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Diversity of caddisfly species (Insecta: Trichoptera) at Lower Hill Evergreen Forest of Nakhon Si Thammarat Range in southern Thailand

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Abstract. Nakhon Si Thammarat range in southern Thailand is dominated by evergreen rainforest, with lower hill type evergreen forest at the peak. The species richness of Trichoptera at the study sites in the Tai Rom Yen (Surat Thani province), Khao Nan and Khao Luang (both Nakhon Si Thammarat province) National Parks is described and discussed along with previous studies in several regions of Thailand. In the present study, 3949 adult Trichoptera specimens were collected, belonging to 21 families, 60 genera, and 173 species. 15 of the recorded species turned out to be new to science.

Keywords: Trichoptera, Tai Rom Yen, Khao Nan, Khao Luang, distribution, diversity, lower hill evergreen forest.

Introduction

In Thailand, over 1000 species of Trichoptera have been discovered in the past 40 years of which more than 70% were new species described from the country in over 70 publications. A summary is given by CHANTARAMONGKOL & al. (2010). Most field studies were made in northern Thailand, particularly at Doi Inthanon and Doi Suthep-Pui National Parks where the forest types are dry dipterocarp, moist evergreen, evergreen deciduous, hill evergreen and moist hill evergreen forests (GARDNER & al. 2000). Studies in these areas are e.g. by MALICKY & CHANTARAMONGKOL 1993, THAPANYA & al. 2004, and BUNLUE & al. 2012. Examples of sites are to be found in MALICKY (2014).

In southern Thailand, studies of Trichoptera have been made mainly in moist evergreen forests. By the year 2007, PROMMI (2007) had recorded 275 species from southern Thailand. PROMMI & PERMKAM (2010) have recorded 30 species from Ko Hong Hill. LAUDEE & MALICKY (2015) and SUWANNARAT & al. (2020) have collected 75 species from streams in Nakhon Si Thammarat Range which is covered by moist evergreen forest.

The hill evergreen forest type is dominating in the southern part of Thailand at Nakhon Si Thammarat Range where Nam Tok Si Khit, Tai Rom Yen, Khao Luang and Khao Nan National Parks are located. Streams of first and second orders dominate in this area. No prior study or survey of Trichoptera was made in hill evergreen forests at 1000 to 1600 metres until now, and many caddis species had not yet been found from this kind of forest. The present study aimed to find out the species richness, and to detect new species in Tai Rom Yen, Khao Nan and Khao Luang National parks (Figures on p. 15 - 16), and to compare the species richness with previous studies.

Material and methods

Adult Trichoptera were collected using a UV pan light trap (10 W fluorescent tube lamp, 12 Volt DC battery) near streams and waterfalls overnight. In each of the three National parks, five sites were chosen for the collection, and at each site was collected twice to cover the hot and the rainy season of the year (Table 1). The specimens were preserved in 70% ethanol. In the laboratory at Surat Thani, the terminal

part of the abdomen of the males was cut and macerated in hot 10% KOH at 60°C for 0,5 – 2 hours. The structures were studied under a light microscope to identify the species with the help of literature (MALICKY 2010).

Study sites

The study sites are in three protected areas (see table 1) where the vegetation is dominated by *Styrax betongensis*, *Lithocarpus garrettianus*, *L. polystachus*, *Podocarpus neriifolius*, *P. wallichianus*, *Cedrela toona*, *Betula alnoides*, *Cephalotaxus griffithii*, *Shorea gratissima*, *Hopea odorata*, *Cotylelobium lanceolatum*, *Intsia palembanica*, *Ailanthus triphysa*, and *Caryota obtusa*. Most of the trees are covered with fern, moss and lichen such as *Aneura indica*, *Colure conica*, *Frullania apiculata*, *Marsupidium knightii*, *Schistochila montricola*, *Adiantum latifolium*, *Angiopteris evecta*, *Antrophyum callifolium*, and *Cyathea contaminans* (JAROENSUTASINEE & al. 2010). There are two seasons: the hot and dry season in January-May and the rainy season in June-December. Air temperatures vary within $18,9 \pm 2,8^\circ\text{C}$, and the average humidity is $87,9 \pm 12,2\%$. Throughout the year, there are about 169 days with rainfall, and the average annual precipitation is about 2400 mm.

Stream characteristics

The three streams Klong Lamphun, Klong Gray and Klong Tha Di are first or second order streams, with substrates dominated by bedrock, boulders, cobbles, pebbles and sand. Some physiochemical parameters of water quality were measured by thermometer, flow meter, and dissolved oxygen meters Aqua-probe AP-700 and AP-800, here shown as Mean $\pm$ DS: air temperature $19,5 \pm 2,56^\circ\text{C}$, water temperature $17,6 \pm 2,31^\circ\text{C}$, velocity $0,37 \pm 0,05$ m/s, and dissolved oxygen $5,43 \pm 0,74$ mg/l. The canopy coverage over the streams exceeded 80%.

Results and discussion

The results are given in Tables 2 and 3, including a comparison with the other mentioned earlier studies. In Tai Rom Yen NP we found 96 species, in Khao Nan NP 118 species, and in Khao Luang NP 81 species. Some of the species may be regional endemics as they were found relatively often and are not known from the mountains of Northern Thailand nor of Sumatra, such as *Macrostemum nigrilatum*, but it is hard to decide that because the density of studied sites is much lower than e.g. in Europe (NEU & al. 2018). *Trichomacronema vietnamensis* was a new record for Thailand, and 15 species (Table 2) were new for science:

It is difficult to state anything about endemism, although local or regional endemics may be present. The density of records in Thailand is still too low; as compared e.g. with Europe (NEU & al. 2018). However, it may be suspected that striking species such as *Macrostemum nigrilatum* which were never found elsewhere could be regional endemics.

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References

- BUNLUE, Pensri; CHANTARAMONGKOL, Porntip; THAPANYA, Decha; MALICKY, Hans, 2012, The biodiversity of Trichoptera assemblage in Doi Suthep-Pui and Doi Inthanon National Parks, Chiang Mai, Thailand. – *Braueria* 39:7-21.
- CHANTARAMONGKOL, P.; THAPANYA, D.; BUNLUE, P., 2010, The Aquatic Insect Research Unit (AIRU) of Chiang Mai University, Thailand, with an updated list of the Trichoptera species of Thailand. – *Denisia* 29:55-79.
- GARDNER, Simon; SIDISUNTHORN, Pindar; ANUSARNSUNTHORN, Vilaiwan, 2000, A field guide to forrest trees of northern Thailand. – Bangkok: Kobfai Publishing Project, 560 pp.
- JAROENSUTASINEE, M., SANGARUN, P., PHEERA, W., JAROENSUTASINEE, K., 2010, Tropical Montane cloud forest characteristics in southern Thailand. – *Walailak Journal of Science and Technology* 7:103-113.
- LAUDEE, Pongsak; MALICKY, Hans, 2015, Trichoptera fauna from Nakhon Si Thammarat Range (southern Thailand), with the description of a new species of *Rhyacophila* Pictet, 1834 (Trichoptera: Rhacophilidae). – *Aquatic Insects* 36:161-169.
- MALICKY, H., CHANTARAMONGKOL, P., 1993, The altitudinal distribution of Trichoptera species in Mae Klang catchment on Doi Inthanon, northern Thailand: stream zonation and cool- and warm-adapted groups. – *Revue d'Hydrobiologie Tropicale* 26:279-291.
- MALICKY, Hans, 2010, Atlas of Southeast Asian Trichoptera – Biology Department, Chiangmai University, 346 pp.
- MALICKY, Hans, 2014, Lebensräume von Köcherfliegen. – *Denisia* 34:1-280.
- MALICKY, Hans; SUWANNARAT, Nannaphat; LAUDEE, Pongsak, 2018, Köcherfliegen (Trichoptera) aus dem Süden Thailands, mit der Beschreibung von vier neuen Arten. – *Linzer biol. Beitr.* 50:1319-1328.
- MALICKY, Hans, SUWANNARAT, Nannaphat, 2020, Sechs neue Köcherfliegen (Trichoptera) aus Süd-Thailand. – *Braueria* 47:48-51.
- NEU, Peter J.; MALICKY, Hans; GRAF, Wolfram; SCHMIDT-KLOIBER, Astrid, 2018, Distribution Atlas of European Trichoptera. – In: *Die Tierwelt Deutschlands*, vol.84; 891 pages. ConchBooks, Harxheim (Germany), ISBN 978-3-939767-93-0.
- PROMMI, Taeng-on, 2007, Taxonomy of Hydropsychidae (Trichoptera) in mountain streams of southern Thailand. – Thesis, Prince of Songkla University, XVI + 339 pp.
- PROMMI, Taeng-on; PERMKAM, Surakrai, 2010, The caddisfly (Insecta, Trichoptera) of Ko Hong Hill nature preserve, southern Thailand. – *Denisia* 29:295-302.
- SUWANNARAT, Nannaphat; MALICKY, Hans; LAUDEE, Pongsak, 2018, Two new species of caddisflies (Trichoptera: Insecta) from lower-hill evergreen forests of southern Thailand. – *Zootaxa* 4524:496-500.
- SUWANNARAT, Nannaphat; MALICKY, Hans; MORSE, John C.; LAUDEE, Pongsak, 2019, Four new species of *Rhyacophila* Pictet, 1834 (Trichoptera: Rhyacophilidae) from southeast Asia. – *Zootaxa* 4657:369-376.
- SUWANNARAT, Nannaphat; MALICKY, Hans; LAUDEE, Pongsak, 2020, Four new species of caddisflies (Trichoptera: Polycentropodidae, Psychomyiidae, Hydropsychidae, Odontoceridae) from Khao Nan and Tai Rom Yen National Parks, southern Thailand. – *Zootaxa* 4801:577-583.
- THAPANYA, Decha; CHANTARAMONGKOL, Porntip; MALICKY, Hans, 2004, An updated survey of caddisflies (Trichoptera, Insecta) from Doi Suthep-Pui and Doi Inthanon National Parks, Chiang Mai Province, Thailand. – *Natural History Journal of Chulalongkorn University* 4:21-40.
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Table 1. The study sites

Area	site code	name of stream	Coordinate North	Coordinate East	elevation metres
Tai Rom Yen	TR1	Klong Lamphun 1	8°50'26"	99°29'56"	1100
	TR2	Klong Lamphun 2	8°50'11"	99°29'07"	960
	TR3	Klong Lamphun 3	8°50'35"	99°28'38"	911
	TR4	Klong Lamphun 4	8°50'39"	99°28'21"	875
	TR5	Klong Lamphun 5	8°50'36"	99°28'01"	854
Khao Nan	KN1	Klong Gray 1	8°44'02"	99°31'39"	1263
	KN2	Klong Gray 2	8°44'01"	99°32'41"	1250
	KN3	Klong Gray 3	8°46'19"	99°31'52"	1147
	KN4	Klong Gray 4	8°45'43"	99°31'56"	1241
	KN5	Klong Gray 5	8°45'30"	99°32'41"	1132
Khao Luang	KL1	Klong Tha Di 1	8°29'24"	99°44'40"	1366
	KL2	Klong Tha Di 2	8°28'59"	99°43'40"	903
	KL3	Klong Tha Di 3	8°28'02"	99°43'37"	823
	KL4	Klong Tha Di 4	8°28'51"	99°43'42"	802
	KL5	Klong Tha Di 5	8°27'58"	99°42'45"	793

Table 2: New species detected during the present study

Name	authors	Reference
<i>Rhyacophila aksornkoei</i>	LAUDEE & MALICKY 2019	SUWANNARAT & al. 2019
<i>Rhyacophila longicaudata</i>	SUWANNARAT & MALICKY 2019	SUWANNARAT & al. 2019
<i>Orthotrichia kaonan</i>	MALICKY, SUWANNARAT & LAUDEE 2018	MALICKY & al. 2018
<i>Plectrocnemia paras</i>	MALICKY & SUWANNARAT 2020	MALICKY & SUWANNARAT 2020
<i>Polypsectropus hofmaierae</i>	MALICKY & SUWANNARAT 2020	SUWANNARAT & al 2020
<i>Eoneureclipsis chinachotiae</i>	MALICKY & LAUDEE 2020	SUWANNARAT & al 2020
<i>Psychomyia hobrazym</i>	MALICKY & SUWANNARAT 2020	MALICKY & SUWANNARAT 2020
<i>Hydropsyche khaonanensis</i>	MALICKY & SUWANNARAT 2020	SUWANNARAT & al 2020
<i>Macrostemum nigralatum</i>	LAUDEE & MALICKY 2018	SUWANNARAT & al. 2018
<i>Helicopsyche artinc</i>	MALICKY & SUWANNARAT 2020	MALICKY & SUWANNARAT 2020
<i>Helicopsyche chairum</i>	MALICKY & SUWANNARAT 2020	MALICKY & SUWANNARAT 2020
<i>Oecetis lehachiah</i>	MALICKY & SUWANNARAT 2020	MALICKY & SUWANNARAT 2020
<i>Oecetis rochel</i>	MALICKY & SUWANNARAT 2020	MALICKY & SUWANNARAT 2020
<i>Lannapsyche tairomyenensis</i>	MALICKY & SUWANNARAT 2020	SUWANNARAT & al 2020
<i>Anisocentropus tairomyenensis</i>	SUWANNARAT & MALICKY 2018	SUWANNARAT & al. 2018

Table 3: Numbers of specimens found during the present study in the three National Parks, and comparison of the species which were in common with other sites:

Abbreviations: LA – LAUDEE, MA – MALICKY, SU – SUWANNARAT, M&C – MALICKY & CHANTARAMONGKOL, C&M – CHANTARAMONGKOL & MALICKY, ■ - present, - absent

Southern Thailand:

- TR Tai Rom Yen NP
- KL Khao Luang NP
- KN Khao Nan NP
- PM several sites in southern Thailand (PROMMI 2007)
- LD 8 waterfalls in Tai Rom Yen and Khao Luang NP (LAUDEE & MALICKY 2015)
- HY Tramot, Boripat and Ton Nga Chang near Hat Yai (MALICKY 2014)

Northern Thailand:

- TP Doi Suthep-Pui NP and Doi Inthanon NP: THAPANYA & al. 2004
- BL Doi Suthep-Pui NP and Doi Inthanon NP: BUNLUE & al. 2012

Name	Authors	TR	KN	KL	PM	LD	HY	TP	BL
Rhyacophilidae									
<i>Rhyacophila aksornkoaei</i>	LA & MA 2019	-	-	14	-	-	-	-	-
<i>R. longicaudata</i>	MA & SU 2019	-	3	5	-	-	-	-	-
<i>R. olahi</i>	ARMITAGE & AREFINA 2003	-	-	2	-	-	-	-	-
<i>R. suratthaniensis</i>	LA & MA 2016	2	8	6	-	■	-	-	-
<i>R. tantichodoki</i>	M&C 1993	10	7	8	■	■	■	-	-
<i>R. malayana</i>	BANKS 1931	11	-	10	■	■	-	-	■
<i>R. scissoides</i>	KIMMINS 1953	166	76	29	■	■	■	■	■
<i>R. tosagan</i>	M&C 1993	-	3	4	■	-	-	-	-
<i>R. murhu</i>	M&C 1989	-	2	1	-	-	-	■	■
<i>R. xayide</i>	M&C 1989	-	2	4	-	-	-	■	■
Hydrobiosidae									
<i>Apsilochorema natibinham</i>	SCHMID 1970	-	2	-	-	-	-	-	-
<i>A. utchichunam</i>	SCHMID 1970	2	2	-	-	-	-	-	-
Glossosomatidae									
<i>Agapetus viricatus</i>	M&C 1992	2	-	-	-	-	-	■	-
<i>Glossosoma malayanum</i>	BANKS 1934	-	2	-	-	-	-	■	■
Hydroptilidae									
<i>Chrysotrichia pulmonaria</i>	XUE & YANG 1990	-	20	200	-	-	■	-	-
<i>Chrysotrichia talthybios</i>	M&C 2007	-	-	2	-	-	-	-	-
<i>Hydroptila sabit</i>	WELLS & HUISMAN 1992	2	1	-	-	-	-	-	-
<i>H. portunus</i>	M&C 2007	-	7	-	-	-	■	-	-
<i>H. rumpun</i>	WELLS & HUISMAN 1992	-	94	-	-	-	-	-	-
<i>H. thuna</i>	OLÁH 1989	-	1	-	-	-	■	-	■
<i>Macrostactobia runcing</i>	WELLS & HUISMAN 1992	2	-	-	-	-	-	-	-
<i>Orthotrichia curvata</i>	ULMER 1951	-	2	-	-	-	-	-	-
<i>O. deukalion</i>	MA & PROMMI 2000	-	2	2	-	-	-	■	-
<i>O. kaonan</i>	MA & SU 2018	12	2	108	-	-	-	-	-
<i>O. terpsichore</i>	M&C 2007	-	-	2	-	■	-	-	-
<i>Scelotrichia temenos</i>	M&C 2007	10	-	-	-	-	-	-	-
<i>Ugandatrichia hongia</i>	OLÁH 1989	-	8	2	■	■	■	■	-
<i>U. hairanga</i>	OLÁH 1989	-	-	2	■	-	-	■	-
<i>U. kerdmuang</i>	M&C 1991	-	-	4	■	■	■	■	-
Philopotamidae									
<i>Chimarra atnia</i>	M&C 1993	8	1	2	■	-	■	■	■
<i>C. bimbltona</i>	MALICKY 1979	42	24	>250	■	■	■	■	-
<i>C. Chiangmaiensis</i>	C&M 1989	46	-	2	-	■	-	■	■
<i>C. devva</i>	M&C 1993	8	1	-	-	-	-	■	■

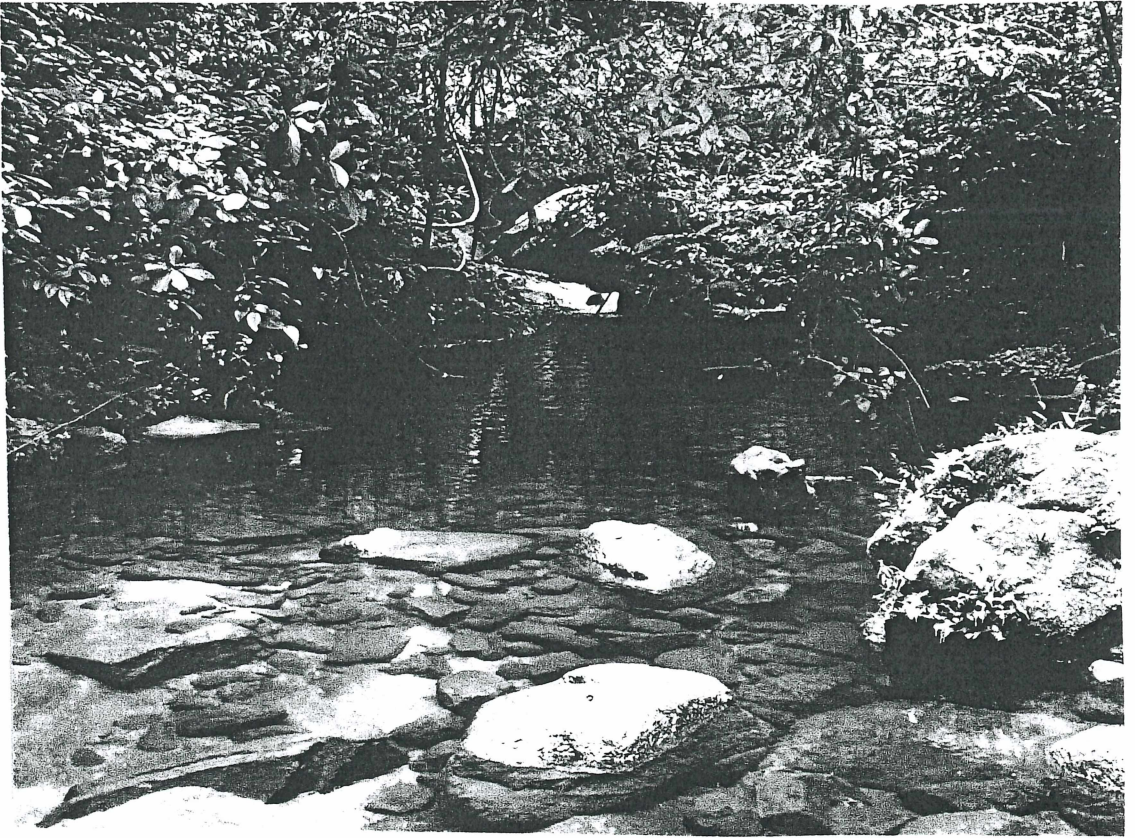
<i>C. fulmeki</i>	ULMER 1951	8	4	-	-	-	-	-	-
<i>C. hinorum</i>	C&M 1989	5	-	-	-	■	-	■	■
<i>C. joliveti</i>	JACQUEMART 1979	-	2	52	-	-	-	■	-
<i>C. khamuorum</i>	C&M 1989	12	-	-	■	■	-	-	■
<i>C. lannaensis</i>	C&M 1989	2	-	-	■	-	-	■	■
<i>C. meorum</i>	C&M 1989	9	-	-	-	-	-	-	■
<i>C. monorum</i>	C&M 1989	58	35	-	■	■	■	■	■
<i>C. okuihorum</i>	MEY 1998	-	-	2	-	-	-	■	■
<i>C. pipake</i>	M&C 1993	-	-	14	■	■	■	■	■
<i>C. rama</i>	M&C 1993	2	-	1	■	-	■	-	-
<i>C. ravanna</i>	M&C 1993	73	6	-	■	-	■	-	-
<i>C. reasilvia</i>	MA & PROMMI 2006	2	-	-	■	-	-	-	-
<i>C. supanna</i>	MALICKY 1993	50	24	2	-	-	-	-	-
<i>C. scopulifera</i>	KIMMINS 1957	5	-	8	-	-	-	■	-
<i>C. sita</i>	M&C 1993	42	-	-	■	-	-	-	-
<i>C. spinifera</i>	KIMMINS 1957	8	1	20	■	■	■	■	■
<i>C. suthepensis</i>	C&M 1989	2	-	-	■	-	■	■	■
<i>C. thienemanni</i>	Ulmer 1951	>250	>250	>250	-	-	-	-	-
<i>C. uppita</i>	M&C 1993	-	-	2	-	-	-	■	■
<i>C. yskal</i>	MALICKY 1989	-	-	2	■	■	■	-	-
<i>Dolophilodes adnemat</i>	M&C 1993	-	-	8	-	-	-	■	■
<i>Gunungiella sibylla</i>	MA & PROMMI 2006	12	2	2	■	-	-	-	-
<i>G. fimfafiazga</i>	M&C 1993	8	2	-	■	-	■	-	-
<i>Kisaura peleg</i>	MA & LA 2009	-	-	4	-	-	-	-	-
<i>Wormaldia lot</i>	M&C 2009	1	-	-	-	-	-	-	-
<i>W. relicta</i>	MARTYNOV 1935	-	-	2	-	-	-	■	■
Stenopsychidae									
<i>Stenopsyche siamensis</i>	MARTYNOV 1931	1	6	10	■	■	■	■	-
Polycentropodidae									
<i>Nyctiophylax tonggachang</i>	M&C 1993	-	-	2	■	-	■	-	-
<i>Plectrocnemix paras</i>	MA & SU 2020	-	2	-	-	-	-	-	-
<i>Polyplectropus hofmaierae</i>	MA & SU 2019	1	-	-	-	-	-	-	-
<i>P. josaphat</i>	MALICKY 1993	-	2	-	-	-	-	-	-
<i>P. admin</i>	M&C 1993	-	1	6	-	-	-	■	■
<i>P. nangajna</i>	M&C 1993	-	2	-	-	-	-	-	■
<i>P. matthatha</i>	M&C 1993	-	2	-	■	■	■	-	-
<i>P. menna</i>	M&C 1993	2	2	-	-	-	-	■	■
<i>Pseudoneureclipsis baring</i>	MALICKY 1993	-	2	-	-	-	-	-	-
<i>P. cheiron</i>	MA & SOMPONG 2000	9	2	-	■	■	-	-	-
<i>P. zethos</i>	MA & PROMMI 2006	-	8	-	■	-	-	-	-
<i>P. usia</i>	M&C 1993	-	1	-	-	-	-	■	■
<i>P. tramot</i>	M&C 1993	5	-	-	■	■	■	-	-
<i>P. thiras</i>	M&C 2009	-	2	74	-	-	-	-	-
<i>P. uma</i>	M&C 1993	2	3	126	■	■	■	-	■
<i>P. locutius</i>	M&C 1997	-	-	6	-	-	-	-	-
Psychomyiidae									
<i>Eoneureclipsis chinachotiae</i>	MA & LA 2019	5	12	2	-	-	-	-	-
<i>E. querquopad</i>	M&C1989	1	2	1	-	-	-	■	-
<i>Paduniella hatyaiensis</i>	M&C 1993	-	2	4	-	-	-	-	-
<i>P. semarangensis</i>	ULMER 1913	-	1	-	■	-	■	■	■
<i>Psychomyia adun</i>	M&C 1993	-	-	3	■	■	■	-	-
<i>P. hobrazym</i>	MA & SU 2020	2	122	-	-	-	-	-	-
<i>P. kerynitia</i>	MA & NUNTAK-WANG 2006	-	-	2	-	-	-	-	■
<i>P. kuni</i>	M&C 1993	-	10	11	■	-	-	-	-
<i>P. reguel</i>	M&C 2009	-	2	1	-	-	-	-	-
<i>P. pinsuwanae</i>	LA & MA 2018	-	-	110	-	-	-	-	-
<i>Tinodes sitto</i>	M&C 1993	-	-	1	■	■	-	-	-
<i>T. ragu</i>	M&C 1993	6	1	2	■	-	■	-	■
<i>T. lebeli</i>	M&C 1993	-	2	-	■	-	■	-	-
<i>Lype atria</i>	M&C 1993	6	4	4	■	-	■	■	■

Xiphocentronidae									
<i>Abaria iuma</i>	M&C 1992	-	1	-	-	-	-	-	-
<i>Drepanocentron jubal</i>	M&C 2009	6	-	-	-	-	-	-	-
<i>Proxiphocentron arjinae</i>	M&C 1993	-	2	-	-	-	-	-	-
Ecnomidae									
<i>Ecnomus neri</i>	M&C 1993	1	2	-	■	■	■	-	-
<i>E. puro</i>	M&C 1993	2	13	1	■	-	■	■	-
<i>E. totiio</i>	M&C 1993	3	14	1	■	■	-	-	-
<i>E. vibenus</i>	M&C 1993	-	2	-	■	■	-	-	-
<i>E. robustior</i>	ULMER 1929	-	2	-	■	-	■	-	■
<i>E. thugarma</i>	M&C 2009	2	24	10	-	-	-	-	-
Hydropsychidae									
<i>Diplectrona burha</i>	SCHMID 1961	1.	-	-	-	-	-	■	-
<i>D. dulitensis</i>	KIMMINS 1955	62	17	19	■	■	■	-	-
<i>D. gombak</i>	OLÁH 1993	2	1	-	■	-	■	-	-
<i>D. hermione</i>	M&C 2002	111	19	31	■	-	-	■	■
<i>D. joannisi</i>	NAVÁS 1932	-	5	1	-	-	-	■	■
<i>Amphipsyche gratiosa</i>	NAVÁS 1922	-	2	-	-	■	-	-	-
<i>Cheumatopsyche charites</i>	M&C 1997	-	61	>250	■	■	-	■	■
<i>C. copia</i>	M&C 1997	16	2	>250	■	■	■	■	■
<i>C. dhanikari</i>	MALICKY 1979	-	23	>250	-	-	-	-	-
<i>C. trilaris</i>	M&C 1997	2	1	1	■	■	-	-	■
<i>C. criseyde</i>	M&C 1997	1	-	-	-	■	-	■	■
<i>Hydromanicus abiud</i>	M&C 1993	3	2	8	■	■	■	■	■
<i>H. adonis</i>	M&C 1996	4	1	2	■	■	-	■	■
<i>H. klanklini</i>	M&C 1993	3	5	1	■	■	■	■	■
<i>H. inferior</i>	C&M 1995	-	84	4	■	-	-	■	■
<i>Hydropsyche biton</i>	M&C 2000	-	12	1	■	-	-	-	-
<i>H. brontes</i>	M&C 2000	5	3	22	■	■	■	-	-
<i>H. camillus</i>	M&C 2000	14	14	-	■	■	-	■	■
<i>H. doctersi</i>	ULMER 1951	2	-	-	■	■	-	■	■
<i>H. pallipenne</i>	BANKS 1938	78	7	-	■	■	■	■	■
<i>H. kaonanensis</i>	MA & SU 2019	1	1	-	-	-	-	-	-
<i>Macrostemum nigralatum</i>	LA & MA 2018	8	17	54	-	-	-	-	-
<i>M. floridum</i>	NAVÁS 1929	-	9	-	■	-	-	■	■
<i>M. fenestratum</i>	ALBARDA 1887	2	2	-	■	■	■	-	-
<i>M. hestia</i>	M&C 1998	60	27	4	■	■	-	■	■
<i>M. midas</i>	M&C 1998	8	8	7	■	■	■	■	■
<i>Potamyia phaidra</i>	M&C 1997	7	16	2	■	-	-	■	■
<i>P. flavata</i>	BANKS 1934	-	1	-	■	-	-	■	■
<i>Pseudoleptonema erawan</i>	M&C 2001	-	2	-	-	-	-	-	-
<i>P. supalak</i>	M&C 1998	-	1	-	■	-	-	-	-
<i>Trichomacronema vietnamensis</i>	UY,MA & BAE 2018	-	4	-	-	-	-	-	-
Phryganeidae									
<i>Eubasilissa maclachlani</i>	WHITE 1862	-	1	-	-	-	-	■	■
Goeridae									
<i>Goera unica</i>	ULMER 1951	5	11	-	-	-	-	-	■
<i>G. uniformis</i>	BANKS 1931	67	2	2	■	■	■	■	■
<i>G. anakpiatu</i>	MALICKY 1995	1	2	-	-	■	-	-	-
<i>G. mandana</i>	MOSELY 1938	1	-	-	-	-	-	■	■
Helicopsychidae									
<i>Helicopsyche chairum</i>	MA & SU 2020	2	-	10	-	-	-	-	-
<i>H. artinc</i>	MA & SU 2020	1	-	-	-	-	-	-	-
<i>H. boniata</i>	M&C 1992	-	8	-	■	■	■	-	-
Lepidostomatidae									
<i>Lepidostoma abruptum</i>	BANKS 1931	40	20	29	■	■	■	■	■
<i>L. brevipennis</i>	OLÁH 1993	11	19	4	■	■	-	-	-
<i>L. moulmina</i>	MOSELY 1949	18	26	5	-	-	-	■	■
Leptoceridae									
<i>Adicella evadne</i>	SCHMID 1994	-	3	1	■	■	■	■	■
<i>A. koronis</i>	MA & THANI 2002	-	-	1	■	■	-	■	■
<i>A. pulcherrima</i>	ULMER 1906	2	-	-	■	-	-	-	-
<i>Leptocerus consus</i>	MA & SOMPONG 2000	-	-	1	-	-	-	-	-

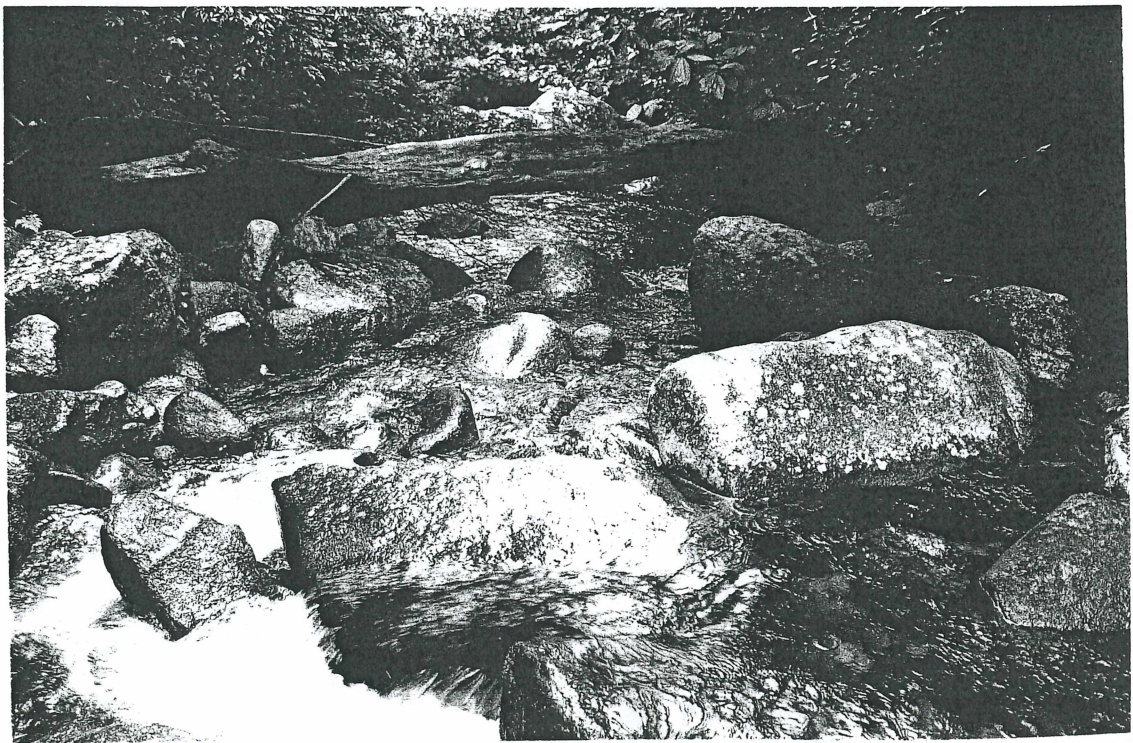
<i>L. tursiops</i>	MALICKY 1979	-	4	1	■	-	-	-	-
<i>Oecetis lehachiah</i>	MA & SU 2020	2	-	2	-	-	-	-	-
<i>O. rochel</i>	MA & SU 2020	1	-	-	-	-	-	-	-
<i>O. miletos</i>	MA & NAEWVONG 2005	-	-	4	-	-	-	-	■
<i>O. lotis</i>	MA & THAPANYA 2004	-	2	-	■	■	■	-	-
<i>O. tripunctata</i>	FABRICIUS 1793	3	8	-	■	-	■	■	■
<i>Parasetodes respersellus</i>	RAMBUR 1842	-	2	-	-	-	■	-	-
<i>Setodes sarapis</i>	M&C 2006	1	1	-	■	-	■	-	-
<i>S. kybele</i>	M&C 2006	-	-	10	-	-	-	-	-
<i>S. thoneti</i>	M&C 2006	-	53	-	-	-	■	-	-
<i>S. akrura</i>	GORDON & SCHMID 1987	-	8	-	-	-	■	■	-
<i>S. alampata</i>	SCHMID 1987	45	2	-	-	-	-	-	-
<i>S. isis</i>	MA & NAEWVONG 2006	-	78	-	■	-	■	-	■
<i>Tagalopsyche brunnea</i>	ULMER 1905	2	-	-	■	-	-	-	-
<i>T. osiris</i>	MA & PROMMI 2006	8	2	-	■	-	-	-	-
<i>Trichosetodes sisypkos</i>	MA & PROMMI 2006	>250	19	68	■	■	-	-	-
<i>Triaenodes dusra</i>	SCHMID 1965	1	-	-	■	-	-	-	-
Brachycentridae									
<i>Micrasema fortiso</i>	M&C 1992	4	2	1	■	-	-	■	■
Odontoceridae									
<i>Lannapsyche tairomyenensis</i>	MA & SU 2019	10	2	2	-	-	-	-	-
<i>Psilotreta assur</i>	M&C 2009	-	3	-	-	-	-	-	-
Calamoceratidae									
<i>Anisocentropus diana</i>	M&C 1994	9	6	-	■	■	-	■	■
<i>A. tairomyenensis</i>	MA & SU 2018	29	23	3	-	-	-	-	-
<i>Ganonema fuscipenne</i>	ALBARDA 1881	5	4	4	■	■	■	-	■
Molannidae									
<i>Molanna oglamar</i>	M&C 1989	1	2	-	-	-	-	-	■



Klong Gray, Kao Nan National Park



Klong Lamphun, Tai Rom Yen National Park



Klong Tha Di, Kao Luang National Park

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