



A new species of *Phloeosinus* from Bhutan (Coleoptera: Curculionidae: Scolytinae: Phloeosinini)

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Abstract

A new species of *Phloeosinus* Chapuis, 1869 from Bhutan is described. The species is suggested to be endemic to Bhutan, occurring on *Cupressus corneyana* Knight & Perry ex Carrière (Cupressaceae).

Key words: bark beetles, endemic species, *Cupressus corneyana*

Introduction

The bark beetle (Coleoptera: Curculionidae: Scolytinae) fauna of Bhutan is rather poorly known. The most recent study published on this insect group is Beaver & Smith (2022), which lists only 31 scolytines species and comments on several doubtful records of other species. Interestingly, as also noted in that paper, rather numerous genera of scolytines with presumed distribution in the country are missing from the faunal record, e.g. *Crypturgus* Erichson, *Dryocoetes* Eichhoff, *Phloeosinus* Chapuis, *Scolytus* Geoffroy, *Xyleborinus* Reitter. *Phloeosinus* is listed among these missing genera, even though species are known from neighbouring countries, e.g. Beaver & Liu (2018) (3 species in Nepal); Maiti & Saha (2009) (3 species in India). Information on the Chinese *Phloeosinus* fauna is listed in Knížek (2011) (12 species, including distant provinces) and additional information is presented in Alonso–Zarazaga et al. (2023) and Bright (2021). The discovery of the new *Phloeosinus* species described herein fulfills the gap of *Phloeosinus* in the Bhutanese fauna.

A new species of *Phloeosinus* was collected in Punakha, Bhutan, in January 2018, and found to be morphologically distinct from all other species of the genus (Wood & Bright 1992; Alonso-Zarazaga et al. 2023).

Material and methods

The newly discovered beetles were compared to representatives of all known genera within the tribe Phloeosinini (Wood 1986; Alonso-Zarazaga & Lyal 2009). The morphological terminology used corresponds to other recent taxonomic studies on Scolytinae (e.g. Wood 1986). Basic information about phloeosinine species was taken from the literature cited above, and particularly from the original descriptions of the morphologically closest species (Sampson 1919, Semenov 1902) and genera (Chapuis 1869 for *Phloeosinus*, Sampson 1921 for *Hyledius*). Specimens were studied using a binocular microscope with magnification up to 100x. Photos were taken by Canon EOS 90D camera with Canon macro photo lens MP-E 65 mm, 1:2.8, 1–5x, combined with StackShot 3X Macro Rail. Body length was measured from the front of the head to the elytral apex, including the head which was kept in normal position with mouthparts directed downward, and the elytral apex.

Phloeosinus corneyanus, new species

Figs 1-9

Type material. HOLOTYPE, male, glued on card mount, with locality data: Bhutan, Punakha, Lingkana palace; 3. I. 2018; N 27°35.00483', E 89°51.80832'; 1242 m a. s. l., Kaka Tshering lgt. ALLOTYPE, female: same data as holotype. PARATYPES (27 specimens): same data as holotype, 15 males, 12 females; same data as holotype. The holotype and allotype are deposited in the collection of National museum Prague, 2 paratypes in Naturhistorisches Museum Wien, 17 paratypes in the MK collection, 8 specimens in the collection of KT.

Diagnosis. 4.0–4.6 mm long ($n = 21$), 2.15–2.31 times longer than wide. Body generally blackish. Typical body shape of stout *Phloeosinus* species of oval shape, of remarkably big body length and developed rows of teeth on lateral margins of elytral declivity.

Similar species. *P. jubatus* Sampson, 1919, *P. turkestanicus* Semenov, 1902



FIGURES 1–9. *Phloeosinus corneyanus* sp. nov.: 1 – 3 male (dorsal, lateral view, declivity, HT, 4.46 mm), 4 – 6 female (dorsal, lateral view, declivity, AT, 4.46 mm), 7 – male frons; 8 – female frons; 9 – antennae (Photo: M. Knížek)

Description. Male (Figs. 1-3, 7): Body length 4.0–4.6 mm (4.46 mm in holotype), 2.15–2.31 times longer than wide (2.15 in holotype). Colour generally very dark brown, blackish, antennae and tarsi slightly lighter, but still dark brown. **Head:** frons (Fig. 7) mostly shining, flat to very slightly convex on upper half, very shallowly concave in lower part; concavity with longitudinal, in epistomal part relatively acutely elevated shining keel ended in the middle of frons with end of the concavity where it is less elevated, this keel sometimes prolonged to the upper half of frons up to the upper level of eyes; whole frons rather deeply and densely punctate, slightly tuberculate; middle of frons with irregular unpunctured shining area, spaces between the punctures in the middle of frons approximately 1.5 times wider than punctures diameter, punctures becoming denser towards the edges of frons; in space between the eyes and epistoma margin longitudinally-oblique rugosities toward mandibles. Vertex semi-matt, shagreened, very densely minutely punctate. Eyes relatively large, deeply emarginated on anterior margin in upper half, emargination nearly reaching middle of eye width. Vestiture of frons consists of rather stout hair-like sparse semierect setae, its



FIGURE 10. Gallery system of *Phloeosinus corneyanus* sp. nov. in the phloem of trunk of *Cupressus corneyana* (Cupressaceae) (Photo: K. Tshering)

length reaching approximately one third of scapus, setae on lower frons part directed downward, on upper part of frons directed upward (from lateral view), all setae directed forward (from dorsal view). Vertex in upper part with hair-like setae nearly adjacent to the surface and directed forward. Antennae (Fig. 9) dark brown, antennal funicle pentamerous, antennal club asymmetrical, very elongate, rather big, approximately as long as scapus; dorsoventrally flattened, elliptical, rounded at apex, widest in the middle, with three oblique sutures marked by rows of setae, clearly visible on both sides. **Pronotum**: 0.82–0.90 times longer than wide (0.88 in holotype), dark brown to blackish, shining; widest basally, weakly convex longitudinally from lateral view with summit in the middle, basal two fifth nearly cylindrical from dorsal view, then strongly narrowed and laterally rather strongly constricted in frontal fifth. Whole surface rather regularly densely punctate, spaces between the punctures slightly smaller than the punctures diameter, with very narrow, but distinct central impunctate longitudinal keel extending on whole disc nearly, but not completely up to basal margin; anterior margin rounded, sometimes shallowly emarginated in the middle from dorsal view, simple. Vestiture of rather long, fine and dense semi-recumbent hair-like setae, directed toward the central line, on fronto-lateral parts of pronotum very long semi-recumbent hair-like setae, five or six times longer than other vestiture, directed backward. **Scutellum**: visible, small, transverse keel-like, slightly raised above the surface of elytra. **Elytra**: 1.32–1.52 times longer than wide (1.41 in holotype), 1.65–1.98 times longer than pronotum (1.65 in holotype), slightly wider than pronotum; dark brown to blackish, declivital part slightly lighter, shining, subparallel on basal two-thirds, broadly rounded apically; basal margin of elytra procurved, armed by one row of remarkable blunt tubercles; elytral striae relatively deep and very narrow, marked by densely placed longitudinal punctures; interstriae transversely flat, minimally five times as wide as striae, finely densely irregularly tuberculato-punctate, punctures approximately half the size of those on striae, space between the punctures approximately 1.5 – 2 times larger than the puncture's diameter; elytral declivity generally regularly rounded; first interstriae strongly widened on declivital part and armed by a strongly developed row of teeth along its lateral parts from top of declivity to near elytral apex, where joined to interstriae 9; first interstriae forms a rather deep, longitudinally broadly oval area along the suture, with a flat surface devoid of striae; third interstriae joining the first interstriae immediately on the top of declivity by similarly ornamented row of teeth, forming parallel and not so well-developed row of teeth on the same base as the teeth of the first interstriae, due to this, the second interstriae disappears between the joining of teeth of first and third interstriae, other interstriae ornamented by sparsely placed clearly visible tubercles on the declivity, which are more conspicuous on odd interstriae; flat oval declivital area very shining, irregularly densely punctured, the distance between the punctures approximately as the diameter of punctures (Fig. 3); vestiture of dense semi erect narrow scale-like pointed setae. **Legs**: brown, procoxae separated by scapus maximum width. Protibiae flattened antero-posteriorly, widened, ornamented with series of well-developed sharply pointed socketed teeth on outer lateral margin, becoming denser in apical rounded part. Mesotibiae similarly formed as protibiae, metatibiae more slender, gradually widened, forming very long triangle, socketed teeth displaced apically except very few on upper lateral margin. Vestiture of all tibiae of rather long hair-like setae.

Female (Fig. 4-6, 8). Of the same appearance as male in all body parts, except pronotum less constricted and not as well-developed elytral declivity. Interestingly, the morphology of frons is similar in both sexes contrary to other *Phloeosinus* species, except the very shallow concavity in lower part not as visible as in male. Body length 4.2–4.5 mm (4.46 mm in allotype), 2.15–2.24 times longer than wide (2.15 in allotype). **Pronotum**: 0.80–0.88 times longer than wide (0.80 in allotype). **Elytra**: 1.39–1.48 times longer than wide (1.41 in allotype), 1.65–1.91 times longer than pronotum (1.65 in allotype). The main difference is in the elytral declivity, where the rows of teeth of third interstriae clearly join the rows of teeth from the first interstriae on the top of the declivity, due to which the teeth on common base are comprised of two parallel rows of teeth of equal size (Fig. 6).

Differential diagnoses. Based on external morphology the newly described species is the most similar to *P. jubatus* Sampson, 1919 and *P. turkestanicus* Semenov, 1902, which also share a strongly widened first declivital interstriae which is armed by a strongly developed row of teeth along its lateral parts from upper part of the declivity to near the elytral apex, forming a rather deep, longitudinally broadly oval area along the suture, with flat surface devoid of striae. *Phloeosinus corneyanus* differs from these species mainly by size, when *P. jubatus* is about 3.5–3.7 mm long and *P. turkestanicus* only 1.8–3.2 mm long. In both species the frons is concave in lower half in males. *Phloeosinus turkestanicus* differs in the male declivity where the rows of teeth of the first and third interstriae are become closer each other but are still well separated, not forming the ridge on the same base. In females these interstriae are still separated from each other, do not converge, stay parallel till the edge of elytra; the first interstriae is much less widened and small tubercles are visible along the interstriae also on the elytral disc. In *P. jubatus* the

basal margin of elytra is more strongly procurved; the teeth of the first interstriae are less developed, more equal to these on the third interstriae; these rows of teeth are standing close to each other, but still visibly separated in males. In females the declivital teeth are also less developed. *Phloeosinus jubatus* is also generally more slender, 2.25–2.49 times longer than wide, elytra more parallel from dorsal view, vestiture of flat oval declivital area much less developed, nearly glabrous. Other species with similarly strongly developed teeth on the elytral declivity or similar body size to *P. corneyanus*, e.g. *P. armatus* Reitter, 1887 (especially females) have the first and third interstriae on the declivity simply continuing in parallel along the suture, and the first interstriae without teeth on declivity. *Phloeosinus variolatus* Brück, 1931 also differs from the new species with continued interstriae on the declivity.

Etymology. The name of the new species, *corneyanus*, is derived from its only known host plant, *Cupressus corneyana* Knight & Perry ex Carrière, the only known endemic *Cupressus* species in Bhutan (see comments below).

Distribution. So far known only from Bhutan and due to the endemism of its host plant, the species is considered endemic to Bhutan. The endemism of the host species is well documented by Grierson & Long (1983), mentioning, except its endemism in Bhutan, its cultivations also in Sikkim, India as a sacred tree around villages and religious buildings and in Anonymous electronic database “Plants of the world online”.

Biology. The species lives and develops in the phloem of weakened and/or dying shrubs of *Cupressus corneyana* (Cupressaceae). The species is monogamous. The gallery (Fig. 10) consists of one longitudinal maternal gallery approximately 15 cm long with a nuptial chamber at the bottom. Larval galleries are very dense and close to each other, about 60 on each side of the maternal gallery, and each approximately 5 cm long. Larvae pupate often in shallow pupal chambers of body length bored into wood.

Discussion

The result of this paper, the description of the new species in *Phloeosinus* from Bhutan, fully supports the conclusion of Beaver & Smith (2022), that new species or records in this genus from Bhutan can be expected. It highlights the fact of poorly known insect fauna of the country, many more species in different genera, even in *Phloeosinus*, are expected to be discovered.

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