

THREE NEW SPECIES OF *RHYACOPHILA*
(TRICHOPTERA, RHYACOPHILIDAE) FROM ASIA

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Three new species of the genus *Rhyacophila* (Trichoptera, Rhyacophilidae) are described and illustrated: *Rhyacophila farkasi* sp. n., in the *Rhyacophila bifida* group from Thailand, *Rhyacophila siposi* sp. n. in the *Rhyacophila naviculata* group from Nepal, and *Rhyacophila szaboi* sp. n. in the *Rhyacophila obscura* group also from Nepal.

Key words: Trichoptera, *Rhyacophila*, new species, *bifida* group, *naviculata* group, *obscura* group, Thailand, Nepal

INTRODUCTION

The number of Trichoptera species in 2009 was estimated to be about 13,574 (MORSE 2011). Rhyacophilidae are represented by 753 species (6% of species) and are distributed in the East Palearctic, West Palearctic, Nearctic, and Oriental biogeographic regions. The Trichoptera of Thailand and Nepal inhabit the Oriental biogeographic region (MORSE 1997a, b, 2011).

The Trichoptera of Thailand have been intensely investigated since the late 1980s by MALICKY (1987, 1991, 1997, 1999, 2009, 2010), MALICKY and CHANTARAMONGKOL (1989, 1995, 1999), MALICKY and TAENG-ON (2006), CHANTARAMONGKOL and MALICKY (1997), CHANTARAMONGKOL *et al.* (1999), MELNITSKY and MALICKY (2008), and PONGSAK and TAENG-ON (2011). MALICKY (2010) published an atlas of the Trichoptera in South Asia, which also contained distributional data. 1029 Trichoptera species are listed from Thailand, including 36 *Rhyacophila* species. BUNLUE *et al.* (2012) reported 9 *Rhyacophila* species from Doi Inthanon National Park.

Data on the distribution of *Rhyacophila* species in Nepal were published by KIMMINS (1952, 1964), MALICKY (1997, 2004), MEY (1999), and MELNITSKY (2005). KISS and MALICKY (2003) reported 13 *Rhyacophila* species from Nepal. MALICKY (2006) subsequently published a preliminary list of 302 caddisfly species from Nepal, which included 26 *Rhyacophila* species. KISS (2011a, b) described four additional new *Rhyacophila* species from Nepal, increasing the number of *Rhyacophila* species to 30.

COLLECTION LOCALITES OF THE NEW SPECIES

In 1954, the forests around Doi Inthanon were preserved, creating Doi Inthanon National Park, situated south-west of the city of Chiang Mai, Mae Chem District, Chiang Mai Province, Northern Thailand, 18°35'N 98°28'E. It covers 482.40 km² and spreads from the lowlands below 800 m in elevation up to the peak in 2572 m (Fig. 10). The park comprises a relatively isolated mountain massif that constitutes part of a pre-Permian ridge of schist and gneiss that forms the western boundary of the Mae Ping Valley. Lower elevations in the most easterly part of the park are limestone formations and contain a number of caves. The eastern slopes are covered by relatively untouched native forests of several types: the foothills are covered by deciduous dipterocarp forest, dominated by *Shorea obtusa*, *Siamensis* spp., and *Dipterocarpus obtusifolius*, while the higher elevations are covered by mixed evergreen forest consisting of many tree species in which Fagaceae, e.g. *Quercus* spp., *Lithocarpus* spp., and *Castanopsis* spp. dominate (KÜCHLER & SAWYER 1968, SAWYER & CHERMSIRIVATHANA 1969). The area is the source of several rivers such as the Kae Klang, Mae Pakong, Mae Pon, Mae Hoi, Mae Ya, Mae Chaem, and Mae Khan Rivers. It is also part of the source of the Ping River, which runs directly through Chiang Mai. At altitudes above 1000 m, rainfall exceeds 2500 mm (GRAY *et al.* 1994).

The imagines of *Rhyacophila farkasi* sp. n. were caught by light trapping at the altitude of 2300 m in the Doi Inthanon National Park, Thailand. The new species is similar to *R. trashipa* SCHMID, 1970 in the *R. bifida* group (branch *R. naviculata* SCHMID 1970), which SCHMID (1970) reported from Manipour, north-eastern India.

Nepal is a small, landlocked Himalayan country, 800 km long and 150 to 250 km wide. It covers the area of 147,181 km². It is situated between China in the north and India in the south (Fig. 30). The climate varies from cool summers and severe winters in north to subtropical summers and mild winters in south. Most of the rivers flow southward from the glaciers of Nepal to join the Ganges, several rivers flow from Tibet through deep gorges in the main Himalayan range. The native forests of the mountain region change from East to West as precipitation, which is between 2500 mm and 1000 mm annually, decreases. Between 1000 and 2000 m the Himalayan subtropical pine forests are found. From 3000 to 4000 m are the Eastern and Western Himalayan sub-alpine conifer forests, including *Picea* spp., *Abies* spp., *Tsuga* spp., and *Larix* sp. (Internet: <http://en.wikipedia.org/wiki/Nepal/Geography>, 2011.12.12.).

The specimens of *Rhyacophila siposi* sp. n. and *R. szaboi* sp. n. were caught by light trapping between the altitudes of 1850 and 3160 m in Mt. Kalinchok, Nepal. *Rhyacophila siposi* sp. n. is similar to *R. ngorpa* Schmid, 1970 in the *R.*

naviculata group (branch *R. naviculata* Schmid 1970), which SCHMID (1970) reported from Sikkim, India and Nepal.

Rhyacophila szabo sp. n. is similar to *R. obscura* Martynov, 1927 in the *R. obscura* group (branch *R. philopotamoides* Schmid, 1970) that was described from Uzbekistan by MARTYNOV (1927). It was subsequently also reported from Sikkim, the Karakorum, Tien Shan, Hindu Kush, and Elbruz by SCHMID (1970).

MATERIAL AND METHODS

The specimens are stored in 75% ethanol. The posterior half of the abdomen of the holotype male and paratype female imagines was cleared in 20% lactic acid. Then the genitalia of the holotype and paratype female were everted BLAHNIK and HOLZENTHAL (2004) and placed in ethanol for examination under a stereomicroscope (Nikon, SMZ-10-2x) and sketched. For the identification of species the works by HUISMAN and ARMITAGE (2011), MALICKY (2010), MARTYNOV (1935), MEY (1995, 1998, 1999), SCHMID (1970), and SUN and YANG (1995) were used. The terminology follows that of ROSS (1956), SCHMID (1970), NIELSEN (1980), and OLÁH and JOHANSON (2008).

The holotype and a paratype female of the new species are deposited in the Mátra Museum (H-3200 Gyöngyös, Kossuth L. u. 40, Hungary). The rest of the paratypes are kept in the collection of OTTÓ KISS at Hort, Hungary.

DESCRIPTION OF THE NEW SPECIES

***Rhyacophila farkasi* sp. n.**

(Figs 1–4, 7–9)

Male: Body length 9.0 mm, forewing length 12.0 mm, forewing width 3.8 mm, forewing and hindwing with sporadically arranged circular pale spots, length of each antenna 17.0 mm. Body, antennae, palpi, and wings yellowish brown, abdomen brown with black spots, legs and genitalia yellowish brown (Figs 8–9).

Male genitalia (Figs 1–4): Apicodorsal lobe of segment IX (a.l.IX, Figs 1–2, 9) longer than phallicata, with slender proximal half, stout distal half and obtuse apex in lateral view, furcate and V-shaped in dorsal view (Figs 1–2). Segment X (X., Fig. 1) triangular with ventral spine in lateral view. Anal sclerites (a.s., Fig. 1) form bulges in lateral view, apical band (a.b., Fig. 1) U-shaped and narrow in lateral view. Endotheca (end., Figs 1, 3–4) with funnel-like proximal end in lateral and ventral views, phallicata (ph., Figs 1, 3–4) long tube, tapering distally in lateral and ventral views. Dorsal appendage (d.app., Fig. 1) of phallic apparatus concave with nearly parallel margins in lateral view. Lateral lobes of apical band (l.l.a.b., Figs 1, 3–4) furcate and bent upward distally with short spike in lateral and ventral views. Parameres (par., Figs 1, 3–4) elongate tapering spikes curved distally, half as long as phallicata or lateral lobe of apical band in lateral and ventral views. First segment of each inferior appendage (f.s., Fig. 1) short (or moderate in length), uniformly broad, shorter than apicodorsal lobe of segment IX (a.l.IX., Fig. 1), second joint (s.j., Fig. 1) of paired inferior appendages directed ventrocaudad with smooth ventral margin, minute spines on dorsal margin, and with obtuse apex.

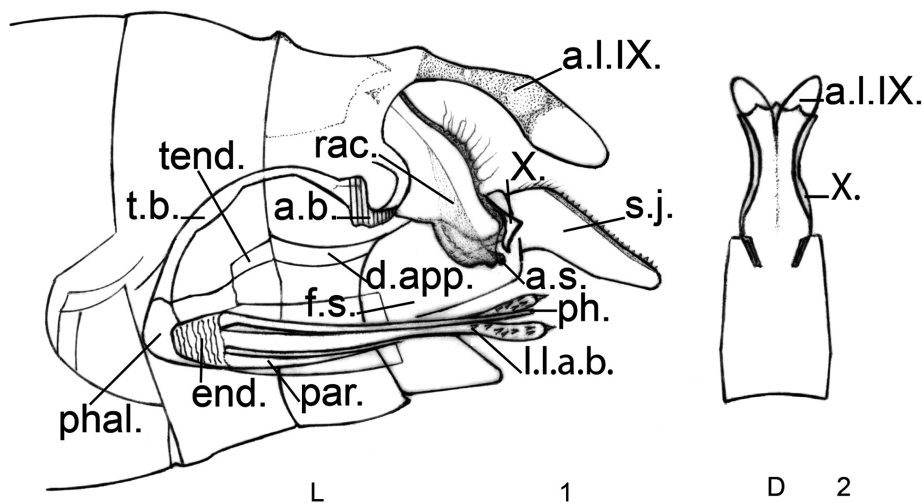
Female: Body length 10.0 mm, forewing length 12.0 mm, wings scattered with circular pale spots, length of each antenna 17.0 mm. Body, antennae, palpi, legs, and wings yellowish brown, abdomen brown with black spots.

Female genitalia (Fig. 7): Simple, of medium length. Segments VIII and IX with setose tergum and sternum. Segment IX roughly trapezoidal in lateral view. Segment XI with dorsal apodemes extending anteriorly into segment VII. Segment X with basal apodemes also extending anteriorly into segment VII. Basal apodemes with short subapicodorsal point. Segment XI with pair of terminal papillae and pair of cerci.

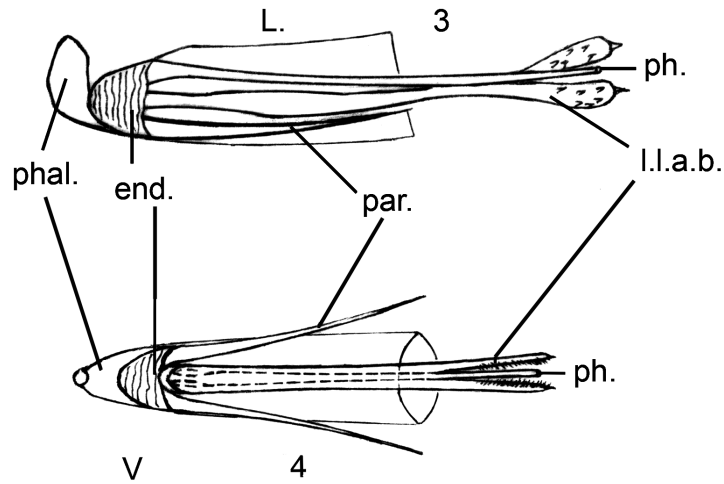
Material – Holotype: male, Northern Thailand, Doi Inthanon National Park, 18°35'N 98°28'E, 2300 m elevation, by light trapping, 03–04 August, 1999, leg. Tibor Csővári and László Mikus (gen. prep. No. 115, Ottó Kiss, coll. Mátra Museum, Gyöngyös, Hungary).

Paratype: 1 female, Northern Thailand, Doi Inthanon National Park, 18°35'N 98°28'E, 2300 m elevation, by light trapping, 03–04 August, 1999, leg. Tibor Csővári and László Mikus (gen. prep. No. 116, Ottó Kiss, coll. Mátra Museum, Gyöngyös, Hungary).

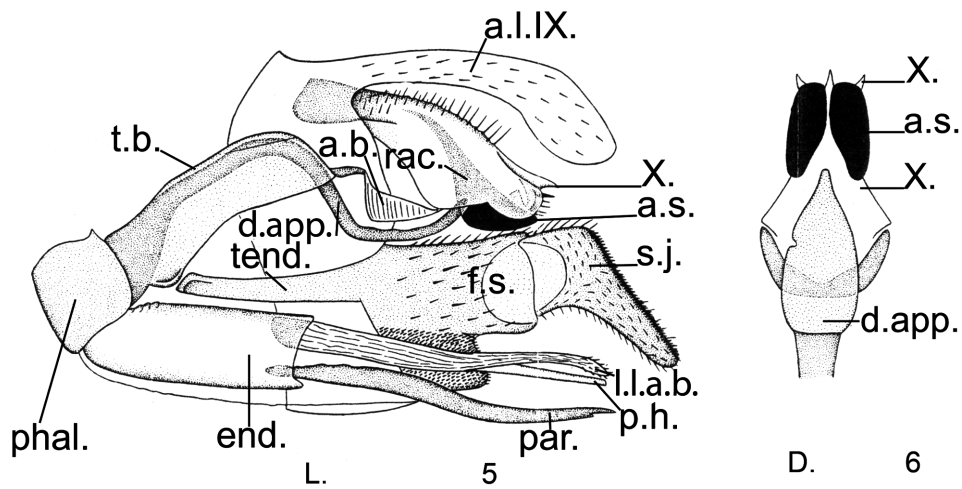
Diagnosis: This new species resembles *Rhyacophila trashipa* Schmid, 1970 (1970, p. 132, pl. XLIII, figs 3–4; herein Figs 5–6) and *Rhyacophila voccia* Malicky et Chantaramongkol, 1993 (2010, p. 4), in the *R. bifida* group that comprises 7 species (approximately 0.9% of the size of Rhyacophilidae) recorded from Asia by SCHMID (5 species 1970), ROSS (one species, 1956), and MALICKY and CHANTARAMONGKOL (one species, 1993).



Figs 1–2. *Rhyacophila farkasi* sp. n. male genitalia: 1 = left lateral view; 2 = apicodorsal lobe of segment IX and segment X, dorsal view. (Abbreviations: a.b. = apical band; a.l.IX. = apico-dorsal lobe of segment IX; a.s. = anal sclerite; end. = endotheca; d.app. = dorsal appendage; D = dorsal view; f.s. = first segment of paired inferior appendages; l.l.a.b. = lateral lobe of apical band; L = lateral view; par. = paired parameres; ph. = phallicata; phal. = phallosome; s.j. = second joint of paired inferior appendages; t.b. = tergal band; tend. = tendon of an inferior appendage, first segment; X. = segment X).



Figs 3–4. *Rhyacophila farkasi* sp. n. male genitalia: 3–4 = phallic apparatus, left lateral view and ventral view. (Abbreviations: end. = endotheca; l.l.a.b. = lateral lobe of apical band; ph. = phallicata; phal. = phallicata; par. = paired parameres; L = lateral view; V = ventral view).



Figs 5–6. *Rhyacophila trashipa* SCHMID, 1970, male genitalia (drawings by SCHMID 1970): 5 = left lateral view; 6 = male genitalia, dorsal view. (Abbreviations: a.b. (U) = apical band; a.l.IX. (a.l.IX.) = apicodorsal lobe of segment IX; a.s. = anal sclerite; D = dorsal view; d.app. (app.d.) = dorsal appendage; f.s. = first segment of paired inferior appendages; L = lateral view; l.l.a.b. (l.l.) = lateral lobe of apical band; par. = paired parameres; ph. = phallicata (aed. = „aedéage“ of Schmid 1970); phal. = phallicata; t.b. (bt) = tergal band; tend. = tendon of an inferior appendage, first segment, X. = segment X).

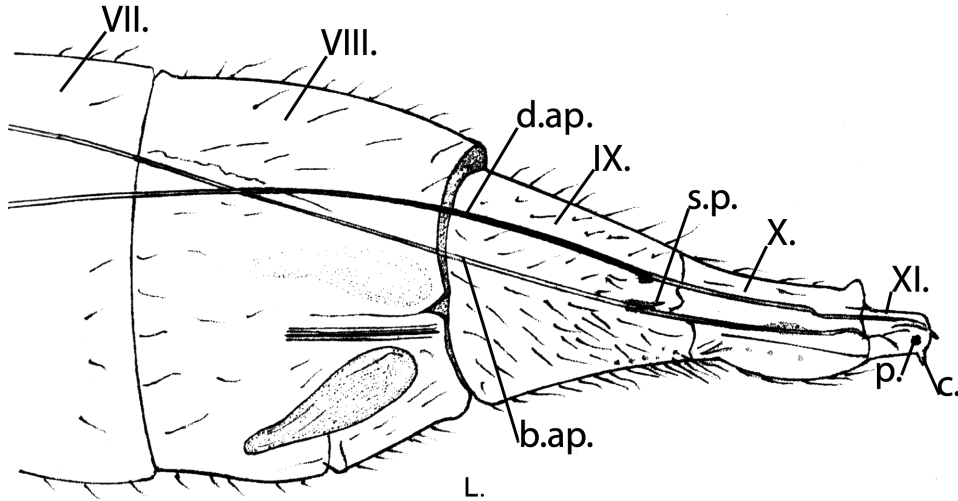
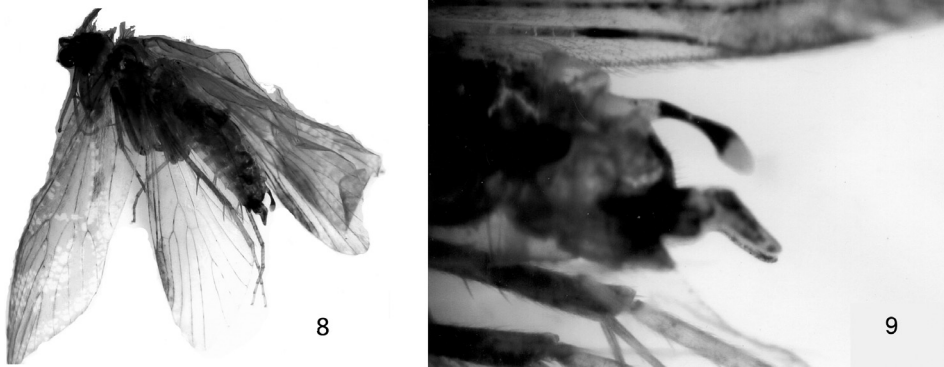


Fig. 7. *Rhyacophila farkasi* sp. n. allotype female genitalia, left lateral view. (Abbreviations: (b.ap. = basal apodemes; c = paired female cerci; d. ap. = dorsal apodemes; L. = lateral view; p. = papillae; s.p. = subapicodorsal point; VII., VIII., IX., X., XI. = segments VII, VIII, IX, X, XI).

The outstanding similarities among the species in this group are the form of apicodorsal lobes of segment IX and that of the second joint of inferior appendages.

The most useful characters to recognize the new species are: second joint of paired inferior appendages, apicodorsal lobe of segment IX, lateral lobe of apical band, parameres and anal sclerites.



Figs 8–9. *Rhyacophila farkasi* sp. n. holotype, male, left lateral view: 8 = habitus, 9 = genitalia, left lateral view.

The characters that indicate the close relationship of *R. farkasi* sp. n. to *R. trashipa* are:

- phallicata of similar shape;
- first segments of paired inferior appendages of same length;
- tergal band of resembling form.

The distinguishing characters of *R. farkasi* sp. n. in comparison to *R. trashipa* are:

- apicodorsal lobe of segment IX longer than phallicata (not as long as phallicata),
- proximal half slender (not broad);
- segment X triangular with ventral spine (not lateral spine);
- lateral lobe of apical band bent upward, distal end furcate with spike (not single ended, bent downward and without spike);
- parameres half of the length of phallicata and curved upward (not as long as phallicata and not undulating);
- anal sclerite forms tiny bulge (not nearly ellipse).

The characters that indicate the relationship of the new species to *R. vocicia* MALICKY et CHANTARAMONGKOL, 1993 are:

- second joint of paired inferior appendages of similar form;
- phallicata of resembling shape.

The distinguishing characters of the new species in comparison to *R. vocicia* MALICKY et CHANTARAMONGKOL, 1993 are:

- apicodorsal lobe of segment IX longer than phallicata (not much shorter than phallicata);
- parameres long and curved, directed caudad (not short, with pointed apex and not directed caudoventrad).

Derivatio nominis: This species is named in memory of my mother, Róza Farkas.

***Rhyacophila siposi* sp. n.**
(Figs 11–15, 19–20)

Male: Body length 13.0 mm, forewing length 14.2 mm, forewing width 5.5 mm, length of the antennae 9.0 mm. Body, antennae, palpi, and wings yellowish brown, abdomen brown, legs yellowish brown, genitalia brown (Figs 19–20).

Male genitalia (Figs. 11–15, 19–20): Apicodorsal lobe of segment IX (a.l.IX, Figs 11–12) elongated with downward bent pointed apex in lateral view and obtuse apex with two tiny teeth on either side in dorsal view. Segment X (X, Figs 11–12) subtrapezoidal with convex dorsal margin and slightly concave distal margin in lateral view. Anal sclerite (a.s., Figs 11,

14) subtriangular with slim-handled lobe. Apical band (a.b., Fig. 11) chalice-shaped in lateral view. Proximal part of phallicata (ph., Figs 11, 13) thick, thinner in middle, distal part gently curved downward. Phallicata shorter than first segment of the inferior appendages in lateral view. Paramere (par., Figs 11, 13) with three bigger teeth and one tiny tooth dorsally, apex pointed. First segment of the inferior appendages (f.s., Fig. 11) long and covered with long bristles. Dorsal lobe of the second joint of inferior appendages (s.j. Figs 11, 15) shorter than ventral one, semicircular excision between the dorsal and ventral lobes deep and broad with thick row of tiny teeth in lateral view.

Female: Unknown.

Material – Holotype: male, 3 km SW of Mt. Kalinchok peak, Central Nepal, 27°23'N 86°01'E, 2900 m, by light trapping, 30 June, 1997, leg. Márton Hreblay & Krisztina Csák (gen. prep. No. 117, Ottó Kiss, is deposited in the Mátra Museum, Gyöngyös, Hungary).

Paratype: 1 male, Mt. Kalinchok, Central Nepal, 5 km W of Bigu, 2300 m, 27°63'N 86°09'E, by light trapping, 03 July, 1997, leg. Márton Hreblay & Krisztina Csák, (coll. Ottó Kiss). 1 male, 6 km SW of Mt. Kalinchok peak, Central Nepal, 3160 m, 27°23'N 86°E, by light trapping, 04 May, 1996, leg. Chenga Sherpa (coll. Ottó Kiss). 1 male, Mt. Kalinchok, Central Nepal, 8 km E of Barabise, 1850 m, by light trapping 05 July, 1997, leg. Márton Hreblay & Krisztina Csák (coll. Ottó Kiss).

Diagnosis: This species is similar to *Rhyacophila ngorpa* Schmid, 1970 (1970, p. 133, pl. LIV, figs 16–18; herein Figs 16–18), of his *R. naviculata* group that includes 28 species (about 3.7% of Rhyacophilidae) described from Asia by SCHMID (20 species, 1970), MALICKY (2 species, 1978), SUN and YANG (3 species, 1975), and Kiss (3 species, 2003, 2011).

The characters that place the new species in the *R. naviculata* group are the second joint of paired inferior appendages, segment X, anal sclerites, apical band, tergal band, phallicata, parameres, and the dorsal appendage.

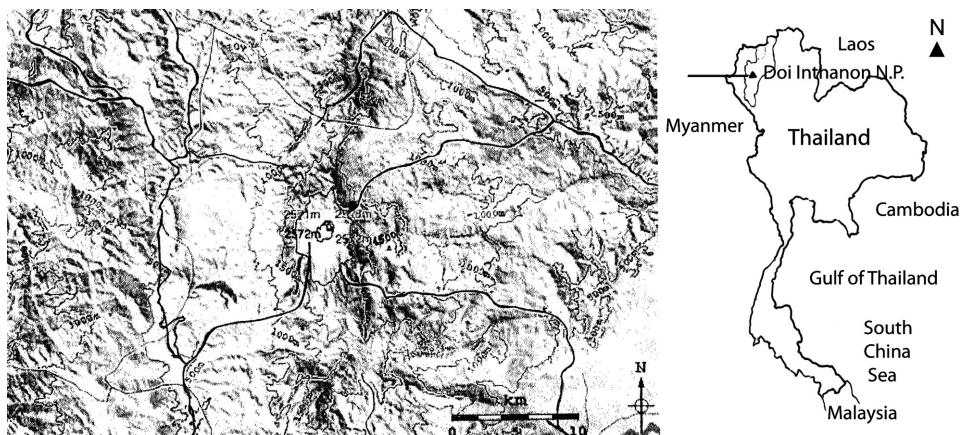


Fig. 10. Thailand, Doi Inthanon National Park.

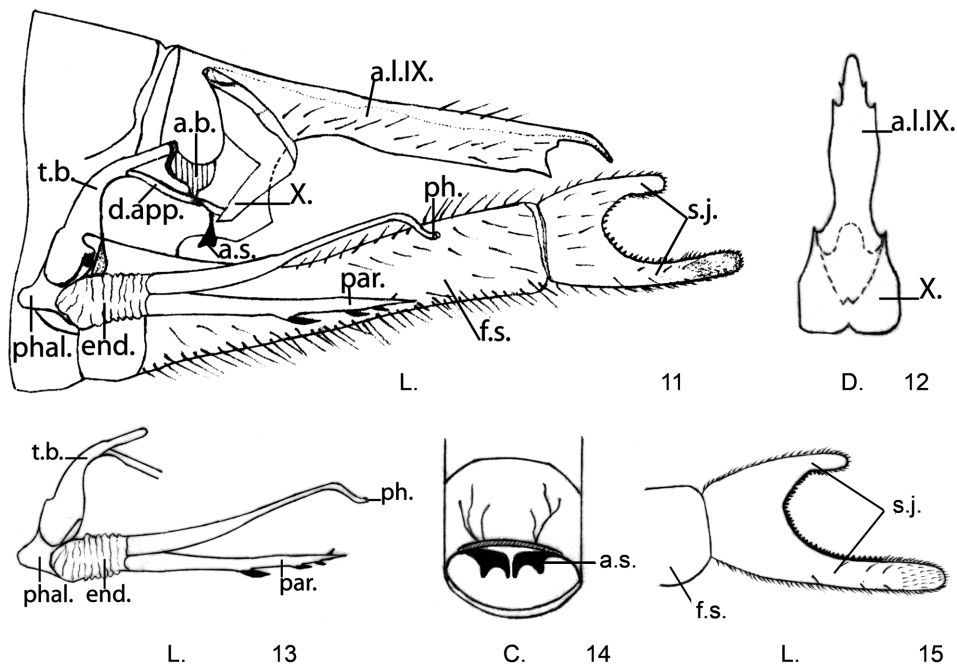
The most useful characters in helping to recognize the new species are the second joint of paired inferior appendages, apicodorsal lobe of segment IX, anal sclerites, apical band, phallicata, and parameres.

The characters that indicate the relationship of *R. siposi* sp. n. to *R. ngorpa* are:

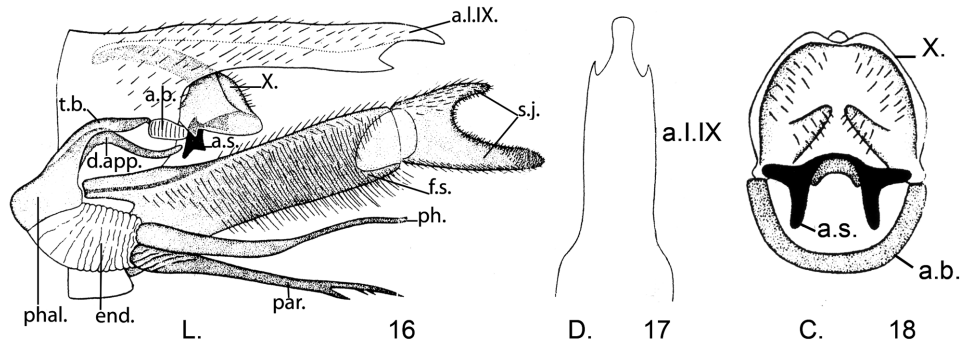
- segment X,
- dorsal appendage,
- and tergal band.

The distinguishing characters of *R. siposi* sp. n. in comparison to *R. ngorpa* are:

- semicircular excision of the second joint of inferior appendages deeper and broader, upper lobe with obtuse (not acute) distal end;



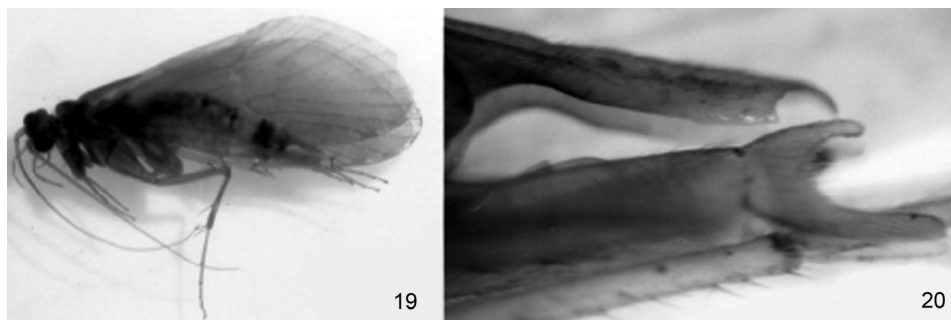
Figs 11–15. *Rhyacophila siposi* sp. n., male genitalia: 11 = left lateral view; 12 = apicodorsal lobe of segment IX, dorsal view; 13 = phallic apparatus, left lateral view; 14 = anal sclerite, caudal view; 15 = first segment of inferior appendages and second joint of inferior appendages, left lateral view. (Abbreviations: a.l.IX = apicodorsal lobe of segment IX; a.s. = anal sclerite; a.b. (U) = apical band; C = caudal view; D = dorsal view; d.app. = dorsal appendage; end. = endotheca; f.s. = first segment of paired inferior appendages; L = lateral view; par. = paired paramere; ph. = phallicata; phal. = phalotheca; s.j. = second joint of paired inferior appendages; t. b. (bt) = tergal band; X. = segment X).



Figs 16–18. *Rhyacophila ngorpa* SCHMID, 1970, male genitalia (drawings by Schmid 1970): 16 = left lateral view; 17 = apicodorsal lobe of segment IX, dorsal view; 18 = anal sclerite, apical band and segment X, caudal view. (Abbreviations: a.l.IX = apicodorsal lobe of segment IX; a.s. = anal sclerite; a.b. (U) = apical band; C = caudal view; D = dorsal view; d.app. = dorsal appendage; end. = endotheca; f.s. = first segment of paired inferior appendages; L = lateral view; par. = paired paramere; ph. = phallicata; phal. = phallosome; s.j. = second joint of paired inferior appendages; t. b. (bt) = tergal band; X. = segment X).

- apicodorsal lobe of segment IX with a tiny tooth on either side (not without tiny teeth);
- anal sclerite subtriangular with lobe (not quadrangular without lobe);
- apical band chalice-shaped (not horizontally ovate);
- distal part of phallicata slightly curved downward (not horizontal);
- phallicata shorter than first segment of inferior appendages (not as long as first segment of inferior appendages);
- paramere with 4 teeth (not with three ones).

Derivatio nominis: This species is named in memory of my grandmother, Ilona Sipos.



Figs 19–20. *Rhyacophila siposi* sp. n., holotype, male, left lateral view: 19 = habitus, left lateral view, 20 = genitalia, left lateral view.

***Rhyacophila szaboi* sp. n.**
(Figs 21–24, 28–29)

Male: Body length 7.0 mm, forewing length 8.5 mm, forewing width 3.5 mm, length of the antennae 6 mm. Body, antennae, palpi, and wings yellowish brown, abdomen black, genitalia and legs yellowish brown (Figs 28–29).

Male genitalia (Figs 21–24, 28–29): Segment X (X, Figs 21, 23–24) dorsally V-shaped, ending laterally in obtuse apex. Apical band (a.b., Figs 21, 24) hemispheric, anal sclerites (a.s., Figs 21, 24) form small paired warts. Phallicata (ph., Figs 21–22) tubular, proximally thick, distally slender. Proximal part of paramere (par., Figs 21–22) in sheath, distal part straight with long setae on dorsal margin and short setae on ventral margin. Ventral lobe (v.l., Figs 21–22) narrow, ribbon-like, longer than phallicata, ending in acute, upward apex. First segment of each inferior appendage (f.s., Fig. 21) moderately long, with concave ventral margin. Dorsal lobe of the second joint of each inferior appendage (s.j., Figs 21, 29) distally round, ventral lobe small, with shallow indentation between lobes.

Female. Unknown.

Material – Holotype: male, Mt. Kalinchok 5 km W of Bigu, 27°62'N 86°03'E, 2000 m, by light trapping, 03 July, 1997, leg. Márton Hreblay & Krisztina Csák (gen. prep. No. 118, Ottó Kiss, is deposited in Mátra Museum, Gyöngyös, Hungary).

Paratype: 1 male, Mt. Kalinchok 5 km W of Bigu, 27°62'N 86°03'E, 2000 m, by light trapping, 03 July, 1997. leg. Márton Hreblay & Krisztina Csák (coll. Ottó Kiss).

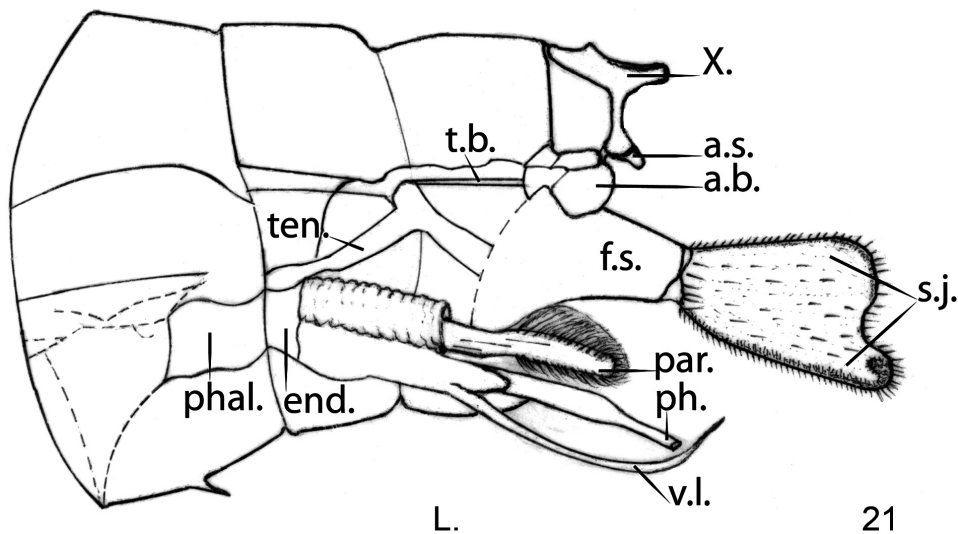
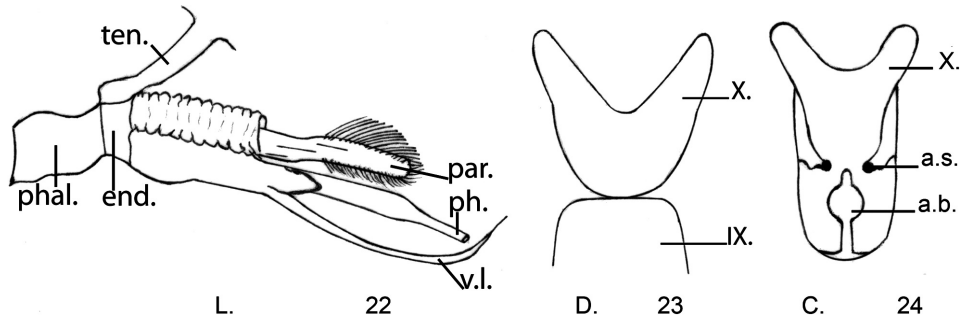
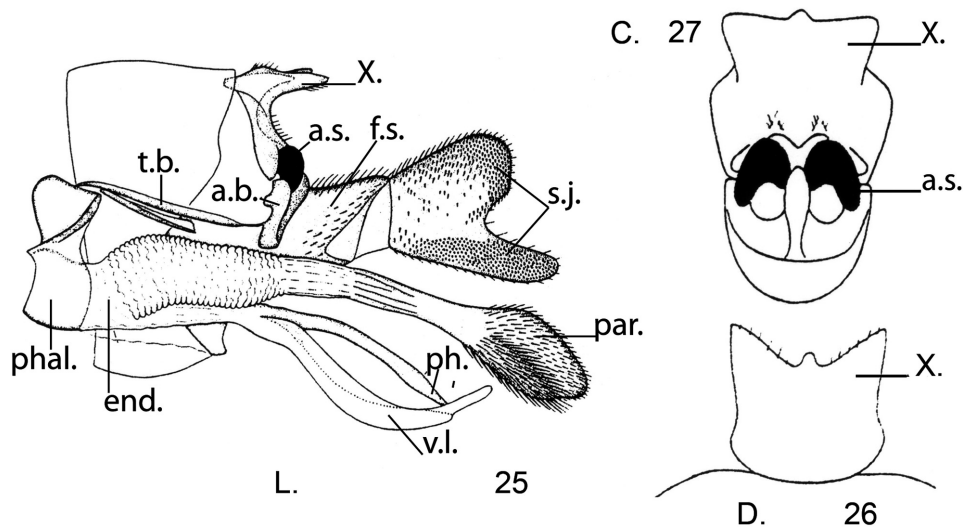


Fig. 21. *Rhyacophila szaboi* sp. n. male genitalia: 21 = left lateral view. (Abbreviations: a.s. = anal sclerite; a.b. (U) = apical band; end. = endotheca; f.s. = first segment of paired inferior appendages; L = lateral view; par. = paired paramere; ph. = phallicata; phal. = phallotheca; s.j. = second joint of paired inferior appendages; t.b. (bt) = tergal band; ten. = paired tenons of the phallotheca; v.l. = ventral lobe; X. = segment X).

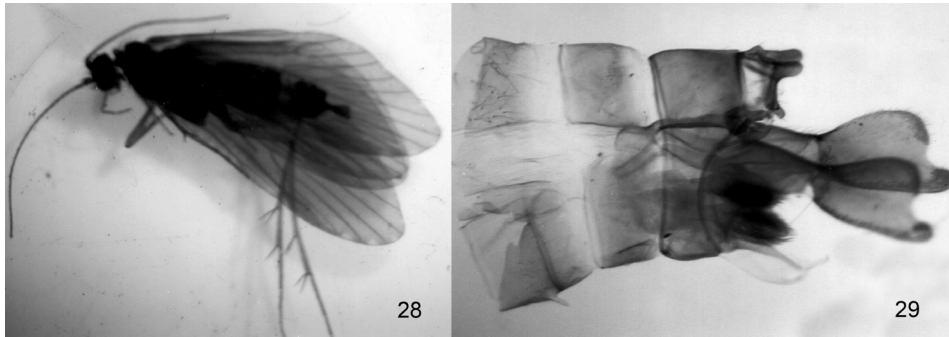


Figs 22–24. *Rhyacophila szaboi* sp. n. male genitalia: 22 = phallic apparatus, left lateral view; 23 = segments IX and X, dorsal view; 24 = segment X, anal sclerite and apical band, caudal view. (Abbreviations: a.s. = anal sclerite; a.b. (U) = apical band; C = caudal view; D = dorsal view; end. = endotheca; L = lateral view; par. = paired paramere; ph. = phallicata; phal. = phallosome; ten. = paired tenons of the phallosome; v.l. = ventral lobe; X. = segment X).

Diagnosis: This species is similar to *Rhyacophila obscura* Martynov, 1927 (drawings by Schmid, 1970, p. 123, pl. XXIII, figs 1–4; herein Figs 25–27) in the *R. obscura* group by Schmid, which comprises 6 species (approximately 0.7%



Figs 25–27. *Rhyacophila obscura* MARTYNOV, 1927, (drawings by SCHMID 1970) male genitalia: 25 = left lateral view; 26 = segment X, dorsal view; 27 = segment X and anal sclerite, caudal view. (Abbreviations: a.s. = anal sclerite; a.b. (U) = apical band; C = caudal view; D = dorsal view; end. = endotheca; f.s. = first segment of paired inferior appendages; t.b. (bt) = tergal band; L = lateral view; ph. = phallicata; phal. = phallosome; s.j. = second joint of paired inferior appendages; t.b. (bt) = tergal band; v.l. = ventral lobe; X. = segment X).



Figs 28–29. *Rhyacophila szaboi* sp. n. holotype, male, left lateral view: 28 = habitus, 29 = genitalia, left lateral view.

of the size of Rhyacophilidae) recorded from Asia by SCHMID (5 species, 1970) and SUN and YANG (one species, 1995).

The characters that place the new species in the *R. obscura* group are segment X, second joint of paired inferior appendages, parameres, apical band, phallicata, and tergal band.

The most useful characters to recognize the new species are:

- second joint of paired inferior appendages,
- segment X,
- anal sclerites,

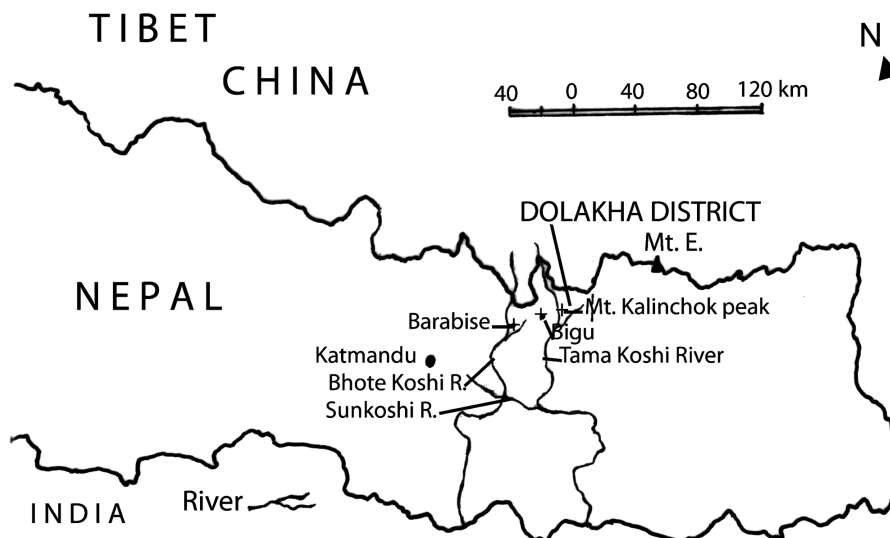


Fig. 30. Map of collection localities in Nepal (+ light trap).

- phallicata,
- paramere,
- and ventral lobe.

The characters that indicate the relationship of *R. szaboi* sp. n. to *R. obscura* are:

- ventral lobe,
- tergal band,
- first segment of paired inferior appendages,
- paired tenons of the phallosome.

The distinguishing characters of *R. szaboi* sp. n. in comparison to *R. obscura* are:

- the V-shaped segment X without protuberance in the middle, with obtuse (not acute) apex;
- anal sclerites form warts (that are not vertically elongate);
- apical band hemispheric (not column-like);
- distal part of phallicata slender (not thick and without expansion);
- distal part of paramere broad and ribbon-like (not heart-shaped), having thick row of long setae (not short ones) on dorsal margin;
- ventral lobe extremely narrow (not broad) and ribbon-like, ending in acute (not broad and obtuse) apex;
- distal indentation between upper and lower lobes of the second joint of the inferior appendages shallow (not deep), lower lobe short (not strongly elongate).

Derivatio nominis: This species is dedicated to the late Prof. Jenő Szabó, who was my professor and initiated me into the study of Trichoptera.

DISCUSSION

The morphologically based phylogenies of Trichoptera which challenge Ross's view were summarized by MORSE (1997a, b). WEAVER (1984) and WEAVER and MORSE (1986) included the Rhyacophiloidea superfamily in the infraorder Spicipalpia. Later this Spicipalpia infraorder was treated as a separate suborder by FRANIA and WIGGINS (1997). Its largest family, Rhyacophilidae, has 753 recorded species MORSE (2011).

The three species described in this paper for the first time are members of 3 of the 72 species groups defined by SCHMID (1970): the *Rhyacophila bifida* group (*Rhyacophila farkasi* sp. n.), the *Rhyacophila naviculata* group (*Rhyacophila siposi* sp. n.), and the *Rhyacophila obscura* group (*Rhyacophila szaboi* sp. n.) and

are new to science, increasing the number of *Rhyacophila* species recorded from Thailand and Nepal to 37 and 32 respectively.

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