



Addition of two new species to genus *Chimarra* Stephens (Trichoptera: Philopotamidae) from Sikkim (India)

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Abstract

Two new species of genus *Chimarra* Stephens from Sikkim are described and illustrated. Newly described species are *C. imperfecta* from Dikchu and *C. indentata* from Gangtok.

Keywords: *Chimarra*, *C. imperfecta*, *C. indentata*, Sikkim, India.

Introduction

Of the 665 species of *Chimarra* known from the World (Morse, 2011), 260 species are recorded from the Oriental region. The vast majority of these have been described just in the last 21 years. This genus is the largest genus of family Philopotamidae Stephens. It is divided into 4 subgenera; *Chimarra* Stephens, *Chimarrita* Blahnik, *Curgia* Walker and *Otarrha* Blahnik (Blahnik, 1998). The last 3 of these subgenera occur only in the Neotropical region, whereas subgenus *Chimarra* Stephens occurs in all biogeographic regions except Antarctic. Though this genus is cosmopolitan yet it is especially abundant in tropical regions. From India, this is the only subgenus represented under subfamily Chimarrinae Rambur. Blahnik (1998) revised the Neotropical species of this genus and discussed its phylogeny. Blahnik *et al.* (2009) described 30 new species of *Chimarra* from Borneo. Wichard (2007) described a new fossil species of this genus in Dominican amber. Immature stages of this genus were described by Hoang and Bae (2008) from Vietnam. Cartwright (2002) described Australian species of *Chimarra*. As far as Oriental region is concerned Malicky (1979, 1989, 1993, 1994, 1995, 1997, 1998, 2000, 2006, 2007, 2008, 2009, 2010 and 2011) is the main contributor with approximately 130 species to his credit from Nepal, China, Thailand, Indonesia, Vietnam, Bhutan, Myanmar, Malaysia, Java, Sumatra, Philippines, Borneo and India. Many other workers like Schmid (1958 and 1960), Kimmins (1957 and 1964), Mey (1990, 1995, 1998a, 1998b, 2003 and 2006), Hwang (1957), Olah (1993), Hsu and Chen (1996) also contributed to the systematics of this genus from Oriental region. So far, 21 species of this genus are on

the record from the faunistic limits of India. Out of this 14 have been reported from Himalayan region alone. Contributors to these 14 species include: Kimmins 1957 (5), Martynov 1935 (4), Ghosh and Chaudhary 1999 (2) and Saini *et al.* 2010 (3). Adult males of this genus are remarkable for their extreme variation in genital morphology particularly in the structure of inferior appendages, tergite X and phallic apparatus of males.

Materials and Methods

The caddisflies belonging to this genus were collected with light traps (ultraviolet mercury vapour bulbs) put near high altitude water streams in the Himalayan belt of India. The collected specimens were preserved in 70% ethyl alcohol with a drop of glycerol and labeled with pertinent information. The examination of various morphological characters such as labial palp, antenna, setal warts, legs, wing maculation, venation and genitalic attributes was done with the help of relevant literature. For studying the genitalic characters, the genitalia was removed from the specimen and put in 10% KOH solution overnight. After this, the genitalia was repeatedly washed with glacial acetic acid and then put in a solution of 80% ethyl alcohol with a drop of glycerol for observation. The drawings were prepared with the aid of a zoom stereoscopic binocular (Kyowa Getner DVZ-555 with maximum magnification of 90 X) fitted with an ocular grid. The inking of the final drawings was done with the Rottering black ink. Terminology for genitalia and wings follows Blahnik (1998, 2009). The types of the new species have been deposited in the

Museum of PUPM, Department of Zoology, Punjabi University, Patiala, India.

Genus: *Chimarra* Stephens, 1829

Type species: *Phryganea marginata* Linnaeus, 1767 (monobasic)

Diagnostic Features: The important diagnostic characteristics of genus *Chimarra* Stephens include: the foretibial spur formula 1, 4, 4; occipital portion of head well developed and extended in a wide curve behind eyes; ocelli present; maxillary palps 5-segmented, with second segment twice the length of first and fourth almost half the length of long annulated and flexible fifth segment; each forewing lacks fork IV (fork of M3+4); costal and anal margins are nearly parallel; vein R_3 strongly sinuous before discoidal cell, and forks I-III and V present. Hind wing only slightly wider than fore wing; vein R_1 narrowly parallel to subcosta, sometimes apparently fused; fork I-III and V present; anal vein A_2 is narrowly looped to join anal vein A_1 (Blahnik, 1998). Inferior appendages in the male genitalia are each 1-segmented while in the other members of family Philopotamidae these are 2-segmented.

***Chimarra imperfecta* sp. nov.**

(Figs. 1)

Material examined: Holotype: ♂, India: Sikkim, Dikchu, 1,550m, 22.v.1999, Ref. no. TRC/P/C42, (PUPM)

Distribution: India; Sikkim.

Etymology: The species name pertains to imperfect outer margin of lateral lobe of segment X.

Description: Adult male; length of fore wing 4.5mm. Body uniformly fulvous except fuscous head and thorax and entirely covered with thick, short and fuscous pubescence.

Male genitalia: Abdominal segment IX with anteroventral margin moderately, triangularly expanded; posteroventral process merely indicated, broadly sub-triangular, very wide basally, apex scarcely projecting, obtuse. Inferior appendage single segmented, slightly longer than tergum X, slender at base but broad at middle and roundly pointed at apex. Tergum X with sclerotized lateral and mesal lobes; each lateral lobe broad at base and its outer margin serrate and apically narrow in dorsal view, with numerous sensilla; median lobe digitate, slender, finger like, smaller than lateral lobe of tergum X. Preanal appendage short, globose, slightly flattened. Aedeagus with long median spine and two short basal spines.

Remarks: *Chimarra imperfecta* sp. nov. though resembling *C. fusca* Kimmins 1957, can be easily distinguished from the latter by the structure of inferior appendage which is narrow basally, broad and rounded apically (digitate in *C. fusca*); preanal appendage wart like (elongate in *C. fusca*); aedeagus with one long median and two short lateral spines (aedeagus enclosing mass of black spinules at apex in *C. fusca*).

***Chimarra indentata* sp. nov.**

(Figs. 2)

Material examined: Holotype: ♂, India: Sikkim, Gangtok 1,700m, 25.v.1999, Ref. no. TRC/P/C50, (PUPM).

Distribution: India; Sikkim.

Etymology: The species name is after peculiar indentation at apex of inferior appendage.

Description: Adult male; length of fore wing 6 mm. Body uniformly fuscous except the lower side of abdomen creamish and entirely covered with thick, short and fuscous setae. Head is covered with thick, long and nigrescent pubescence.

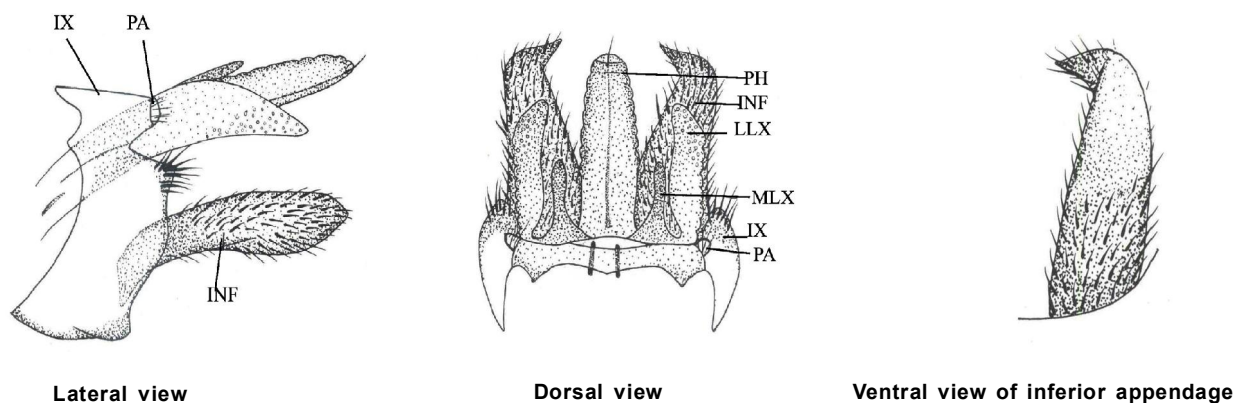
Male genitalia: Abdominal segment IX with anteroventral margin sub triangularly roundly pointed; posterolateral side truncate; posteroventral process short, broadly triangular. Inferior appendage single segmented, shorter than tergum X, with superior and inferior margins parallel, apically with shallow excision and in ventral view with mesoapically directed tooth. Tergum X with sclerotized lateral and mesal lobes; lateral lobe broad at base and narrow towards apex in lateral view, with an infold at middle, rounded apically, convergent in dorsal view; mesal lobe digitate, spoon like, twisted in dorsal view. Preanal appendage short, globose and spinifere. Aedeagus long, apically bifid, with a pair of sickle-like spines at base.

Remarks: *C. indentata* sp. nov. deserves the status of species novum as the apex of its inferior appendage is indented; sclerotized lateral lobe of tergum X large and convergent, with infold at middle and mesal lobe twisted at apex.

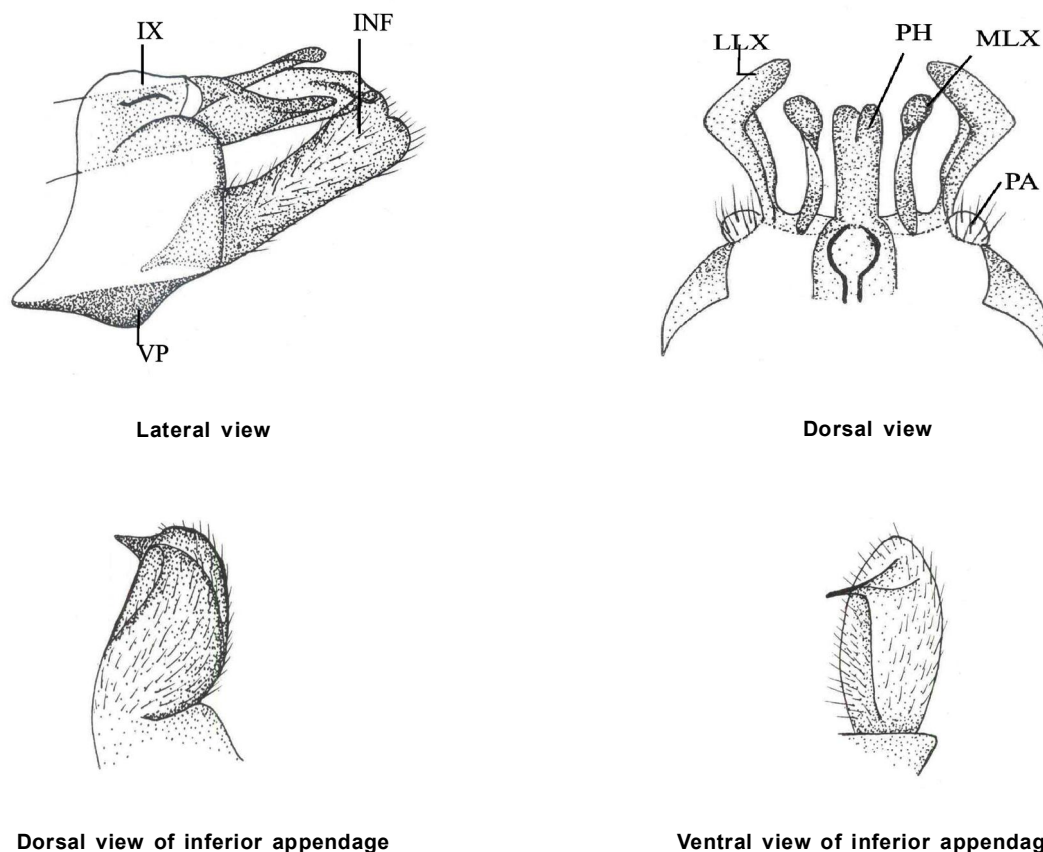
Abbreviations: PUPM= Punjabi University Patiala Museum.

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Figs.1: Male genitalia of *Chimarra imperfecta* sp. nov.



Figs.2: Male genitalia of *Chimarra indentata* sp. nov.

INF- Inferior appendage; LLX- Sclerotized lateral lobe of tergum X; MLX- Sclerotized mesal lobe of tergum X; PA- Preanal appendage; PH- Phallus; VP- Post ventral process; IX- Abdominal segment IX.

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