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RESEARCH PAPER

Cuccodorodes gen. nov., an apterous Batrisitae from the tropical Himalayas (Coleoptera: Staphylinidae: Pselaphinae)

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Abstract. A new apterous genus of the pselaphine tribe Batrisini, *Cuccodorodes* gen. nov., is described from the tropical Himalayan region, with three new species: *C. darjeelingensis* sp. nov. (type species) from northern India, and *C. koshiensis* sp. nov. and *C. weiperti* sp. nov. from eastern Nepal. All new species are similar in external morphology, and are probably restricted to small geographical areas. Reliable species identifications may only be based on an examination of the aedeagus.

Key words. Coleoptera, Staphylinidae, Pselaphinae, Batrisini, new genus, new species, taxonomy, India, Nepal, Oriental Region

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Introduction

The tribe Batrisini of the staphylinid subfamily Pselaphinae is a genus-rich and morphologically diverse group that holds its greatest diversity in the tropics (Chandler 2001). While approximately 240 batrisine genera have been described worldwide (Yin 2018), the fauna is only fragmentarily documented in the tropical Himalayas (Schülke & Smetana 2015). My recent examination of over 15,000 unidentified batrisines housed in the Muséum d'histoire naturelle, Geneva led to the discovery of a fairly large series of a distinct apterous genus from northern India and eastern Nepal. Further study of this material revealed three superficially very similar, but distinct species which showed profound differences in aedeagal structures.

Material and methods

The type material of the new species is housed in the Muséum d'histoire naturelle, Geneva (MHNG) and Insect Collection of the Shanghai Normal University (SNUC). The label data of the material are quoted verbatim. My additional notes are included in parentheses.

Dissected parts were preserved in Euparal on plastic slides that were placed on the same pin with the specimen. The habitus images (Figs 1–2) were taken using a Canon 5D Mark III camera in conjunction with a Canon MP-E 65mm f/2.8 1–5X Macro Lens, and a Canon MT-24EX Macro Twin Lite Flash was used as light source. Images of the morphological details (Figs 3–6) were produced using a Canon G9 camera mounted to an Olympus CX31 microscope under reflected or transmitted light. Zerene Stacker (version 1.04) was used for image stacking. All images were modified and grouped into plates in Adobe Photoshop CS5 Extended. The distributional map was produced using Google Earth Pro ver. 7.1.7.2606. Collecting sites of A. Smetana and I. Löbl were retrieved from Smetana (1988).

Morphological terms follow Chandler (2001), except I use 'ventrite' instead of 'sternite' when describing thoracic structures; the abdominal tergites and sternites are numbered in Arabic for the visible segments, and in Roman to indicate their morphological positions. The visible abdominal segments begin with tergite 1 (IV) and sternite 1 (III). The following abbreviations are applied in the description: BL – length of the body (= HL + PL + EL + AL), AnL – length of the antenna, HL – length of the head from the anterior clypeal margin to the occipital constriction, HW – width of the head across the eyes, PL – length of the pronotum along the midline, PW – maximum width of the pronotum, EL – length of the elytra along the suture, EW – maximum width of the elytra, AL – length of the dorsally visible part of abdomen along the midline, AW – maximum width of the abdomen.

Taxonomy

Cuccodorodes gen. nov.

(Figs 1–6)

Type species. *Cuccodorodes darjeelingensis* sp. nov. (here designated).

Comparative diagnosis. At present *Cuccodorodes* cannot be placed near any known genus of the Indomalayan Batrisini. The relationship of the new genus to other members of the group is difficult to discern given the extensive amount of homoplasy in Batrisitae (Löbl & Kurbatov 2001). Members of *Cuccodorodes* are probably confined to the Himalayan region due to the complete absence of functional wings. The concept of the new genus is based on a unique combination of many peculiar external characters, notwithstanding that these may be homoplasious in other batrisine genera: head rounded-triangular in shape, lacking distinct frontal rostrum, vertex with a distinct reversed U-shaped sulcus connecting nude foveae, temples rounded, eyes small; antennal clubs loosely assembled by apical three antennomeres. Pronotum roundly expanded laterally, narrowing at the apex and base, disc with three basolateral foveae, and five longitudinal sulci, lateral pair of sulci strongly sinuate, densely setose and broadening in basal half, overlapping small lateral antebasal foveae, transverse antebasal sulcus absent, lacking antebasal and discal tubercles, ventral surface of pronotal lateral expansion deeply sulcate. Elytra small, much narrower than abdomen, strongly constricted at the base, each elytron with single basal fovea, lacking discal striae; lacking metathoracic wings; abdomen large, all foveae densely setose; tergite 1 (IV) longest, much longer than tergite 2 (V), with thin, oblique inner and thick outer marginal carinae, tergite 1 (IV) with four, and sternite 2 (IV) with eight basal foveae which are connecting inter-

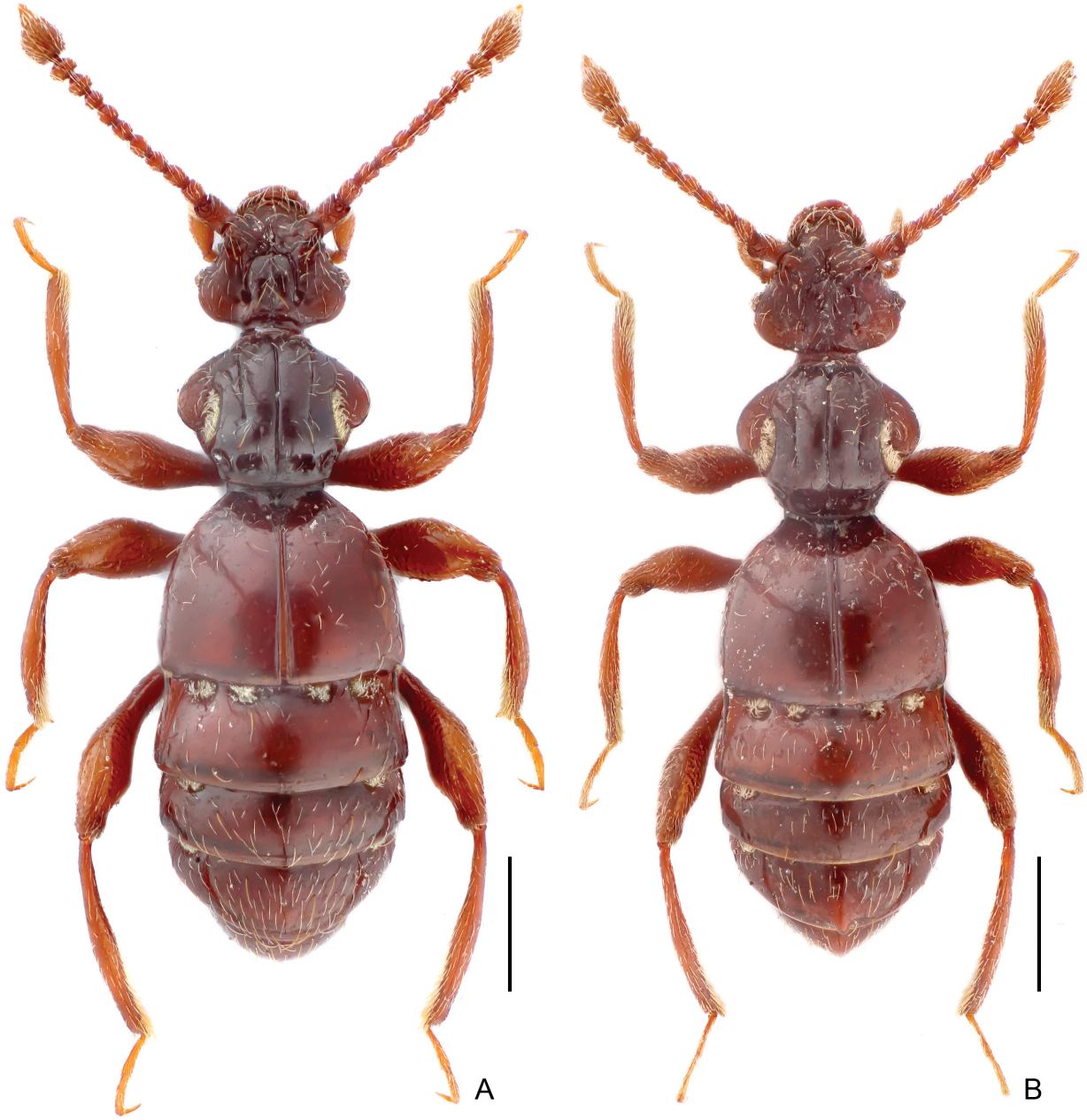

Fig. 1. Dorsal habitus of *Cuccodorodes darjeelingensis* sp. nov. A – male; B – female.

nally. Male has mesotibia spinose at the apex, sternite 2 (IV) decorated with arched median projection. Female has strongly sclerotized genital complex.

Description. Body length 2.93–3.26 mm; habitus (Figs 1–2) stout, antennae relatively short, not reaching half elytral length when angled posteriorly.

Head (Figs 3A, 3C, 3E, 4A–C) rounded-triangular; lacking distinct frontal rostrum, antennal tubercles strongly raised; vertexal foveae (Fig. 4A; *vf*) nude and small, connected by complete reversed U or V-shaped sulcus (Fig. 4A; *vs*); with 11 antennomeres, clubs loosely formed by three apical antennomeres, antennomeres XI elongate and conical; ocular-mandibular carinae (Fig. 4B; *omc*) distinct; eyes small; maxillary palpus with trapezoid palpomeres III, palpomeres IV narrowed at apex and base; punctiform gular foveae (Fig. 4C; *gf*) in shared round opening.

Pronotum (Figs 3A, 3C, 3E, 4D) transverse, lateral margins roundly expanded near middle, narrowing at apex and base, anterior and posterior margins slightly curved; lateral antebasal foveae (Fig. 5A; *laf*) small, covered by dense setae and not visible in dry specimens, median antebasal fovea (Fig. 4D; *maf*) tiny and obscure, lacking discal or antebasal spines/tubercles; disc convex; with three pairs of basolateral foveae (Figs 4D, 5A; *blf*) and one pair of basolateral pits (Fig. 5A; *p*); median (Figs 4D, 5A; *mls*), discal (Figs 4D, 5A; *dls*), and lateral (Figs 4D, 5A; *lls*) longitudinal sulci present, lateral pair of sulci strongly sinuate, densely setose and broadening in basal half, lacking transverse antebasal sulcus; prosternite with distinct paranotal sulci (Fig. 4E; *ps*); ventral side of lateral expansion deeply sulcate; opening of lateral procoxal foveae (Fig. 4E; *lpcf*) at base of broad, setose sulci.

Fig. 2. Dorsal habitus of *Cuccodorodes* species. A – *C. koshiensis* sp. nov., male; B – *C. weiperti* sp. nov., male.

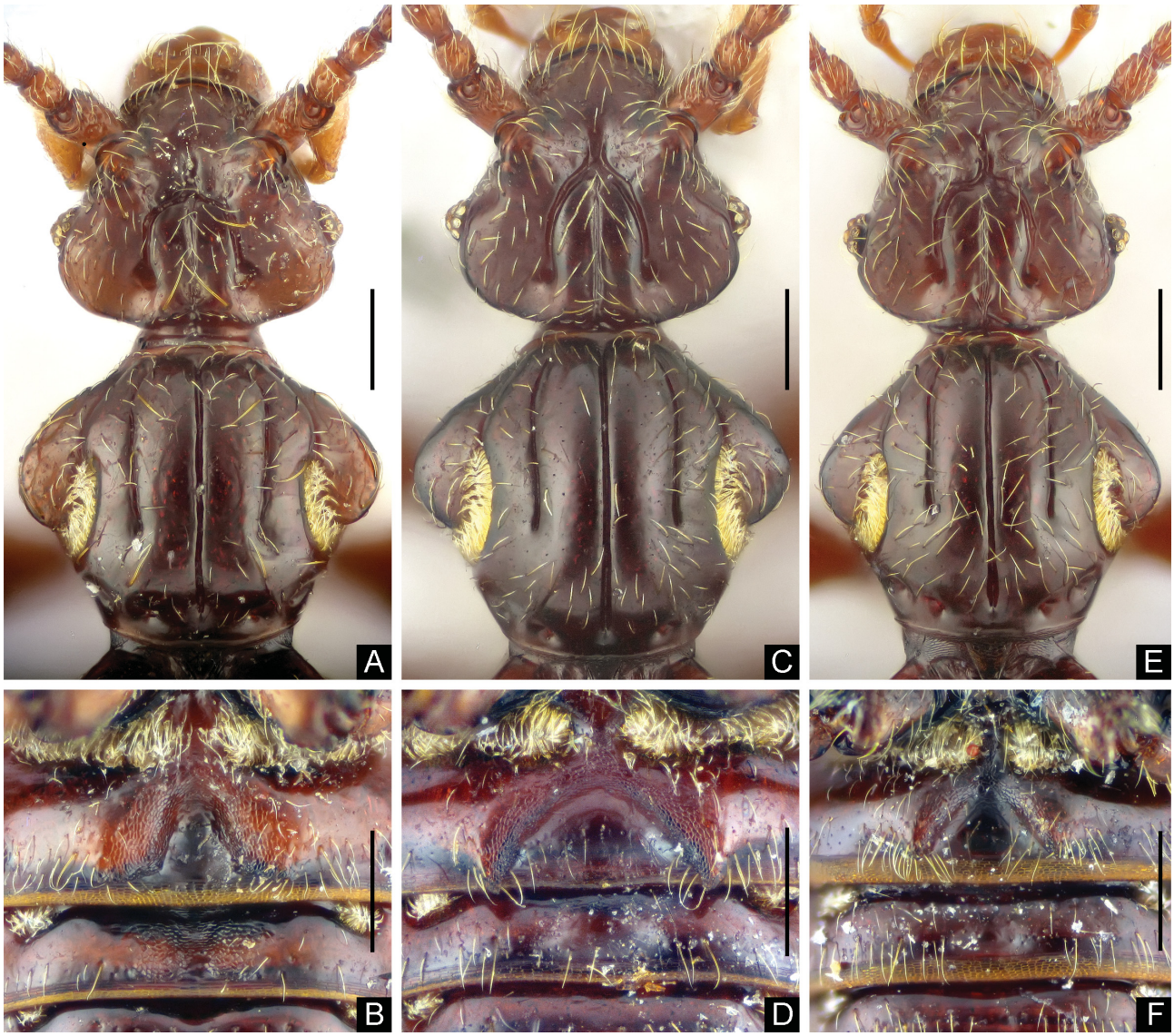

Fig. 3. Male head and pronotum (A, C, E), and sternites 2–3 (IV–V) (B, D, F) of *Cuccodorodes darjeelingensis* sp. nov. (A–B), *C. koshiensis* sp. nov. (C–D), and *C. weiperti* sp. nov. (E–F).

Elytra (Figs 1–2) strongly constricted at base; each elytron (Fig. 4F) with one basal fovea (Fig. 4F; *bef*), lacking subbasal fovea, lacking discal stria, with complete sutural stria, thin marginal carina present in posterior half of lateral side.

Mesoventrite with median foveae (Fig. 5B; *mmsf*) in transverse opening, with large lateral mesoventral foveae unforked internally (Fig. 5B; *lmsf*), with oval mesoventral foveae, metaventrite with lateral foveae (Fig. 5B; *lmtf*), posterior margin with narrow notch at middle; metacoxae well-separated.

Abdomen with lateral margins of visible tergite 1 (IV) produced as thick, triangular ridge edged by thin inner and thick marginal carinae; tergites 2–3 (V–VI) with lateral margins similarly edged; tergite 4–5 (VII–VIII) lacking marginal carinae; tergite 1 (IV) longest, 2–3 (V–VI) distinctly shorter and subequal in length, 4 (VII) longer than 3 (VI); tergite 1 (IV) with one pair of mediobasal (Fig. 5C; *mbf*) and one pair of basolateral foveae (Fig. 5C; *blf*), lacking discal carinae and basal impression, tergites 2–4 (V–VII) each with one pair of basolateral foveae. Visible sternite 2 (IV) with one pair of mediobasal (Fig. 5C; *mbf*) and three pairs of basolateral foveae (Fig. 5C; *blf*) in broad, setose basolateral sulci, sternites 3–4 (V–VI) each with two pairs of basolateral foveae, and sternite 5 (VII) with one pair of basolateral foveae. All foveae of abdomen densely setose, those of tergite 1 (IV) and sternite 2 (IV) deep and connecting internally (Fig. 5C).

Legs relatively stout; tarsomeres II and III subequal in length.

Male has relatively longer antennae than female (Fig. 1); mesotibia with one tubercle (Fig. 4G; *at*) and two small spines (Fig. 4G; *as*) at apex; sternite 2 (IV) (Figs 3B, 3D, 3F) modified with arched median projection (Figs 3B, 3D, 3F, 5C; *mp*); sternite 7 (IX) semi-membranous (Figs 6A, 6D, 6G); aedeagus (Figs 6B–C, 6E–F, 6H–I) with parameres fused to median lobe to form elongate ventral lobe, with large basal capsule and foramen, with well-developed basoventral projection. Female genital complex composed of strongly sclerotized structure (Figs 5D–E).

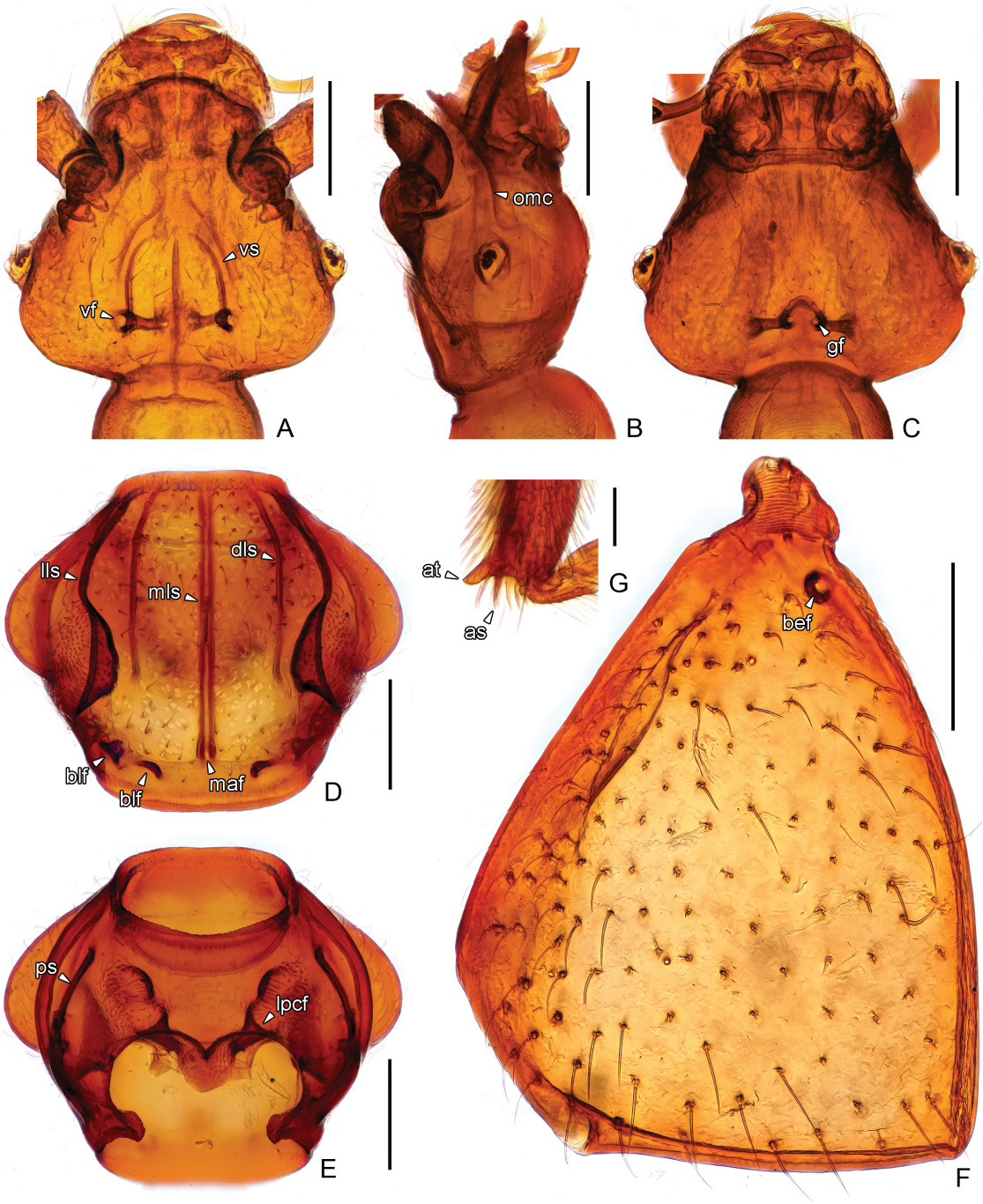

Fig. 4. Morphology of *Cuccodorodes* gen. nov., based on *C. koshiensis* sp. nov. A–C – head in dorsal (A), lateral (B), and ventral (C) view; D – pronotum; E – prosternite; F – left elytron; G – apex of male mesotibia. Abbreviations: as – apical spine; at – apical tooth; bef – basal elytral fovea; blf – basolateral foveae; dls – discal longitudinal sulcus; gf – gular foveae; lls – lateral longitudinal sulcus; lpcf – lateral procoxal foveae; maf – median antebasal fovea; mls – median longitudinal sulcus; omc – ocular-mandibular carina; ps – paranotal sulcus; vf – vertex foveae; vs – vertexal sulcus. Scale bars: 0.2 mm in A–F; 0.05 mm in G.

Etymology. The new genus is named in honor of Dr. Giulio Cuccodoro, who has offered support and help during my visits to Geneva. The gender is masculine.

Key to males of *Cuccodorodes*

Notes. The three new species described below are exceptionally similar in external morphology, and probably restricted to a small area in eastern Nepal and northern India (Fig. 7). Reliable species identification of additional material from this region requires an examination of the aedeagus.

1 Vertexal sulcus evenly convergent anteriorly, more or less V-shaped (Fig. 3C); sternite 2 (IV) with area surrounded by median projection broadly triangular (Fig. 3D). (Nepal: Koshi; Fig. 7). ..... ***C. koshiensis* sp. nov.**

– Vertexal sulcus truncate anteriorly, more or less U-shaped (Figs 3A, 3E); sternite 2 (IV) with area surrounded by median projection narrowly triangular (Figs 3B, 3F). 2

2 Median area of sternite 3 (V) distinctly microsculptured (Fig. 3B); membranous basal half of sternite 7 (IX)

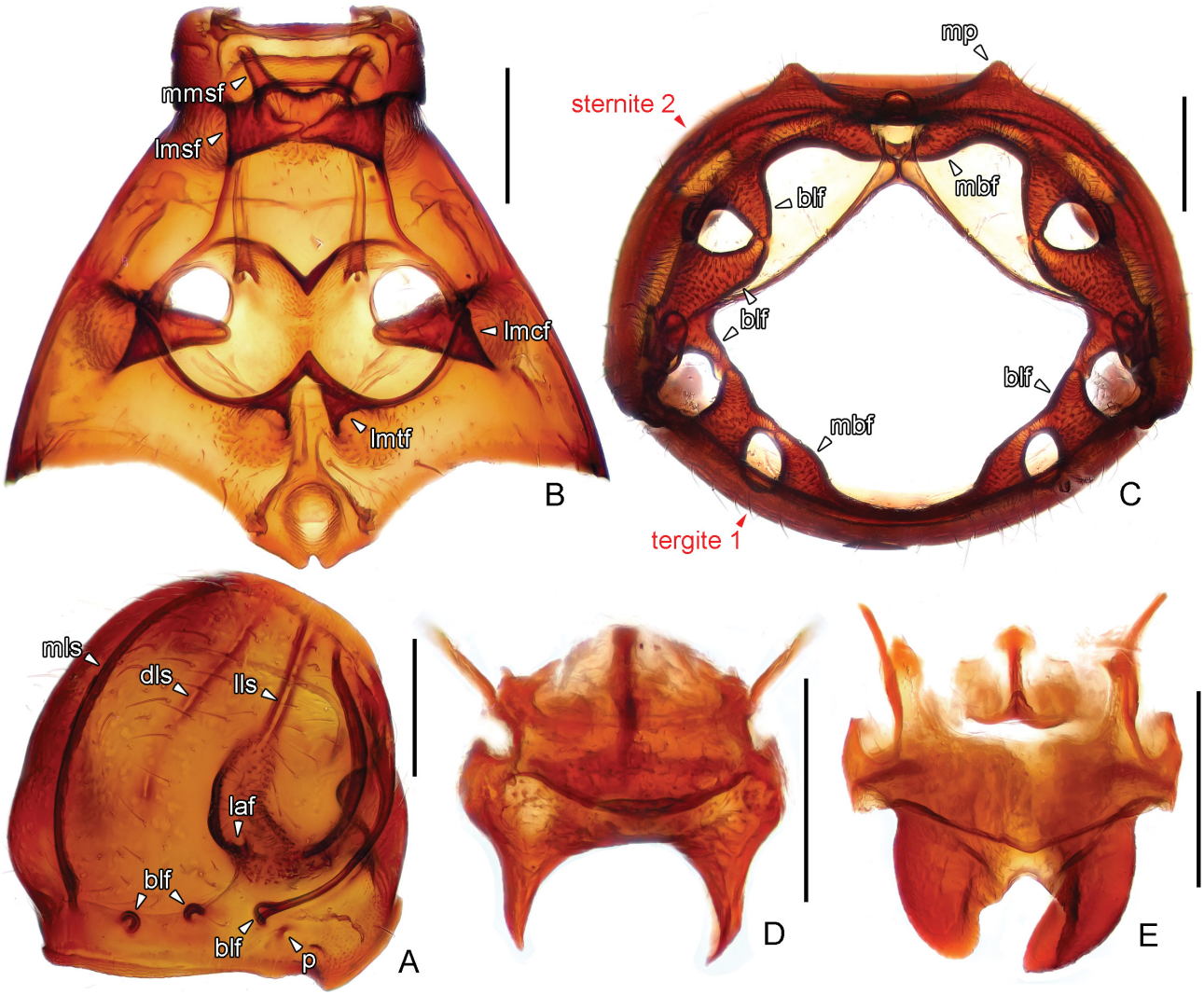

Fig. 5. Morphology of *Cuccodorodes* gen. nov., based on *C. koshiensis* sp. nov. unless specified otherwise. A – prothorax, in dorso-lateral view; B – meso- and metaventrite; C – internal foveal structure of tergite 1 (IV) and sternite 2 (IV); D–E – female genital complex, in dorsal view (D – *C. darjeelingensis* sp. nov.; E – *C. koshiensis* sp. nov.). Abbreviations: blf – basolateral foveae; dls – discal longitudinal sulcus; laf – lateral antebasal foveae; lls – lateral longitudinal sulcus; lmcf – lateral mesocoxal foveae; lmsf – lateral mesoventral foveae; lmtf – lateral metaventral foveae; mbf – mediobasal foveae; mls – median longitudinal sulcus; mmsf – median mesoventral foveae; mp – median projection; p – pit. Scale bars: 0.2 mm.

obliquely and lengthily elongate (Fig. 6A); aedeagus in ventral view lacking narrowly elongate sclerite at left side (Fig. 6C). (India: Darjeeling; Fig. 7). .... ***C. darjeelingensis* sp. nov.**

– Median area of sternite 3 (V) lacking microsculpture (Fig. 3F); membranous basal half of sternite 7 (IX) roundly expanded (Fig. 6G); aedeagus in ventral view with narrowly elongate sclerite at left side (Fig. 6I). (Nepal: Mechi; Fig. 7). ..... ***C. weiperti* sp. nov.**

Cuccodorodes darjeelingensis sp. nov.

(Figs 1, 3A–B, 5D, 6A–C, 7)

Type material (37 ♂♂ 32 ♀♀). Holotype: **INDIA:** ♂, 'INDIA, W. BENGAL, Darjeeling dist., Tonglu, 3100 m, 16.x.78, Besuchet-Löbl (MHNG). Paratypes: **INDIA:** 36 ♂♂ 32 ♀♀, same label data of the holotype (6 exs in SNUC, rest in MHNG).

Description. ***Male.*** General habitus stout (Fig. 1A), body reddish brown, pronotum slightly darker, mouthparts and tarsomeres lighter in color, BL 3.10–3.14 mm. Head slightly wider than long, HL 0.51–0.52 mm, HW 0.55–0.57 mm; vertexal foveae located below level of posterior margin of eyes, sulcus truncate anteriorly, more or less U-shaped (Fig. 3A), median carina extending anteriorly from near head base to meet sulcus; eyes small, slightly protruding laterally, each eye composed of about 10 facets; AnL 1.02–1.10 mm. Pronotum wider than long, PL 0.58–0.60 mm, PW 0.71–0.72 mm; median longitudinal sulcus extending from small median antebasal fovea to near apex, discal longitudinal sulci slightly curved, lateral longitudinal sulci strongly sinuate, broadening at basal half and densely setose. Elytra much wider than long, EL 0.73–0.77 mm, EW 0.87–0.93 mm. Abdomen widest at tergite 1 (IV), AL 1.13–1.20 mm, AW 0.91–0.96 mm; sternite 1 (IV) with broad and thickened arched median projection (Fig. 3B), surface of projection with scaly microsculpture, area surrounded by projection narrowly triangular; median area of sternite 3 (V) with distinct microsculpture; sternite 7 (IX) with membranous basal half obliquely and lengthily elon-

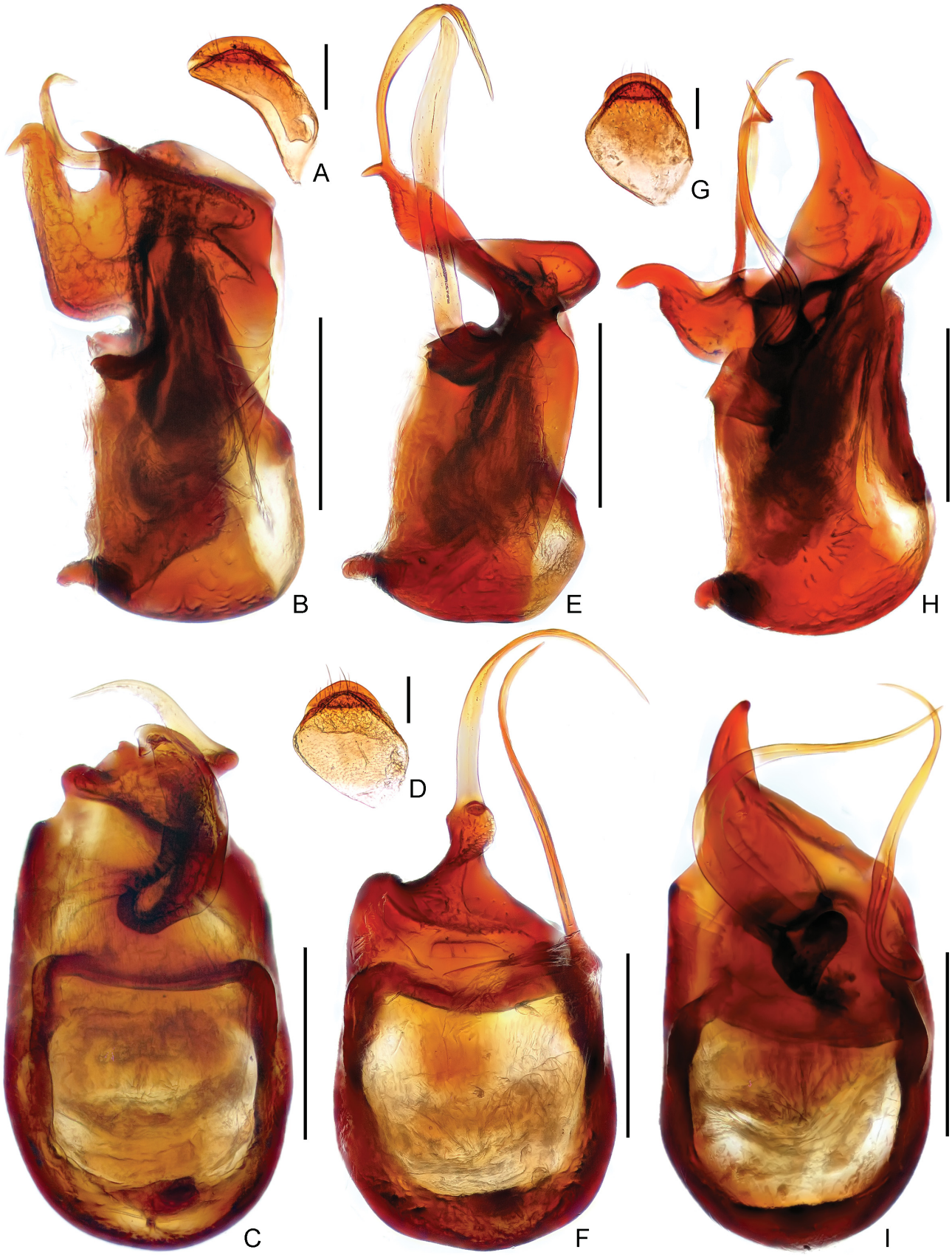

Fig. 6. Male sternite 7 (IX) (A, D, G), and aedeagus (B–C, E–F, H–I) of *Cuccodorodes darjeelingensis* sp. nov. (A–C), *C. koshiensis* sp. nov. (D–F), and *C. weiperti* sp. nov. (G–I). Scale bars: 0.1 mm in A, D, G; 0.2 mm in B–C, E–F, H–I.

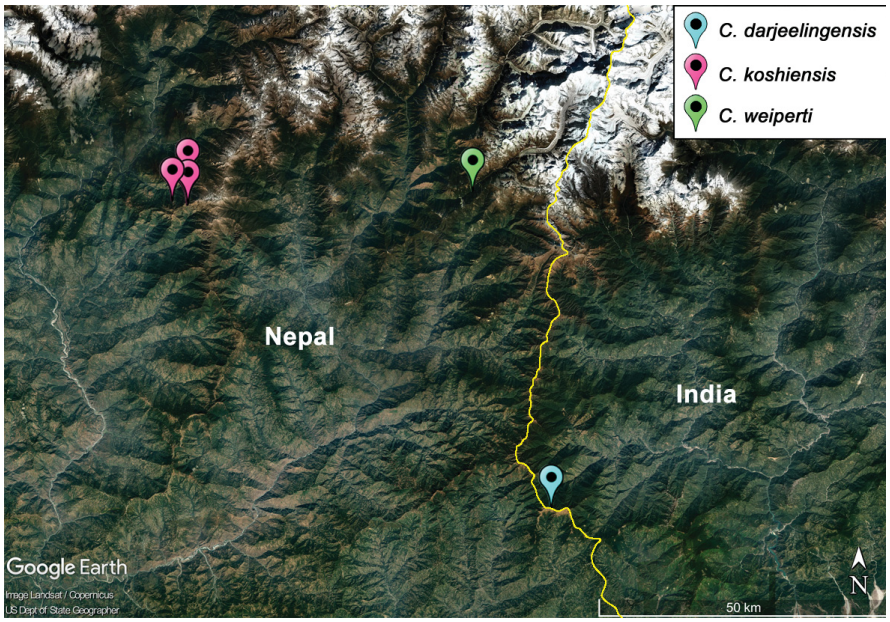

Fig.7. Map showing the distribution of *Cuccodorodes* species.

gate (Fig. 6A). Length of aedeagus (Figs 6B–C) 0.61 mm; ventral lobe broadly protruding ventrally, pointed at apex, dorsal margin with short elongate sclerite narrowing and curved apically, lacking longitudinal sclerite at left side.

Female. General habitus similar to male (Fig. 1B) but with shorter antennae; each eye composed of about 10 facets; mesotibia simple; most individuals bear one small to conspicuous median projection on tergites 3–4 (VI–VII), while few others totally lack such structure; sternite 2 (IV) unmodified; genital complex (Fig. 5D) with basolateral extensions narrowing and acute posteriorly. Measurements: BL 2.94–3.08 mm, AnL 1.07–1.10 mm, HL 0.53–0.54 mm, HW 0.58–0.59 mm, PL 0.58–0.59 mm, PW 0.68–0.69 mm, EL 0.72 mm, EW 0.86–0.87 mm, AL 1.05–1.15 mm, AW 0.88–0.91 mm.

Etymology. The new species is named after Darjeeling District, where the type locality lies; adjective.

Distribution. India: Darjeeling District (Fig. 7).

Cuccodorodes koshiensis sp. nov.

(Figs 2A, 3C–D, 5E, 6D–F, 7)

Type material (14 ♂♂ 33 ♀♀). Holotype: **NEPAL:** ♂, 'E. NEPAL: KOSI, Val. Induwa Kola, 2800 m, 15.iv.(19)84, Löbl – Smetana' (MHNG). Paratypes: **NEPAL:** 13 ♂♂ 30 ♀♀, same label data as holotype; same collector, also from KOSI; 1 ♀, 'Goru Dzure Dara, 3600 m, 9.iv.84'; 1 ♀, 'Goru Dzure Dara, 3350 m, 9.iv.84'; 1 ♀, 'Crete, S. Mangsingma, 2800 m, 7.iv.84' (4 exs in SNUC, rest in MHNG).

Description. ***Male.*** General habitus stout (Fig. 2A), body reddish brown, pronotum slightly darker, mouthparts and tarsomeres slighter in color, BL 3.02–3.36 mm. Head about as long as wide, HL 0.56–0.58 mm, HW 0.57–0.59 mm; vertexal foveae located far below level of posterior margin of eyes, sulcus evenly convergent anteriorly, more or less V-shaped (Fig. 3C), median carina extending anteriorly from near head base to meet sulcus; eyes small, slightly protruding laterally, each eye composed of about 10 facets; AnL 1.18–1.20 mm. Pronotum wider than long, PL 0.58–0.62 mm, PW 0.68–0.69 mm; median longitudinal sulcus extending from small median antebasal fovea to near apex, discal longitudinal sulci slightly curved, lateral longitudinal sulci strongly sinuate, broadening at basal half and densely setose. Elytra much wider than long, EL 0.72–0.82 mm, EW 0.87–0.93 mm. Abdomen widest at tergite 1 (IV), AL 1.13–1.16 mm, AW 0.89–1.00 mm; sternite 1 (IV) with broad and moderately thickened arched median projection (Fig. 3D), surface of projection with scaly microsculpture, area surrounded by projection broadly triangular; median area of sternite 3 (V) lacking microsculpture; sternite 7 (IX) with membranous basal half broadly expanded (Fig. 6D). Length of aedeagus (Figs 6E–F) 0.64 mm, ventral lobe strongly elongate, protruding posteroventrally; two markedly elongate sclerites at apex of ventral lobe and left side.

Female. General habitus similar to male; with slightly shorter antennae; each eye composed of about 9–10 facets; mesotibia simple; none of available specimens has median projection on tergites 3–4 (VI–VII); sternite 2 (IV) unmodified; genital complex (Fig. 5E) with basolateral extensions roundly narrowing posteriorly. Measurements: BL 2.93–3.02 mm, AnL 1.13 mm, HL 0.56–0.58 mm, HW 0.56–0.58 mm, PL 0.58 mm, PW 0.68 mm, EL 0.71–0.74 mm, EW 0.89–0.92 mm, AL 1.10–1.12 mm, AW 0.96–0.97 mm.

Etymology. The new species is named after Koshi Zone, where the type locality lies; adjective.

Distribution. Nepal: Koshi (= Kosi) Zone (Fig. 7).

Cuccodorodes weiperti sp. nov.

(Figs 2B, 3E–F, 6G–I, 7)

Type material (2 ♂♂). Holotype: **NEPAL:** ♂ 'NEPAL, Prov. Mechi, südlich von Tortong vor Paß, Gesiebe, 16.iv.2003, 3100 m NN, leg.: J. Weipert' (MHNG). Paratype: **NEPAL:** 1 ♂, same label data as holotype (MHNG).

Description. ***Male.*** General habitus stout (Fig. 2B), body reddish brown, pronotum slightly darker, mouthparts and tarsomeres lighter in color, BL 2.95–3.10 mm. Head about

as long as wide, HL & HW 0.57–0.58 mm; vertexal foveae located below level of posterior margin of eyes, sulcus truncate anteriorly, more or less U-shaped (Fig. 3E), median carina extending anteriorly from near head base to meet sulcus; eyes small, slightly protruding laterally, each eye composed of about 10 facets; AnL 1.13–1.15 mm. Pronotum wider than long, PL 0.60–0.61 mm, PW 0.68–0.69 mm; median longitudinal sulcus extending from small median antebasal fovea to near apex, discal longitudinal sulci slightly curved, lateral longitudinal sulci strongly sinuate, broadening at basal half and densely setose. Elytra much wider than long, EL 0.71–0.76 mm, EW 0.87–0.89 mm. Abdomen widest at tergite 1 (IV), AL 1.11–1.20 mm, AW 0.93–0.97 mm; sternite 1 (IV) with narrow and thickened arched median projection (Fig. 3D), surface of projection with scaly microsculpture, area surrounded by projection narrowly triangular; median area of sternite 3 (V) lacking microsculpture; sternite 7 (IX) with membranous basal half broadly expanded (Fig. 6G). Length of aedeagus (Figs 6H–I) 0.64 mm; ventral lobe conspicuously protruding ventrally; two markedly elongate sclerites at apex of ventral lobe and left side.

Female. Unknown.

Etymology. The new species is named after Jörg Weipert (Plaue, Germany), who collected the type series.

Distribution. Nepal: Mechi Zone (Fig. 7).

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