This paper is a contribution to the knowledge of the Indian fauna of the genus *Chimarra* Stephens. Here we describe and illustrate three new species from the Indian Himalaya: *Chimarra dentata* sp. n., *C. recurvata* sp. n. (both from Sikkim) and *C. dibangensis* sp. n. from Arunachal Pradesh. The males of these species are distinguishable from each other and from the previously described species by consistent variation in the structure of the inferior appendages, tergite X and the phallic apparatus. With these new additions, the genus is now represented by 40 species in India.

Keywords: Chimarrinae, Sikkim, Arunachal Pradesh, Himalaya, India.

INTRODUCTION

After *Rhyacophila* Pictet, 1834 (Rhyacophilidae) *Chimarra* Stephens, 1829 is the second largest caddisfly genus in terms of species diversity and is known from all biogeographical regions except Antarctica. The genus is represented by about 736 species in the World and 310 species are recorded from the Oriental region.

Andaman and Nicobar Island). Immature stages of this genus were described by Hoang and Bae (2008) from Vietnam.

Currently the 4 subgenera Chimarra, Chimarrita Blahnik, 1997, Curgia Walker, 1860 and Otarra Blahnik, 2002 (Blahnik 1998, 2002) are recognized in the genus Chimarra. The latter 3 subgenera occur only in the Neotropical Region, whereas the subgenus Chimarra occurs worldwide and is especially abundant in tropical regions, and also the only subgenus of the subfamily Chimarrinae represented in India.

So far 37 species of this genus have been recorded from India. Among these previously described species, 29 have been reported from the Himalayan region alone. Contributors to these species include; Kimmins (1957, 5 species), Martynov (1935, 4 species), Ghosh and Chaudhary (1999, 2 species), Saini et al. (2010, 2011a, b, 8 species) and Pandher and Saini (2012a, b, 10 species). Four species occurring in mountain springs of the Western Ghats (Maharashtra and Karnataka) were presented by Navas (1932, 3 species) and Kimmins (1957, 1 species) and 4 species are reported from tropical rain forests of Andaman and Nicobar Island by Malicky (1979, 2 species; 1997, 2 species). Chimarra aberrans Martynov occurs in all regions of India.

MATERIALS AND METHODS

Most of the Chimarra specimens covered in this study were collected by M. S. Pandher and S. H. Parey in 2009–2010 (April–October), using light traps with ultraviolet or mercury-vapour bulbs or a 22 W circline ultraviolet, fluorescent (BL) tube (Bioquip Products, USA) powered by 12 V 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 specimens collected were preserved in 70% ethyl alcohol with a drop of glycerol.

Various morphological characters such as labial palps, antennae, setal warts, legs, wing maculation and venation, and genitalic structures were examined. Terminology for Chimarra genitalia and wings follows that of Blahnik (1998) and Blahnik et al. (2009). The abdomens were put in 10% KOH solution overnight for maceration. Some specimens were also cleared in lactic acid according to the method described by Blahnik et al. (2007). The genitalia were put in a solution of 80% ethyl alcohol with a drop of glycerol for examination. Illustrations were prepared with a radical zoom stereoscopic binocular microscope (maximum magnification of 120×) fitted with an ocular grid in one eyepiece. The inking of the final drawings was done with Rotring black ink. After illustration, the genitalia were transferred to a glass vial together with the rest of the specimen in 80% ethanol. The 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.
TAXONOMY

Chimarra dentata sp. n.
(Figs 1–5)

Description – Adult male; color in alcohol light brown, head and thorax dark brown. Length from tip of head to apex of folded forewings 8 mm; length of maxillary palps 1.70 mm, 3rd segment longer than 2nd, length of 5th segment almost equal to 3rd segment; labial palps 0.70 mm. Forewing length 6.75 mm; discoidal cell length more than double its width; Rs curved, thickened; cross vein m proximal to cross veins s and r-m; 2A looped to 1A. Hind wing 5 mm long.

Male genitalia (Figs 1–5) – Tergum IX short, wide dorsally, produced anterodorsally; anteroventral margin roundly produced, posterolateral margin sinuously produced; posteroventral process absent. Preanal appendages short, rounded, setose, obliquely placed in lateral view. Inferior appendages longer than tergum X, bearing tuft of long setae in lateral view; directed posterodorsally, wide basal and ventral margins narrowing towards pointed apex in lateral view; in ventral view uniformly wide, mesally with 2 pointed, teeth-like structures preapically. Tergum X with sclerotized lateral lobes and separate projecting membranous mesal lobes; each lateral lobe long, narrow at base, wide medially, produced ventrally in lateral view; in dorsal view, resembling snake head like, bearing numerous sensilla; each mesal lobe directed posterodorsally, digitate, small than lateral lobe, about half the length of lateral lobe. Phallobase globular, sclerotized; endotheca, tubular, long, bearing granular area preapically, length not discernable; with 5 asymmetrical preapical spines visible in lateral view; phallotremal sclerite complex composed of ring and rod structures, forked prong-like in ventral view.

Diagnosis – In the shape of sclerotized lateral lobes in dorsal view and the phallus in lateral view Chimarra dentata sp. n. is similar to C. haimuoi Malicky, 1995. However, in lateral view the segment IX is slightly produced on posterolateral margin, sclerotized lateral lobe of tergum X wide apically in lateral view and the inferior appendage with 2 sharp dent like structures on mesal surface apically in C. dentata sets this species aside from C. haimuoi.


Distribution – India: Sikkim.

Etymology – This species is named on the basis of presence of two sharp dents on the mesal surface of each inferior appendage.

Chimarra recurvata sp. n.
(Figs 6–10)

Description: Adult male; color in alcohol, dark brown, antenna yellow, forewings light brown, dorsum of head dark. Length from tip of head to apex of folded wing 6.50 mm;
Figs 1–10. *Chimarra* species, male genitalia. 1–5 = *C. dentata* sp. n.: 1 = left lateral view, 2 = dorsal view, 3 = ventral view of right inferior appendage, 4 = phallus ventral view, 5 = phallus left lateral view. 6–10 = *C. recurvata* sp. n.: 6 = left lateral view, 7 = dorsal view, 8 = ventral view of right inferior appendage, 9 = phallus ventral view, 10 = phallus lateral view.
antenna 3.50 mm, maxillary palps about 1.90 mm, length of 3rd segment of maxillary palps
sub-equall to length of 5th, more than 1.75 times length of 2nd segment; labial palps 0.70
mm long. Length of forewings about 5 mm; venation: Rs curved, thickened, discoidal cell
about 2.5 times longer than wide; cross vein m in close proximity of s and r-m cross veins;
2A obsolete, looped to 1A; hind wings broad; 4 mm long.

Male genitalia (Figs 6–10) – Tergum IX antero-dorsally reduced, pointed; anterior
margin concave; produced antero-ventrally, postero-lateral margin produced; postero-
ventral process present. Preanal appendages setose, semicircular in lateral view. Inferior
appendages each, slightly longer than tergum X, in lateral view directed postero-dorsally,
narrow at base, widening gradually towards quadrate apex; in ventral view uniformly
wide, somewhat curved mesad sub-apically. Tergum X with sclerotized lateral lobes and
separate mesal lobes; each lateral lobe wedge shaped, broad basally, narrowing towards
pointed apex, with many sensilla in lateral view; in dorsal view diverging, with small
tooth-like structure on lateral side, basally wide and serrate along outer margin; mesal lobe
directed dorsally, basally broad, pointed apically in lateral view; in dorsal view, narrow at
base, broad medially, curved outward apically. Phallobase globular and sclerotized.
Endotheca tubular, looping forwards in ventral view, length not discernable, long spine-like
structure apically on ventral side in lateral view, a pair of curved spines visible preapically
in ventral view, necklace-like arrangement of small spine visible in ventral view, a pair of
lateral spines visible in ventral view.

Diagnosis – The male genitalia of this species is similar to those of Chimarra nepalensis Kimmins, 1964. However, the new species is distinguished by having segment IX more strongly produced anteroventrally and has long pointed postventral process, sclerotized lateral lobe of tergum X long, diver-
gent and with small tooth-like structure on the lateral margin in dorsal view distinguish this species from C. nepalensis.

Material – Holotype male, India: Sikkim, Singhik, 1700 m, 12-v-2009, Pandher & Parey (NPC). Paratypes: 2 males, 2 females, collection data same as of holotype.

Distribution – India: Sikkim.

Etymology – The species name pertains to apically recurved inferior appendages in
ventral view.

**Chimarra dibangensis** sp. n.  
(Figs 11–15)

Description: Adult male; color in alcohol brown, wings pale hyaline, antenna dark
brown, head dorsum dark brown, legs pale yellowish. Length from tip of head to apex of
folded forewing 5.25 mm; maxillary palp 1.25 mm long, 3rd segment about 1.5 times longer
than 2nd segment, sub equal in the length to 5th segment; labial palp 0.50 mm. Forewing
length 4 mm; venation: Rs curved, thickened, discoidal cell long, more than twice its width;
cross vein m in close proximity of s and r-m cross veins, 2A looped to 1A; hind wing about
3 mm long.
Male genitalia (Figs 11–15) — Tergum IX pointed posterodorsally, reduced; anterior margin concave; anteroventral margin slightly produced; posterolateral margin convex; posteroventral process well developed, pointed. Preanal appendages each rounded, setose in lateral view; globose in dorsal view. Inferior appendages, each almost equal to tergum X; in lateral view dorsally inflected basoventrally, almost uniformly wide, with serrate ventral margin; in ventral view, wide basally with median lobe on mesal surface, curved, pointed apicomically. Tergum X with lateral sclerotized lobes and separate mesal lobes; each lateral lobe broad basally, downwardly curved medially, each bearing 2 sensilla, one baso medially and another apically in lateral view; wedge-shaped in dorsal view; each mesal lobe digitate, bifid at apex, small than lateral lobes. Phallobase, rounded, and sclerotized. Endotheca tubular, length not discernable, produced ventrally near base in lateral view, with two lateral rows of comb like spines; phalotremal complex visible in ventral view, with well developed ring and rod structure.

Figs 11–15. *C. dibangensis* sp. n., male genitalia: 11 = left lateral view, 12 = dorsal view, 13 = ventral view of right inferior appendage, 14 = phallus ventral view, 15 = phallus left lateral view.
Diagnosis – In possession of well developed posteroventral process on sternum VIII, this species is similar to Chimarra exapia Malicky et Chantaramongkol, 1993 and C. atnia Malicky et Chantaramongkol, 1993 both reported from Thailand. However, C. dibangensis sp. n. is distinguished from these species by the presence of dorsally directed inferior appendage in lateral view; in lateral view the lateral lobe of tegum X has two sensilla one basal and another apical one. These sensillae are not present in the related species. Moreover, there are considerable differences visible in the phallus, and the shape and number of endothelial spines in all the three species.

Material – Holotype, male, India: Arunachal Pradesh, Roing, 800 m, 2-v-2010, Pandher & Parey (NPC). Paratype: 2 females, collection data same as of holotype.

Distribution – India: Arunachal Pradesh.

Etymology – The species name is derived from the district: “Lower Dibang valley” in which type locality falls.

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