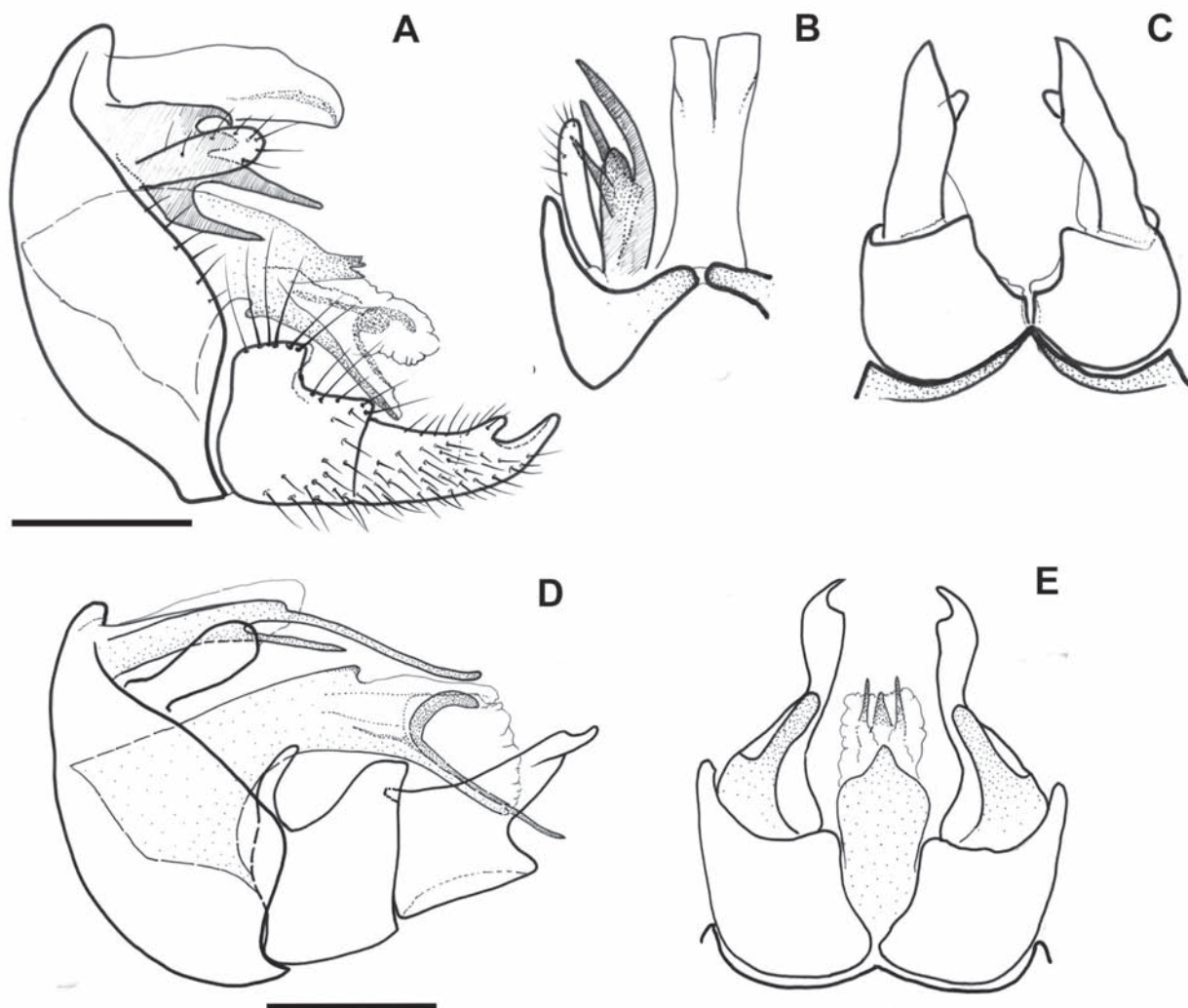
#### *Dipletrona hermione* Malicky & Chantaramongkol, 1992

**Material.** 16 ♂ 5 ♀, 2 miles south of Mindat, 1260 m a.s.l., 12.x.2002, photo 17/20, LF, leg. W. Mey (5 ♂ 5 ♀ pinned).





**Figure 5.** Male genitalia. *Chimarra aberrans*, A. Lateral, B. Ventral, C. Dorsal; *Chimarra argax*; D. Lateral, E. Ventral, F. Dorsal; *Hydromanicus seth*; G. Lateral, H. Dorsal, J. Ventral. Scale bars: 0.5 mm (A.–C.); 0.25 mm (D.–F.); 0.4 mm (G., H., J.).



**Figure 6.** Male genitalia *Arctopsyche tricornis* A. Lateral, B. Dorsal, C. Ventral; *Arctopsyche subflava* sp. nov., ♂ holotype; D. Lateral, E. Ventral. Scale bars: 0.5 mm.

***Diplectrona flavospilota* Mey, 1998**

**Material.** 1 ♂ 3 ♀, 8 miles camp, 2500 m a.s.l., 6–8.x.2002, LF, leg. W. Mey, (pinned).

***Diplectrona sanguana* Kimmins, 1964**

Fig. 3H

**Material.** 14 ♂ 10 ♀, 9 miles west of Mindat, 1960 m a.s.l., LF, 9.x.2002, leg. W. Mey, cleared abdomen in glycerine vial, (11 ♂ 10 ♀, pinned).

***Potamyia flavata* (Banks, 1934)**

**Material.** 1 ♂, Tiddim, Thaing gnin Village, 2200 m a.s.l., 17–20.v.2001, leg. S. Naumann (pinned).

***Hydromanicus abdominalis* sp. nov.**

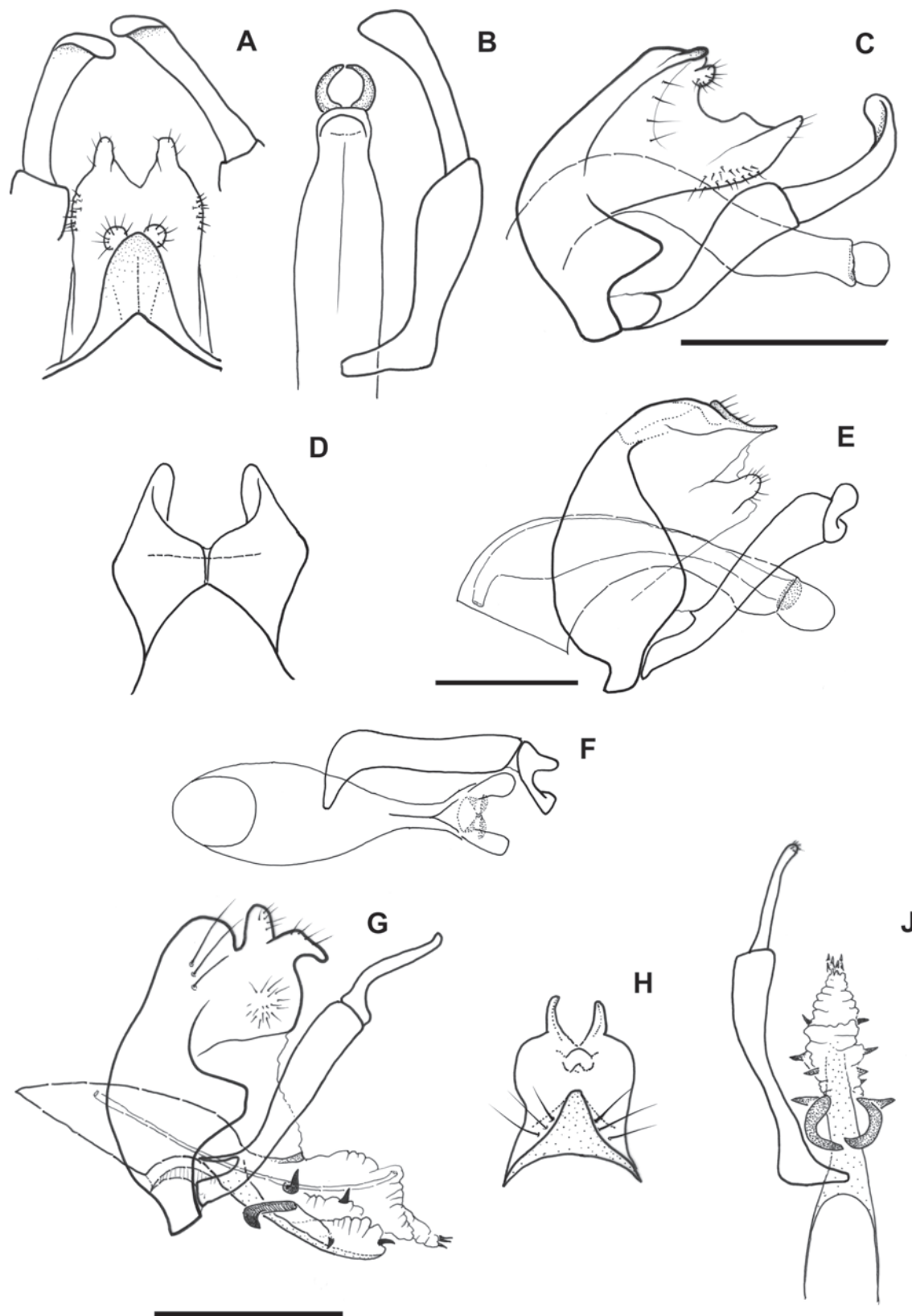
<http://zoobank.org/7BE3B46A-0F78-47D5-BCED-9E7114F76A75>

Figs 3J, 7A–C, 9A

**Type material.** *Holotype* ♂ (pinned), Myanmar, Chin, Chin Hills, Myohaung Camp, 2060 m a.s.l., area of Mt. Victoria, 21°12'N, 93°59'E, 2060 m a.s.l., 3–5.x.2002, at light, leg. W. Mey, photo 43/20 (MfN).

**Etymology.** Latin, *abdominalis*, adjective of abdomen, named after the contrasting yellow colour of the male abdomen including most of the genitalia structures.

**Diagnosis.** The new species is assigned to the *H. verrucosus* group, as defined by Oláh and Johanson (2008b). In contrast to other members of the group, the male abdomen including genitalia, except inferior appendages, is completely yellow, the endothelial processes are round and not elongate and the harpagones are apically



**Figure 7.** Male genitalia (scale: 0.5 mm). *Hydromanicus abdominalis* sp. nov., ♂ holotype, **A**, Dorsal, **B**, Ventral, **C**, Lateral; *Cheumatopsyche janosolahi* sp. nov., ♂ holotype, **D**, Dorsal, **E**, Lateral, **F**, Ventral; *Hydropsyche athamas* **G**, Lateral, **H**, Dorsal, **J**, Ventral.

enlarged, flat and twisted. *H. scotosius* Mey, 1996 (Thailand, Vietnam) seems to be a related species by sharing a similar form of the inferior appendages and the small size of the adults.

**Description.** Length of forewing 8.7 mm, wing span 18 mm. Head and thorax black, cephalic warts with black bristles, eyes small, interocular index 1.0, antennae black, longer than forewing length, proepisternal setal wart



present, legs black, inner spur of fore-tibiae very small, inner unguis of praetarsi with bundle of black hairs; forewings dark brown, with naked (= without hairs) costal field, fork 1 present (Fig. 9A), hindwings sparsely covered by brown hairs, fork 1 present. Abdomen with segments I–II black, remaining segments yellow.

Male genitalia (Fig. 7A–C). Ventral and dorsal part of segment IX narrow; segment X curving dorsad, with short apicodorsal lobes widely separated in dorsal view and with blunt tips in lateral view, lateral sides with spinose margins; inferior appendages black in contrast to other parts of genitalia, as long as phallosome, coxopodites short and broad at apices, harpagones as long as coxopodites, enlarged apically, flat and twisted; phallic apparatus with phallosome broad and narrowed subapically, endothelial processes evenly rounded, phallosomal sclerites small, clearly separating endothelial processes at their bases.

**Distribution.** Myanmar, Chin Hills

**Biology.** Mountainous species with flight period in autumn. Adults are attracted to light.

#### *Hydromanicus almansor* Malicky, 1993

**Material.** 1 ♂, 30 miles camp, 2495 m a.s.l., 24–26.vi.2008, leg. S. Naumann (pinned).

#### *Hydromanicus luctuosus* Ulmer, 1905

**Material.** 1 ♂ 3 ♀, 2 miles south of Mindat, 1260 m a.s.l., 12.x.2002, LF, leg. W. Mey (3 ♀ pinned).

#### *Hydromanicus remiel* Malicky & Mey, 2020

**Material (Holotype and paratypes):** 1 ♂, 2 km east of Kanpetlet, 1700 m a.s.l., 2.x.2002, LF, leg. W. Mey, (pinned); 1 ♂, 1 ♀, Myohaung Camp, area of Mt. Victoria, 2060 m a.s.l., 3–5.x.2002, leg. W. Mey (pinned); 1 ♂, Mindat-Matupi road, 22 miles camp, 2286 m a.s.l., 15.v.2012, leg. S. Naumann; 4 ♂, Mindat, Agricultural Station, 22.v.2012, leg. S. Naumann (pinned); 2 ♂, Mindat-Matupi Road, 16–18.v.2012, 30 miles camp, 2496 m a.s.l., leg. S. Naumann (pinned); 1 ♂, Mindat, 1916 m a.s.l., Agricultural Research Station, 22.v.2012, leg. S. Naumann.

#### *Hydromanicus seth* Malicky, 1993

Figs 3K, 5G–J

**Material.** 1 ♂, 1.5 km west of Hakha, 2260 m a.s.l., 24.v.2001, leg. S. Naumann; 1 ♂, 9 miles west of Mindat, 1960 m a.s.l., LF, 9.x.2002, leg. W. Mey (pinned), cleared abdomen in glycerine vial; 4 ♂, 8 km west of Mindat, 1914 m a.s.l., 30.vi.2008, leg. S. Naumann; 1 ♂, 14 km west of Mindat, 1910 m a.s.l., 10.xi.2015, cleared abdomen in glycerine vial, leg. S. Naumann (pinned).

**Remarks.** The species belongs to the *H. truncatus* group sensu Oláh and Johanson 2008b. *H. seth* is characterised by the subapically-excised harpagones, the bulbous apex of the phallosome and the endothelial processes, which are divided into a dorsal, sclerous and a ventral, membranous part. Congeneric species with similar, non-circular, endothelial processes are *H. asor* Malicky, 1993 and *H. eleasar* Malicky, 1993, both described from Myanmar too. The latter two differ from *H. seth* by the form of the second segment of the inferior appendages, which are variably excised subapically in *H. seth* (Fig. 5H).

#### *Hydromanicus umbonatus* Li, 1993

**Material.** 1 ♂, 30 miles camp, Natma Taung National Park, 2495 m a.s.l., 24–26.vi.2008, leg. S. Naumann.

#### *Cheumatopsyche charites* Malicky & Chantaramongkol, 1997

**Material.** 1 ♂, 9 miles west of Mindat, 1960 m a.s.l., LF, 9.x.2002, leg. W. Mey (pinned).

#### *Cheumatopsyche chryseis* Malicky & Chantaramongkol, 1997

**Material.** 2 ♂ 2 miles south of Mindat, 1260 m a.s.l., 12.x.2002, LF, leg. W. Mey, genitalia in glycerine vial, (1 ♂ pinned).

#### *Cheumatopsyche janosolahi* sp. nov.

<http://zoobank.org/0F5B10AC-3E4A-4167-B6A9-FB3397580CB1>  
Fig. 7D–F

**Type material.** *Holotype* ♂ (pinned), Myanmar, Chin, Chin Hills, Natma Taung National Park, 8 miles camp, area of Mt. Victoria, 2500 m a.s.l., 6–8.x.2002, at light, genitalia in glycerine vial (MfN).

**Paratypes** (pinned): 2 ♂, same data as holotype (MfN)

**Etymology.** The species is named in honour of Janos Oláh, who reviewed the Oriental and Afrotropical species of this genus.

**Diagnosis.** The new species belongs to the *C. holzschuhi* group (Oláh et al. 2008a), which is defined by the presence of apicodorsal lobes on segment IX and apicovertral setal lobes on segment X. The male genitalia of the new species resemble *C. automedon* Malicky & Chantaramongkol, 1997 (Thailand) and *C. meyi* Malicky, 1997 (Vietnam). Each of these species, however, has specifically-formed harpagones, allowing their clear separation and identification.

**Description.** Length of forewing 5–5.5 mm. Head and thorax black, cephalic warts with black bristles, eyes small, interocular index 1.0, antennae dark brown, longer

than forewing length, indistinct spots at articulations on ventral side; legs brown, inner spur of fore-tibiae very small; forewings brown, with golden-brown macula on subapical costal field, fork 1 present, hindwings sparsely covered by brown hairs, fork 1 present.

Male genitalia (Fig. 7D–F). Ventral part of segment IX broad, dorsal part short and narrow; apicodorsal lobes of segment IX widely separated in dorsal view and with pointed tips in lateral view, apicoventral lobes on segment X short and rounded; inferior appendages shorter than phallosome, harpagones deeply split into a longer median branch and a shorter, lateral branch; phallic apparatus with phallosome bulbous at base and narrowed subapically, endothecal processes evenly rounded, oval, phallosomal sclerites large, clearly separating endothecal processes at their bases.

**Distribution.** Myanmar, Chin Hills.

**Biology.** Mountainous species with flight period in autumn. Adults are attracted by light.

#### *Cheumatopsyche naumanni* Malicky, 1986

**Material.** 1 ♂, Mindat, 1453 m a.s.l., 21.v.2012, leg. S. Naumann.

#### *Hydropsyche appendicularis* Martynov, 1931

**Material.** 10 ♂, Falam, 1500–1700 m a.s.l., 21–22.v.2001, leg. S. Naumann; 1 ♂, 1 km east of Mindat, 1278 m a.s.l., 9.xi.2015, leg. S. Naumann (pinned).

#### *Hydropsyche athamas* Malicky & Chantaramongkol, 2000

Fig. 7G–J

= *Hydropsyche januha* Oláh & Barnard, 2008, syn. nov.

**Material.** 1 ♂, 2 miles south of Mindat, 1260 m a.s.l., 12.x.2002, LF, leg. W. Mey; 1 ♂, Myohaung Camp, area of Mt. Victoria, 2060 m a.s.l., 3–5.x.2002, LF, leg. W. Mey, cleared abdomen and metathorax in glycerine vial, (pinned).

**Remarks.** The illustrations of the male genitalia of *Hydropsyche januha* Oláh & Barnard, 2008b: 60, described from Khasi Hills, matches nearly completely with the genitalia of *H. athamas*. The species is herewith synonymised with *H. athamas*.

#### *Hydropsyche atlas* Malicky & P Chantaramongkol, 2000

Fig. 8A–C

**Material.** 2 ♂, Mindat-Matupi Road, 22 miles camp, 2280 m a.s.l., 14–15.vi.2012, at light, leg. S. Naumann (pinned).

**Remarks.** The species was described from Nepal and later reported also from Bhutan (Malicky 2007). The male genitalia of the specimens largely correspond with those of the Nepalese holotype.

#### *Hydropsyche briareus* Malicky & Chantaramongkol, 2000

**Material.** 2 ♂, 1 km north-east of Falam, 1500–1700 m a.s.l., 21–22.v.2001, genitalia in glycerine vial, leg. S. Naumann (1 ♂ pinned); 1 ♂, Mindat, 1453 m a.s.l., 21.v.2012, leg. S. Naumann.

#### *Hydropsyche ditalon* Tian & Li, 1982

**Material.** 4 ♂ 1 ♀, Myohaung Camp, 2060 m a.s.l., 3–5.x.2002, LF, area of Mt. Victoria, leg. W. Mey, (pinned); 3 ♂, 8 miles camp, 2500 m a.s.l., 6–8.x.2002, LF, leg. W. Mey, 1 ♂ genitalia in glycerine vial (pinned).

**Remarks.** The range of the species extends from eastern Tibet, north-east India, Yunnan to Myanmar. The occurrence in the Chin Hills is the southernmost record suggests an uninterrupted occurrence along the north-south stretching mountain ranges connecting the Chin Hills with the eastern Himalayas.

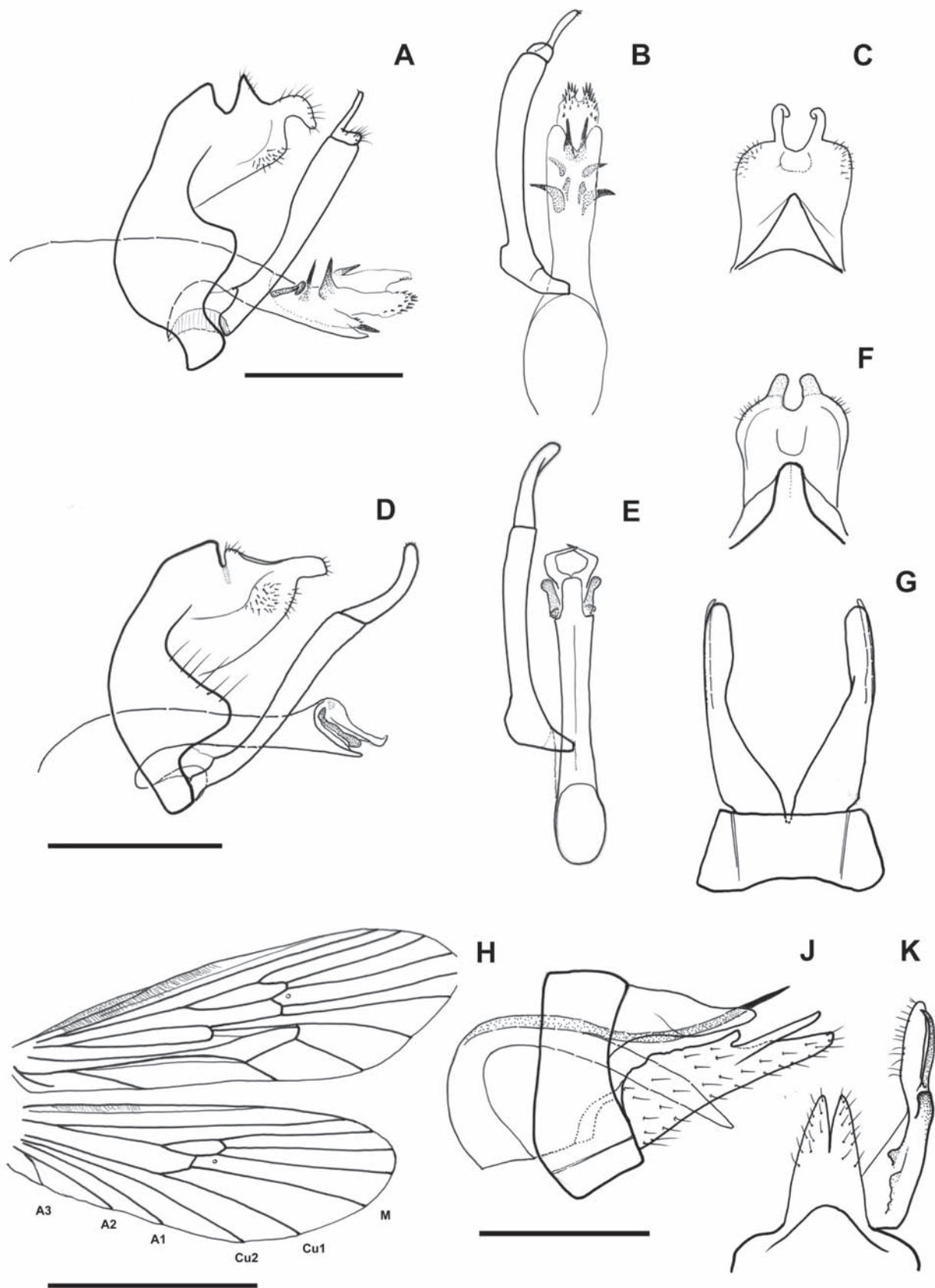
#### *Hydropsyche hackeri* Mey, 1998

**Material.** 1 ♂, Mindat-Matupi Road, 22 miles camp, 2286 m a.s.l., 15.v.2012, leg. S. Naumann.

#### *Hydropsyche khasigiri* Oláh & Barnard, 2008 sp. nov.

= *Hydropsyche kiogupa* Oláh & Scheffer, 2008, syn. nov.

**Material.** 4 ♂, Myohaung Camp, area of Mt. Victoria, 2060 m a.s.l., 3–5.x.2002, LF, leg. W. Mey (1 ♂, pinned); 7 ♂, 8 miles camp, 2500 m a.s.l., 6–8.x.2002, LF, leg. W. Mey (pinned); 8 ♂ 1 ♀, 9 miles west of Mindat, 1960 m a.s.l., LF, 9.x.2002, leg. W. Mey, (3 ♂ 1 ♀ pinned); 1 ♂, 16 miles camp, 2500 m a.s.l., 10.x.2002, leg. W. Mey (pinned); 1 ♂, Mindat, 1453 m a.s.l., 21.v.2012, leg. S. Naumann; 1 ♂, Mindat, 1916 m a.s.l., Agricultural Research Station, 22.v.2012, leg. S. Naumann 2 ♂, Myanmar, Chin, east of Kalemyo, west of Thaung Gnin Village, 23°12.861'N, 93°48.478'E, 6.xi.2015, 2090 m a.s.l., genitalia in glycerine vial, leg. S. Naumann (pinned); 2 ♂, same locality, 4–5.xi.2015; 2 ♂, Mindat-Matupi Road, 22 miles camp, 2286 m a.s.l., 20.v.2012; 1 ♂, Falam, 22°54'49"N, 93°40'40"E, 1500–1700 m, a.s.l. 21–22.v.2001, genitalia in glycerine vial; 1 ♂, 30 miles camp, 2495 m a.s.l., 24–26.vi.2008, leg. S. Naumann (pinned); 3 ♂ 3 ♀, 14 km W Mindat, 1910 m a.s.l., 10.xi.2015, all leg. S. Naumann (pinned).



**Figure 8.** Male genitalia (scale: 0.5 mm). *Hydropsyche atlas* A. Lateral, B. Ventral, C. Dorsal; *Hydropsyche khasigiri* D. Lateral, E. Ventral, F. Dorsal; *Lepidostoma subpanaitos* sp. nov., ♂ holotype, G. Ventral, H. Wing venation (scale: 2 mm), J. Lateral, K. Dorsal



**Remarks.** The species was at first identified as *H. kiogupa* Oláh & Barnard, 2008 and described from the Naga Hills of Manipur, which are connected with the Chin Hills in the south. In the male genitalia, the dorsal keel of segment IX, the dorsal depression between segment IX and X and the endothelial processes of the phallic apparatus exhibit some variation, which includes also the genital morphology of *H. khasigiri*, as illustrated in Oláh and Johanson (2008b). The latter species has page priority rendering *H. kiogupa* as a junior synonym of *H. khasigiri*. This species was described from the Khasi Hills, an area about 250 km west of the type locality of *H. kiogupa*.

#### *Hydropsyche pallipenne* Banks, 1938

Fig. 4A

**Material.** 6 ♂, 1 ♀, 2 miles south of Mindat, 1260 m a.s.l., 12.x.2002, LF, leg. W. Mey, photo 18/20, (pinned); 1 ♂, Tiddim, Thaing gnin Village, 2200 a.s.l. m, 17–20.v.2001, leg. S. Naumann (pinned); 2 ♂, W Hakha, 2260 m a.s.l., 23–24.v.2001, leg. S. Naumann (1 ♂ pinned); 2 ♂, Natma Taung National Park, 15 km north of Mindat, 4.ii.2005, leg. S. Naumann (pinned); 4 ♂, 2 miles south of Mindat, 1260 m a.s.l., 12.x.2002, LF, leg. W. Mey; 2 ♂, Mindat, 1453 m a.s.l., 21.v.2012, leg. S. Naumann.

#### *Hydropsyche rakshakaha* Oláh, 1994

**Material.** 6 ♂, Falam, 1500–1700 m a.s.l., 21–22.v.2001, leg. S. Naumann; 1 ♂, Tiddim, Thaing gnin Village, 2200 m a.s.l., 17–20.v.2001, leg. S. Naumann (pinned); 1 ♂, 4 km north-west of Thaing-gnin, 2310 m, 25.v.2001, leg. S. Naumann; 3 ♂, W Hakha, 2260 m a.s.l., 23–24.5.2001, leg. S. Naumann; 2 ♂ 1 ♀, 9 miles west of Mindat, 1960 m a.s.l., LF, 9.x.2002, leg. W. Mey, (1 ♂ 1 ♀ pinned); 1 ♂, 16 miles camp, 2500 m a.s.l., 10.x.2002, cleared abdomen in glycerine vial, leg. W. Mey (pinned); 3 ♂, 2 miles south of Mindat, 1260 m a.s.l., 12.x.2002, LF, leg. W. Mey; 2 ♂, Chin Hills, Natma Taung National Park, 15 km north of Mindat, 4.ii.2005, leg. S. Naumann (pinned); 1 ♂, path to Mt. Victoria, 2600 m a.s.l., 2.ii.2005, leg. S. Naumann; 5 ♂ 1 ♀, 30 miles camp, 2495 m a.s.l., 24–26.vi.2008, leg. S. Naumann (2 ♂ 1 ♀ pinned); 3 ♂, 20 miles camp, 2350 m a.s.l., 27.vi.2008, leg. S. Naumann; 7 ♂, Mindat, 8 km east, 1914 m a.s.l., 30.vi.2008, leg. S. Naumann (1 ♂ pinned); 1 ♂ 1 ♀, Mindat-Matupi Road, 22 miles camp, 2286 m a.s.l., 14–18.v.2012, leg. S. Naumann (pinned).

#### *Hydropsyche tabulifera* Schmid, 1963

**Material.** 6 ♂ 1 ♀, Myohaung Camp, 2060 m a.s.l., 3–5.x.2002, LF, area of Mt. Victoria, photo 15/20, leg. W. Mey, (4 ♂ 1 ♀, pinned)

#### *Hydropsyche uvana* Mey, 1995

**Material.** 1 ♂, west of Hakha, 2260 m a.s.l., 23–24.v.2001, leg. S. Naumann; 4 ♂, 2 miles south of Mindat, 1260 m a.s.l., 12.x.2002, LF, leg. W. Mey, (2 ♂ pinned); 3 ♂, W Hakha, 2260 m a.s.l., 23–24.v.2001, leg. S. Naumann (pinned); 2 ♂, Mindat, 1453 m a.s.l., 13.5.2012, leg. S. Naumann (pinned).

#### Phryganeidae

##### *Eubasilissa maclachlani* (White, 1862)

**Material.** 2 ♀, Mindat-Matupi Road, 2286 m a.s.l., 14–15.v.2012, leg. S. Naumann (pinned); 2 ♂, Mindat, Agricultural Station, 1916 m a.s.l., 10.xi.2015, leg. S. Naumann (pinned); 1 ♀, road to Matupi, 25 miles camp, 12.xi.2015, leg. S. Naumann (pinned).

#### Brachycentridae

##### *Micrasema turbo* Malicky & Chantaramongkol, 1992

Fig. 4D

**Material.** 12 ♂ 1 ♀, 8 miles camp, 2500 m a.s.l., 6–8.x.2002, LF, leg. W. Mey, photos 30/20, 33/20, (6 ♂ 1 ♀ pinned); 2 ♂, 16 miles camp, 2500 m a.s.l., 10.x.2002, leg. W. Mey.

##### *Micrasema spec. A*

**Material.** 1 ♀, 8 miles camp, 2500 m a.s.l., 6–8.x.2002, LF, leg. W. Mey, (pinned).

#### Goeridae

##### *Goera spec.*

**Material.** 1 ♀, 2 miles south of Mindat, 1260 m a.s.l., 12.x.2002, LF, leg. W. Mey, (pinned).

#### Lepidostomatidae

##### *Lepidostoma armatum* (Ulmer, 1905)

**Material.** 6 ♂ 3 ♀, 8 miles camp, 2500 m a.s.l., 6–8.x.2002, LF, leg. W. Mey, cleared abdomen in glycerine vial, (pinned); 10 ♂ 6 ♀, 16 miles camp, 2500 m a.s.l., 10.x.2002, cleared ♂ abdomen in glycerine vial, (6 ♂ 6 ♀ pinned); 3 ♂, 1 ♀, road to Matupi, 25 miles camp, 12.xi.2015, leg. S. Naumann (pinned).

##### *Lepidostoma assamense* (Mosely, 1949)

Fig. 4E

**Material.** 11 ♂, 6 ♀, Myohaung Camp, area of Mt. Victoria, 2060 m a.s.l., 3–5.x.2002, LF, leg. W. Mey, photo 09/20, (7 ♂, 4 ♀ pinned); 4 ♂, 8 miles camp, 2500 m a.s.l., 6–8.x.2002, LF, leg. W. Mey, photo 29/20, (pinned); 1 ♂

1 ♀, 9 miles west of Mindat, 1960 m a.s.l., LF, 9.x.2002, leg. W. Mey, (pinned); 4 ♂ 1 ♀, Mindat – Matupi Road, 22 miles camp, 2266 m a.s.l., 14–15.v.2012, leg. S. Naumann (1 ♂ 1 ♀ pinned).

***Lepidostoma brueckmanni* Malicky & Chantaramongkol, 1994**

**Material.** 2 ♂, Natma Taung National Park, path to Mt. Victoria, 2600 m a.s.l., 2.ii.2005, leg. S. Naumann; 1 ♂, Mindat, 1916 m a.s.l., Agricultural Research Station, 22.v.2012, leg. S. Naumann.

***Lepidostoma hardiel* Malicky & Mey, 2020**

**Material (Holotype and paratypes):** 1 ♂, 1 ♀, 2 km east of Kanpetlet, 1700 m a.s.l., 2.x.2002, LF, leg. W. Mey, (pinned); 10 ♂, 4 ♀, Myohaung Camp, 2060 m a.s.l., 3–5.x.2002, LF, leg. W. Mey, photo 12/20, 13/20, (4 ♂ 4 ♀ pinned); 1 ♂, 8 miles camp, 2500 m a.s.l., 6–8.x.2002, leg. W. Mey; 1 ♂, 9 miles west of Mindat, 1960 m a.s.l., 9.x.2002 (pinned).

***Lepidostoma moulmina* (Mosely, 1949)**

**Material.** 2 ♂, 2 miles south of Mindat, 1260 m a.s.l., 12.x.2002, LF, leg. W. Mey.

***Lepidostoma serratum* (Mosely, 1949)**

Fig. 4F

**Material.** 2 ♂, 2 km east of Kanpetlet, 1700 m a.s.l., 2.x.2002, LF, leg. W. Mey, photo 25/20, (1 ♂ pinned).

***Lepidostoma subpanaitos* sp. nov.**

<http://zoobank.org/97783E87-74AE-4D3A-BB49-30BE05D31088>

Fig. 8G–K

**Type material.** *Holotype* ♂ (pinned), Myanmar, Chin, Chin Hills, Natma Taung National Park, 8 miles camp, area of Mt. Victoria, 2500 m a.s.l., 6–8.x.2002, at light, genitalia in glycerine vial (MfN).

**Paratypes** (pinned): 1 ♂, same data as holotype (MfN).

**Etymology.** The name refers to the close similarity to *L. panaitos* Malicky & Silalom, 2012.

**Diagnosis.** This species is closely related to *L. panaitos* Malicky & Silalom, 2012, described from Chiang-mai Province (Thailand) and *L. parva* (Mosely, 1941), described from northern Myanmar. *L. subpanaitos* sp. nov. differs by having the inferior appendages much more slender at bases, by absent baso-dorsal processes and with possessing parameres longer than phallus.

**Description.** Length of forewing 8 mm. Head brown, second segment of male maxillary palpi with erected bun-

dle of black, androconical scales, labial palpi with basal segment very short, terminal segment longer than second segment; scape short, curved and kneed subapically, covered with long bristles, flagellomeres bicoloured, yellow basally and brown apically; forewings brown, small androconial scales sparsely distributed at base and along veins, costal fold with hair comb, end of thyridial cell with naked spot; wing venation in Fig. 8K.

Male genitalia (Fig. 8G–J). Segment IX fused forming compact ring, dorso-mesal processes of segment X long and triangular, with acute tips, lateral processes absent, first article of inferior appendages nearly rectangular at base in lateral view, baso-dorsal process absent, ventroapical process finger-like, rounded at apices, dorsoapical process short, second article slightly shorter than ventroapical process, with apicomeral point; phallicata with basal portion slender and recurved basally, apical half nearly straight and broadened distally, parameres long, slender, symmetrical, longer than phallicata and slightly curved dorsad apically.

**Distribution.** Myanmar, Chin Hills

**Biology.** Mountainous species with flight period in autumn. Adults are attracted by light.

***Lepidostoma yehuiah* Malicky & Mey, 2020**

**Material (Holotype and paratypes):** 11 ♂, 8 miles camp, 2500 m a.s.l., 6–8.x.2002, LF, leg. W. Mey, (2 ♂ pinned)

***Lepidostoma ylesomi* Weaver, 2002**

Fig. 4G

**Material.** 1 ♂, Myohaung Camp, 2060 m a.s.l., 3–5.x.2002, LF, leg. W. Mey, photo 09/20, (pinned); 2 ♂, 14 km W Mindat, 1910 m a.s.l., 10.xi.2015, cleared abdomen in glycerine vial, leg. S. Naumann (pinned); 1 ♂, Mindat – Matupi Road, 22 miles camp, 2266 m a.s.l., 14–15.v.2012, leg. S. Naumann.

***Paraphlegopterix aykroydi* Weaver, 1999**

Fig. 4H

**Material.** 1 ♂, 1 ♀, 2 km east of Kanpetlet, 1700 m a.s.l., 2.x.2002, LF, leg. W. Mey, (pinned); 2 ♂ 1 ♀, Myohaung Camp, 2060 m a.s.l., 3–5.x.2002, LF, leg. W. Mey, photo 14/20, (1 ♂ 2 ♀ pinned); 2 ♂, 2 ♀, 8 miles camp, 2500 m a.s.l., 6–8.x.2002, LF, leg. W. Mey, (pinned); 1 ♂, west of Kanpetlet, 1750 m a.s.l., 23.vi.2008, leg. S. Naumann; 1 ♂, Mindat – Matupi Road, 22 miles camp, 2266 m a.s.l., 14–15.v.2012, leg. S. Naumann; 1 ♂, Mindat, Agricultural Station, 1916 a.s.l., 22.5.2012, leg. S. Naumann (pinned); 2 ♂, 1 ♀, same locality, 10.xi.2015, leg. S. Naumann (pinned); 1 ♂, Matupi, 25 miles camp, 12.xi.2015, cleared abdomen in glycerine vial, leg. S. Naumann (pinned).

**Apataniidae*****Moropsyche chandrabuchita* Schmid, 1968**

**Material.** 1 ♂, Mindat, 1916 m a.s.l., Agricultural Research Station, 22.v.2012, leg. S. Naumann.

***Moropsyche vauliah* Malicky & Mey, 2020**

**Material (Holotype and paratypes):** 3 ♂ 1 ♀, Mindat – Matupi Road, 22 miles camp, 2266 m a.s.l., 14–15.v.2012, leg. S. Naumann.

**Limnephilidae*****Aplatyphylax pumilus* sp. nov.**

<http://zoobank.org/3BC48CA3-CE24-4974-939F-96824D91992C>  
Figs 4C, 9B–D

**Type material.** *Holotype* ♂ (pinned), Myanmar, Chin, Chin Hills, 9 miles west of Mindat, 1960 m a.s.l., 9.x.2002, at light, leg. W. Mey, photo 24/20 (MfN).

**Paratypes** (pinned): 1 ♂, same data as holotype (MfN); 2 ♂, Natma Taung National Park, 16 miles camp, 2500 m a.s.l., 10.x.2002, at light, leg. W. Mey, photo 23/20, genitalia in glycerine vial (MfN).

**Etymology.** Latin, *pumilus*, pygmy, referring to the small size of the male adults.

**Diagnosis.** With 8–9 mm forewing length, the new species appears to be the smallest in the genus. The broadly-rounded apices of the forewings and the absent tessellated bands on abdominal sternites are further distinguishing characters. Concerning male genitalia, the short inferior appendage, the long, free intermediate appendages and the curved parameres are similar with *A. unicornis* (Mey & Yang, 2001) described from Shaanxi, China. The slightly serrate dorsal margins of the intermediate appendages and the forewing pattern are unique features of the new species, which together with *A. unicornis*, seems to take an isolated position within the genus. The majority of *Aplatyphylax* species occur in the Eastern Himalayas from Sikkim to Assam (Schmid 1991b).

**Description.** Length of forewing 8–9 mm (♂), wing span 16–18 mm. Head and thorax dark brown, setal warts slightly paler, frons and palpi light brown, antennae yellow-brown, somewhat longer than forewings; legs yellow-brown, spines black, absent on praetarsi, spurs 1.2.2; membrane of forewings light grey, with scattered pale spots, nygma present at base of fork 2 and in apical part of thyridial cell, venation as in *A. mishmicus* Kimmins, 1950 (genotype); abdomen yellow-brown, sternites unicoloured, without bands of tessellate structures on dorsal sides.

Male genitalia (Fig. 9B–D). Tergit VIII with pair of subapical patches of short and black, spaced spines encircling a rounded depression between patches; segment IX in lateral view broadest in the middle, narrow on dorsal and ventral sides; pre-anal appendages relatively broad, long, slightly curved dorsad; intermediate appendages a pair of long, separate processes, not fused at bases,

directed dorso-distad, dorsal margin with finely serrated surface; inferior appendages short and shallow, rounded in ventral view. Phallic apparatus large, endotheca extensible, long, with round sclerite on gonoporus; bases of parameres membranous, broad, apical parts sclerotised, hook-like, with apices directed laterad in exposed stadium and mediad in reposed state.

**Female.** Unknown.

**Distribution.** Myanmar, Chin Hills.

**Biology.** Mountainous species (1900–2500 m a.s.l.) with flight period in autumn. Adults are attracted by light.

**Leptoceridae*****Adicella medaia* Malicky & Chantaramongkol, 1992**

**Material.** 1 ♂ 1 ♀, 9 miles west of Mindat, 1960 m a.s.l., 9.x.2002, leg. W. Mey (1 ♀ pinned)

***Adicella natmataungensis* sp. nov.**

<http://zoobank.org/CC70909A-FEE0-421E-8F63-2B5F1D1DB036>  
Figs 4J, 9E–G

**Type material.** *Holotype* ♂ (pinned), Myanmar, Chin, Chin Hills, Natma Taung National Park, 8 miles camp, area of Mt. Victoria, 2500 m a.s.l., 6–8.x.2002, at light, leg. W. Mey, genitalia slide Mey 31/20 (MfN).

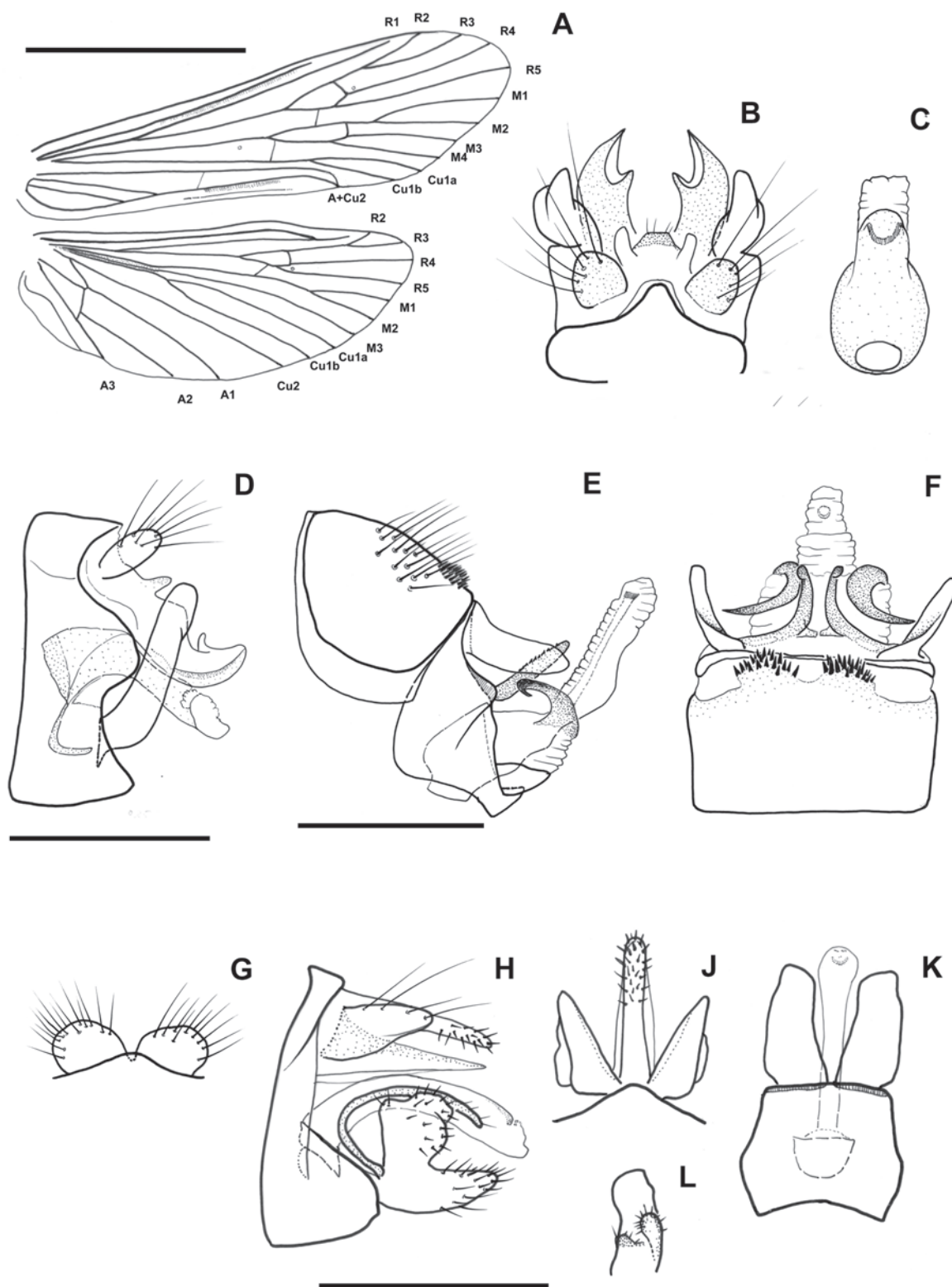
**Paratypes:** 3 ♂ 2 ♀ (pinned), photo 31/10, 1 ♂ (in alcohol), same data as holotype (MfN).

**Etymology.** The specific epithet refers to the name of the type locality, the summit Natma Taung (= Mt. Victoria).

**Diagnosis.** The species does not exhibit a clear similarity to any of the known species of China, the Indian or South East Asian regions. According to male genitalia, the species resembles those of the *A. pulcherrima* group. However, the external morphological criteria of the group, as listed by Schmid (1994) and Yang and Morse (2000), include a cushion of dense, erect hairs on the jugal lobes of the forewings and a brush of long hairs on the jugum of the hindwings. Both characters are imperfectly present in the new species, with short, erect hairs on the base of the anal vein (but not cushion) and with long hairs on the hindwing jugum representing the normal fringes (but not hair brushes). The long segment X with only one pair of dorsal processes and the widely-diverging apical parts have a similar shape in some species of the group, for example, *A. papillosa* Yang & Morse, 2000 from south-western China and *A. castanea* Kimmins, 1963 from Khasi Hills.

**Description.** Length of forewings 5.6–6 mm, wing span 13 mm. Head and thorax dark brown, vestiture on setal warts brown, palpi brown, basal segments of antennae and flagellum densely covered by short brown hairs; legs pale brown, spurs 1.2.2; forewings densely covered by brown hairs, maculae absent, jugal area and base of anal veins with short, erect hairs; hindwings sparsely covered by brown hairs, veins darker than membrane, fringes longer than diameter of wings, hair brush on jugal area absent.





**Figure 9.** Male genitalia (scale: 0.5 mm) and wing venation. **A.** Wing venation of *Hydromanicus abdominalis* sp. nov., ♂ holotype (scale: 2 mm); *Adicella natmataungensis* sp. nov., ♂ holotype, **B.** Dorsal, **C.** Phallic apparatus, ventral, **D.** Lateral; *Aplatyphylax pumilus* sp. nov., ♂ holotype; **E.** Lateral, **F.** Dorsal, **G.** Ventral; *Triaenodes mindatensis* sp. nov., ♂ holotype, **H.** Lateral, **J.** Dorsal, **K.** Ventral, **L.** Inferior appendage, dorsal.

Male genitalia (Fig. 9E–G). Segment IX in lateral view with straight anterior margin and posterior margin with rounded, medial lobe; pre-anal appendages elon-

gate, sub-cylindrical, with long hairs; inferior appendages long, in sub-vertical position, slightly lobed apically on median side, the inner bases with short spicules; segment

X valves large, fused dorsally from segment IX to beyond paired dorsal processes, valves widely separated in apical half, deeply excised subapically and pointed at tips. Phallic apparatus with phallosome curved from broader base, endotheca short, with arched phallosomal sclerite.

**Distribution.** Myanmar, Chin Hills.

**Biology.** Mountainous species (2500 m a.s.l.) with flight period in autumn. Adults are attracted by light.

#### *Adicella* spec.

**Material.** 1 ♀, 8 miles camp, 2500 m a.s.l., 6–8.x.2002, LF, leg. W. Mey, (pinned).

**Remarks.** The individual insect is notably larger than the two preceding species and represents a third species that occurs sympatrically with *A. natmataungensis* sp. nov.

#### *Triaenodes mindatensis* sp. nov.

<http://zoobank.org/B44F43BD-99A0-442F-939B-4F39AD141CFD>

Fig. 9H–L

**Type material.** *Holotype* ♂ (pinned), Myanmar, Chin, Chin Hills, Natma Taung National Park, 2 miles south of Mindat, 1280 m a.s.l., 12.x.2002, at light, leg. W. Mey, genitalia slide Mey 52/20 (MfN).

**Etymology.** The specific epithet refers to the name of the type locality near the township of Mindat.

**Diagnosis.** In the male genitalia, the new species is closely related to *T. trivulcio* Schmid, 1994, described from Manipur and *T. dusrus* Schmid, 1965, described from Yunnan, but differs by the trilobate form of the inferior appendages, which are pointed in *T. trivulcio* and deeply split in *T. dusrus*. The forewings of *T. mindatensis* sp. nov. are brown and bear some dark apical spots. Related species are also *T. pentheus* Malicky, 2005 and *T. menestheus* Malicky, 2005, which seem to be widely distributed in South-East Asia (Malicky 2005). The morphology of the inferior appendages is species specific and represents the main diagnostic feature in separating species in this genus.

**Description.** Length of forewing 8 mm. Head and thorax light brown, hairs of setal warts brown, maxillary palpi covered with long grey-brown hairs, labial palpi short, light brown; antennae yellow-brown, scape with longer hairs apically, flagellum smoothly haired, indistinctly flecked on articulations; legs yellow-brown, smooth, spurs 1.2.2; forewings densely clothed by brown hairs, some darker spots at apex extending into fringes, hindwings membranous, apical area with sparse hairs, fork 1 seemingly absent.

Male genitalia (Fig. 9H–L). Pleural regions of segment IX semi-sclerotised, ventral region projecting caudad, subquadrat in ventral view; pre-anal appendages large, foliaceous, two times longer than wide, somewhat triangular in dorsal view; segment X with long, median process, slightly curved and surpassing tip of segment X; inferior appendages terminating in three lobes, one

small middle lobe and larger ventral and dorsal lobes; recurved process of basal plate short, not extending beyond ventral lobes of inferior appendages. Phallic apparatus slender, evenly curved, parallel-sided, with pair of lateral ridges near middle, apical region bulbous, with small endothecal sclerites.

**Distribution.** Myanmar, Chin Hills.

**Biology.** Sub-mountainous species (1280 m a.s.l.) with flight period in autumn. Adults are attracted by light. The larvae of *Triaenodes* species are usually inhabitants of stagnant waters.

#### *Triaenodes* spec.

**Material.** 1 ♀, 2 km east of Kanpetlet, 1700 m a.s.l., 2.x.2002, LF, leg. W. Mey, (pinned); 1 ♀, Chin Hills, Natma Taung National Park, 15 km north of Mindat, 4.ii.2005, leg. S. Naumann (pinned).

#### *Poecilopsyche duhchamana* Schmid, 1968

Fig. 4K

**Material.** 1 ♂, 1 ♀, 8 miles camp, 2500 m a.s.l., 6–8.x.2002, LF, leg. W. Mey, genitalia slide Mey 30/20, photo 27/20, 28/20, (pinned).

#### *Poecilopsyche* spec.

**Material.** 1 ♀, 8 miles camp, 2500 m a.s.l., 6–8.x.2002, LF, leg. W. Mey, (pinned).

#### *Setodes nakir* Malicky & Mey, 2020

**Material (Holotype):** 1 ♂, Natma Taung National Park, path to Mt. Victoria, 2600 m a.s.l., 2.ii.2005, leg. S. Naumann.

#### *Setodes* spec.

**Material.** 1 ♀, 8 miles camp, 2500 m a.s.l., 6–8.x.2002, LF, leg. W. Mey, photo 32/20, (pinned).

#### *Oecetis maron* Malicky & P Chantaramongkol, 2005

**Material.** 1 ♂, Mindat, 1916 m a.s.l., Agricultural Research Station, 22.v.2012, leg. S. Naumann.

#### *Marilia tuyetmira* Oláh & Johanson, 2010

**Material.** 1 ♂, Chin Hills, Natma Taung National Park, 15 km north of Mindat, 4.ii.2005, leg. S. Naumann (pinned); 1 ♂, Mindat, 1453 m a.s.l., 21.v.2012, leg. S. Naumann.

## *Anisocentropus pandora* Malicky & Chantaramongkol, 1992

**Material.** 1 ♂, 8 miles camp, 2500 m a.s.l., 6–8.x.2002, LF, leg. W. Mey, cleared abdomen in glycerine vial (pinned); 3 ♂, 1 ♀, 8 miles camp, 2500 m a.s.l., 6–8.x.2002, LF, leg. W. Mey, (pinned); 4 ♂, 1 ♀, Matupi, 25 miles camp, 12.xi.2015, leg. S. Naumann (pinned); 1 ♂, 14 km W Mindat, 1910 m a.s.l., 10.xi.2015, leg. S. Naumann (pinned); 1 ♂, Mindat, 1916 m a.s.l., 12.v.2012, leg. S. Naumann (pinned); 1 ♂, Mindat – Matupi Road, 1910 m a.s.l., 20.v.2012, leg. S. Naumann (pinned).

## Biogeography

The first information on caddisflies of the Chin Hills and from its National Park was provided by Wityi et al. (2015). They recorded a total of 25 species, 13 of which are found again in this study. Together with the 106 species communicated here, a total of 119 species is now known from the Chin Hills. The number of existing species is certainly much higher. The fieldwork concentrated on the higher elevations and habitats at lower elevations were sampled only sporadically. The resulting family spectrum is therefore that of a mountain fauna, that lacks a number of groups or contains only a few species from speciose families (e.g. Psychomyiidae, Leptoceridae). The Hydroptilidae are completely absent, which appears to be an artifact based on sampling methodology rather than reflecting reality.

From a biogeographical point of view, the fauna of the Chin Hills should resemble the fauna of the Indian Subregion (Franz and Beier 1970), especially the fauna of their north-eastern part, known in the past as Assam, the former Province of British India. The Chin Hills range has a north-south orientation and is connected via the Naga Hills in the north to Assam, a topography that facilitates the formation and presence of a common mountain fauna. Further to the north, the mountain ranges are connected with the Eastern Himalayas, which open a dispersal route of Himalayan or Palaearctic elements to the south. However, this route is also open for the entire montane fauna which is dispersed over numerous mountain ranges, stretching in the west from eastern Tibet, northern Myanmar, Yunnan, Sichuan to Guangxi, northern Thailand and to northern Vietnam in the east. The species present in this transition zone between the Palaearctic and Oriental faunal regions are sometimes difficult to designate as being of Oriental or Palaearctic origin. The distribution ranges of individual species are poorly known in this zone and only a few records are usually available from distant localities. In Table 1, the 106 identified species are listed in systematic order together with indications of their occurrences in three defined longitudinal transects in a west-east gradient. Table 2 gives a summary of the distribution of all species, highlighting the number of species restricted to each section and provides species

numbers according to the four suborders in each of the transects. Annulipalpia, Plenitentoria and Brevitentoria are considered as valid suborders, while Spicipalpia is a paraphyletic group encompassing the basal lineages and families of Plenitentoria+Brevitentoria (Thomas et al. 2020). Though not valid in a systematic sense, the taxon has practical value in comparisons of results in faunistic, biogeographic and ecological studies and is used here.

The Trichoptera fauna of the Chin Hills is nearly equally divided into a group of species with a wide distribution in south-east Asia (eastern transect) and into a group whose members are inhabitants of mountain ranges in north-east India and further west (western and central transects). The equal portions of both groups in the composition of the fauna (Table 2) are an argument for considering the Chin Hills as a range situated in the transition zone between “western” and “eastern” faunal elements in the Oriental Region. The width and longitudinal extension of this zone is currently unknown, but should follow the mountain topography including parts of Eastern Bangladesh, eastern India and Western Myanmar. The Chin Hills are situated on the western border of the Ayeyawaddy River watershed. It is a task of future studies to find out whether the transition zone includes the entire watershed or remains restricted to mountain ranges on its western and northern margins.

There are only a few distributional ranges, which are connecting the Chin Hills in the north with Xizang (e.g. *Hydropsyche ditalon*) or Yunnan and Sichuan (e.g. *Rhyacophila assimilis*, *Himalopsyche navasi*, *Stenopsyche cazul*, *Hydromanicus umbonatus*, *Aplatyphylax pumilus* sp. nov.). The species of these distributional types are considered as palearctic elements, whose occurrence in the Chin Hills is further strengthening the character of the fauna as being a mixture of species of different origins.

The mountain fauna of the Chin Hills is dominated by species of Annulipalpia. About 2/3 of the species have wide ranges. The Spicipalpia with species of *Rhyacophila* spp., *Glossosoma* spp. and *Apsilochorema* spp. and the Plenitentoria with species of *Lepidostoma* spp. have most of their ranges lying in the western transect. A number of these species are certainly endemics with ranges centred in the north-east of India.

## Discussion

The discovery of 19 hitherto unknown species is an interesting result. Twelve species were described by Malicky and Mey (2020) as a first part and, in this article, we provide species descriptions of seven further species as a second part. The Chin Hills are a somewhat isolated mountain range and the occurrence of endemic species and their detection was and, is, of high probability. Some of the described species are perhaps true endemics, while others may occur with further populations north or south of the Chin Hills. Further collecting in Myanmar is necessary to determine the biogeographic status of the new taxa.



**Table 1.** Distribution of resident species from the Chin Hills and their occurrences in adjacent countries plotted to longitudinal sections (85°–95°E: A = Assam, B = Bhutan, H = Himalayas; I = India, N = Nepal, Ti = Tibet; 95°–98°E: M = Myanmar, S = Sichuan, Y = Yunnan; 98°–108°E: C = Cambodia, L = Laos, Ma = Malaysia, T = Thailand, V = Vietnam). Presumed localities of near relatives of the new species are indicated by an asterisk (\*). Species marked with **bold** are 12 additional records retrieved from Wityi et al. (2015).

Species/taxon	West-east longitudinal gradient		
	85°–95°	95°–98°	98°–108°
<i>Rhyacophila assimilis</i> Kimmins, 1953	A	M	
<i>Rhyacophila aureomaculata</i> Schmid, 1970	A		
<i>Rhyacophila bifida</i> Kimmins, 1953	Ti	M, Y	T
<i>Rhyacophila chenmo</i> Schmid, 1970	A		
<i>Rhyacophila curvata</i> Morton, 1900	A, I	Y	T, Y
<i>Rhyacophila manipuri</i> Schmid, 1970	A		
<i>Rhyacophila marae</i> Malicky & Mey, 2020	*		
<i>Rhyacophila parva</i> Kimmins, 1953	A		
<i>Rhyacophila scissa</i> Morton, 1900	A, H		T
<i>Rhyacophila scissoides</i> Kimmins, 1953	A, H, N	M, Y	T
<i>Rhyacophila scotina</i> Kimmins, 1953	A		
<i>Rhyacophila</i> spec. A			
<b><i>Himalopsyche lanceolata</i> (Morton, 1900)</b>	<b>A</b>		
<i>Himalopsyche navasi</i> Banks, 1940		S	V
<i>Apsilochorema annandalei</i> Martynov, 1935	I, N		
<i>Apsilochorema tanum</i> Schmid, 1970	I		
<i>Apsilochorema uchchunam</i> Schmid, 1970	I, N	M	T, V
<i>Glossosoma atestas</i> Malicky & Chantaramongkol, 1992	I, N	S, Y	V
<i>Glossosoma dentatum</i> McLachlan, 1875	I, N		
<i>Glossosoma hamael</i> Malicky & Mey, 2020	*	*	
<i>Glossosoma hemantajam</i> Schmid, 1971	I		
<i>Glossosoma malayanum</i> Banks, 1934	B		Ma, T, V
<i>Glossosoma vehuel</i> Malicky & Mey, 2020	*	*	
<i>Chimarra aberrans</i> Martynov, 1935	I, N		
<i>Chimarra argax</i> Malicky, 1989			C, Ma, T
<i>Chimarra areli</i> Malicky & Mey, 2008			C
<b><i>Chimarra ariadne</i> Malicky, 1997</b>		<b>Nikobar</b>	
<i>Chimarra crepidata</i> Kimmins, 1957	A		
<i>Chimarra devva</i> Malicky & Chantaramongkol, 1993			T, V
<i>Chimarra naheson</i> Malicky & Chantaramongkol, 1993			T, V
<i>Chimarra okuthorum</i> Mey, 1998	N		T, V
<i>Chimarra otiel</i> Malicky & Mey, 2020	*	*	*
<i>Chimarra scopulifera</i> Kimmins, 1955	N		T, V
<i>Wormaldia relicta</i> (Martynov, 1935)	B, N	M	T, V
<i>Wormaldia serrata</i> (Kimmins, 1955)		M	T
<i>Wormaldia simulans</i> Kimmins, 1955		M	
<i>Wormaldia thenapien</i> Schmid, 1991	I		
<i>Wormaldia timoleon</i> Schmid, 1991	I		
<i>Kisaura alsuel</i> Malicky, 2012	A		
<i>Kisaura longispina</i> (Kimmins, 1955)		M	T, V
<i>Kisaura moselyi</i> (Kimmins, 1955)		M	
<i>Kisaura sura</i> Malicky & Chantaramongkol, 1993			T, V
<i>Dolophilodes elongata</i> Kimmins, 1955		M	
<i>Dolophilodes flaviventris</i> Kimmins, 1955	B, N	M	
<i>Dolophilodes torrentis</i> Kimmins, 1955	B, N	M	T, V
<i>Stenopsyche benaventi</i> Navás, 1934	I	M	T
<i>Stenopsyche brevata</i> Tian & Zheng, 1989		M, Y	T
<i>Stenopsyche cazul</i> Malicky & Mey, 2020	*	*	
<i>Stenopsyche himalayana</i> Martynov, 1926	H, I	S, Y	T, V
<b><i>Stenopsyche khasia</i> Kimmins, 1958</b>	<b>A</b>		
<i>Stenopsyche similis</i> Ulmer, 1927	I, N	M	
<i>Lype atria</i> Malicky & Chantaramongkol, 1993			Ma, T, V
<b><i>Psychomyia nimmoi</i> Schmid, 1997</b>	<b>I</b>		
<i>Plectrocnemia forcipata</i> Schmid, 1965		Y	V
<i>Polyplectropus anakempat</i> Malicky, 1995	N		
<i>Polyplectropus phrixos</i> Malicky & Changrhomg, 2007			T
<i>Polyplectropus musiriell</i> Malicky & Mey, 2020	*		
<i>Polyplectropus sabaell</i> Malicky & Mey, 2020			*
<i>Arctopsyche subflava</i> sp. nov.	*		
<i>Arctopsyche tricornis</i> Schmid, 1968	A	M	

Species/taxon	West-east longitudinal gradient		
	85°–95°	95°–98°	98°–108°
<b><i>Pseudoleptonema quinquefasciatum</i> (Martynov, 1935)</b>	I, N	Y	L, T, V
<i>Diplectrona aumel</i> Malicky & Mey, 2020			*
<i>Diplectrona aurovittata</i> Ulmer, 1906	A, N	S	Ma, T
<i>Diplectrona burba</i> Schmid, 1961	I, N		T, V
<i>Diplectrona harpyia</i> Malicky & Chantaramongkol, 1992			T
<i>Diplectrona hermione</i> Malicky & Chantaramongkol, 1992			T, Ma
<i>Diplectrona flavospilota</i> Mey, 1998			V
<i>Diplectrona sanguana</i> Kimmins, 1964	N		
<i>Cheumatopsyche charites</i> Malicky & Chantaramongkol, 1997			T, V
<i>Cheumatopsyche chryseis</i> Malicky & Chantaramongkol, 1997			T
<b><i>Cheumatopsyche cressida</i> Malicky, 1979</b>	<b>N</b>		<b>T</b>
<b><i>Cheumatopsyche dhanikari</i> Malicky, 1979</b>		<b>Andamanes</b>	<b>T, V</b>
<i>Cheumatopsyche janosolabi</i> sp. nov.			*
<i>Cheumatopsyche naumanni</i> Malicky, 1986	I, N		T
<i>Potamyia flavata</i> (Banks, 1934)	Ti		Ma, T, V
<i>Hydromanicus abdominalis</i> sp. nov.			*
<i>Hydromanicus abmansor</i> Malicky, 1993		M	T
<b><i>Hydromanicus inferior</i> Chantaramongkol &amp; Malicky, 1995</b>	<b>N</b>	<b>M</b>	<b>T</b>
<i>Hydromanicus luctuosus</i> Ulmer, 1905	A, N	Y	T, V
<i>Hydromanicus remiel</i> Malicky & Mey, 2020		*	*
<i>Hydromanicus seth</i> Malicky, 1993			M
<i>Hydromanicus umbonatus</i> Li, 1993			S, Y
<b><i>Hydromanicus aiakos</i> Malicky, 1997</b>		<b>B</b>	<b>M</b>
<i>Hydropsyche appendicularis</i> Martynov, 1931	A, N	S	L, T
<i>Hydropsyche atlas</i> Malicky & Chantaramongkol, 2000	I, N		
<i>Hydropsyche athamas</i> Malicky & Chantaramongkol, 2000	I		
<i>Hydropsyche briareus</i> Malicky & Chantaramongkol, 2000			T
<b><i>Hydropsyche bootes</i> Malicky &amp; Chantaramongkol, 2000</b>			<b>T</b>
<i>Hydropsyche ditalon</i> Tian & Li, 1988	I, Ti	Y	
<i>Hydropsyche khasigiri</i> Oláh & Barnard, 2008	A		
<i>Hydropsyche hackeri</i> Mey, 1998	I	S, Y	
<i>Hydropsyche pallipenne</i> Banks, 1938	I, N	M	Ma, T
<i>Hydropsyche rakshakaha</i> Oláh, 1994	I, N		
<i>Hydropsyche tabulifera</i> Schmid, 1963	I, N		
<i>Hydropsyche uvana</i> Mey, 1995	I	M	T, V
<i>Eubasilissa macclachlani</i> White, 1862	N	Y, S	T, V
<i>Micrasema turbo</i> Malicky & Chantaramongkol, 1992			T
<i>Micrasema</i> spec.			
<b><i>Goera vaichravana</i> Schmid, 1991</b>	<b>A</b>		
<i>Goera</i> spec.			
<i>Lepidostoma armatum</i> (Ulmer, 1905)	I		
<i>Lepidostoma assamense</i> (Mosely, 1949)	A		
<i>Lepidostoma brueckmanni</i> Malicky & Chantaramongkol, 1994	I	Y	L, T
<i>Lepidostoma hardiel</i> Malicky & Mey, 2020	A		
<i>Lepidostoma moulmuna</i> Mosely, 1949	N	M	T
<i>Lepidostoma serratum</i> (Mosely, 1949)	I		
<i>Lepidostoma subpanaitos</i> sp. nov.	*		*
<i>Lepidostoma yehuiab</i> Malicky & Mey, 2020	A		
<i>Lepidostoma ylesami</i> Weaver, 2002	I, N		
<i>Paraphlegopterix aykroydi</i> Weaver, 1999	I		
<i>Moropsyche chandrabuchita</i> Schmid, 1968	A		
<i>Moropsyche vauliab</i> Malicky & Mey, 2020	*		
<i>Aplatyphylax pumilus</i> sp. nov.		*	
<i>Adicella medaia</i> Malicky & Chantaramongkol, 1992			T
<i>Adicella natmataungensis</i> sp. nov.	*		
<i>Adicella</i> spec.			
<i>Trienodes mindatensis</i> sp. nov.	*	*	
<i>Trienodes</i> spec.			
<i>Poecilopsyche dubchasana</i> Schmid, 1968	A		
<i>Poecilopsyche</i> spec.			
<i>Setodes nakir</i> Malicky & Mey, 2020	*		
<i>Setodes</i> spec.			
<b><i>Oecetis scutulata</i> Martynov, 1936</b>	<b>I, N</b>		<b>T</b>
<i>Oecetis maron</i> Malicky & Chantaramongkol, 2005			M, T
<b><i>Marilia mogtiana</i> Malicky, 1989</b>			<b>L, T</b>
<i>Marilia tuyetmina</i> Oláh & Johanson, 2010			L
<i>Anisocentropus pandora</i> Malicky & Chantaramongkol, 1992			T
	81	45	62

**Table 2.** Number of species in the three latitudinal sections of table 1, and their distribution according to suborders. 7 species were only identified to genus level in Spicipalpia (1), Plenitentoria (2) and Brevitentoria (4). Species with an asterix (\*) may occur in more than one column.

	All species	Annulipalpia	Spicipalpia	Plenitentoria	Brevitentoria
Ranges restricted to the western segment:	42	15	11	11	4
Ranges restricted to the western and median segment:	18	11	3	1	2
Ranges extending over all segments:	60	41	8	5	6
<b>total</b>	<b>118</b>	<b>65</b>	<b>22 (+ 1)</b>	<b>17 (+ 2)</b>	<b>10 (+ 4)</b>

The Trichoptera of Myanmar were summarised in a first, annotated check-list by Wity et al. (2015) providing data for a total of 227 species. The investigations of the present authors yielded another 77 species, previously unrecorded from the country or herein established as new taxa. This brings the number of species records from Myanmar to 304. However, this number will certainly increase with future collection efforts, such as the initiative of P. Laudee from Thailand. After Kambaiti in the Kachin State, the NTNP in the Chin State represents now the second location of a more thorough inventory of Trichoptera in Myanmar. It will hopefully be followed by further studies in coming years, a demanding task with regard to the shrinking areas of natural habitats in Myanmar and elsewhere in south-east Asia.

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