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Research article

[urn:lsid:zoobank.org:pub:57BE020F-F904-498E-A4A1-A7585AD0A8B6](https://zoobank.org/pub:57BE020F-F904-498E-A4A1-A7585AD0A8B6)

The Oriental genera of Xyloperthini (Coleoptera: Bostrichidae: Bostrichinae), with a new genus and species from Thailand, and a key to the genera

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Abstract. We describe a new genus, *Infrantenna* gen. nov. and a new species *Infrantenna fissilis* gen. et sp. nov., from Thailand and briefly review the Oriental genera currently placed in the tribe Xyloperthini Lesne, 1921. A key to the Oriental genera of Xyloperthini is provided.

Keywords. Xyloperthini, Oriental fauna, new genus, new species, key.

Liu L.-Y. & Sittichaya W. 2022. The Oriental genera of Xyloperthini (Coleoptera: Bostrichidae: Bostrichinae), with a new genus and species from Thailand, and a key to the genera. *European Journal of Taxonomy* 828: 45–60. <https://doi.org/10.5852/ejt.2022.828.1851>

Introduction

In the fourth part of his monograph of the family Bostrichidae Latreille, 1802, Lesne (1901) included sixteen genera under the heading “*Les Xylopertha*” in the subfamily Bostrichinae Latreille, 1802. Lesne (1921) formally erected the tribe Xyloperthini Lesne, 1921 to include those genera with a lamelliform intercoxal process of the first abdominal ventrite. The tribe Xyloperthini is the most species-rich in the Bostrichidae, and currently includes 35 genera (Borowski & Węgrzynowicz 2007; Ivie 2010; Park *et al.* 2015; Liu *et al.* 2016; Liu & Beaver 2017; Liu 2021a; Zhang *et al.* 2022).

The tribe has a worldwide distribution, but the individual genera are mostly confined to a single zoogeographical region or subregion (Morrone 2002; Borowski & Węgrzynowicz 2007; Beaver *et al.* 2011; Holt *et al.* 2013; Sittichaya *et al.* 2013; Park *et al.* 2015; Liu *et al.* 2016, 2021; Liu & Beaver 2017; Borowski 2018; Liu 2021a, 2021b; Zhang *et al.* 2022), with the Oriental region having the most genera-rich fauna, and the African region the most species-rich fauna.

In this paper, we describe a new genus for an unusual species collected in northern Thailand. We provide an initial profile of Oriental Xyloperthini and a key to all Oriental genera of the tribe Xyloperthini.

Material and methods

In the course of this study, the senior author has examined all available types, and other specimens of Xyloperthini in the Paris Museum, numerous additional European museums, private collections, the online database of Insect Types of MCZ and the results of the examination of types in the IFRI by Borowski & Singh (2017).

Institutional abbreviations

IFRI	= Indian Forest Research Institute, Uttar Pradesh, Dehra Dun, India
LYL	= Private collection of Dr Liu Lan-Yu, Yilan, Taiwan
MCZ	= Insect Type Database, Museum of Comparative Zoology, Harvard University, USA
MNHN	= Muséum national d'histoire naturelle, Paris, France
NHMU	= Natural History Museum, London, UK
PMCSNHM	= Princess Maha Chakri Sirindhorn Natural History Museum, Prince of Songkla University, Songkla, Thailand
WST	= Private collection of Dr Wisut Sittichaya, Songkla, Thailand

The biogeographic regions used are based on Morrone (2002) and Holt *et al.* (2013).

Photographs were taken with an Olympus E-M5MII digital camera and a Canon 6D digital camera with a Canon MP-E 65 mm macro photo lens (Canon, Tokyo, Japan) and StackShot-Macrorail (Cognisys Inc, MI, USA). The photographs were then combined using the program Helicon Focus ver. 6.8.0. and ver. 7.0 (Helicon Soft, Ukraine), and optimized with Adobe Photoshop ver. CS2 and ver. CS6 (Adobe Systems, California, USA)

The discussion of the characters of the Oriental Xyloperthini genera are mainly based on Lesne (1901, 1921), with additional characters obtained by the examination of specimens from the museums and collections listed above.

Results

Taxonomy

Class Insecta Linnaeus, 1758
Superfamily Bostrichoidea Latreille, 1802
Family Bostrichidae Latreille, 1802
Subfamily Bostrichinae Latreille, 1802
Tribe Xyloperthini Lesne, 1921

Infrantenna gen. nov.

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Type species

Infrantenna fissilis gen. et sp. nov., here designated.

Diagnosis

A member of the tribe Xyloperthini as characterized by the antennal club segments elongated, the mandibles crossed at the tips, and the lamelliform intercoxal process of the first abdominal ventrite (Lesne 1901; Fisher 1950; Liu & Schönitzer 2011). This taxon is distinguished from other genera of

Xyloperthini by the following combination of characters: frons weakly convex, without tuft of long upwardly directed hairs on the head in either sex. Antennal fossa inserted next to lower intero-lateral margin of eyes below the fronto-clypeal suture; eyes strongly detached from cheek. Posterior part of elytral disc without costae or teeth, infero-lateral margin of elytral declivity strongly raised to form a false epipleuron; female elytra declivity with deep clefts extending a little above the middle of the declivity, dividing the outer part of the declivity from a pair of elongate, raised and grooved sutural lobes; posterior margin of 5th abdominal ventrite strongly emarginate in female; 5th abdominal ventrite of male with pleural pieces.

Etymology

The genus name is feminine, and refers to the unusually low position of the antennal fossa.

Description

BODY. Elongate, cylindrical. Head deeply inserted in prothorax, not visible from above.

HEAD. Frons weakly convex, without tuft of long upwardly directed hairs on the head in either sex, apart from a pair next to the inner margin of the eyes; fronto-clypeal suture dark, impressed in middle; clypeus strongly transverse. Mandibles subequal, sharply pointed. Eyes large, globose, strongly detached from cheeks posteriorly. Antennal fossa inserted next to lower intero-lateral margin of eyes below fronto-clypeal suture, antenna with ten antennomeres, first and second antennomeres elongate, antennomeres 3–7 forming funicle, each antennomere short, fifth widest, together subequal to first club antennomere in length; antennomeres 8–10 forming elongate, loose club, each antennomere with short, recumbent hairs, two distinct C-shaped sensory impressions near anterior margin of antennomeres 8 and 9, indistinct sensory patches $\frac{1}{3}$ of length from apex on last antennomere; antennomeres 8 and 9 subequal in length, last antennomere elongate, oval, longer than penultimate antennomere, but subequal in width.

PRONOTUM. Slightly wider than long, widest at base, antero-lateral angle with small, strongly upcurved tooth on each side, anterior margin between upcurved teeth slightly concave; sides broadly rounded, converging more strongly anteriorly, posterior angles broadly rounded, without lateral carina; anterior slope coarse with 4 large upcurved teeth antero-laterally on each side; discal surface shining, sparsely punctate.

SCUTELLUM. Small, tongue-shaped, with very sparse punctures.

ELYTRA. Subequal to pronotum in width, parallel-sided, shining, disc and sides rugulose with small punctures, bearing minute hairs. Elytral declivity sexually dimorphic. Male with declivity concave, puncturation stronger and becoming smaller and shallower towards apex, declivital margins forming distinct infero-lateral epipleuron (false epipleuron of Lesne 1901) gradually narrowing to sutural apex to form carina which runs into the apical margin. Female with declivity convex, with deeper and larger punctures, infero-lateral epipleuron distinct and abruptly cut into semi-circular emargination from middle to apex; elytral declivity with deep clefts extending a little above middle of declivity, dividing outer part of declivity from a pair of elongate, raised and grooved sutural lobes.

ABDOMEN. In female, 5th abdominal ventrite strongly emarginated in middle on posterior margin. Last visible abdominal ventrite of male with pleural pieces.

LEG. Subequal in length, procoxae separated by narrow intercoxal process of first thoracic ventrite, mesocoxae very narrowly separated; tibiae expanded toward apices, protibiae broadly, shallowly grooved on external face, protarsi longer than the length of protibiae, with series of long hairs beneath, meso- and meta-tarsi longer than their respective tibiae.

Remarks

Infrantenna gen. nov. can be distinguished from all other xyloperthine genera by the combination of the frons with only one long hair on each side next to eyes, the antennal fossa placed very low on the head below fronto-clypeal suture, 10-segmented antennae with two C-shaped sensory areas near anterior margin of 1st and 2nd club segments, without lateral carina of pronotum, the female with deep clefts on the elytral declivity and strongly emarginated 5th abdominal ventrite and male with pleural pieces of 5th abdominal ventrite.

Five genera which appear to be related to *Infrantenna* gen. nov. in their form and morphology have been selected, and characters considered to be potentially informative in the determination of phylogenetic relationships are compared in Table 1. *Psicula* Lesne, 1941 is the most similar genus morphologically to *Infrantenna* gen. nov. It has similar modifications of the apex of the elytral declivity and last abdominal ventrite of the female, and has a similar distribution. However, *Psicula* has nine-segmented antennae and, like all the other genera compared, a more dorsal location of the antennal fossa. The last ventrite of the male also lacks pleural pieces. The African genus *Xylion* differs in the modifications of the female abdominal ventrites with variously modified from 3rd to 5th ventrites. The Australian genus, *Xylobosca* Lesne, 1901, differs in the sexually dimorphic frons, the first abdominal ventrite of female enlarged, and the widest of the protibia toward to middle. The North American genus, *Xyloblaptus* Lesne, 1901, which is the only selected genus with entire declivital apex in both sexes, lacks male pleural pieces, and has the widest of the protibia toward to middle. The protibia of the Mediterranean genus, *Xylopertha* Guérin-Méneville, 1845, has the same form as *Infrantenna* gen. nov., but it differs in the nine-segmented antenna, and the higher position of the antennal insertions.

Based on either geographical distribution or morphological characters, *Psicula* is the most similar genus to *Infrantenna* gen. nov.

Distribution

Northern Thailand.

Infrantenna fissilis gen. et sp. nov.

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Figs 1–4

Etymology

The name '*fissilis*' is from the Latin word for 'cleft' which refers to the deep clefts of the elytral declivity of the female.

Type material

Holotype

THAILAND • ♂; Mueang District, Maehongson Province; 19°08.01' N, 98°12.30' E; 7 Mar. 2019; ex. semi-dry twig of unknown Fagaceae L.; col. W. Sittichaya; NHMUK014433955.

Allotype

THAILAND • ♀; same collection data as for holotype; NHMUK014433956.

Paratype

Thailand • 1 ♀; same collection data as for holotype; PMCSNHM.

Table 1. Comparison of characters of *Infrantenna* gen. nov. with selected genera of Xyloperthini Lesne, 1921.

Character	Genus					
	<i>Infrantenna</i> gen. nov.	<i>Psicula</i> Lesne, 1941	<i>Xyflon</i> Lesne, 1941	<i>Xylobosca</i> Lesne, 1901	<i>Xyloblaptus</i> Lesne, 1901	<i>Xylopertha</i> Guérin-Méneville, 1845
No. of antennal segments	10	9	10	10	10	10
Antennal fossa insertion	Below fronto-clypeal suture.	Above fronto-clypeal suture.	Above fronto-clypeal suture.	On fronto-clypeal suture.	Above fronto-clypeal suture.	Above fronto-clypeal suture.
Long hairs on frons	X	Directed upwardly	X	Directed upwardly, long to very long in female, short or absent in male.	Long upwardly at sides, short upward in middle.	Directed upwardly
Posterior angles of pronotum	Without lateral carina	Without lateral carina	With lateral carina	Without lateral carina	Without lateral carina	Without lateral carina
Pleural pieces	V	X	V	V	X	V
Shape of disc of elytral declivity	Male: concave Female: convex Male: with a small V-shaped emargination at apex. Female: apex of each elytron strongly emarginate, emargination filled by a pair of ventrally-directed processes next to suture.	Male: concave Female: convex Male: without an apical emargination. Female: apex of each elytron strongly emarginate, emargination filled by a pair of ventrally-directed processes next to suture.	Slightly convex	Male: concave Female: convex	Slightly, evenly concave	Male: weakly to strongly concave Female: convex
Sculpture of apical margin of declivity	5 th ventrite strong emarginate in middle posteriorly.	5 th ventrite strong emarginate in middle posteriorly.	Both sexes with deep emargination at apex and raised tip.	Male: not emarginate at apex Female: emarginate.	Entire, raised slightly at apex.	Male: with a small V-shaped emargination at apex. Female: apex of each elytron strongly emarginate.
Modified ventrites of female abdomen	5 th ventrite strong emarginate in middle posteriorly.	5 th ventrite strong emarginate in middle posteriorly.	Variously modified from 3 rd to 5 th ventrites, strong emargination at posterior margin of 5 th ventrite	1 st ventrite enlarged; 4 th and 5 th ventrites emarginate in middle posteriorly; 4 th ventrite with a pair of spines in some species.	5 th ventrite strong emarginate in middle posteriorly.	5 th ventrite variously modified.
Prothibia	Wider at apex than in middle, external face broadly grooved.	Widest close to apex, external face flattened.	Widest at apex, external face more or less flattened	Widest towards middle, without a flat external face	Widest towards middle, without a flat external face	Widest at apex, grooved on external face
Geographical distribution	Northern Thailand	India and Thailand	Africa	Australia	USA and Mexico	Mediterranean

Description

Male (Figs 1–2)

MEASUREMENTS. 3.3–3.6 mm long, about $2.6\text{--}3.0\times$ as long as wide.

COLORATION. Head, pronotum, pro- and mesotibiae and tarsi, ventral side reddish brown, labrum, antennae, elytral disc, pro- and mesofemora and whole hind legs brown, pronotum and elytra gradually becoming darker brown anteriorly and posteriorly respectively, elytral declivity dark brown.

HEAD. Mandibles dark, stout, apex strongly pointed, inner margin sharp. Labrum trapezoid, narrowed towards base, fringe of dense, short, golden hairs along anterior margin, and fringe of long, yellowish hairs along anterior and lateral margins (Fig. 1A). Clypeus transverse, finely punctured, anterior margin emarginated in middle to cover base of labrum and pair of small, broadly rounded teeth on either side. Fronto-clypeal suture dark, attenuated laterally, with median fovea (Fig. 1A). Frons rugulose with sparse, fine punctures, each puncture with short, white hair; one long upwardly-directed hair close to intero-lateral margin of eye, triangular shining area on lower middle part, and triangular area with reticulations on upper part above shining area (Fig. 1A), upper part with row of small punctures between each two rugosities. Vertex with sparse small punctures, longitudinal rugosities slightly angled toward midline arranged along whole vertex (Fig. 1A). Eyes large, strongly detached from cheeks posteriorly (Fig. 1A). Antennal fossa inserted next to lower intero-lateral margin of eyes below fronto-clypeal suture (Fig. 1B). Antennae 10-segmented, 1st and 2nd antennomeres subequal in length, 3–7 antennomeres together subequal to first club antennomere and shorter than last club antennomere in length, first and second club antennomeres subtriangular and subquadrate, wider than long, with small, visible C-shaped areas of dense sensillae close to middle part of anterior margin, last club antennomere more elongate, and longer than penultimate antennomeres, sensory areas indistinct patches at one-third of length from apex (Fig. 1C).

PRONOTUM. $1.1\text{--}1.2\times$ as wide as long, widest at base, antero-lateral angles with small, strongly upcurved tooth, semicircular area above anterior margin with transverse rugosities; sides of pronotum broadly rounded, converging more strongly anteriorly, posterior angles broadly rounded (Fig. 2A), without lateral carina (Fig. 2B), postero-lateral area with fine rugosities (Fig. 2C); anterior slope coarse with 4 large upcurved teeth antero-laterally on each side, 2–3 teeth next to antero-lateral upcurved teeth small, remaining teeth gradually reduced in size towards summit, and arranged approximately in arcs (Fig. 2A–C); discal surface shining with sparse punctures, sparser toward posterior angles, postero-lateral areas with small, slightly elongate rugosities and series of granuloistes along posterior angles (Fig. 2B–C). Anterior slope with short, semi-erect hairs between teeth, recumbent hairs on sides.

SCUTELLUM. Small, tongue-shaped, with very sparse punctuation.

ELYTRA. $1.8\text{--}2\times$ as long as wide, parallel-sided, shining, disc and sides rugulose with small punctures, bearing minute hairs; epipleuron narrow, elongated triangular; declivity concave, punctuation larger than on disc, but becoming smaller and shallower toward apex with triangular, nearly glabrous area at apex, sutural margin raised, more strongly in apical three-quarters of declivity (Fig. 2D), declivital margins forming distinct rim at sides and apex, infero-lateral epipleuron distinct gradually narrowing to sutural apex to form carina which runs into apical margin (Fig. 2C, E); margin slightly upwardly raised at sutural apex and with tiny V-shaped emargination at apex of declivity (Fig. 2D).

LEGS. Protibiae expanded from base to apex, broadly, shallowly grooved on external face (Fig. 2A–B). Protarsi with long hairs underneath. Second and third segments of tarsi subequal in length and shorter than last segment.

ABDOMEN. Abdominal ventrites finely, moderately densely punctured, punctures with moderately long, whitish hairs; last ventrite with pleural pieces, posterior margin slightly concave with fringe of dense, short, yellowish hairs and fringe of very long, golden hairs along posterior margin (Fig. 2C).

Female (Figs 3–4)

MEASUREMENTS. 4–4.5 mm long, about $3 \times$ as long as wide. Generally similar to male, but pronotum $1-1.1 \times$ as wide as long and elytra $2-2.2 \times$ as long as wide.

ELYTRA. Discal punctures become larger posteriorly, declivity convex, with deeper and larger punctures (Fig. 3A, D), piceous and darker on raised sutural margin and latero-apical margin (Fig. 3A, C–D); infero-lateral epipleuron distinct and abruptly cut into semi-circular emargination from middle to apex with only posterior margin continuing to apex (Fig. 3B–C); elytra with two narrow fissure-like emarginations extending from close to apex about two-thirds of height of declivity, separating a narrow inner, leglike, grooved process from the outer part of declivity (Fig. 3D), each process minutely and sparsely punctured, with sinuate lateral margin, constricted before apex and then slightly raised to form spoon-like apex; inner margin of outer part of declivity thickened, inner area abruptly, strongly raised, gradually sloping downward towards apex, forming an arc (Fig. 3A, C–D).

ABDOMEN. Last abdominal ventrite strongly curved upwards at sides to form triangular profile (Fig. 4B), ventrally with deep, broad emargination in one-third of middle part forming trapezoidal arc with pair of strongly sclerotised protrusions on sides, margin of trapezoidal arc and protrusion sclerotised, thickened (Fig. 4A–C), and sinuate with a pair of tubercles in middle, and pointed, slightly upwardly curved hook on inner side of protrusion, and postero-dorsal upwardly curved hook on postero-lateral angle on both sides (Fig. 4A, C), fringe of long, golden hairs along inner margin of trapezoidal arc and external side of sclerotised, thickened margin of protrusion (Fig. 4A–C). Abdominal 5th tergite convex with transverse prominence in middle third, two oval pads of very dense, short, white hairs on apical half behind prominence ventrally (Fig. 4A, C).

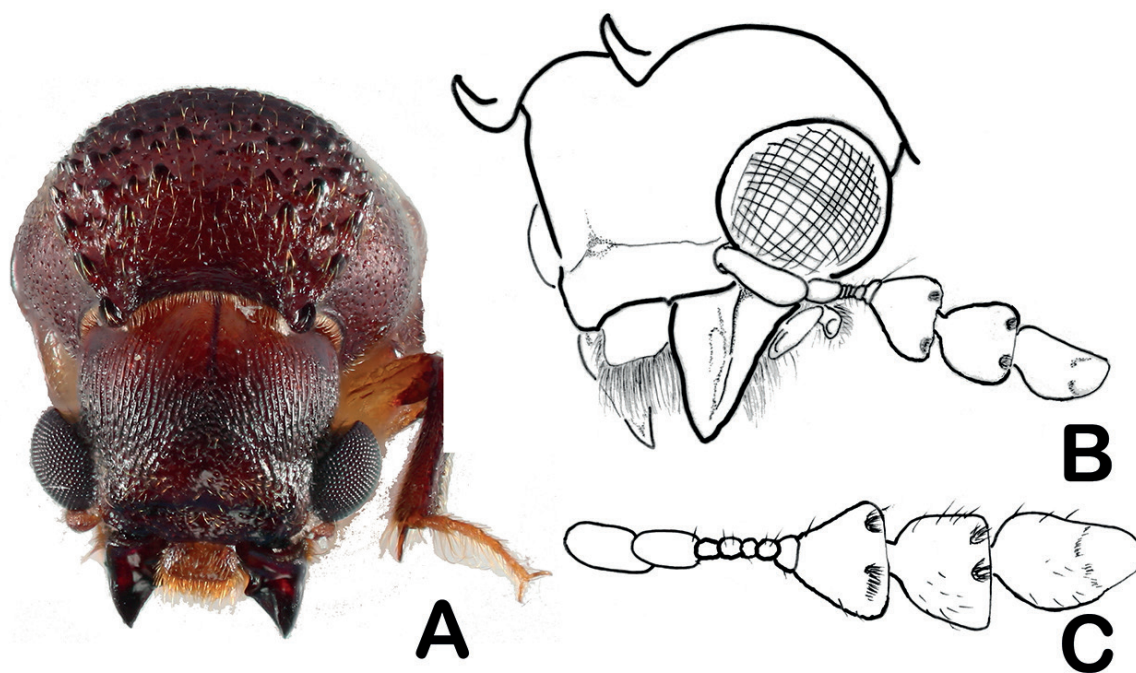


Fig. 1. Head of *Infrantenna fissilis* gen. et sp. nov., ♂, holotype (NHMUK014433955). A. Frontal view. B. Fronto-lateral view. C. Antennae. Not to scale.

Biology

As a member of the family Bostrichidae, the species is likely to be polyphagous. The junior author extracted the specimens from a semi-dry twig of an unknown species of Fagaceae L. We suggest that the hind legs could move vertically in the clefts to clean wood frass. The strongly developed last abdominal ventrite and tergite of the female may help to hold the male genitalia during mating and support the ovipositor during oviposition. Observations of mating and oviposition behaviours are necessary to confirm this hypothesis.

Distribution

Northern Thailand.

Key to the Oriental genera of *Xyloperthini* Lesne, 1921 (see also Table 2)

1. Antennae with 10 segments 6
 - Antennae with less than 10 segments 2
2. Antennae with 8 segments 3
 - Antennae with 9 segments 4
3. Antennae distinctly shorter than pronotum. Funicle subequal in length to first antennomere of club. Last antennomere with two distinct circular, sensory impressions. Elytral declivity with a large spine on each elytron. Female with unmodified third ventrite. Male without pleural pieces of last abdominal ventrite *Octodesmus* Lesne, 1901
 - Antennae distinctly longer than pronotum. Funicle much shorter in length than first antennomere of club. Last antennomere without sensory impressions. Elytra with more than one costa, lacking spines on declivity. Female with third ventrite thickened and modified, overlapping and concealing fourth ventrite. Male with pleural pieces of last abdominal ventrite *Octomeristes* Liu & Beaver, 2016

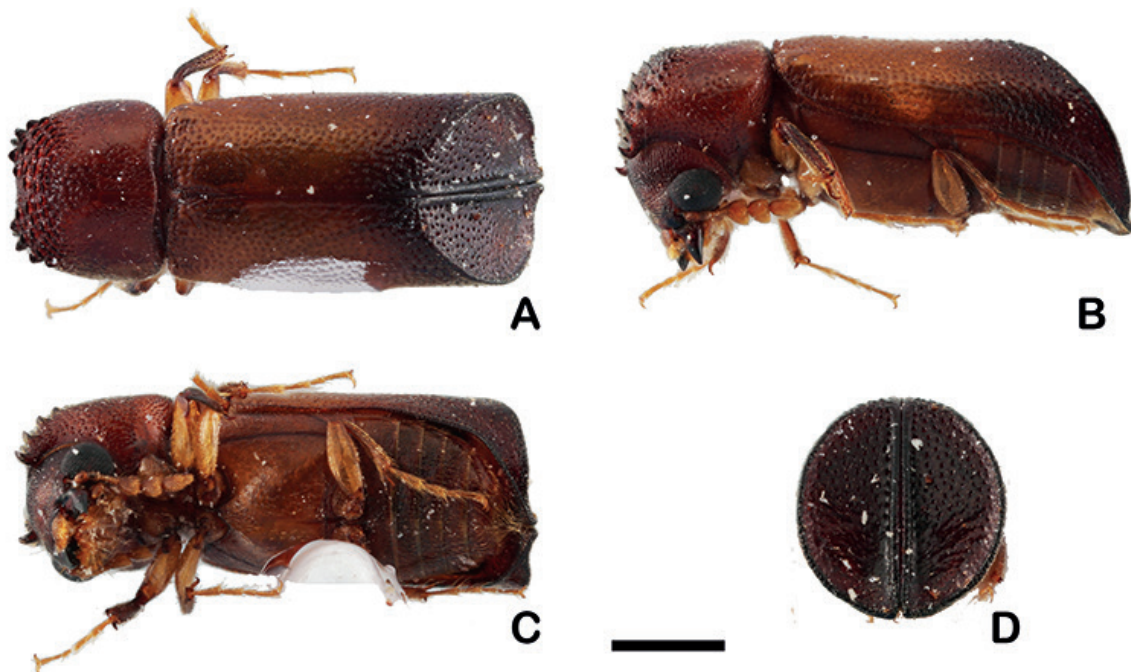


Fig. 2. *Infrantenna fissilis* gen. et sp. nov., ♂, holotype (NHMUK014433955). **A.** Dorsal view. **B.** Lateral view. **C.** Ventral view. **D.** Declivity. **E.** False epipleuron. Scale bar = 1 mm.

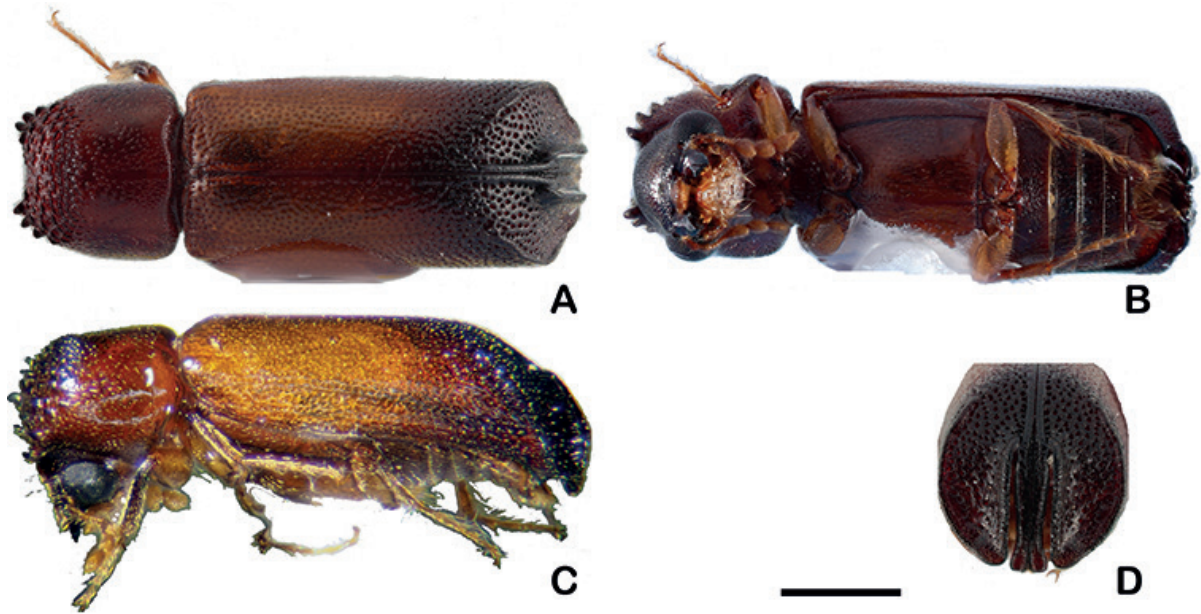


Fig. 3. *Infrantenna fissilis* gen. et sp. nov., ♀, allotype (NHMUK014433956). **A.** Dorsal view. **B.** Ventral view. **C.** Lateral view. **D.** Declivity. Scale bar = 1 mm.

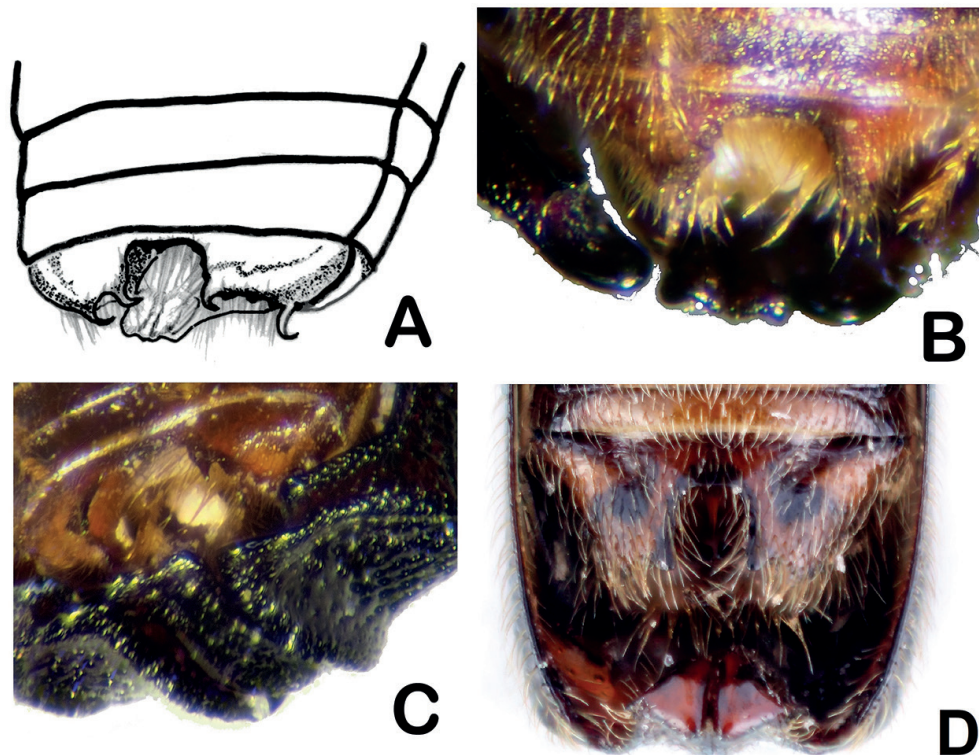


Fig. 4. Apical posterior of female of *Infrantenna* gen. nov. and *Psicula* Lesne 1941. **A–C.** *Infrantenna fissilis* gen. et sp. nov., allotype (NHMUK014433956). **A.** 2nd to 5th visible abdominal ventrites and apical part of last tergite with two very dense, short hairy oval pads on apex. **B.** Ventral view of last two ventrites. **C.** Apical-lateral view of last ventrite and declivity. **D.** *Psicula heterogama* Lesne 1941, ventral view of last two visible abdominal ventrites.

4. Antennal club segments without clear sensory areas. Pronotum with lateral carinae and postero-lateral angles pointed *Xylopsocus* Lesne, 1901 (*capucinus*, *intermedius*, *radula*)
– Antennal club segments with clearly visible sensory areas. Pronotum without lateral carinae and postero-lateral angles rounded 5
5. Dense sensory hairs along anterior margin of 1st and 2nd antennomeres of club. Frons without long erect hairs. Declivital disc flattened. External face of protibia grooved. Male with pleural pieces of last abdominal ventrite *Xylophorus* Lesne, 1906
– Antennal club segments without distinct impressions, only areas with denser pores. Frons with long erect hairs. Declivital disc concave in male and convex in female. External face of protibia flattened. Male without pleural pieces of last abdominal ventrite *Psicula* Lesne, 1941
6. Antennal club segments without clear sensory areas. Pronotum with lateral carinae and postero-lateral angles pointed 7
– Antennal club segments with clearly visible sensory areas. Pronotum without lateral carinae and postero-lateral angles rounded 8
7. Body 3.5–4 mm in length. Frons without long erect hairs. Male without pleural pieces of last abdominal ventrite *Xylopsocus* Lesne, 1901 (part)
– Body 6–7.5 mm in length. Frons with long erect hairs. Male with pleural pieces of last abdominal ventrite *Xylothrips* Lesne, 1901
8. Frons with long erect hairs. Apical margin of declivity entire. Last abdominal ventrite of female without emargination 9
– Frons without long erect hairs. Apical margin of declivity emarginated. Last abdominal ventrite of female with emargination 10
9. Body 4.5–5 mm in length. Declivital disc flattened. Declivity obliquely sloping and without spines on upper margin *Paraxylion* Lesne, 1941
– Body 6–8.5 mm in length. Declivital disc slightly convex. Declivity steep with three pairs of spines on upper margin *Xylodrypta* Lesne, 1901
10. Sensory areas on antennal club segments indistinct. Declivital disc not sexually dimorphic. Male without pleural pieces of last abdominal ventrite 11
– Sensory areas on antennal club segments distinct. Declivital disc sexually dimorphic. Male with pleural pieces of last abdominal ventrite 12
11. Body 2.2–3 mm in length. Antennal club segments without distinct impressions, only areas with denser pores. Declivital disc evenly concave. Protibia expanded from base to apex, external face convex. In female, 4th abdominal ventrite extended over 5th as a thin, leaflike, plate, convex ventrally; the middle part of the 5th abdominal ventrite slightly emarginate *Calonistes* Lesne, 1936
– Body 3.5–6 mm in length. Antennal club segments with two indistinct areas of sensory hairs at anterior margin of 1st and 2nd antennomeres of club. Declivital disc slightly convex. Protibia expanded from base to apex, external face flattened. Abdominal ventrites not sexually dimorphic *Xylodectes* Lesne, 1901
12. Antennal fossa inserted next to lower intero-lateral margin of eyes. Antennal club with two areas of concentration of sensory pores on 1st and 2nd antennomeres. Protibia expanded from base to apex with broadly, shallowly grooved external face. In male, upper margin of declivity without processes, a small V-shaped emargination at apex of declivity. In female, apex of each elytron

- strongly emarginate, emargination filled by a pair of ventrally-directed processes next to suture, 5th abdominal ventrite strongly emarginate in middle posteriorly *Infrantenna* gen. nov.
- Antennal fossa inserted next to middle intero-lateral margin of eyes. Antennal club with dense sensory hairs along anterior margin on 1st and 2nd antennomeres. Protibia expanded from base to apex with broadly grooved external face. In male, upper margin of declivity with a pair of tiny teeth, entire apex. In female, declivity with a Y-shaped carina on lower half, apex entire with one pair of distinct tubercles at the apex, 5th abdominal ventrite broadly emarginate posteriorly*Xylocis* Lesne, 1901

Discussion

Table 2 compares the characters of the twelve Oriental genera of Xyloperthini based on the senior author's observations of specimens (except for *Xylophorus* Lesne, 1906 for which specimens could not be examined, and the original description has been used). Among the twelve Oriental genera, there are two genera with eight antennal segments, two genera and three species of *Xylopsocus* Lesne, 1901 with nine antennal segments, and the remainder have ten antennal segments. The sensory impressions on club segments are absent or indistinct in *Calonistes* Lesne, 1936, *Psicula*, *Xylopsocus* and *Xylothrips* Lesne, 1901.

There are no long erect hairs on the frons in *Calonistes* Lesne, 1936, *Octodesmus* Lesne, 1901, *Xylocis* Lesne, 1901, *Xylodectes* Lesne, 1901, *Xylophorus* and *Xylopsocus* and only one long hair on each side near the eyes in *Infrantenna* gen. nov. Lateral carinae of pronotum are only present in *Xylopsocus* and *Xylothrips*. The pleural pieces of the last abdominal ventrite of male are absent in *Calonistes*, *Octodesmus*, *Psicula*, *Xylodectes* and *Xylopsocus*. These characters and differences in the sculpture of the elytral declivity, and modifications of the abdominal ventrites of the female shown in Table 2 permit us to easily key out the twelve genera.

Including the new genus, there are 36 genera in the tribe Xyloperthini, and the geographical distribution of the tribe covers all zoogeographic regions except the Arctic-Siberian (Liu 2016). The faunal elements of the tribe Xyloperthini (Table 3) shows the largest number of genera occur in the Oriental region, and nine genera are endemic to that region, but more species (about 82 species) occur in the African region. Twelve genera occur in the Oriental region, of which six are confined to India and the Indochinese Peninsula, including *Calonistes*, *Infrantenna* gen. nov., *Octodesmus*, *Octomeristes* Liu & Beaver, 2016, *Psicula* and *Xylodrypta* Lesne, 1901. They include two genera (*Infrantenna* gen. nov. and *Octomeristes*) described in the last 6 years, implying that more research in the region may discover further genera, and that the Oriental region is likely to be a hotspot for the tribe Xyloperthini (Liu 2016).

Following a series of revisions of genera of the tribe Xyloperthini (Liu *et al.* 2016; Liu & Beaver 2017, 2021; Liu 2021a), this study added to the profile of the Oriental fauna, and provided baseline information for a large further study project, which will revise the interesting tribe Xyloperthini.

Acknowledgements

We are most grateful to Department of National Parks, Wildlife and Plant Conservation, Thailand, for research permission in all conservation areas. Special thank also go to all staff of National Parks and Wildlife Sanctuaries for their facilitation in specimen collection. This research was supported by Thailand Research Fund (TRF), project number DBG-6180023. We appreciate the following curators who have allowed us access to the collections in their charge or who have sent specimens for identification: A. Taghavian (MNHN), M.V.L. Barclay and S. Shute (NHMUK).

Table 2 (continued on next page). Comparison of characters of Oriental genera of Xyloperthini Lesne, 1921.

Character	Genus					
	<i>Calonistes</i> Lesne, 1936	<i>Infrantenna</i> gen. nov.	<i>Octodesmus</i> Lesne, 1901	<i>Octomeristes</i> Liu & Beaver, 2016	<i>Paraxylion</i> Lesne, 1941	<i>Psicula</i> Lesne, 1941
No. of antennal segments	10	10	8	8	10	9
Sensory impressions on club	Without distinct impressions, only areas with denser pores.	Two zones of concentration of sensory pores on 1 st and 2 nd antennomeres of club.	Dense sensory hairs along anterior margin on 1 st and 2 nd antennomeres of club.	Dense sensory hairs along anterior margin on 1 st and 2 nd antennomeres of club.	Dense sensory hairs along anterior margin on 1 st and 2 nd antennomeres of club.	Without distinct impressions, only areas with denser pores.
Clypeus armed on sides	X	X	X	X	X	X
Long hairs on frons	X	X	X	V	V	V
Lateral carinae of pronotum	X	X	X	X	X	X
Pleural pieces	X	V	X	V	V	X
Shape of disc of elytral declivity	Concave evenly	Male: concave Female: convex	Slightly concave	Weekly convex	Flatten	Male: concave Female: convex
Sculpture of apical margin of declivity	Entire, raised slightly at apex.	Male: with a small V-shaped emargination at apex. Female: apex of each elytron strongly emarginate, emargination filled by a pair of ventrally-directed processes next to suture.	Rised with a tiny V-shaped emargination.	Emarginated	Entire	Male: without an apical emargination. Female: apex of each elytron strongly emarginate, emargination filled by a pair of ventrally-directed processes next to suture.
Modified ventrites of female abdomen	4 th ventrite extended over 5 th as a thin, leaflike, plate, convex ventrally. The middle part of the 5 th ventrite, slightly emarginate	5 th ventrite strong emarginate in middle posteriorly.	X	3 rd ventrite projecting over and concealing fourth ventrite, its posterior margin with lobes or teeth.	X	5 th ventrite strong emarginate in middle posteriorly.
Protibia	Expanded from base to apex, external face convex.	Wider at apex than in middle, external face broadly grooved.	Wider at apex than in middle, external face flattened.	Wider at apex than in middle, external face flattened.	Expanded from base to apex, external face grooved.	Widest close to apex, external face flattened.
Distribution	Malaysia and Thailand	Northern Thailand	India and Burma	India and Thailand	India and Southeast Asia	India and Thailand

Table 2 (continued).

Character	Genus					
	<i>Xylocis</i> Lesne, 1901 (<i>X. ornatus</i> Lesne, 1897)*	<i>Xylodectes</i> Lesne, 1901	<i>Xylotrypta</i> Lesne, 1901	<i>Xylophorous</i> Lesne, 1906 (based on description by Lesne)	<i>Xylopsocus</i> Lesne, 1901 (10/17)**	<i>Xylothrips</i> Lesne, 1901 (<i>X. flavipes</i> (Illiger, 1801))*
No. of antennal segments	10	10	10	9	9/10	10
Sensory impressions on club	Dense sensory hairs along anterior margin on 1 st and 2 nd antennomeres of club	Indistinct two zones of sensory hairs at anterior margin on 1 st and 2 nd antennomeres of club	Dense sensory hairs along anterior margin on 1 st and 2 nd antennomeres of club	Dense sensory hairs along anterior margin on 1 st and 2 nd antennomeres of club	Indistinct	X
Clypeus armed on sides	X	X	V	X	V	V
Long hairs on frons	X	X	V	X	X	V
Lateral carinae of pronotum	X	X	X	X	V	V
Pleural pieces	V	X	V	V	X	V
Shape of disc of elytral declivity	Male: concave evenly Female: convex	Slightly convex	Slightly convex	Flatten	Flatten / Slightly convex	Slightly convex
Sculpture of apical margin of declivity	Male: entire with one pair of tiny tips at upper margin. Female: entire with one pair of distinct tubercle at the apex.	Entire with tiny v-shaped emargination at apex.	Entire	Entire.	Entire with slightly raised apex.	Entire with tiny v-shaped emargination at apex.
Modified ventrites of female abdomen	5 th ventrite broadly emarginate posteriorly	X	X	(can't examined)	X	Convex in middle of posterior margin
Protibia	Expanded from base to apex, external face flatten	Expanded from base to apex, external face flatten	Expanded from base to apex, external face weakly convex	Expanded from base to apex, external face grooved	Expanded from base to apex, external face weakly grooved	Expanded from base to apex, external face grooved
Distribution	India, Sri Lanka, Laos, Hong Kong, Taiwan	Taiwan, Philippines, Indonesia, Vietnam, Laos, India	India and Thailand	Sri Lanka	Southeast Asia	Southeast Asia

Table 3. Faunal elements of Xyloperthini Lesne, 1921 (see Discussion for further explanation).

Faunal Elements	Number of genera	Generic list
Oriental	12	<i>Calonistes</i> Lesne, 1936, <i>Infrantenna</i> n. g., <i>Octodesmus</i> Lesne, 1901, <i>Octomeristes</i> Liu & Beaver, 2016, <i>Paraxylyon</i> Lesne, 1941, <i>Psicula</i> Lesne, 1941, <i>Xylocis</i> Lesne, 1901, <i>Xylodectes</i> Lesne, 1901, <i>Xylodrypta</i> Lesne, 1901, <i>Xylophourus</i> Lesne, 1906, <i>Xylopsocus</i> Lesne, 1901, <i>Xylothrips</i> Lesne, 1901
African	9	<i>Amintinus</i> Anonymous, 1939, <i>Enneadesmus</i> Mulsant, 1851, <i>Plioxylyon</i> Vrydagh, 1955, <i>Scobicia</i> Lesne, 1901, <i>Xylion</i> Lesne, 1901, <i>Xylionopsis</i> Lesne, 1937, <i>Xylionulus</i> Lesne, 1901, <i>Xyloperthella</i> Fisher, 1950, <i>Xylopsocus</i> Lesne, 1901
Neotropical	8	<i>Ctenobostrychus</i> Reichardt, 1962, <i>Dendrobiella</i> Casey, 1898, <i>Sifidius</i> Borowski & Węgrzynowicz, 2007, <i>Tetrapriocera</i> Horn, 1878, <i>Xylobiops</i> Casey, 1898, <i>Xyloblaptus</i> Lesne, 1901, <i>Xylomeira</i> Lesne, 1901, <i>Xyloprista</i> Lesne, 1901
Australian & Oceanian	8	<i>Mesoxylyon</i> Vrydagh, 1955, <i>Xylobosca</i> Lesne, 1901, <i>Xylodectes</i> Lesne, 1901, <i>Xylodeleis</i> Lesne, 1901, <i>Xylogenes</i> Lesne, 1901, <i>Xylopsocus</i> Lesne, 1901, <i>Xylothrips</i> Lesne, 1901, <i>Xylotillus</i> Lesne, 1901
Palaearctic	8	<i>Calophagus</i> Lesne, 1902, <i>Enneadesmus</i> Mulsant, 1851, <i>Gracilenta</i> Zhang, Meng & Beaver, 2022, <i>Scobicia</i> Lesne, 1901, <i>Xylogenes</i> Lesne, 1901, <i>Xylopertha</i> Guérin-Méneville, 1845, <i>Xylopsocus</i> Lesne, 1901, <i>Xylothrips</i> Lesne, 1901
Nearctic	2	<i>Dendrobiella</i> Casey, 1898, <i>Scobicia</i> Lesne, 1901

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Manuscript received: 10 Feb. 2022

Manuscript accepted: 27 May 2022

Published on: 7 July 2022

Topic editor: Tony Robillard

Section editor: Max Barclay

Desk editor: Eva-Maria Levermann

Printed versions of all papers are also deposited in the libraries of the institutes that are members of the *EJT* consortium: Muséum national d'histoire naturelle, Paris, France; Meise Botanic Garden, Belgium; Royal Museum for Central Africa, Tervuren, Belgium; Royal Belgian Institute of Natural Sciences, Brussels, Belgium; Natural History Museum of Denmark, Copenhagen, Denmark; Naturalis Biodiversity Center, Leiden, the Netherlands; Museo Nacional de Ciencias Naturales-CSIC, Madrid, Spain; Real Jardín Botánico de Madrid CSIC, Spain; Zoological Research Museum Alexander Koenig, Bonn, Germany; National Museum, Prague, Czech Republic.