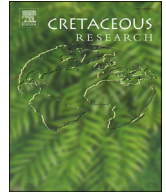




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Short communication

A new genus and species of family Mimarachnidae (Hemiptera: Fulgoromorpha: Fulgoroidea) from mid-Cretaceous Kachin amber, northern Myanmar[☆]

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ABSTRACT

A new planthopper genus *Tenebricosus* gen. nov. from mid-Cretaceous Kachin amber with its type species *Tenebricosus coriaceus* sp. nov. is described in the family Mimarachnidae. The new genus and species is the fourteenth genus and 22nd species of the extinct family Mimarachnidae, which is the most diverse planthopper family among Kachin amber inclusion. This genus can be distinguished from the previously described genera in tegmen venation, with stem ScP + R shorter than the common stem ScP + R + MP, stem MP with two terminals in margin, costal cell broad and tegmen coriaceous with length/width ratio about 2.4. Diagnostic features of the new genus are briefly discussed.

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1. Introduction

The insect order Hemiptera is subdivided into six suborders including Paleorrhyncha Carpenter, 1931, Sternorrhyncha Amyot et Audinet-Serville, 1843, Fulgoromorpha Evans, 1946, Cicadomorpha Evans, 1946, Coleorrhyncha Myers et China, 1929 and Heteroptera Latreille, 1810. Fulgoroidea is one of the three superfamilies (i.e. Fulgoroidea Latreille, 1807, Coleoscytoidea Martynov, 1935 and Surijokocixioidea Shcherbakov, 2000) of Fulgoromorpha (commonly known as planthoppers), and represent one of the main groups with high diversity among hemipterans (Bartlett et al., 2018; Szwed, 2018). Thirty-four families including thirteen extinct families have been recorded by far in the superfamily Fulgoroidea, of which the fossil record can be dated back to the Triassic (Szwed and Żyła, 2009; Szwed, 2018; Bourgoin, 2022; Zhang,

et al., 2021). Most of the Fulgoroidea extinct families are Cretaceous: Lalacidae Hamilton, 1990, Neazoniidae Szwed, 2007, Perforissidae Shcherbakov, 2007a, Mimarachnidae Shcherbakov, 2007b, Dorytocidae Emeljanov et Shcherbakov, 2018, Jubisentidae Zhang, Ren et Yao, 2019, Yetkhatidae Song, Szwed et Bourgoin, 2019, Katlasidae Luo, Jiang et Szwed, 2020 and Inoderbidae Shcherbakov et Emeljanov, 2021. Eleven planthopper families have been observed in Kachin ambers, including extant families Achilidae Stål, 1866, Cixiidae Spinola, 1839, Derbidae Spinola, 1839, and extinct ones Dorytocidae Emeljanov & Shcherbakov, 2018, Inoderbidae Shcherbakov et Emeljanov, 2021, Jubisentidae Zhang, Ren et Yao, 2019, Katlasidae Luo, Jiang et Szwed, 2020, Mimarachnidae Shcherbakov, 2007b, Perforissidae Shcherbakov, 2007a, and Yetkhatidae Song, Szwed et Bourgoin, 2019 (Song et al., 2019; Luo et al., 2020a).

Among them, families Mimarachnidae is the most diverse one with 13 genera and 21 species already described including *Mimamontsecia cretacea* Szwed and Ansoerge, 2015 and *Chalicoridulum montsecensis* Szwed and Ansoerge, 2015 from the Lower Cretaceous (lower Barremian) of north-eastern Spain; *Saltissus fennahi* Luo, Liu et Jarzembowski, 2021 from Lower Cretaceous (lower Barremian) of Smokejacks Brickworks, southern England, *Mimarachne mikhailovi*

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Shcherbakov, 2007b and *Saltissus eskovi* Shcherbakov, 2007b from the Lower Cretaceous (Aptian) Zaza Formation of Baissa, Buryatia in Russia; *Nipponoridium matsui* (Fujiyama, 1978) from the Lower Cretaceous (Aptian) Kuwajima Formation, Kaseki-kabe, Hakusan City, Ishikawa Prefecture in Japan (Fujiyama, 1978; Szwedo, 2008); 8 genera and 15 species from Upper Cretaceous (lowermost Cenomanian; 98.79 ± 0.62 Ma) Kachin amber of northern Myanmar: *Burmissus latimaculatus* Fu et Huang, 2020, *Burmissus raunoi* Shcherbakov, 2017, *Burmissus szwedoi* Luo et al., 2020, *Dachibangus hui* Zhang, Yao et Pang 2021, *Dachibangus formosus* Fu et al., 2019, *Dachibangus trimaculatus* Jiang et al., 2018, *Jaculistilus oligotrichus* Zhang et al., 2018, *Mimaplax ekrypsan* Jiang et al., 2019, *Ayaimatum minutum* Fu et Huang, 2021, *Ayaimatum trilobatum* Jiang et Szwedo, 2020, *Cretodorus rostellatus* Zhang, Yao et Pang, 2021, *Cretodorus angustus* Fu et Huang, 2020, *Cretodorus granulatus* Fu et Huang, 2020, *Mimaerypteris burmiticus* Fu et Huang, 2021 and *Multistria orthotropa* Zhang, Yao et Pang 2021 (Luo et al., 2021) (Fig. 1).

Here we present a new genus and species of this family, *Tenebricosus coriaceus* gen. et sp. nov., based on a specimen from mid-Cretaceous Kachin amber.

2. Material and method

The specimen studied here is a piece of amber from the Cretaceous deposits in the Hukawng Valley of Kachin State, northern Myanmar (locality: Noije Bum; $26^{\circ}21'33.41''N$, $96^{\circ}43'11.88''E$; palaeocoordinates $12.4^{\circ}N$, $93.8^{\circ}E$; see figure 1 in Jiang et al. (2018)) (Kania et al., 2015; Thu and Zaw, 2017). As the southward extension of the Tibetan orogeny, Myanmar lies south to the eastern Himalayan syntaxis, and is suggested to be subdivided into three major tectonic zones: the Indo-Burma range, the West Burma and Sibumasu Terranes (Metcalf, 2013; Li et al., 2018). The amber locality in this study lies in northern part of the West Burma Terrane (Broly et al., 2015),

which was suggested to collide with the Sibumasu Terrane in the Early Cretaceous (Gardiner et al., 2016; Zaw et al., 2017). In the mid- to Late Cretaceous, the West Burma Terrane was situated in the southern edge of the southeastern Asia, and the frontal area of the subduction of the Neo-Tethyan ocean to the Eurasian plate (Metcalf, 2013; Gardiner et al., 2016; Li et al., 2018). Humid tropical climate with volcanic activities was thought to be dominated in this area, which can also be indicated from fossil records (Cruickshank and Ko, 2003; Jiang et al., 2018; Jiang et al., 2019).

Kachin amber, the fossil resin referred as burmite (Helm, 1892, 1893), has become the most important source of Cretaceous amber inclusions. There are more than 600 species varying from invertebrates, vertebrates, protists, plants, and fungi have been reported from Kachin amber by now, indicating the enormous biodiversity and biotic importance of the Kachin amber biota (Ross, 2022). The amber deposits mainly outcrop as clastic sedimentary rocks, with thin limestone beds and abundant coaly and carbonaceous material. An estimated age of earliest Cenomanian (98.8 ± 0.6 Ma) for the amber deposit was proposed by Shi et al. (2012) from radiometric U–Pb dating of zircons from the volcano clastic matrix. This age is younger than the age based on fossil ammonites, pholadid bivalves inclusion and palynological study (Wright et al., 1996; Cruickshank and Ko, 2003; Smith and Ross, 2018; Yu et al., 2019). Xing and Qiu (2020) also proposed an older zircon U–Pb dating age (ca. 110 Ma) from the newly discovered Hkamti mine south to the Hukawng basin, indicating the importance of distinguishing amber sources from different mining regions. Detailed geological surveys are still needed to differentiate various amber bearing layers and constrain their ages in the Cretaceous strata of northern Myanmar.

To avoid any confusion and misunderstanding, all authors declare that the fossil reported in this study was legally collected before June 2017, and was not involved in the armed conflict and

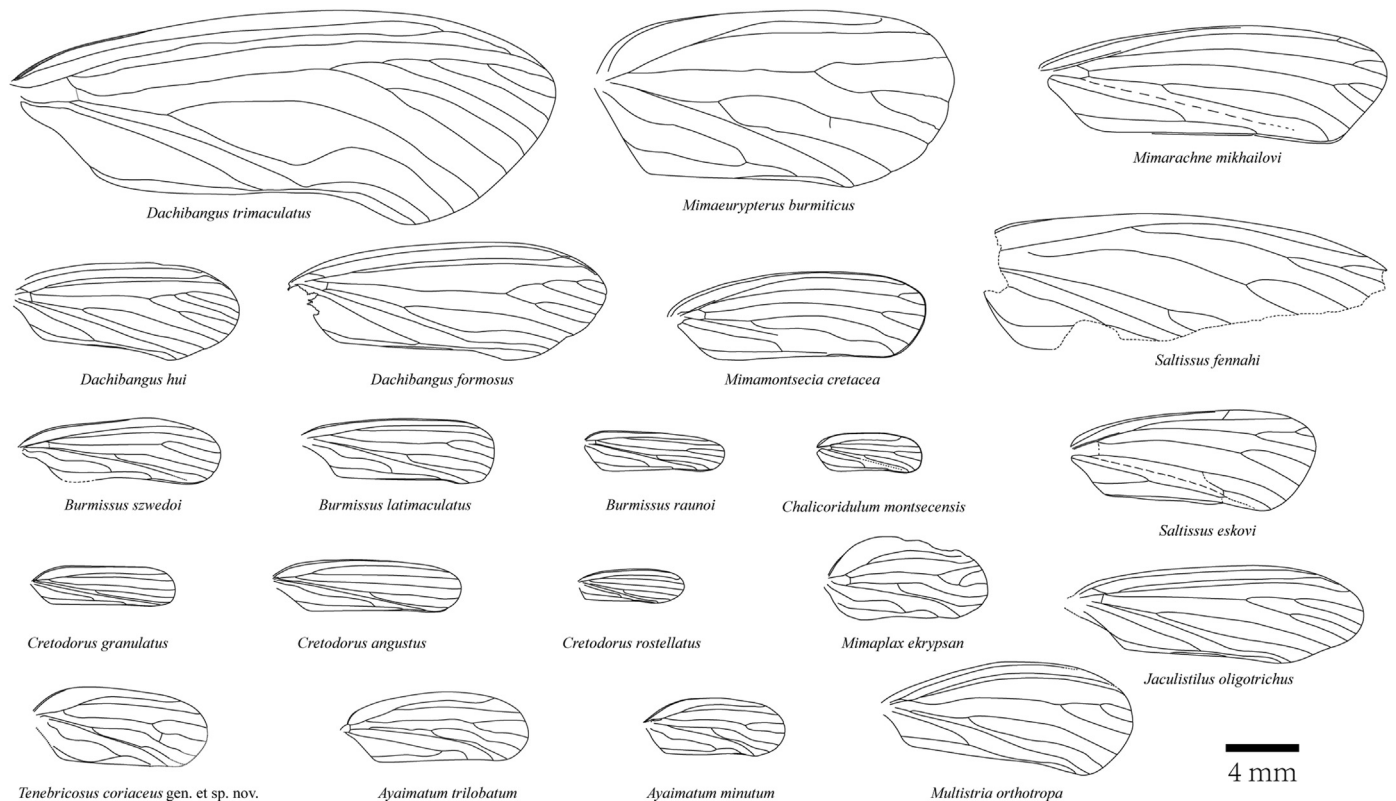


Fig. 1. Tegmen venation patterns of genera and species from family Mimarachnidae. Scale bar = 4 mm.

ethnic strife in Myanmar. The fossil specimen is deposited permanently in the Nanjing Institute of Geology and Palaeontology, Chinese Academy of Sciences, Nanjing, China (see 'NIGP Statement & Museum Catalogue Entry' in Supplementary Material), in full compliance with the International Code of Zoological Nomenclature (ICZN 1999), Statement of the International Palaeontological Society (Szwedo et al., 2020) and policies presented by Haug et al. (2020).

Observations were performed using stereomicroscopes Nikon SMZ1000 and Zeiss AxioZoom V.16 in the Nanjing Institute of Geology and Palaeontology, Chinese Academy of Sciences. Drawings were prepared with use of camera lucida attached to Nikon SMZ1000, microphotographs were taken with a digital camera AxioCam 512 color attached to Zeiss AxioZoom V.16 stereoscopic microscope under control of Zen software package. Photomicrographic composites of 20–100 individual focal planes were digitally stacked and obtained using the software HeliconFocus 6.7.1 for a better illustration of 3D structures. Because of the amber thickness, the samples were placed in a sugary liquid to improve their light transmission and remove optical distortions. The wing venation used in this paper is based on the general scheme for the Hemiptera (Nel et al., 2012; Bourgoïn et al., 2015).

3. Systematic paleontology

Order Hemiptera Linnaeus, 1758

Infraorder Fulgoromorpha Evans, 1946

Superfamily Fulgoroidea Latreille, 1807

Family Mimarachnidae Shcherbakov, 2007b

Genus *Tenebricosus* gen. nov., He, Jiang & Szwedo

LSID:urn:lsid:zoobank.org:act:651B1256-6AB6-4920-97DB-05132087AB71

Type species: *Tenebricosus coriaceus* He, Jiang et Szwedo, sp. nov.; by present designation.

Etymology. Generic name is derived from a Latin adjective "tenebricosus" meaning "full of darkness or gloom, shrouded in darkness, dark, gloomy", refers to the dark appearance of inclusion. Gender: masculine.

Diagnosis. Differs from other genera of Mimarachnidae in the following characters: Mesonotum present, with doubled elevated median carinae reaching the anterior margin (not reaching the anterior margin and much closer to each other in *Mimaerypteris*); Tegmen coriaceous (as in *Mimaerypteris*, membranous in most genera); slender, length/width ratio about 2.4 (broader in *Mimaerypteris* and *Mimaplax*); anteroapical and posteroapical angle widely rounded (apical margin truncate in *Mimaerypteris*); costal cell broad (as in *Mimaerypteris*, much broader in *Mimaplax* and narrow in most genera); stem ScP + R is shorter than the common stem ScP + R + MP (stem ScP + R is distinctly longer than common stem ScP + R + MP in *Mimaerypteris*, *Mimaplax*, common stem ScP + R + MP + (CuA) as long as stem ScP + R in *Ayaimatum*); stem MP with two terminals in margin (three terminals in *Mimaerypteris* and *Multistria*, single MP in *Cretodorus*, more than three terminals in *Dachibangus* and *Jaculistilus*).

Description. Head with compound eyes about 0.6 wide as pronotum width. Anterior margin of vertex triangular, lateral margins sinuous, diverging posteriad; anterior and lateral margins of vertex elevated; disc of vertex concave. Frons widest at level of antennae, median carina present, branched anteriad. Median ocellus present. Frontoclypeal suture slightly arcuate.

Thorax. Pronotum subhexagonal, about 4 times as wide as long in mid line, anterior margin sinuated; posterolateral margins straight, diverging posteriad; posterior margin sinuate, concave medially, slightly W-shaped; anterior angle obtuse,

posterolateral angle less than 90°. Disc of pronotum slightly elevated in the mid part with two diverging posteriad median carinae, reaching anterior and posterior margins; sides of pronotum declivous, lateral margin carinate. Mesonotum with double elevated median carinae reaching the anterior margin, slightly diverging posteriad, transversely diamond-shaped, wider than long in middle.

Tegmen. Length/width ratio about 2.4, coriaceous, filled with meshwork of veinlets forming irregular polygonal nets in the apical portion of tegmen. Costal margin widely curved and thickened at base, then straight, anteroapical angle widely rounded, apex rounded, posteroapical angle rounded, tornus short and slightly concave, claval margin almost straight. Stem Pc + CP close to the costal margin at base and submerged to margin at about ¼ of the tegmen length. Stem ScP + R + MP slightly arcuate, longer than length of common stem ScP + R. Stem ScP + R forked at basal ¼ of tegmen length; branch ScP + RA single, slightly arcuate, curved apically and reaching margin at anteroapical angle; branch RP single, subparallel to costal margin and reaching margin more apically than branch ScP + RA. Stem MP strongly curved at base, then subparallel to branch RP, forked at level of claval veins Pcu + A₁ reaching claval margin, with two terminals at apex; branch MP₃₊₄ curved at base and slightly curved back in middle. Stem CuA straight, forked basal of claval veins junction; branch CuA₁ parallel to stem MP basally, then curved posteriad nearly the level of stem MP forking, then subparallel to branch MP₃₊₄; CuA₂ strongly curved at base, very close and parallel to claval suture and CuP, abruptly diverging mediad from claval suture at the level of stem MP forking. Claval suture and CuP almost straight, slightly arcuate in the distal portion, reaching margin at apical ¾ of tegmen length. Claval vein Pcu sinuous; vein A₁ arcuate and very close to claval margin at the level of stem CuA fork, then curve to the conjunction with Pcu; Pcu and A₁ fused at the mid of stem CuA fork and stem MP fork, about ½ of tegmen length; stem Pcu + A₁ strongly arcuate at base, then straight, reaching claval margin at about 1/3 of tegmen length. Costal cell wide, more than three times as wide as cell C1 at base. Cell C5 curved lanceolate, twice as long as cell C3.

Hind wing membranous, translucent, nearly as long as the length of tegmen, with meshwork of veinlets forming irregular polygonal nets, veinlets slightly thicker on anal field, polygonal cells apparently bigger than tegmen; coupling lobe at nearly 1/3 of wing length. Costal margin slightly sinuate, then curved to anteroapical angle at the level of nodus, posterior margin arcuate. Stem ScP + R slightly sub-parallel and close to costal margin, forked apicad the level of coupling lobe; branches ScP + RA and RP reaching margin on apex, slightly posteriad of hind wing anteroapical angle. Stem MP single, almost straight and weakly curved apicad the stem ScP + R forking, reaching margin basal of apex. Stem CuA separated from stem MP + CuA at very base of hind wing, arcuate at base and then straight, forked slightly basad of stem ScP + R forking near the level of nodus; branch CuA₁ sinuous, apparently curved basally and apically; branch CuA₂ almost straight. Stem CuP sinuous, curved apically, distance between tip of CuP and tip of CuA₂ smaller than distance between tips of CuA branches. Stem Pcu slightly sinuate in distal section, subparallel to stem CuP in apical section, distance between tip of Pcu and tip of CuP nearly the same as distance between tips of CuA branches. Vein A₁ strongly curved in the mid length, vein A₂ almost straight. Meshwork of transverse veinlets present between longitudinal veins, more regular cells visible on anal lobe.

Abdomen. Abdomen flattened, not reaching tips of tegmina. Female terminalia with gonoplags (?) (abdominal flaps?) large and membranous. Anal tube with circular anal style at apex. Male unknown. **Age and distribution.** Late Cretaceous (Cenomanian); Kachin State, northern Myanmar.

Tenebricosus coriaceus He, Jiang et Szwed, sp. nov.
 LSID:urn:lsid:zoobank.org:act:93B5DEA7-DDB8-47D9-9C16-8FAE497E79AF
 (Figs. 2A-D, 3A-D)

Etymology. Specific epithet is derived from Latin adjective “coriāceus” and refers to its leathery fore wing.

Material. Holotype. Specimen number NIGP 180538 housed in the in Nanjing Institute of Geology and Palaeontology, Chinese Academy of Sciences, Nanjing. Kachin amber, collected before 2016, piece of amber 2.6 g, ca. 27.0 × 18.0 × 5.5 mm. Holotype inclusion incomplete – rostrum and legs missing; dorsal view of head capsule, pronotum, mesonotum and tegmen obscured; abdomen partly preserved.

Diagnosis. As for genus as it is the only included species. Additionally: tegmen dark evenly without colour bands, become more translucent in the apical section, which filled with meshwork of veinlets, apical portion of meshwork smoked, cells translucent; transverse veinlets *m-cua* connect branch MP_{3+4} and CuA_1 at $\frac{1}{4}$ of the tegmen length. Hind wing with distance between terminals of CuP and Pcu at margin distinctly wider than distance between apices of Pcu and A_1 , CuA_2 and CuP ; distance between apices of A_1 and A_2 is about $\frac{1}{3}$ of hind wing width.

Description. Head with compound eyes 1.91 mm wide. Vertex 1.0 mm long at mid line, 1.40 mm wide at widest point. Frons

0.80 mm wide at widest point at the level of antennae. Pronotum 0.88 mm long at mid line, 3.57 mm wide. Mesonotum 2.11 mm long at mid line. Tegmen 10.03 mm long, maximum width 4.24 mm at the level of stem $ScP + R$ fork, with distinct longitudinal veins, polygonal net of transverse veinlets in the apical section where the tegmen become more translucent, without distinctive dark bands or some irregular patches of darker areas preserved. Costal area broad at base and become apparently narrow at the level before the junction of claval veins and after the forking of vein CuA ; costal cell narrower than radial cell apically, 1.02 mm wide at widest point; cell $C1$ 6.48 mm long, 0.41 mm wide; cell $C3$ 3.13 mm long, 0.79 mm wide; cell $C5$ 5.26 mm long, 0.78 mm wide at widest point. Hind wing membranous and transparent basal portions of longitudinal veins and meshwork smoked along, 7.58 mm long, 5.65 mm wide in the level of nodus; cell $C1$ 2.42 mm long and 0.42 mm wide; cell $C5$ 2.88 mm long and 0.96 mm wide apically.

Horizon and occurrence. Upper Cretaceous, earliest Cenomanian (mid-Cretaceous auct.); Noije Bum Hill, Hukawng Valley, Kachin State, northern Myanmar.

4. Discussion

Mimarachnidae was first described by Shcherbakov (2007b) based on two impression specimens and it was described as spider

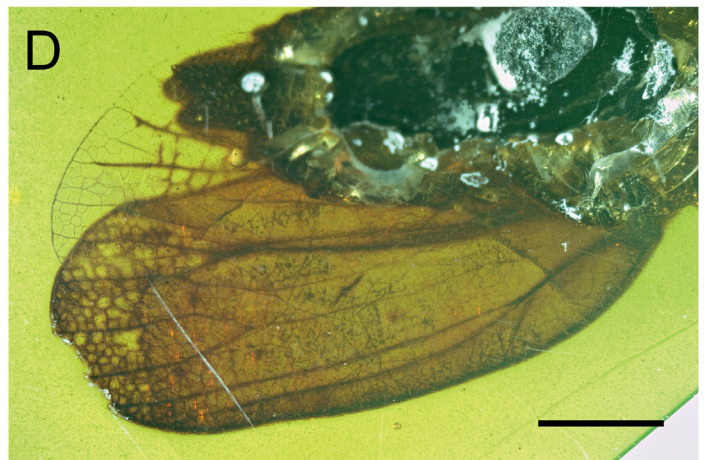
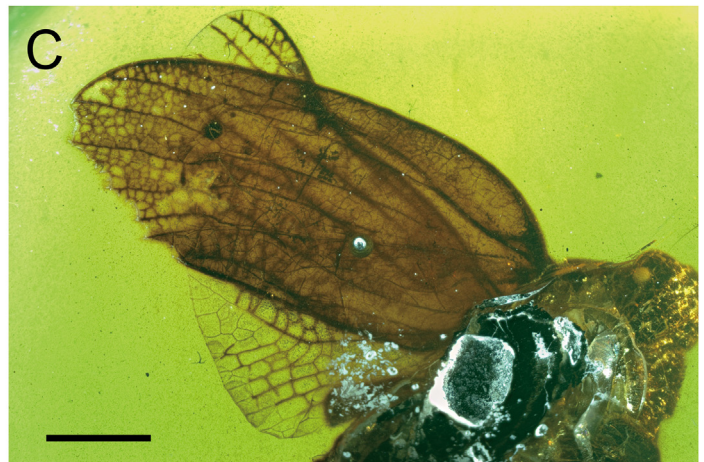
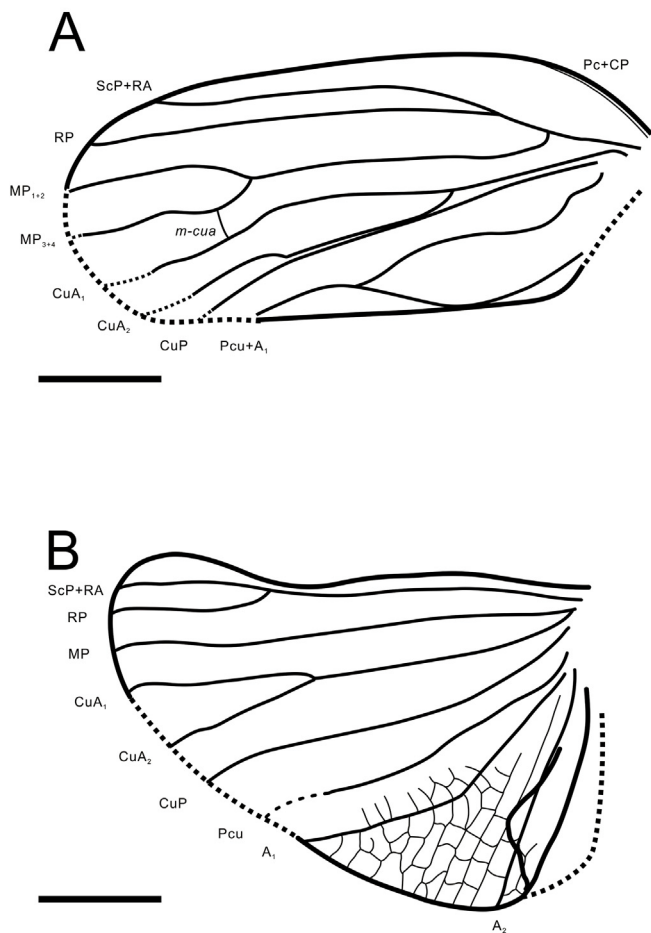


Fig. 2. Line drawings and photographs of *Tenebricosus coriaceus* gen. et sp. nov. from Kachin amber, holotype (NIGP 180538). (A) Line drawing of right tegmen. (B) Line drawing of right hind wing. (C) Right tegmen in ventral view. (D) Left tegmen in ventral view. Scale bars = 2 mm.

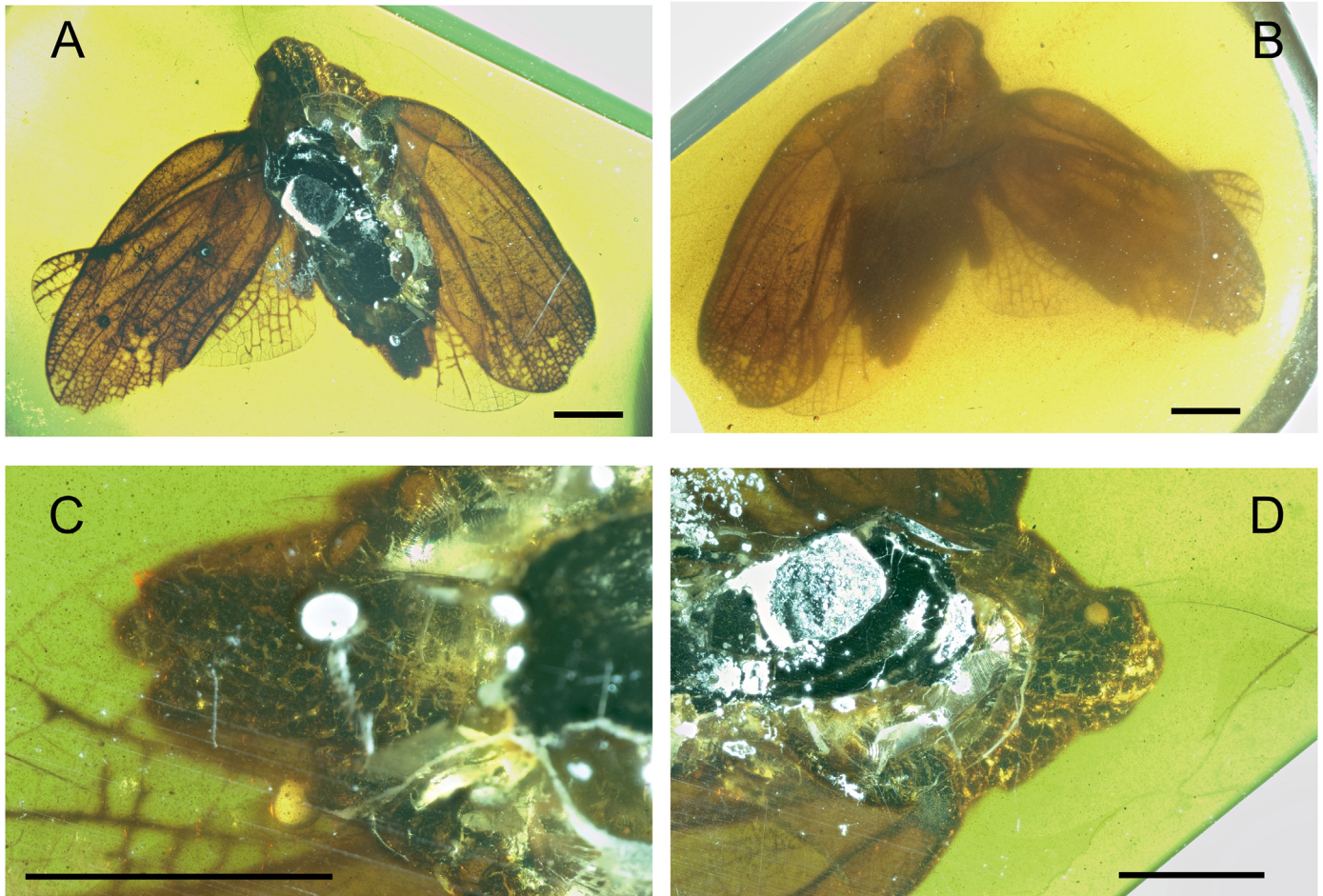


Fig. 3. Photographs of the holotype (NIGP 180538) of *Tenebricosus coriaceus* gen. et sp. nov. from Kachin amber. (A) General habitus in ventral view. (B) General habitus in dorsal view. (C) Female terminalia in ventral view. (D) Ventral view of the face. Scale bars = 2 mm.

mimic planthopper with eyespot coloration and dark appearance. With more taxa founded in this family, different unique morphological features and peculiarities have been described beside the spider mimicry, such as giant size, elongated head, flatoidinisation syndrome, and a rostrum that exceeds the length of the body, indicating high taxonomic diversity and morphological disparity of taxa included to the family (Shcherbakov, 2017; Zhang et al., 2017; Jiang et al., 2018, 2019). The newly described genus and species increase the range of reported diversity and disparity of Mimarachnidae by its very dark appearance and more coeliopterous tegmina. Beside the special morphological characters in some taxa, Mimarachnidae is distinguished by its simplified venation with meshwork of irregular veinlets on both wings, double carination in median line of pronotum and mesonotum, setigerous metatibial pecten and hind leg armature, and retention of nymphal sensory pits in adults (Shcherbakov, 2007b, 2017). *Tenebricosus* gen. nov. described herein belongs to Mimarachnidae based on the following identified characters: tegmen with simplified venation and irregular meshwork of crossveins, stem ScP + R deeply and narrowly forked, CuA₁ and CuA₂ simple, weakened basal cell; hind wing with ScP + R and CuA forked and MP simple; mesonotum with doubled median carinae.

Narrow costal area of Mimarachnidae was firstly noted by Shcherbakov (2007b), based on pattern observed in *Mimarachne* Shcherbakov, 2007b and *Saltissus* Shcherbakov, 2007b. Narrow costal area was also observed in *Mimamontsecia* Szwedo et

Ansorge, 2015, *Dachibangus* Jiang, Szwedo et Wang, 2018 (with irregular transverse veinlets), *Jaculistilus* Zhang, Ren et Yao, 2018, *Multistria* Zhang, Yao et Pang, 2021 and *Cretodorus* Fu et Huang, 2020 (Zhang et al., 2018; Fu and Huang, 2020; Zhang, et al., 2021). In *Chalicoridulum* Szwedo et Ansorge, 2015, *Mimaeurypterus* Fu et Huang, 2021 and *Ayaimatum* Jiang et Szwedo, 2020, costal area is wider, with common stem ScP + R and its branches elevated or embossed, and the costal cell slightly concave (Szwedo and Ansorge, 2015; Jiang et al., 2020; Fu and Huang, 2021). In *Mimaplax* Jiang, Szwedo et Wang, 2019, costal area is much wider than others, with undulate margin (Jiang et al., 2019). The wide costal area in the newly established genus *Tenebricosus* gen. nov. is similar to *Mimaeurypterus*, especially in the basal part, where the costal margin is thickened in both genera as well as the stem ScP + R. The difference is stem Pc + CP distinctly separated with the costal margin at base and submerged to margin at $\frac{1}{3}$ of tegmen length in *Mimaeurypterus* (Fu and Huang, 2021), while in *Tenebricosus* gen. nov. stem Pc + CP is submerged to margin at base.

Compare to *Mimaeurypterus*, *Tenebricosus* gen. nov. is distinctly smaller, more close to range of *Ayaimatum*, between the size of *A. minutum* and *A. trilobatum*, but differs in features of tegmen venation especially in basal portion. The hind wing venation of *Tenebricosus* gen. nov. and *Ayaimatum* are also different, by presence of additional branching of A₂ in *Ayaimatum*.

The stem MP is single in *Cretodorus*, while MP has more than 2 terminals in *Dachibangus*, *Jaculistilus*, *Mimarachne*, *Multistria* and *Mimaerypteris* (Jiang et al., 2018; Zhang et al., 2018; Fu et al., 2019; Fu and Huang, 2020, 2021). There are 2 terminals of stem MP in *Tenebricosus* gen. nov. as well as in *Chalicoridulum*, *Mimamontsecia*, *Saltissus*, *Burmissus* and *Ayaimatum* (Shcherbakov, 2007b, 2017; Szwedo and Ansoerge, 2015; Luo et al., 2020b). *Tenebricosus* gen. nov. differs from *Chalicoridulum*, *Mimamontsecia* and *Saltissus* in tegmen venation which RP has additional branches in *Mimamontsecia* and *Saltissus*, and the junction of claval veins at the level of CuA forking in *Chalicoridulum* (Shcherbakov, 2007b; Szwedo and Ansoerge, 2015). The tegmen in *Burmissus* is slender and tectiform in shape with extremely long rostrum, while there seem no trace of long rostrum in *Tenebricosus* gen. nov. (Shcherbakov, 2017; Fu and Huang, 2020; Luo et al., 2020b).

Most genera and species of Mimarachnidae described from Kachin amber show morphological disparity related to various ecological strategies. Some of them are related with feeding strategies, such as long and slender rostrum of *Burmissus*. Some of them are related with cryptic behavior, such as flatoidinisation syndrome in *Mimaplax*, coloration and patterns in *Dachibangus*, flattened head and elevated mesonotum in *Ayaimatum* (Jiang et al., 2018, 2019, 2020). There are many strategies for cryptic behavior or visual camouflage, such as disruptive coloration (patterns that conceal an animal's body outline) and background matching (colors that resemble the general color of the visual background) (Thery and Gomez, 2010; Michalis et al., 2017). The dark appearance of *Tenebricosus* gen. nov. seems to be common morphological feature for cryptic behavior against visual hunting predators. In the warm, humid equatorial forest of the mid-Cretaceous West Burma terrane, the dark rough bark and damp shadow of the trees like araucaria could most likely be the habitats for most planthoppers, especially Mimarachnidae, of which some fossil species are suggested to live in damp and dark surroundings (Poinar, Lambert and Wu, 2007; Jiang et al., 2018, 2019). In these dark background, whether it is disruptive or not, a prey with dark appearance could greatly reduce the risk of being detected, especially against predator with sensitive visual ability like avian predator, which has already been reported from Kachin amber inclusion (Thery and Gomez, 2010; Xing et al., 2016, 2017). However, crypsis involves various mechanisms to prevent detection, such as body shape, contour, colour, and colour pattern. We still need more evidence to reconstruct the ecological evolution of cryptic strategies in Mimarachnidae as well as in other planthoppers in Cretaceous Kachin amber.

5. Conclusion

The described above new fossil planthopper *Tenebricosus coriaceus* gen. et sp. nov. is 14th genus and 22nd species ascribed to extinct family Mimarachnidae. This finding adds novel morphological information on the group, new data to palaeoecological and palaeobehavioral interpretation of these insects and their paleohabitats, and provides new data about the taphocoenosis of the Kachin amber inclusions.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.cretres.2022.105308>.

Figure 1

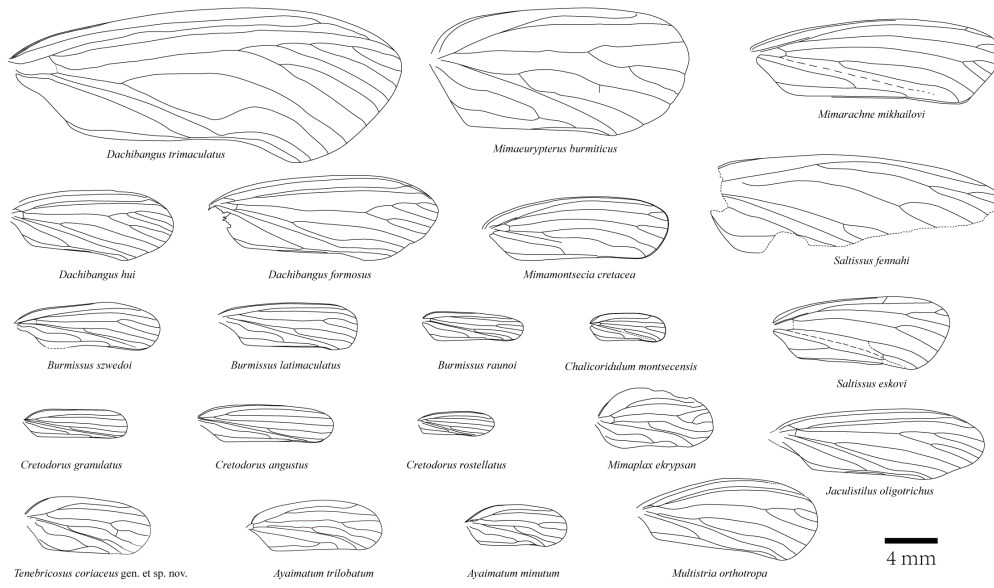


Figure 2

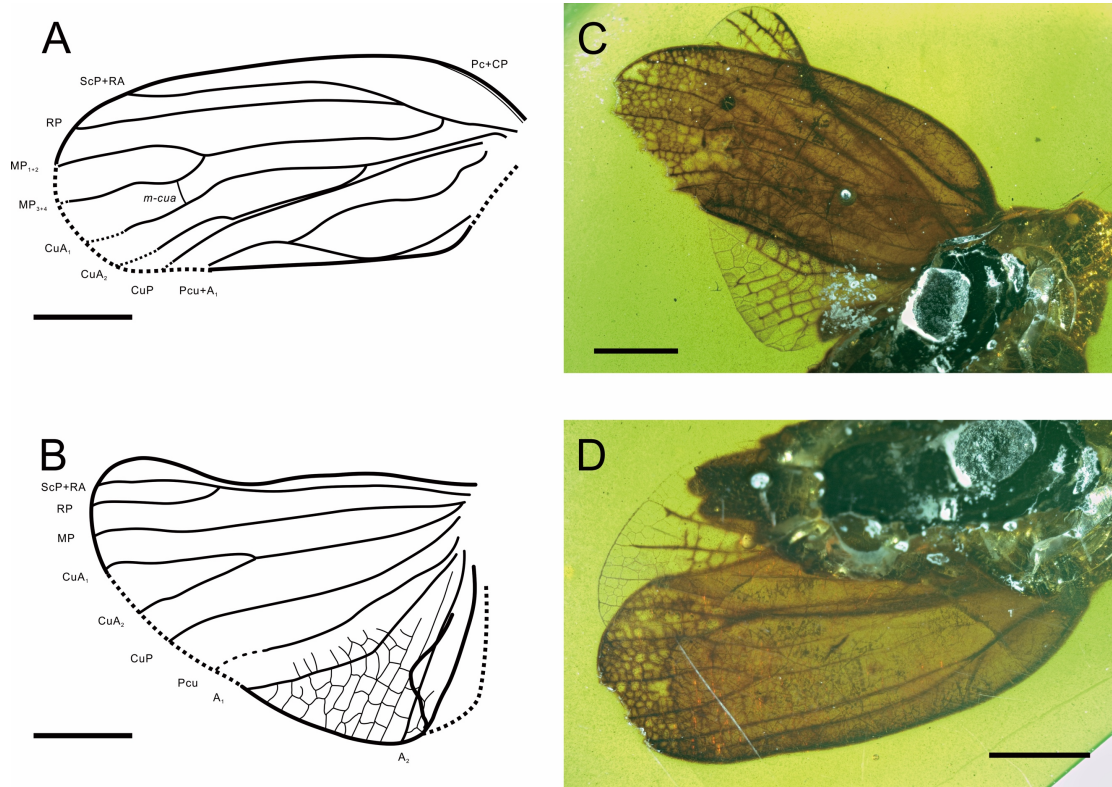


Figure 3

