Zoosymposia 18: 112–117 (2020)
https://www.mapress.com/j/zs

ISSN 1178-9905 (print edition)
ZOOSYMPOSIA
ISSN 1178-9913 (online edition)
https://doi.org/10.11646/zoosymposia.18.1.14
http://zoobank.org/urn:lsid:zoobank.org:pub:4D0B189A-6307-43F2-9917-E9774C46C8F8

Two new species of genus *Polyplectropus* Ulmer 1905 (Insecta: Trichoptera: Polycentropodidae) from the Indian Himalaya

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Abstract

Two new species of the genus *Polyplectropus* Ulmer are described and illustrated from the Indian Himalaya *viz*.: *Polyplectropus purolaensis* sp. nov. (from Uttarakhand) and *Pol. sikkimensis* sp. nov. (from Sikkim). With these new additions, the genus is now represented by nine species from India.

Key Words: Caddisfly, India, Uttarakhand, Sikkim

Introduction

Ulmer (1905) established the genus *Polyplectropus* based on a specimen from Brazil, South America. The genus is widespread and is currently represented by 280 species worldwide (Morse 2018), having been recorded from most of the World's biogeographic regions. It is more diverse in the Oriental, Neotropical, and Australasian regions (Zhong *et al.* 2010). The monophyly of this genus is uncertain, as depicted by Chamorro & Holzenthal (2010). Although the genus has a rich diversity in the Oriental Region (136 spp., Morse personal communication), it is poorly represented from India. The family Polycentropodidae itself is represented merely by 21 species in five genera from India.

At present, *Polyplectropus* is represented by seven species from India: *Polyplectropus dhinkari* Malicky 1979 (from the Andaman Islands), *Pol. melchi* Malicky 1993 (from Darjeeling), *Pol. antinoos* Malicky 1998 and *Pol. diniel* Malicky 2012 (both from Kerala), *Pol. sainii* Pandher & Parey 2018 and *Pol. himachalica* Pandher & Parey 2018 (both from Himachal Pradesh), and *Pol. kailashchandrai* Pandher & Parey 2018 (from Uttarakhand). In this paper, we describe two new species of the genus *Polyplectropus* from India. With these additions, the number of Indian species in this genus now stands at nine.

Materials and methods

Most of the caddisfly specimens covered under this study were collected by the authors (April–October, 2010–2011) using light traps with ultraviolet or mercury-vapour bulbs or a 22-W Circline ultraviolet, fluorescent (BL) tube (Bioquip Products, USA) powered by a 12-volt rechargeable battery. Traps were placed near the edge of high-altitude streams in the Himalayan region of India for 1–4 hours beginning at dusk. The collected specimens were preserved in 70% ethyl alcohol with a drop of glycerol in each vial.

Various morphological characters such as the labial palps, antennae, setal warts, legs, wing maculation and venation, and genitalic structures were examined. Terminology for *Polyplectropus* genitalia follows that of Nielsen (1957) and Li & Morse (1998). The abdomens were put in 10% KOH solution overnight for macera-

 Submitted: 30 Jul. 2019; Accepted by Pongsak Laudee: 2 Sept. 2019; published: 12 Jun. 2020

tion. The genitalia were then put in a solution of 80% ethyl alcohol with a drop of glycerol for observation. The illustrations were prepared with a radical zoom stereoscopic binocular microscope (maximum magnification of 160X) fitted with an ocular grid in one eyepiece. The inking of the final drawings was done with Rotring black ink. After illustration, the genitalia for each specimen were transferred to a glass vial together with the rest of the specimen in 80% alcohol. The finished illustrations were scanned at 600 dpi greyscale and mounted onto plates in Adobe© Photoshop© 10.

The types of the new species have been deposited in the National Pusa Collection (NPC), Indian Agricultural Research Institute, New Delhi.

Systematics

Genus *Polyplectropus* Ulmer 1905

Polyplectropus Ulmer 1905: 103

Type species: *Polyplectropus flavicornis* Ulmer 1905 (monotypic)

***Polyplectropus purolaensis* sp. nov.**
(Figs 1–5)

Material examined. Holotype; male, India: Uttarakhand; Purola, 1,200 m, 28-ix-2008, Pandher & Parey, NPC.

Paratype: 1 male, same data as the holotype.

Diagnosis. This species resembles to *Polyplectropus menna* Malicky and Chantaramongkol 1993 (Thailand), *Pol. ranauensis* Ulmer 1951 (Sumatra), *Pol. nam* Malicky 1995a (Vietnam), and *Pol. anakjari* Malicky 1995b (Perak) in the general shape of the male genitalic appendages in lateral view. The male genitalia of *Pol. purolaensis* sp. nov. are most similar to those of *Pol. nam*. However, in *Pol. purolaensis* the inferior appendages are each broad in the basal half and constricted before the triangular apical half in lateral view, with distal end terminating before the distal ends of the preanal appendages; the apex of each inferior appendage is pointed in both lateral and ventral views. Tergum IX+X is quadrate with a median apical incision in dorsal view. Whereas, in *Pol. nam* the inferior appendages are each broad for the basal 2/3 of their length and then the apical 1/3 is slender and produced inwardly into ridge, the distal end is longer than distal end of the preanal appendages, and the apical part of the inferior appendages is rounded in both lateral and ventral views. Tergum IX+X is not quadrate in this latter species, but instead has two pointed teeth apically.

Description. Adult male; color in alcohol dark brown, maxillary palps and antennae light brown, wings infuscated, covered with small setae, dorsum of head blackish. Body covered with small brown pubescence. Length from tip of head to apex of folded forewings about 5.75 mm; maxillary palps each 1.25 mm long, segments I:II:III:IV:V = 1:1.5:2.25:1.75:5.25; labial palps each about 0.50 mm long; antennae each 4 mm long. Length of each forewing about 4.75 mm; venation typical for genus; forks I–V present; petiole of fork I about 1.5 times length of fork I; median cell closed, discoidal cell long, more than 3 times its width; Cu_2 apically bent, recurved proximally then joining 2A+3A at wing margin. Hind wings each about 3 mm long; discoidal cell open; Cu thickened.

Male genitalia (Figs. 1–5). Sternum IX anterolaterally pointed, trapezoidal in lateral view; anterior and posterior margins in ventral view with semicircular excisions. Terga IX+X short lobe-like in lateral view, quadrate and with apicomesal incision in dorsal view. Preanal appendages broad and parallel-sided, slightly narrowed at 2/3 distance from base in lateral view; long, slightly narrower in distal half in dorsal view; dorsobasal processes of preanal appendages needle like and recurved caudad at 1/4 distance from their bases in lateral view. Basal half of each inferior appendage broad, ventral margin deeply constricted at 1/3 distance from base, apical 1/3 triangular in lateral view with acute distal end terminating before distal end of preanal appendages; in ventral view ventromesal lobe of each inferior appendage well developed, forming subapical process, apex acute, strongly curved mesad. Phallus simple, bifid apically in lateral view.

Distribution. India: Uttarakhand.

Etymology. This species is named for the type locality 'Purola,' situated in Uttarakhand.

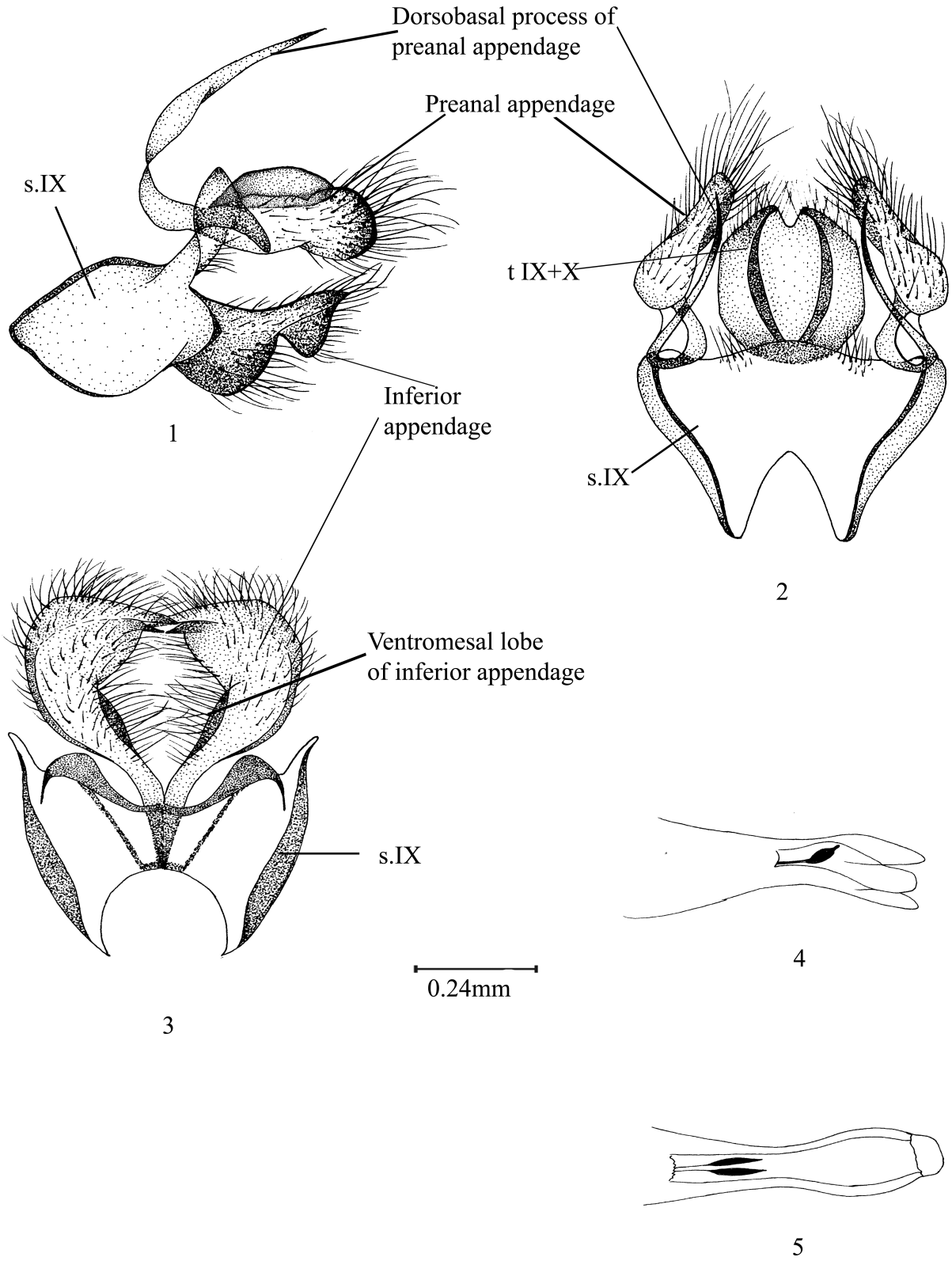
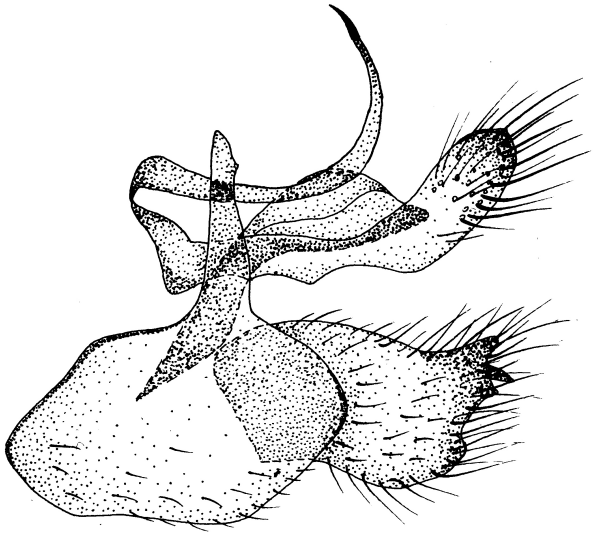


FIGURE 1–5. *Polyplectropus purolaensis* sp. nov., male genitalia. 1, left lateral view; 2, dorsal view; 3, ventral view; 4, phallic apparatus, left lateral view; 5, phallic apparatus ventral view.



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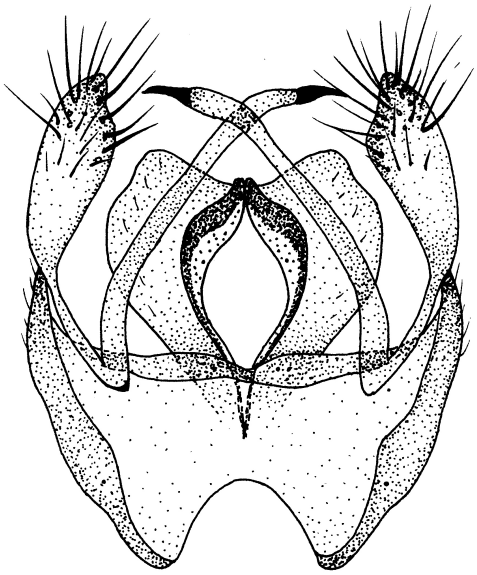

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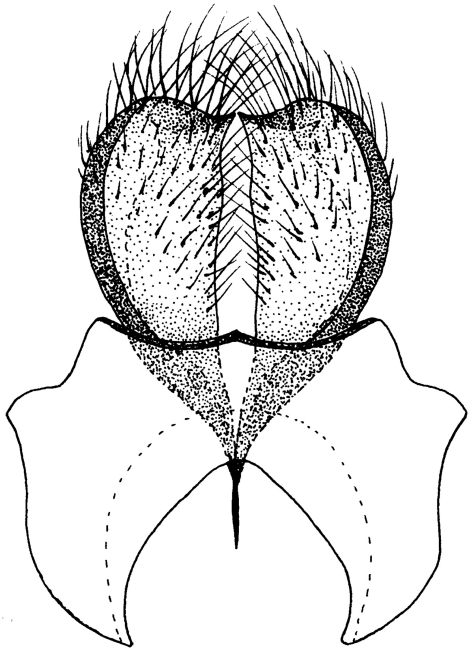

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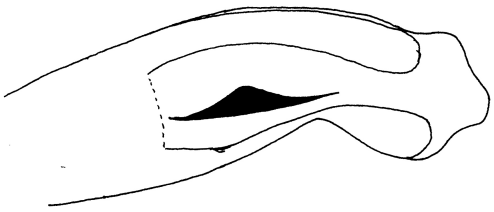

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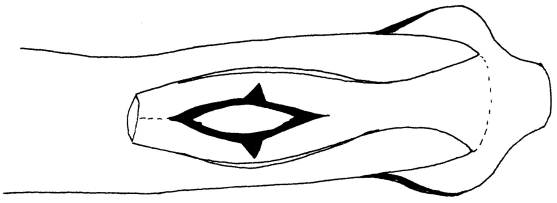

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FIGURE 6–10. *Polyplectropus sikkimensis* sp. nov., male genitalia. 6, left lateral view; 7, dorsal view; 8, ventral view; 9, phallic apparatus, left lateral view; 10. phallic apparatus, ventral view.

***Polyplectropus sikkimensis* sp. nov.**
(Figs 6–10)

Diagnosis. *Polyplectropus sikkimensis* sp. nov. is similar to *Pol. dairi* Malicky 1993, reported from Sumatra, in the lateral view of the male genitalic structures. However, in *Pol. sikkimensis* the inferior appendages are broad with three apicodorsal processes in lateral view, curved and pointed apicomesally in ventral view; whereas, in the *Pol. dairi* the inferior appendages are moderately long, narrow with a large swelling in the middle of the appendage in lateral view, oval in ventral view.

Material examined. Holotype; male, India: Sikkim; Singhik, 1900 m, 14-ix-2009, Pandher & Parey, NPC.

Paratype. 1 male, same data as the holotype.

Description. Adult male; color in alcohol dark brown, antennae and maxillary palps and legs light brown, wings brownish hyaline. Length from tip of head to apex of folded forewings about 5.50 mm; maxillary palps each about 1.25 mm long, segments I:II:III:IV:V = 1:1.5:2.25:1.6:5, segment II globular; labial palps small, each 0.50 mm long. Length of each forewing about 4 mm; venation typical for genus; discoidal cell long, about 2.5 times its width; forks I–V present, fork I with petiole about 1.5 times length of fork I; Cu_2 recurved, meeting combined 2A+3A near wing margin. Hind wings each about 3.25 mm long; discoidal cell open.

Male genitalia (Figs. 6–10). Sternum IX trapezoidal in lateral view; anterolaterally roundly produced. Terga IX+X produced dorsally, digitate in lateral view; posterior margin broadly and shallowly excised in dorso-ventral view. Preanal appendages each narrow at base, wider in distal half, with pointed apex in dorsal view; slightly deflexed dorsad and apically rounded in lateral view. Dorsobasal processes of preanal appendages needle-like, curved apicodorsally and recurved caudad and dorsad in lateral view; crossing each other in dorsal view. Inferior appendages broad, quadrate, each with 3 apicodorsal processes in lateral view, shorter than preanal appendages; in ventral view broadly rounded laterally, ventromesal lobe slightly indicated, apex curved and apicomesal angle pointed. Phallus long, tube-like, slightly notched preapicoventrally in lateral view; obliquely wide preapically in ventral view, rounded apically, phallotheca tube-like, endotheca membranous, with clearly visible sclerites.

Distribution. India: Sikkim.

Etymology. This species is named for its type state: Sikkim.

Acknowledgements

We are grateful to the Director Zoological Survey of India for providing necessary laboratory facilities. We are thankful to Dr. Pongsak Laudee for inviting and hosting us during the 16th International Symposium on Trichoptera held at the Prince of Songkla University, Surat Thani Campus, Thailand during 3–9 June 2018. Dr. H. Malicky (Lunz am See, Austria) and Dr. J.C. Morse (Clemson University, USA) kindly supported us with relevant literature and valuable suggestions. The Science & Engineering Research Board (SERB), Government of India, financially supported this research in the form of a SERB Start-up Young Scientist Project. Thanks are also due to various forest officials, Principal Chief Conservator of Forests & Chief Conservator of Forests and District Forest Officer of Uttarakhand and Sikkim for providing necessary facilities during expeditions. The authors would also like to say words of gratitude to Dr. H. Malicky as well as Dr. James O' Connor for critically reviewing this manuscript and sparing some of their valuable time to bring this manuscript into its present form.

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