



Three new species of the genus *Cacothryptus* Sharp, 1902 from Asia (Coleoptera: Limnichidae)

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Cacothryptus Sharp, 1902 is a genus of Limnichidae with a mainly Oriental distribution, with only some species at the fringes of the Palearctic (Hernando & Ribera 2014, 2016). The genus was recently revised by Hernando & Ribera (2014), which described 14 new species and divided the by then 20 species in five species groups, the *compactus*, *rouyeri*, *testudo*, *jaechi* and *zetteli* groups. Subsequently, Yoshitomi (2015) described four additional species in the *C. testudo* group, rising the total number of species to 24. In this paper we describe three additional species in the *testudo* and *compactus* groups, among them the so far westernmost species of the genus, from Uttarakhand (India).

Materials and methods

Specimens were rehydrated with warm water and dissected; genitalia were mounted in DMHF (dimethyl hydantoin formaldehyde) on transparent cards and pinned with the specimens. Aedeagus were figured from outlines traced from photographs obtained with a compound microscope. Exact label data are cited for specimens. A double slash (//) indicates separate label lines. The types of all new species are deposited in the NMW.

Taxonomy

Cacothryptus Sharp, 1902

Cacothryptus Sharp (1902: 63). Type species: *Cacothryptus compactus* Sharp, 1902 by monotypy.

Macrobyrrhinus Pic (1922: 4). Type species: *Macrobyrrhinus rouyeri* Pic 1922 by monotypy. Synonymy in Champion (1923: 222).

Cacothryptus testudo group

Hernando & Ribera (2014)

Cacothryptus occidentalis sp. n. (Fig. 1)

Type locality. Teen Pani, Uttarakhand, India.

Type material. Holotype male (NMW): "IND: Uttaranchal // Teen Pani [r.], Deharadun Dist. // 30°04'20"N/78°12'23"E // 9.XI.2006 // leg. M.A. Jäch (3)"; "left tributary of River Song // NE Doiwala // ca. 15 km ESE Dehradun // ca. 365 m a.s.l."; genitalia extracted and mounted on a transparent card, abdominal tergites mounted on a second transparent card; both cards pinned with the same specimen; plus red holotype label.

Description. Length 4.1, width 2.1 mm. Body dark brown, oval. Antennae and legs dark brown, except protibiae, which are black, and tarsi, paler.

Head: Eye margin weak, with a small denticle by insertion of antennae; with a very narrow supra-ocular sulcus. Eyes prominent. Puncturation on head uniformly fine and dense; space between punctures larger than their diameter. Pubescence long, erect, golden.

Pronotum: Transverse, slightly narrower than base of elytra, lateral margins regularly and slightly curved, very finely bordered. Puncturation denser than in head, very uniform; spaces between punctures wider than diameter. Two types of setae, one long, erect and castaneous; a second shorter, anteriorly recumbent, golden. The recumbent setae forming a weakly defined pattern.

Elytra: Base of elytra very convex. Disk with irregular and weakly impressed 3-4 rows of punctures. Elytral pubescence similar to that of pronotum, but anteriorly recumbent; with a zig-zag pattern, with varying colouration depending on illumination. Membranous wings well developed.

Venter: Fully pubescence except hypomeres, which are glabrous; prosternum strongly encased into the mesosternum. Prosternum finely punctured, margins bordered; mesosternum small, strongly punctured; metasternum with puncturation similar to mesosternum, dense and strong. Puncturation double, with smaller punctures irregularly distributed among the larger. Glandular pores in 4th abdominal sternite only.

Aedeagus (Fig. 1): Slightly curved in lateral view. Apex of median lobe very wide in lateral view, with a strong angle in ventral side; apex emarginated in dorsal view, with a lateral angulosity. Apex of parameres rounded, internal margin of emargination sinuated, with a medial angulosity.

Comparative notes. Aedeagus in lateral view similar to *C. jendeki* Hernando & Ribera, 2014 and *C. taiwanus* Yoshitomi, 2015. Apex of the parameres rounded as in *C. sinensis* Hernando & Ribera, 2014 (with a very different apex of the median lobe), *C. orion* Yoshitomi, 2015 (without denticle in lateral view) and *C. taiwanus* Yoshitomi, 2015 (with broader apex of parameres and shorter median lobe in lateral view, and different apex of the median lobe in dorsal view).

Etymology. Named in reference to their known distribution, at the occidental extreme of the range of the genus.

Distribution. So far only known from the type locality.

***Cacothryptus compactus* group**

Hernando & Ribera (2014)

***Cacothryptus schillhammeri* sp. n. (Fig. 2)**

Type locality. Alaungdaw Katthapa NP, Sagaing Division, Myanmar.

Type material. **Holotype** male (NMW): "MYANMAR: Sagaing Division // Alaungdaw Katthapa NP // 22°19.113'N 94°28.518'E // 13.5.2003, ca. 350 m // leg. Schillhammer et al. (122)"; genitalia extracted and mounted on a transparent card, abdominal tergites mounted on the same card, pinned with the specimen; plus red holotype label.

Paratypes. 5 exx (NMW): same data as holotype, with red paratype labels.

Description. Holotype: length 3.7 mm, width 2.1 mm; paratypes: length 3.7-4.2 mm, width 2.1-2.2 mm. Body black, oval. Antennae, other cephalic appendages and legs dark brown, protibiae darker.

Head: Eye margin weak, with a small denticle by insertion of antennae; with a very narrow supra-ocular sulcus. Eyes slightly prominent. Puncturation on head uniformly fine and very dense; space between punctures smaller than their diameter. Two types of golden pubescence, one long, erect, a second short, very dense, recumbent. Pubescence on frons orientated towards clypeum; pubescence on the lateral and basal areas orientated towards vertex.

Pronotum: Transverse, slightly narrower than base of elytra, lateral margins regularly and slightly curved. Very finely bordered; border narrowing towards base, in which it becomes almost unappreciable. Puncturation similar to that on head, denser on disc, less dense on margins, very uniform; spaces between punctures wider than diameter. Two types of setae, one long (much longer than on head), erect and castaneous; a second shorter, anteriorly recumbent, golden. The recumbent setae forming a weakly defined pattern.

Elytra: Disk with double puncturation, one very fine and dense, a second coarser, more irregular but with some series forming incipient 4-5 series, especially in the disc. Elytral pubescence double, similar to that of pronotum; erect setae darker, recumbent setae generally golden, but in some areas darker (colour depends on angle of incidence of light). Recumbent seta with a zig-zag pattern, orientated towards apex. Elytra bordered; border stronger in humerus and less marked apically, almost indistinguishable at apex. Membranous wings well developed.

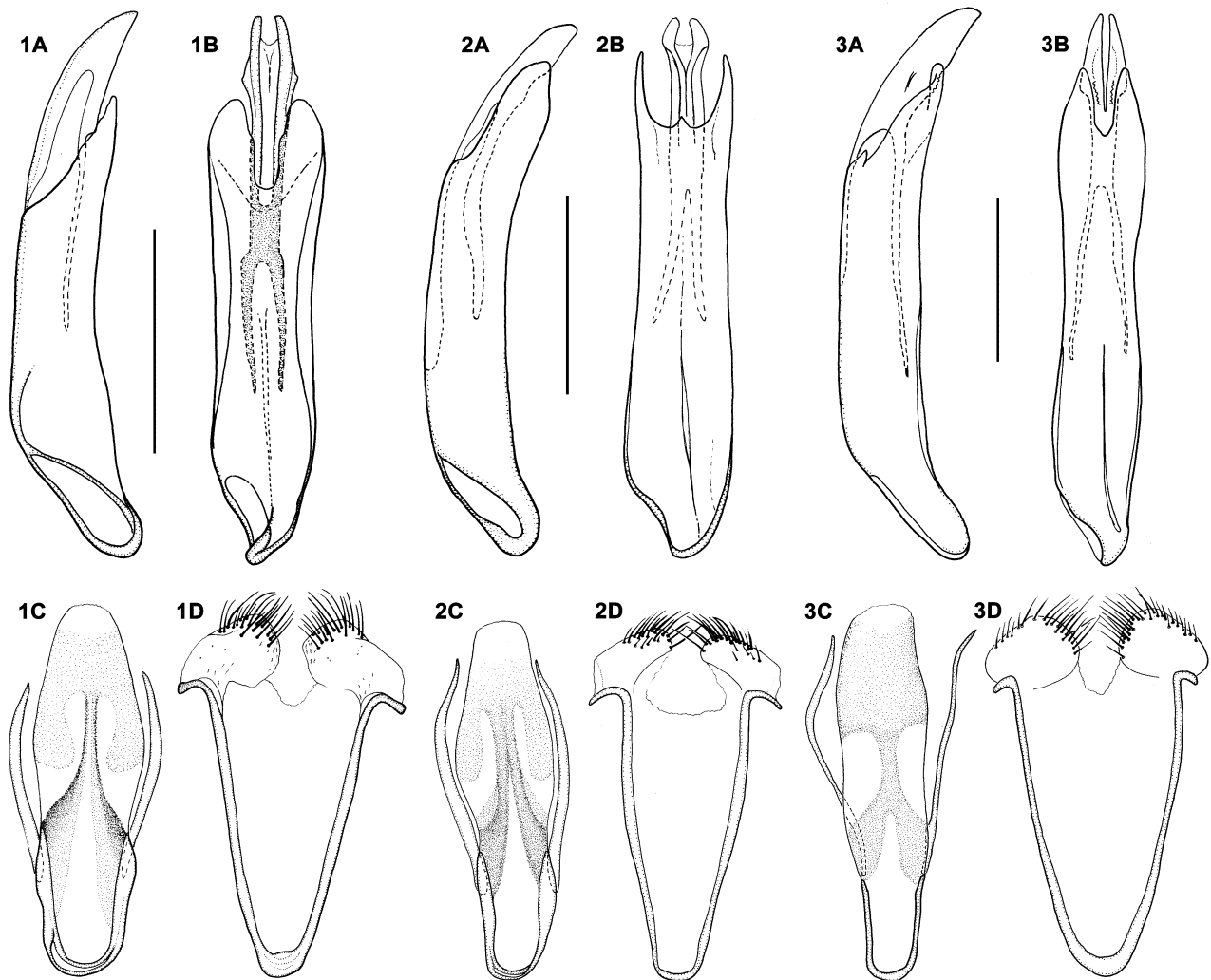
Venter: Black; abdominal ventrites with a marginal brownish area, last abdominal ventrite castaneous. Venter fully pubescence except hypomeres, which are glabrous. Prosternum strongly encased into mesosternum. Prosternum finely and densely punctured, margins bordered; mesosternum small, finely and densely punctured; metasternum with puncturation similar to mesosternum. Puncturation simple. Glandular pores in 4th abdominal sternite only.

Aedeagus (Fig. 2): Distal part of parameres and lateral sides of median lobe with a marked transverse reticulation, giving an overall dull appearance. Apex of parameres very narrow, with a deep emargination; with a denticular process in the medial part.

Comparative notes. The presence of reticulation in the aedeagus is unique among the known species of *Cacothryptus*. Among the species of the *C. compactus* group, the species can be easily distinguished by its narrow parameters in ventral view (Fig. 2B), leaving a broad space between the median lobe and the apex of the parameters (see Figs 11-14 in Hernando & Ribera 2014).

Etymology. Named after Harald Schillhammer, collector of the type series and specialist in Staphylinidae (and mineralogy).

Distribution. So far only known from the type locality.



FIGURES 1–3. Male genitalia of: 1) *Caccothryptus occidentalis* sp. n., 2) *Caccothryptus schillhammeri* sp. n., 3) *Caccothryptus thai* sp. n.—aedeagus in A) lateral and B) ventral views; C) sternite XIX; D) sternite VIII. Scale bar: 0.5 mm.

***Caccothryptus thai* sp. n. (Figs 3,4)**

Caccothryptus compactus group sp2: Hernando & Ribera (2014: 289).

Type locality. Doi Inthanon, Bang Khun Klang, Thailand.

Type material. **Holotype** male (NMW): "N-THAILAND, 3.-10.10. // 18°32'N 98°32'E // Doi Inthanon, 1200m // Bang Khun Klang, Malicky // & Chantaramongkol 1989"; genitalia extracted and mounted on a transparent card pinned with the specimen; plus red holotype label.

Paratypes. 4 exx (NMW): 2 exx. same data as holotype, with red paratype labels; 2 females "NW-THAILAND // Doi Inthanon, 1200m// Bang Khun Klang / 98°32'E 18°32'N"; "1989 // Malicky & // Chantaramongkol"; "*Caccothryptus* sp.n.? // Hernando & Ribera det 2002"; plus red paratype labels.

Description. **Holotype:** length 4.9 mm, width 2.6 mm; **paratypes:** length 4.6–4.8 mm, width 2.5–2.6 mm. Body dark brown (most specimens are teneral, with a lighter colour); oval, elongated, parallel sided. Tarsi and antennae light brown, legs dark brown (as body).

Head: Eye margin strong, with a small denticle by insertion of antennae; with a very narrow supra-ocular sulcus. Eyes slightly prominent. Puncturation on head uniformly fine and very dense; space between punctures similar to their

diameter. Two types of pubescence, one erect, castaneous limited to disk; a second golden, very dense, recumbent. Pubescence on frons orientated towards clypeum; pubescence on the lateral and basal areas orientated towards vertex.

Pronotum: Transverse, same width than base of elytra, lateral margins regularly and slightly curved; strongly bordered, borders narrowing towards base. Puncturation similar to that on head, very uniform; spaces between punctures wider than diameter. Pubescence mostly formed by longer erect setae, castaneous; some shorter greyish setae on the lateral margins, absent from disk, which only has erect setae.

Elytra: Disk with coarser puncturation than on pronotum and head; puncturation double, one very fine and dense, a second coarser, very irregular but with 3-4 poorly defined series on disc; some coarse punctures forming irregular 2-3 series on elytral margins. Elytral pubescence double; erect setae castaneous, recumbent setae generally golden, but in some areas darker (colour depends on angle of incidence of light). Recumbent seta with a zig-zag pattern, orientated towards apex. Elytra strongly bordered, border stronger in the humerus and less marked apically, from middle part to apex; almost indistinguishable at apex. Membranous wings well developed.



FIGURE 4. Detail of the denticles in the main lobe of the aedeagus of *Caccothryptus thai* sp. n.

Venter: Uniformly dark brown. Fully pubescent except hypomeres, which are glabrous; prosternum strongly encased into mesosternum. Prosternum densely punctured, punctures deeper and larger than on dorsum; margins bordered; mesosternum with slightly shallower puncturation than on prosternum; disk of metasternum with fine

puncturation; lateral process of the metaventrite (metasternal wings) with very coarse puncturation. Glandular pores in 4th abdominal sternite only.

Aedeagus (Figs 3,4): ventral margin of the median lobe with two series of 3-4 irregular, small dents (Fig. 4). Dorsal part of base of parameres in lateral view with a small denticle; apex of parameres and median lobe narrow, fusiform; tips of parameres slightly divergent.

Comparative notes. The species can be clearly separated by the presence of small dents in the median lobe, which is unique among the species of the *C. compactus* group. The shape of the aedeagus in ventral view (Fig. 3B) is also peculiar, with a very compact and fusiform apex, in contrast to all other known species of the group (Fig. 2B; Hernando & Ribera 2014).

Etymology. Named in reference to their known distribution. The name is a noun in apposition.

Distribution. So far only known from the type locality.

Remarks. Two females of this species were recorded by Hernando & Ribera (2014) as "*Cacothryptus compactus* group sp2", but not described due to the absence of males. The finding of males collected together with these females among the unsorted collections of the Naturhistorisches Museum Wien (NMW) allowed us to describe this new taxon here.

Discussion

The three new species described here are known from a single locality (one of them a single male), confirming the abundance of narrowly distributed species in the genus *Cacothryptus*, already pointed by Hernando & Ribera (2014) and Yoshitomi (2015). As it is usually the case, some species within the genus have widespread distributions (as e.g. *C. maculosus* (Pic, 1923)), but most are still known from a handful of specimens from very few localities (Hernando & Ribera 2014; Yoshitomi 2015). It can thus be expected that the number of species of *Cacothryptus* will increase substantially as more material becomes available.

One of the species described here (*C. occidentalis* sp.n.) expands the range of the genus towards the west, although only marginally, as two species of the same *C. testudo* group were already known from Uttarakhand in India (*C. ripicola* Champion, 1923 and *C. testudo* Champion, 1923, Hernando & Ribera 2014). The known localities of the two species of the *C. compactus* group, in Myanmar and Thailand, are within the known distribution of the other species of the group (Hernando & Ribera 2014).

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