Zootaxa 4137 (3): 439–444
http://www.mapress.com/j/zt/

Article

ISSN 1175-5326 (print edition)
ZOOTAXA
ISSN 1175-5334 (online edition)

http://doi.org/10.11646/zootaxa.4137.3.11
http://zoobank.org/urn:lsid:zoobank.org:pub:BE122BE2-51F4-4062-93BD-DD7A600CB20E

Limnocentropus kritsaneepaibooni new species (Limnocentropodidae: Trichoptera) from Shan State, Myanmar, with faunistic data for the family

PONGSAK LAUDEE[1,3] & HANS MALICKY[2]

[1]*Department of Fishery and Costal Resources, Faculty of Science and Industrial Technology, Prince of Songkla University, Surat Thani Campus, Muang District, Surat Thani Province, Thailand 84100. E-mail: pongsak.l@psu.ac.th*
[2]*Sonnengasse 13, A-3293 Lunz am See, Austria*
[3]*Corresponding author*

Abstract

A new species of *Limnocentropus*, *Limnocentropus kritsaneepaibooni* **n. sp.** from Keng Tung Province, Shan State, Myanmar, is described and figured. Three other, previously described species of *Limnocentropus* are newly recorded for Myanmar, including *L. apollon* Malicky 1999, *L. sammuanensis* Malicky & Chantaramongkol 1989, and *L. siribhumensis* Malicky & Chantaramongkol 1989, resulting in 7 species of the family found in Myanmar.

Key words: Caddisfly, Oriental Region, Southeast Asia

Introduction

Limnocentropodidae is a small family in the order Trichoptera, with only one genus, *Limnocentropus* Ulmer 1907. According to Yang and Morse (2005), 15 species of *Limnocentropus* were previously described from the Oriental and East Palearctic Regions including China (1 species), Japan (1 species), India (3 species), Indonesia (1 species), Malaysia (1 species), Myanmar (2 species) and Thailand (6 species). Recently, *L. sichem* Malicky 2012 was described from Laos and *L. florianorum* Malicky 2015 from Yunnan, China, resulting in 17 species of the genus found around the world. Moreover, in Nepal and Bhutan, *L. himalayanus* has been reported (Malicky 2006; Malicky 2007) and Yang *et al*. (2005) reported *L. insolitus* from China (Guangdong). The distribution of the family is mainly in the Oriental Region except 2 species (*L. insolitus* Ulmer 1907, *L. arcuatus* Yang and Morse 2005) are found in the East Palearctic Region from Japan and China (Gansu, Shaanxi).

In Myanmar, three species of the family have been reported, including *L. bifidus* Kimmins 1950, *L. moselyi* Kimmins 1950, and *L. himalayanus* Matynov 1930 (Wityi *et al*, 2015). Considering the poor number of Trichoptera publications for Myanmar, there are probably more species of *Limnocentropus* present in this country that have not been recovered. This research represents part of a survey of the biodiversity of Trichoptera in Shan State, Myanmar.

Materials and methods

Caddisflies were collected by a UV pan light trap (12 V, 10 W) near streams overnight at each site. The Trichoptera specimens were preserved in 70% ethanol and manually sorted afterwards. The adult male genitalia were cut and macerated by heating in 10% KOH at 60ºC for 30–60 minutes. Only male insects were identified and counted in this study. The identified specimens are deposited in the Department of Fishery and Coastal Resources, Faculty of Science and Industrial Technology, Prince of Songkla University, Surat Thani campus. The specimen collection sites were as follows:

Accepted by J. Morse: 8 Jun. 2016; published: 12 Jul. 2016

1. Pin Tao Waterfall, Keng Tung Province, Shan State, Myanmar, 21°26’37”N, 99°34’42”E, 977 m a.s.l., 28 Feb 2015, leg. Pongsak Laudee.
2. Sip Sam Lak, Kheun River, Keng Tung Province, Shan State, Myanmar, 21°27’23”N, 99°36’56”E, 764 m a.s.l., 27 Feb 2015, leg. Pongsak Laudee.
3. Water Electric Power Station, Jo Stream, Keng Tung Province, Shan State, Myanmar, 21°28’18”N, 99°34’40”E, 1149 m a.s.l., 28 Feb 2015, leg. Pongsak Laudee.
4. Nam Lab Stream, Moung Ping, Keng Tung Province, Shan State, Myanmar, 21°20’51”N, 99°01’33”E, 446 m a.s.l., 3 May 2015 leg. Sai Aye.
5. Nam Lok Stream, Moung Ping, Keng Tung Province, Shan State, Myanmar, 21°21’52”N, 99°00’51”E, 443 m a.s.l., 3 May 2015, leg. Sai Aye.
6. Nam Hlong, Naw-awn, Keng Tung Province, Shan State, Myanmar, 21°13’17”N, 98°44’52”E, 374 m a.s.l., 4 May 2015, leg. Sai Aye.
7. Salawin River, Naw-awn, Keng Tung Province, Shan State, Myanmar, 21°12’32”N, 98°42’27”E, 256 m a.s.l., 4 May 2015, leg. Sai Aye.

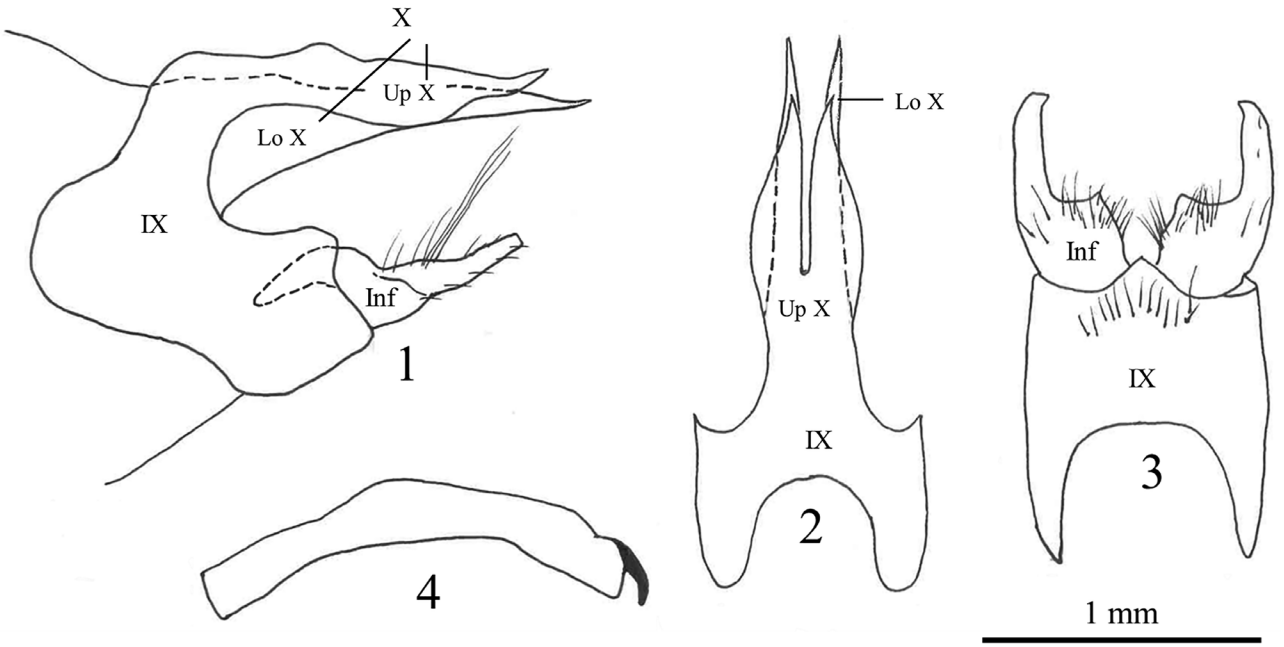
For the new species discovered, the male genitalia were drawn by compound microscopy with a drawing tube, first with pencil and then with ink. The holotype and paratypes are stored in 70% ethanol and are deposited at Princess Maha Chakri Sirindhorn Natural History Museum, Prince of Songkla University, Hat Yai Campus, Hat Yai District, Songkhla Province, Thailand (PSUNHM). A paratype is deposited in the collection of Hans Malicky (CHM).

Taxonomy

***Limnocentropus kritsaneepaibooni* n. sp.**
(Figs. 1–4)

Type material. Holotype male (PSUNHM). **Myanmar:** Shan State, Keng Tung Province, Water Electric Power Station, Jo Stream, 21°28’18”N, 99°34’40”E, 1149 m a.s.l., 28 Feb 2015, leg. Pongsak Laudee.

Paratypes: Myanmar: Same data as holotype, 1 male (CHM). **Myanmar:** Shan State, Keng Tung Province, Sip Sam Lak, Kheun River, 21°27’23”N, 99°36’56”E, 764 m a.s.l., 27 Feb 2015, leg. Pongsak Laudee, 1 male (PSUNHM).



FIGURES 1–4. Male genitalia of *Limnocentropus kritsaneepaipooni* **n. sp.** 1, genitalia, left lateral: segment IX (IX), segment X (X), upper part of segment X (Up X), lower part of segment X (Lo X), inferior appendages (Inf); 2, segments IX and upper part of Segment X (Up X), lower part of segment X (Lo X), dorsal; 3, segment IX and inferior appendages (Inf), ventral; 4, phallus, left lateral.

Etymology. Named for Asst. Prof. Dr. Saeng Kritsaneepaiboon, Entomologist who worked at the Faculty of Natural Resources, Prince of Songkla University, Hat Yai Campus.

Description. Length of each male forewing 13 mm (n=3); antennal length 8 mm; specimens in alcohol with head, thorax, abdomen yellowish brown; wings light gray.

Male genitalia (Figs. 1–4). In lateral view (Fig. 1), segment IX C-shaped with strong lateral protuberance on each side anteromesally and deep lateral excavation on each side posteromesally. Preanal appendages not evident. Segment IX fused with segment X. Segment X divided into 2 parts, upper part and lower part: Upper part long, isosceles triangle with ventral margin sinuous, posterior apex acute and directed dorsocaudad; lower part long, isosceles triangle beneath and between arms of upper part. Inferior appendages single-segmented, shorter than tergum X, each forming isosceles triangle, with basal part stout, massive, distal part tapered to blunt apex, with short hair except mesodorsal tuft of long hair. In dorsal view (Fig. 2), upper part of segment X blade-like, sinuous laterally, divided 1/2 of its length apicomesally, with pointed apices; lower part of segment X also divided apicomesally, slightly longer than upper part, with pointed apices. In ventral view (Fig 3), segment IX anterior margin with U-shaped incision nearly 1/2 as deep as length of segment, segment with transverse band of subapicomesal setae, posteromesal margin with acute tip. Inferior appendages each axe-like, basal half rectangular with tuft of setae subapicomesally, apical half cylindrical with beak-like apex. Phallus (Fig. 4) cylindrical, slightly curved downward, with dark apicodorsal hook.

Diagnosis. The male genitalia of *L. kritsaneepaibooni* **n. sp.** appear very similar to those of *L. inthanonensis* Malicky & Chantaramongkol 1989 and *L. auratus* Malicky & Chantaramongkol 1989, which are found in Doi Inthanon National Park, and Fang District, Chiang Mai Province, northern Thailand, respectively. These three species have similar lateral shapes of male genitalia and dorsal views of segment X. However, they can be distinguished by (1) the length of a forewing which is 13 mm in *L. kritsaneepaibooni* **n. sp.** but 15–16 mm in *L. auratus* and *L. inthanonensis*, (2) the upper part of segment X of *L. kritsaneepaibooni* **n. sp.** in dorsal view is blade-like, but triangular in both of *L. auratus* and in *L. inthanonensis*, (3) segment X of *L. kritsaneepaibooni* **n. sp.** is divided into 2 parts, upper and lower parts but not divided in *L. auratus* or *L. inthanonensis*, and (4) inferior appendages of *L. kritsaneepaibooni* **n. sp.** and *L. auratus* are triangular in lateral view, but those of *L. inthanonensis* are rectangular basally and tubular distally.

Faunistic data for Limnocentropodidae spp. from Myanmar

The Limnocentropodidae species identified in this study are listed along with the relevant sample numbers in Table 1. Four species were found, including *L. apollon* Malicky 1999, *L. kritsaneepaibooni* **n. sp.**, *L. sammuanensis* Malicky & Chantaramongkol 1989, and *L. siribhumensis* Malicky & Chantaramongkol 1989. Wityi *et al*. (2015) listed 3 species of Limnocentropodidae from Myanmar. In this study, 3 additional species are new records for Myanmar. These results update the totals to 7 species of Limnocentropodidae from Myanmar, including 1 new species described here.

The presently known distributions of Limnocentropodidae species are provided (Table 2, Fig. 5). Myanmar now has the highest number of Limnocentropodidae species of any country. In Thailand, 6 species were reported from northern Thailand (Bunlue *et al*. 2012; Malicky 2010). Three species of *Limnocentropus* found in Shan State, eastern Myanmar, were similar to those found in northern Thailand and Laos (Malicky 2010). There are 3 species of *Limnocentropus* reported form Kachin State, northern Myanmar including *L. bifidus*, *L. himalayanus*, and *L. moselyi*, and only one reported in India, *L. himalayanus* (Gupta & Marjumda 2013). This species also has been reported from Nepal and Bhutan (Malicky 2006; Malicky 2007). *Limnocentropus bifidus* and *L. moselyi* seem to be endemic to northern Myanmar. The three species from China (Gansu, Shaanxi, Guangdong, and Yunnan), 1 species from Malaysia (Kinabalu), and 1 species from Indonesia (Butik Raja, Kalimantan) have not been recorded in Myanmar (Yang & Morse 2005; Malicky 2015; Wityi *et al*. 2015).

TABLE 1. Limnocentropodidae species of Keng Tung Province, Shan State, Myanmar.

Species of Limnocentropodidae	Myanmar Location[1] (number of specimens)
Limnocentropus apollon Malicky 1999	5(1)
Limnocentropus kritsaneepaibooni **n. sp.**	2(1); 3(2)
Limnocentropus sammuanensis Malicky & Chantaramongkol 1989	4(1); 6(1); 7(7)
Limnocentropus siribhumensis Malicky & Chantaramongkol 1989	1(1)

[1]Locations were as follows;

1. Pin Tao Waterfall, Keng Tung Province, Shan State, Myanmar, 21°26'37"N, 99°34'42"E, 977 m a.s.l.
2. Sip Sam Lak, Kheun River, Keng Tung Province, Shan State, Myanmar, 21°27'23"N, 99°36'56"E, 764 m a.s.l.
3. Water Electric Power Station, Jo Stream, Keng Tung Province, Shan State, Myanmar, 21°28'18"N, 99°34'40"E, 1149 m a.s.l.
4. Nam Lab Stream, Moung Ping, Keng Tung Province, Shan State, Myanmar, 21°20'51"N, 99°01'33"E, 446 m a.s.l.
5. Nam Lok Stream, Moung Ping, Keng Tung Province, Shan State, Myanmar, 21°21'52"N, 99°00'51"E, 443 m a.s.l.
6. Nam Hlong, Naw-awn, Keng Tung Province, Shan State, Myanmar, 21°13'17"N, 98°44'52"E, 374 m a.s.l.
7. Salawin River, Naw-awn, Keng Tung Province, Shan State, Myanmar, 21°12'32"N, 98°42'27"E, 256 m a.s.l.

TABLE 2. Distribution of Limnocentropodidae: *Limnocentropus* spp.

Limnocentropus spp.	East Palearctic		Oriental									
	Ch	Ja	Bh	Ch	In	Ind	La	Ma	My	Ne	Th	Ve
L. apollon Malicky 1999									X		X	
L. arcuatus Yang & Morse 2005	X											
L. auratus Malicky & Chantaramongkol 1989											X	X
L. bifidus Kimmins 1950									X			
L. borneonius Ulmer 1930						X						
L. florianorum Malicky 2015				X								
L. grandis Banks 1934								X				
L. himalayanus Martynov 1930			X		X				X	X		
L. hysbald Malicky & Chantaramongkol 1991							X				X	
L. insolitus Ulmer 1907		X										
L. inthanonensis Malicky & Chantaramongkol 1989											X	
L. kritsaneepaibooni **n. sp.**									X			
L. mergatus Kimmins 1950					X							
L. moselyi Kimmins 1950									X			
L. rectus Kimmins 1950					X							
L. sammuanensis Malicky & Chantaramongkol 1989							X		X		X	
L. sichem Malicky 2012							X					
L. siribhumensis Malicky & Chantaramongkol 1989									X		X	

Abbreviations: Ch—China, Ja—Japan, Bh—Bhutan, In—India, Ind—Indonesia, La—Laos, Ma—Malaysia, My—Myanmar, Ne—Nepal, Th—Thailand, Ve—Vietnam. (Data in the table are from the references and the collection of the second author.)

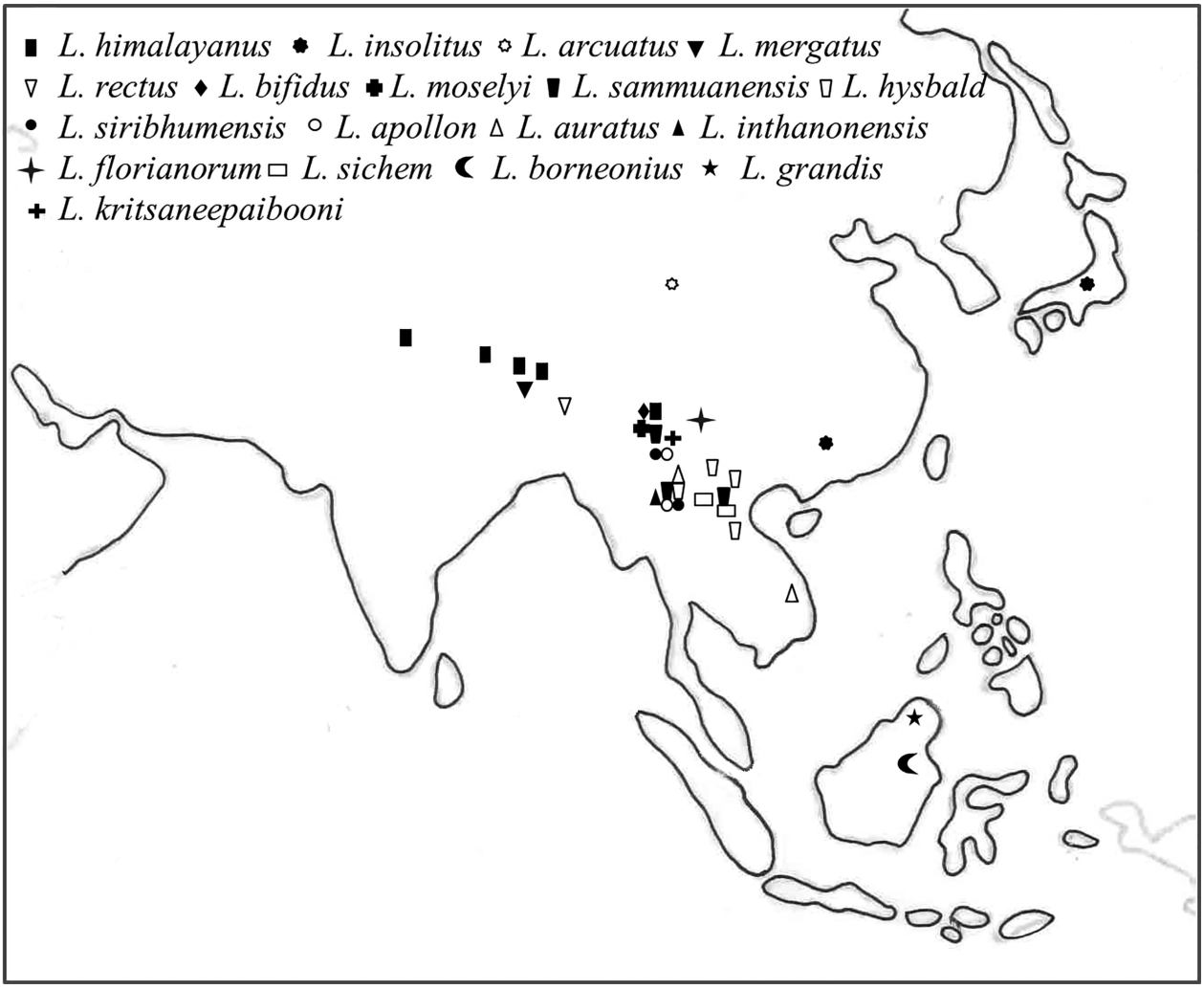


FIGURE 5. Distribution map of *Limnocentropus* spp. in the world. (Data on the map are from the references and the collection of the second author) (Source of map: redrawn from www.outline-world-map.com).

Acknowledgements

This work was supported by the Higher Education Research Promotion and National Research University Project of Thailand, Office of the Higher Education Commission, and Prince of Songkla University. We thank Assoc. Prof. Dr. Seppo Karrila for English correction and Prof. Dr. John C. Morse for providing literature.

References

Banks, N. (1934) XXXVIII Supplementary neuroteroid insects from the Malay Peninsula, and from Mt. Kinabalu, Borneo. *Journal of Federated Malay States Museums*, 17, 567–578.

Bunlue, P., Chantaramongkol, P. & Thapanya, D. (2012) The biodiversity of Trichoptera assemblage in Doi Suthep-Pui and Doi Inthanon National Parks, Chiang Mai, Thailand. *Braueria*, 39, 7–21.

Gupta, I.J. & Marjumda, M. (2013) Species of the order Trichoptera presented in the natural zoological collection of the zoological of India, Kolkata. *Zoological Survey of India*, 113 (4), 181–192.

Kimmins, D.E. (1950) Indian Caddis Flies (Trichoptera). I. New species of the genus *Limnocentropus* Ulmer. *Annals and Magazine of Natural History*, 12 (3), 591–603.

Malicky, H. (1999) Neue Köcherfliegen aus Europa, Asien und von den Seychellen. *Braueria*, 26, 44–48.

Malicky, H. (2006) Caddisflies from Bardia National Park, Nepal, with a preliminary survey of Nepalese species (Insecta, Trichoptera). *Entomofauna Zeitschrift für Entomologie*, 27 (20), 241–246.

Malicky, H. (2007) Köcherfliegen aus Bhutan (Insecta, Trichoptera). *Linzer Biologische Beiträge*. 39, 475–517.

Malicky, H. (2010) *Atlas of Southeast Asian Trichoptera*. Faculty of Science Printing Unit, Chiang Mai University, Chiang Mai Province, Thailand, 346 pp.
Malicky, H. (2012) Neue asiatische Köcherfliegen aus neuen Ausbeuten (Insecta, Trichoptera). *Linzer Biologische Beiträge*, 44 (2), 1263–1360.
Malicky, H. (2015) Einige neue chinesische Köcherfliegen (Trichoptera). *Linzer Biologische Beiträge*, 47 (1), 667–686.
Malicky, H. & Chantaramongkol, P. (1989) Beschreibung von neuen Köcherfliegen (Trichoptera) aus Thailand und Burma. *Entomologische Berichte Luzern*, 22, 117–126.
Malicky, H. & Chantaramongkol, P. (1991) Elf neue Köcherfliegen (Trichoptera) aus Thailand und angrenzenden Läden (Studien über thailädische Köcherfliegen Nr. 7). *Entomologische Zeitschrift mit Insecktenbörse*, 101 (5), 80–89.
Matynov, A.V. (1930) On the trichoptera fauna of China and eastern Tibet. *Proceedings of the Zoological Society of London*. 5, 65–112.
Ulmer, G. (1907) Note I: Neue Trichoptera. *Notes from the Leyden Museum*, 29, 1–53.
Wityi, H., Nozaki, T. & Fujino, T. (2015) A list of Myanmar caddisflies (Trichoptera including recently collected data). *Entomological Research Bulletin*, 31 (1), 41–55.
Yang, L.F. & Morse, J.C. (2005) Description of a new species *Limnocentropus* species from China (Trichoptera: Limnocentropodidae). *Oriental Insects*, 39, 141–146.
http://dx.doi.org/10.1080/00305316.2005.10417427
Yang, L.F., Sun, C., Wang, B. & Morse, J.C. (2005) Present status of Chinese Trichoptera, with an annotated checklist. *Proceedings of the 11th International Symposium on Trichoptera (2003 Osaka)*. Tokai University Press, Kanagawa, Japan, pp. 441–465.