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New data on Cicadomorpha from the Early Cretaceous Jehol Biota of China

YAN-ZHE FU[1,4*], MATHIEU BODERAU[2,5], DOLEV FABRIKANT[1,3,6] & ANDRÉ NEL[2,7]

[1]*State Key Laboratory of Palaeobiology and Stratigraphy, Nanjing Institute of Geology and Palaeontology, Chinese Academy of Sciences, Nanjing 210008, China*
[2]*Institut de Systématique, Évolution, Biodiversité (UMR 7205), MNHN, CNRS, SU, EPHE-PSL, UA, CP50, 57 Rue Cuvier, 75005 Paris, France*
[3]*Steinhardt Museum of Natural History and New Environmental School, Tel Aviv University, Tel Aviv 6100000, Israel*
[4] *yzfu@nigpas.ac.cn; https://orcid.org/0000-0002-7819-1703*
[5] *mathieuboderau@gmail.com; https://orcid.org/0000-0003-3067-077X*
[6] *dolevf@mail.tau.ac.il; https://orcid.org/0009-0004-4388-4026*
[7] *anel@mnhn.fr; https://orcid.org/0000-0002-4241-7651*
**Corresponding author*

Abstract

The Early Cretaceous Jehol Biota yielded exceptionally diverse and abundant insect fossils, yet its cicadomorphan record remains incompletely documented. Here, we describe new cicadomorphan specimens from the Lower Cretaceous Yixian Formation of Huangbanjigou, Beipiao City, northeastern China. The material includes *Stellularis longirostris* and *Sinocercopis* sp. (Procercopidae), a new species, *Cretohylicella lambkini* **sp. nov.**, tentatively assigned to Hylicellidae, and a new specimen tentatively assigned to Cicadelloidea. This study enriches the cicadomorphan diversity of the Yixian Formation and provides new insights into the phytophagous insect assemblage of the Jehol Biota.

Key words: Lower Cretaceous, Yixian Formation, Huangbanjigou, Hylicellidae, Procercopidae, Cicadelloidea

Introduction

The Early Cretaceous terrestrial Jehol Biota was widely distributed across eastern Eurasia, particularly in western Liaoning Province and adjacent regions of northeastern China (Zhang *et al*. 2010; Zhou 2014). It is renowned for its exceptionally preserved fossils, including feathered dinosaurs, pterosaurs, early birds, mammals, abundant insects, and flowering plants (Zhou 2014). The insect assemblages of the Jehol Biota (Jehol Entomofauna) are remarkably diverse: to date, more than 800 species in over 200 families and 19 orders have been documented (Zhang *et al*. 2010; Ren *et al*. 2019).

The Yixian Formation represents a key component of the Jehol Biota and corresponds to the middle phase of this Biota (Zhang *et al*. 2010; Zhou 2014). The age of the main fossil-bearing horizons of the Yixian Formation has long been considered to be approximately 125 Ma (e.g., Swisher III *et al*. 1999; Sha 2007; Chang *et al*. 2017). Recently, high-precision U–Pb zircon dating constrains this formation to a short interval between 125.755 ± 0.061 Ma and 124.122 ± 0.048 Ma, indicating rapid deposition within the Early Cretaceous (Zhong *et al*. 2021). During this period, the insect assemblage appears to be among the richest documented within the Jehol Biota, with Coleoptera Linnaeus, 1758 and Hymenoptera Linnaeus, 1758 being the most diverse groups, followed by Hemiptera Linnaeus, 1758 (Zhang *et al*. 2010).

Cicadomorpha Evans, 1946 is a suborder of Hemiptera comprising cicadas, froghoppers, leafhoppers, and treehoppers, and represents one of the major plant-feeding insect groups in modern terrestrial ecosystems. Understanding the composition and diversity of Early Cretaceous Cicadomorpha is therefore important for reconstructing insect community structure and plant-insect interactions within the Jehol Biota. The family-level composition of Early Cretaceous Cicadomorpha may have differed from that of modern faunas, a pattern possibly linked to the ecological restructuring associated with the Cretaceous Terrestrial Revolution, after which most Mesozoic cicadomorphan

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families did not persist beyond the end Cretaceous (Boderau *et al*. 2025a, b). The Yixian Formation captures part of this evolutionary shift, yet its cicadomorphans remain insufficiently documented.

Here, we describe new cicadomorphan fossils from the Lower Cretaceous Yixian Formation at Huangbanjigou, Liaoning Province, China, including a new species of Hylicellidae Evans, 1956, a new specimen of *Sinocercopis* Hong, 1982 together with four additional specimens of *Stellularis longirostris* Chen, Yao & Ren, 2015 (Procercopidae Handlirsch, 1906), and a specimen assigned to Cicadelloidea Latreille, 1802.

Material and methods

The studied cicadomorphan specimens (NIGP209632–NIGP209637, and NIGP209709) were collected from the yellowish tuff of the Jingangshan Member of the Yixian Formation near Huangbanjigou Village, Beipiao City, Liaoning Province, northeastern China. For the detailed location of the fossil site, see Cai *et al*. (2020: fig. 1). All specimens are deposited in the Nanjing Institute of Geology and Palaeontology, Chinese Academy of Sciences (CAS), Nanjing, China.

The studied specimens were carefully prepared using a sharp blade. They were examined both dry (under low-angled light) and moistened with 70% ethanol (in order to improve contrast). Photomicrographs were taken using a Zeiss Discovery V20 microscope and a Keyence VHX-6000 digital microscope. Images were further processed by Adobe Photoshop CC 2019 to adjust brightness and contrast. Line drawings were drafted with CorelDRAW Graphics Suite 2024.

The wing venation terminology largely follows Nel *et al*. (2012) for Acercaria, as adapted by Schubnel *et al*. (2019) for the interpretation of the postcubitus vein. Wing venation abbreviations are as follows: CA, costa anterior; CP, costa posterior; Pc, praecosta; ScP, subcostal posterior; RA_1, first branch of the radius anterior; RA_2, second branch of the radius anterior; RP, radius posterior; M, media; CuA_1, first branch of cubitus anterior; CuA_2, second branch of cubitus anterior; CuP, cubitus posterior; PCu, postcubitus; A1, first anal vein. Crossveins are written in lowercase, e.g. *cua-cup* is the crossvein between CuA and CuP.

Systematic palaeontology

Order Hemiptera Linnaeus, 1758
Suborder Cicadomorpha Evans, 1946
Superfamily Hylicelloidea Evans, 1956
Family Hylicellidae Evans, 1956

Genus *Cretohylicella* gen. nov.

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Type species. *Cretohylicella lambkini* **sp. nov.**; by present designation.

Etymology. The generic name derives from *Creto-*, referring to the Cretaceous, and the genus name *Hylicella*. Gender: feminine.

Diagnosis. Tegmen length over 20 mm, covered with light-coloured rounded spots between main veins; crossvein *cua-cup* ending at point of separation of M and CuA; Pc+CP extending to RA_2 terminals; (ScP)+R much longer than (ScP)+RA; (ScP)+RA_1 simple, short; RA_2 pectinately forked; RP forked near wing apex; M distally forked, with seven terminals; two crossveins *ir* and *r-m* present.

Cretohylicella lambkini sp. nov.

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(Fig. 1)

Type material. Holotype, NIGP209632; deposited in the Nanjing Institute of Geology and Palaeontology, CAS.

Etymology. The specific epithet is in honour of Dr Kevin Lambkin for his valuable contributions to the study of fossil Cicadomorpha.

Diagnosis. As for the genus (monospecific) with additional characters: tegmen covered with light-coloured rounded spots along basal 3/4 of tegmen length, except for costal area and area between (ScP)+RA and RP.

Locality and horizon. Huangbanjigou, Shangyuan Township, Beipiao City, Liaoning Province, China; Yixian Formation; Lower Cretaceous.

Description. Tegmen length 22.3 mm; costal margin arched; apical margin slightly truncate; bScP smoothly arched; Pc+CP arched, long, extending to RA_2 terminals; crossvein *cua-cup* ending at the point of separation of M and CuA; (ScP)+R more than twice as long as M+CuA, forked at basal 0.31 of tegmen length; (ScP)+R about three times longer than (ScP)+RA; (ScP)+RA forking into (ScP)+RA_1 and RA_2 basad of M forking; (ScP)+RA_1 short; RA_2 pectinate, with four terminal branches; stem RP nearly straight, distally forked, with three short terminals; stem M forked slightly apicad of CuA forking, at basal 0.70 of tegmen length, with seven terminal branches; stem CuA smoothly curved at base, forked at basal 0.68 of tegmen length; 1st section of CuA_1 slightly longer than CuA_2, 2nd section CuA_1 about 1.3 times as long as 1st section of CuA_1; two crossveins *ir* present at same level as two *r-m*, apparently positioned apicad of M forking; *m-cua* very short. Tegmen with evenly distributed distinctive punctures; tegmen covered with light-coloured rounded spots mainly in basal cell, radial cell, median cell, and cubital cell.

Taxonomic notes. The new fossil is considered to be a tegmen of Cicadomorpha (Hemiptera) based on its bearing strong punctures on the basal half of the tegmen, main veins delimiting large cells throughout the tegmen, and the presence of an elongated *cua-cup* closing a long basal cell (Shcherbakov 1984).

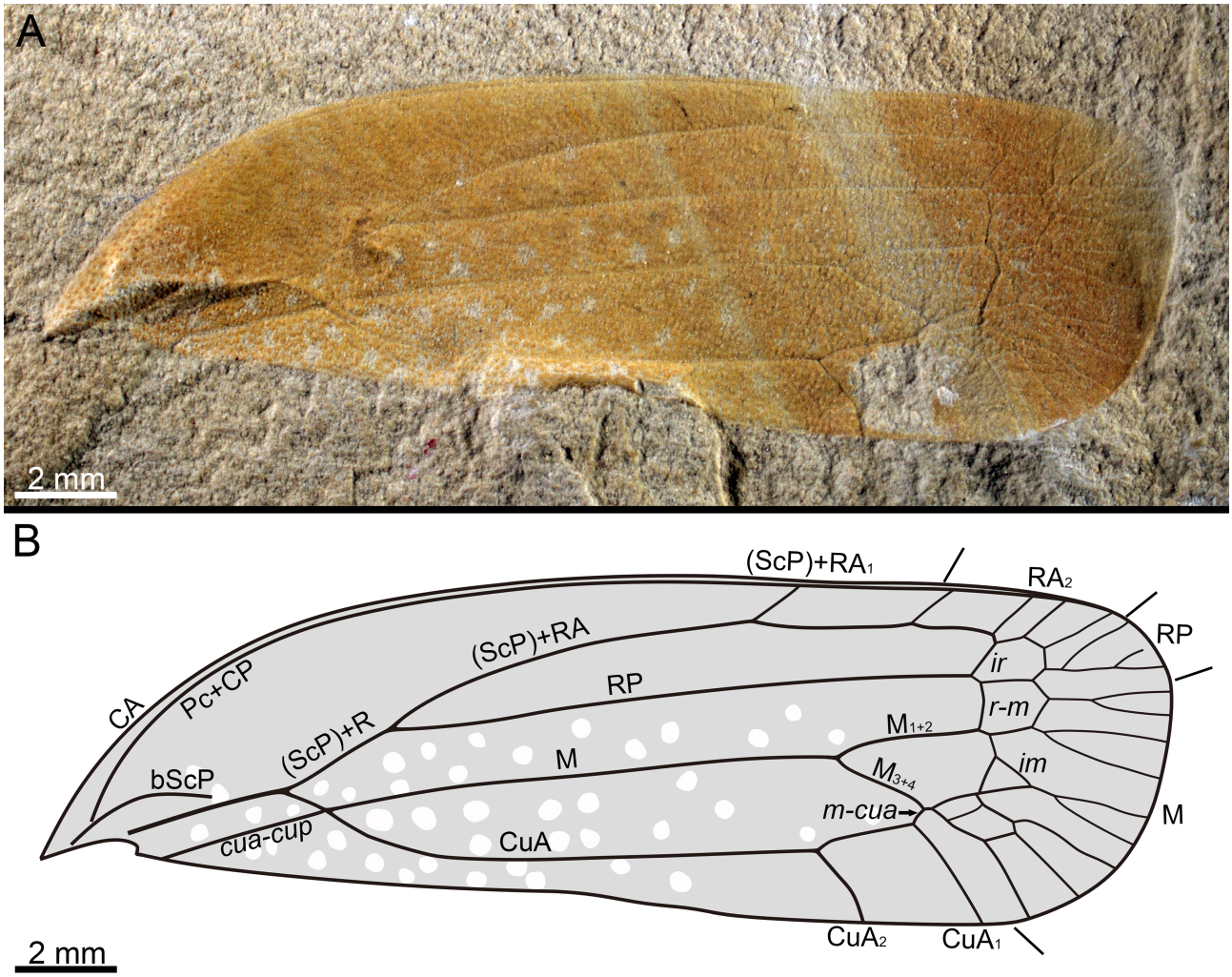

Figure 1. *Cretohylicella lambkini* **gen. et sp. nov.**, holotype NIGP209632, Yixian Formation of northeastern China. **A,** Photograph. **B,** Line drawing.

Although several authors have proposed definitions for the superfamily Hylicelloidea Evans, 1956 and the family Hylicellidae Evans, 1956 (e.g., Evans 1956; Becker-Migdisova 1962; Shcherbakov 2011; Chen *et al*. 2019), both groups remain insufficiently diagnosed (Wang *et al*. 2010; Fu *et al*. 2024). Recently, Lambkin (2024) proposed the following characters to attribute three fossil tegmina to the Hylicellidae: 'short lower carina at base of costal field, basal cell broad proximally then tapering distally, CuA+M and then CuA curved downward and approaching claval suture, *ir* present, RA_1 [ScP+RA_1] simple, RA_2 forked, RP simple, and M with four terminal branches'. The new fossil matches most of these characters, except that RP is not simple but bears short terminal branches. A branched RP is also

present in *Reticycla drosopoulosi* Shcherbakov, 2020 (Hylicellidae: Vietocyclinae Shcherbakov, 1988) (Shcherbakov 2020). However, because the claval portion of the new wing is not preserved, the fossil cannot be confidently attributed to Hylicelloidea as defined by Shcherbakov (2011). Nevertheless, the new fossil also has the 'basal portion of CuA leaving basal cell strongly curved mediad, towards claval suture', a character proposed by Chen *et al*., (2019) for the Hylicelloidea.

Within the Hylicelloidea, the new fossil differs from Chiliocyclidae Evans, 1956 in having a tegmen with multi-branched RA, RP, and M. It further differs from Mesojabloniidae Storozhenko, 1992 in having an apically forked CuA (Shcherbakov 2011). In addition, the forewing venation of the Minlagerrontidae Chen, Szwedo & Wang, 2019 is markedly different from that of the new fossil (Chen *et al*. 2019).

Hylicellidae are currently divided into three subfamilies under a fragile systematic framework, viz. Vietocyclinae, Hylicellinae Evans, 1956, and Conjucellinae Shcherbakov, 2012. The new fossil does not fit within Conjucellinae, as it possesses multi-branched RA, RP, and M, lacks a common stalk formed by R and M beyond the basal cell, and has more than seven apical cells (Shcherbakov 2012).

Known representatives of Vietocyclinae usually exhibit very dense venation with numerous rows of cells towards the apex of the tegmen, as observed in the new fossil. The new fossil corresponds to several diagnostic characters of Vietocyclinae, including the presence of two crossveins between RP and M, at least four terminals of M, and M fused with CuA beyond the basal cell at a single point or for a short distance (Shcherbakov 2020). However, relying on distal terminals and crossveins alone is insufficient, because the distal-most crossvein can be variable, as in extant Cicadomorpha, and both Hylicellinae and Vietocyclinae show considerable intraspecific or even intra-individual variation in tegminal venation (Chen *et al*. 2022). A closer comparison shows that the new fossil shares with *Cycloscytina* Martynov, 1926 and *Vietocycla* Shcherbakov, 1988 the condition of the *cua-cup* ending at the point of separation of M and CuA, in contrast to *Reticycla* Shcherbakov, 2020, where the *cua-cup* ends in the common stalk of M+CuA. *Vietocycla* and *Cycloscytina* share with *Jiphara* Ren, 1995 and *Crosbella* Evans, 1956 the presence of veinlets emerging from (ScP)+RA_1, a feature that is absent in the new fossil. Additionally, in all these genera, the radial, median, and cubital cells do not exceed one-third of the total tegmen length, while they extend to nearly half of the tegmen length in the new fossil.

This new tegmen also resembles the hylicelline genus *Triassoscelis* Evans, 1956; however, assignment of the fossil to *Triassoscelis* is unlikely based on the trifurcation of RP, the presence of a large cell delimited by the first two forks of (ScP)+RA_1, the presence of two crossveins (*ir* and *r-m*), and the absence of a short stalk formed by M and CuA. In general, Hylicellinae species are considered to share a single RP, M with four branches, and single (or reduced) *ir*, *r-m*, *im*, and *m-cua* (Chen *et al*. 2022), in contrast to the new fossil.

Taken together, we tentatively assign the new fossil to Hylicellidae, given its incomplete preservation and the unstable diagnosis of the group. A new genus of Hylicellidae is erected, but left unassigned within the family, as revisions of its systematics are still required.

Superfamily Cercopoidea Leach, 1815
Family Procercopidae Handlirsch, 1906
Genus *Stellularis* Chen, Yao & Ren, 2015

Type species. *Stellularis longirostris* Chen, Yao & Ren, 2015

***Stellularis longirostris* Chen, Yao & Ren, 2015**
(Figs 2–4)

Material. NIGP209633, female; NIGP209634, female; NIGP209635, female; NIGP209636, male?. All specimens are deposited at the Nanjing Institute of Geology and Palaeontology, CAS.

Locality and horizon. Huangbanjigou, Shangyuan Township, Beipiao City, Liaoning Province, China; Yixian Formation; Lower Cretaceous.

Remarks. *Stellularis longirostris* was established based on several specimens from the Lower Cretaceous Yixian Formation at Huangbanjigou Village, Liaoning Province, China, among which the holotype is a nearly complete female (Chen *et al*. 2015). In our new material, tegmen lengths generally fall within, or is only slightly shorter than, the previously reported range for the type series (tegmen lengths 10–12 mm). The venation pattern of the newly examined specimens also accords with that of this species, including the presence of a common stalk of M+CuA beyond the basal cell, unbranched RA, RP, and M, CuA_1 approximately 1.5 times as long as CuA_2, the crossvein *ir* situated at the same

Figure 2. *Stellularis longirostris*, Yixian Formation of northeastern China. **A,** General habitus, NIGP209633. **B,** General habitus, NIGP209634. **C,** Hind tibia and tarsus, NIGP209633. **D,** Hind tarsus, NIGP209633. **E,** Antenna, NIGP209633. All specimens shown were photographed moistened with 70% ethanol. Abbreviations: ta1, tarsomere I; ta2, tarsomere II; ta3, tarsomere III; ti, tibia. Arrows indicate the lateral spine on hind tibia in (**C**) and joints between antennomeres in (**E**).

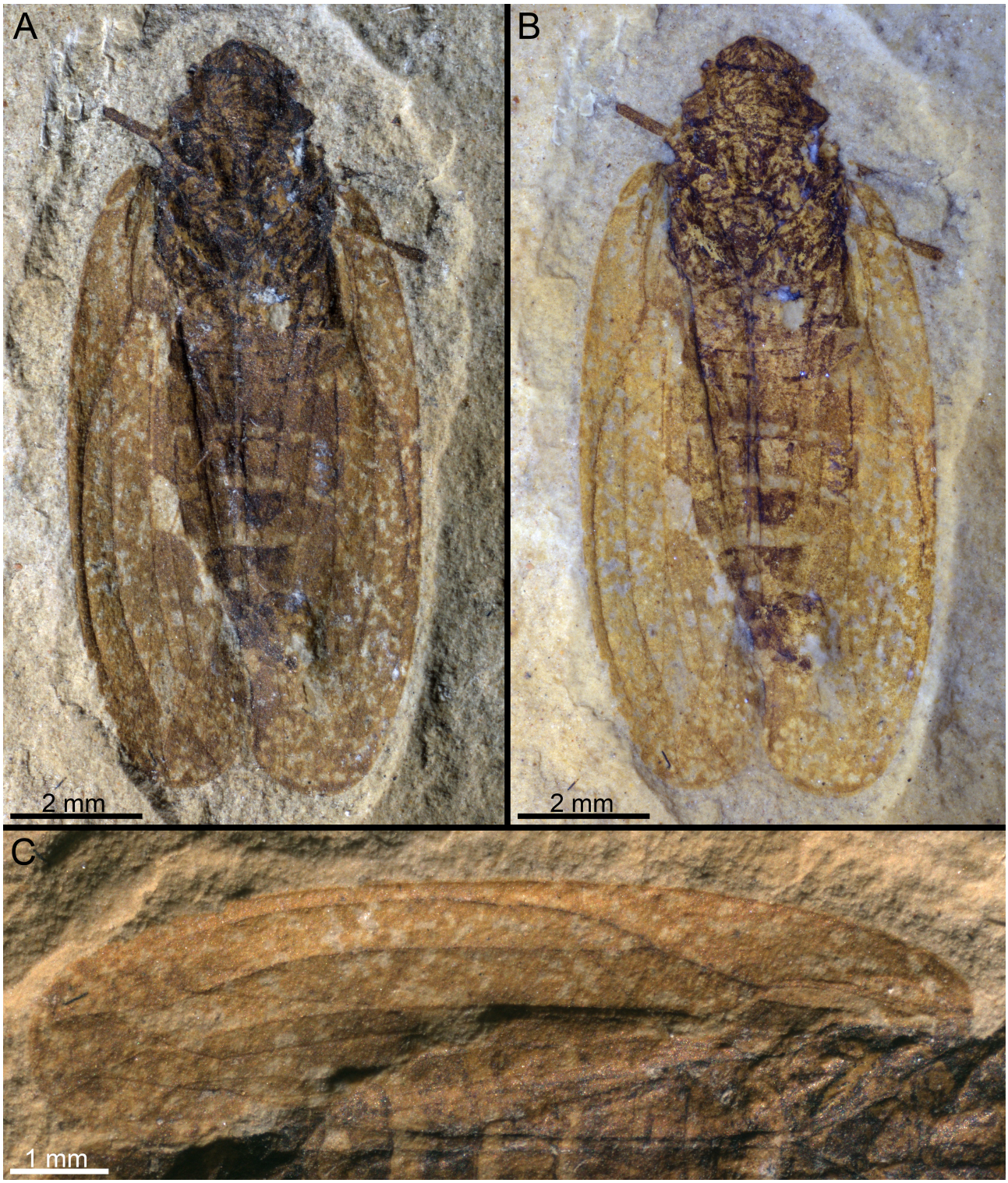

Figure 3. *Stellularis longirostris*, Yixian Formation of northeastern China, NIGP209635. **A,** General habitus. **B,** General habitus, photographed moistened with 70% ethanol. **C,** Tegmen.

Figure 4. *Stellularis longirostris*, Yixian Formation of northeastern China, NIGP209636. **A,** General habitus. **B,** General habitus, photographed moistened with 70% ethanol.

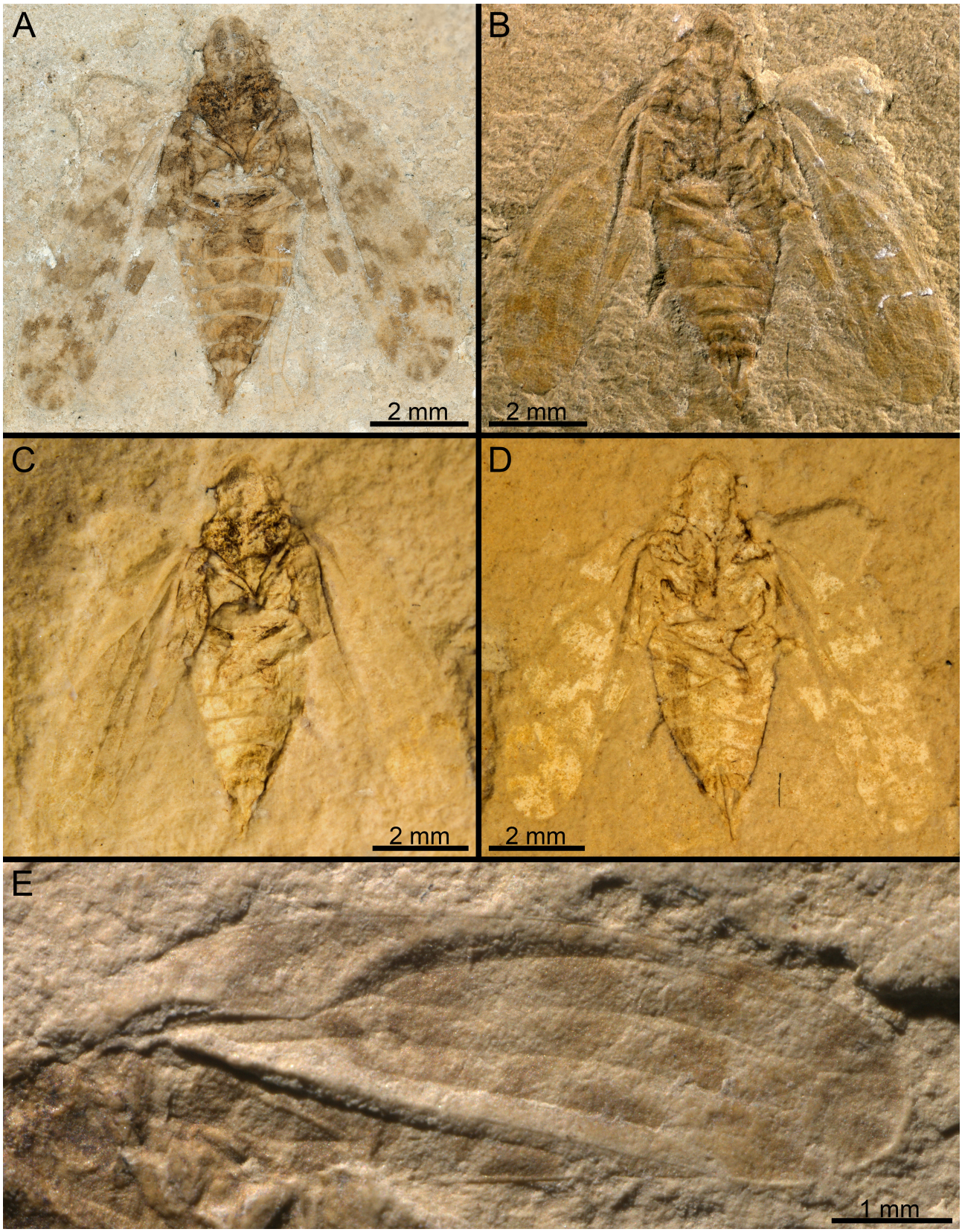

Figure 5. *Sinocercopis* **sp.**, Yixian Formation of northeastern China, NIGP209637. **A, C,** General habitus, part. **B, D,** General habitus, counterpart. **E,** Tegmen. (**C, D**) were photographed moistened with 70% ethanol.

level as *r–m*, and an unbranched M in the hindwing. Moreover, the new specimens exhibit the characteristic mottled tegmen observed in the holotype. The colour pattern also fits well with that of *Stellularis longirostris*. Therefore, these characters support assigning the four specimens to the co-occurring species *Stellularis longirostris*.

Supplemental description. Antenna preserved length approximately 0.67 mm; scape thicker than pedicel; flagellum with four or five visible flagellomeres, flagellomeres I–V progressively tapering distally. Hind tibia longer than fore and mid tibiae, bearing a large spine at about 0.60 of tibia length; apex widened, with two rows of apical teeth. Hind tarsus with basal and second tarsomeres widened apically and armed with small teeth; basitarsus longer than second tarsomere; third tarsomere slender, longest. Tegmen length 11.9 mm in NIGP209633 and NIGP209634, 9.6 mm in NIGP209635, and 9.0 mm in NIGP209636. Colour pattern on tegmen: potentially cryptic mottled colouration consisting of small scattered dark dots 0.1 mm in size on a pale background, as well as larger 1 mm wide spots arranged longitudinally along posterior margin of tegmen.

Genus *Sinocercopis* Hong, 1982

Type species. *Sinocercopis liaoyuanensis* Hong, 1982

***Sinocercopis* sp.**
(Figs 5, 6)

Material. NIGP209637, female, with part and counterpart; deposited in the Nanjing Institute of Geology and Palaeontology, CAS.

Locality and horizon. Huangbanjigou, Shangyuan Township, Beipiao City, Liaoning Province, China; Yixian Formation; Lower Cretaceous.

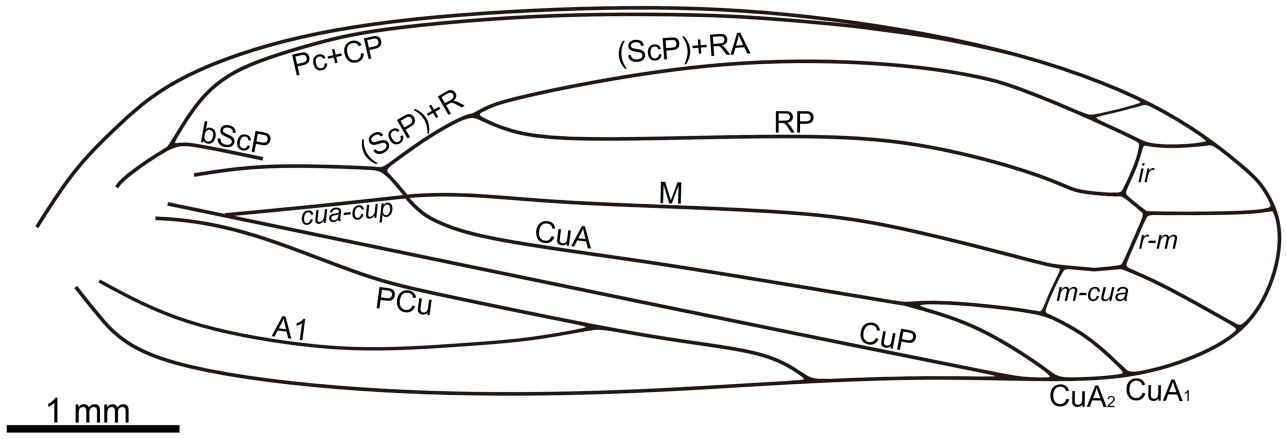

Figure 6. *Sinocercopis* **sp.**, NIGP209637, line drawing of forewing.

Remarks. The new fossil can be assigned to *Sinocercopis* based on the combination of characters including unbranched RP and M, CuA_1 being apparently longer than CuA_2 and slightly curved near its junction with crossvein *m-cua*, and a long A1 that does not reach the wing margin and is apically shifted toward PCu (Chen *et al*. 2020). Following the revision and synonymies proposed by Chen *et al*. (2020), *Sinocercopis* currently comprises five species: *S. liaoyuanensis* Hong, 1982, *S. lushangfenensis* (Hong, 1984), *S. pustulosis* (Ren, 1995), *S. trinervis* (Ren, 1995), and *S. macula* (Hu, Yao & Ren, 2014). The venation patterns of these species are generally similar, but the new fossil differs from *S. liaoyuanensis*, *S. pustulosis*, and *S. macula* in having an apically forked RA, and from *S. liaoyuanensis*, *S. pustulosis*, *S. trinervis*, and *S. lushangfenensis* in having an unbranched M. In addition, the new specimen exhibits a distinctive colour pattern: the tegmen bears 14–16 irregularly distributed dark patches that gradually reduce in size from approximately 0.5 mm to 0.3 mm toward the wing apex, differing from the denser mottled pattern characteristic of *S. macula*. However, given the overall similar size, identical locality, and only limited venational differences between *S. macula* and the new fossil, we refrain from erecting a new species here, pending the discovery of additional material.

Description. Body length about 8.0 mm. Head, pronotum, and tegmen densely covered with punctures. Head narrower than pronotum; eyes large and oval; postclypeus swollen; rostrum extending beyond middle coxae. Pronotum subhexagonal, posterior margin medially concave; mesonotum exposed. Tegmen about 7.2 mm long, and 2.2 mm wide,

length-to-width ratio 3.27; costa anterior curved before basal one-third of tegmen length; apical margin rounded; bScP arched; Pc+CP extending to basal two-thirds of tegmen length; crossvein *cua-cup* terminating at point of separation of M and CuA; (ScP)+R about three times as long as M+CuA, forked at about basal 0.35 of tegmen length; (ScP)+RA apically forked, with two terminals; RP sinuous, simple, subparallel to costa anterior; M simple; stem CuA curved at base, forked at about basal 0.70 of tegmen length; CuA_1 arched, longer than CuA_2; CuP nearly straight, terminating near CuA_2; PCu slightly sinuous; A1 long, migrated to PCu apically; crossvein *ir* nearly as long as *r-m*, positioned at the base of *r–m* and apicad of *m–cua*; tegmen colouration consisting of 14–16 irregularly distributed dark patches 0.5 mm wide.

Superfamily Cicadelloidea Latreille, 1802
Cicadelloidea indet.
(Figs 7, 8)

Material. NIGP209709, female; deposited in the Nanjing Institute of Geology and Palaeontology, CAS.

Locality and horizon. Huangbanjigou, Shangyuan Township, Beipiao City, Liaoning Province, China; Yixian Formation; Lower Cretaceous.

Remarks. The new fossil can be assigned to Cicadelloidea based on the following combination of characters: hind tibia bearing several dorsal macrosetae and anteroventral macrosetae, and a row of short apical setae. Cicadelloidea encompass the extinct family Archijassidae Becker-Migdisova, 1962 and the extant family Cicadellidae Latreille, 1802. Shcherbakov (2012) proposed the following diagnostic features for Archijassidae tegmina: 'Tegmen: CP present; bSc reduced; 6–8 full-sized apical cells; 13 subapical cells (one or two *r-m*, sometimes *ir* absent)'. The new fossil shares with the family the presence of six apical cells, but less than 13 subapical cells; it has one *ir* and two *r-m* and based on the preservation, it is impossible to state if CP is present and bSc reduced. Diagnostic features of Cicadellidae rely on body characters that are impossible to be confidently examined on this specimen. Therefore, the specimen cannot be attributed to any cicadelloid family.

Description. Body length about 4.8 mm. Head narrower than pronotum, eyes relatively large and bulbous, rostrum extending to hind coxae. Pronotum rounded, with anterior margin parabolic. Legs with hind tibia and tarsus preserved; hind tibia bearing seven dorsal macrosetae visible and three anteroventral macrosetae, widened apically and armed with a row of short apical setae; tarsus with three tarsomeres, basitarsus longer than the other two tarsomeres. Forewing well developed but not reaching abdominal apex; 3.45 mm long and 1.17 mm wide, length-to-width ratio 2.95; membrane opaquely sclerotized; costal margin broadened and flared posterad of claval base; clavus poorly preserved, with indistinct venation; corium with two closed anteapical cells of approximately equal length, veins distinctly elevated; appendix narrow but extending around wing apex; fork of R into RA and RP near mid-wing; RP simple; M and CuA two-branched; crossvein *ir* present, two *r-m* present. Hind wing not visible.

Discussion

Despite the rich insect record of the Jehol Biota, the cicadomorphan assemblage of the Lower Cretaceous Yixian Formation remains relatively limited, with systematic studies to date largely restricted to Palaeontinidae Handlirsch, 1906 and Procercopidae. This stands in marked contrast to the Middle Jurassic Daohugou beds (Haifanggou Formation) of northeastern China, where cicadomorphan diversity is considerably higher, with seventy species in five families (Lian *et al*. 2021).

Currently, Palaeontinidae from the Yixian Formation include: *Miracossus ingentius* Ren, Yin & Dou, 1998 and *M. gongi* Li, Chen & Wang, 2019 from Liaoning Province and Inner Mongolia; *Ilerdocossus beipiaoensis* (Ren, Yin & Dou, 1998), *I. exiguus* (Ren, Yin & Dou, 1998), *I. fengningensis* (Ren, Yin & Dou, 1998), *I. hui* (Ren, Yin & Dou, 1998), *I. pingquanensis* (Ren, Yin & Dou, 1998), *I. ningchengensis* Wang & Zhang, 2008, and *I. dissidens* Li, Chen & Wang, 2019 from Hebei and Liaoning provinces, and Inner Mongolia; *Yanocossus guoi* Ren, Lu & Guo, 1995 from Hebei Province; and *Palaeontinodes* sp. Wang *et al*., 2008 from Inner Mongolia. This species richness is far lower than that of the Daohugou palaeontinids. As another representative group of large-sized Cicadomorpha in the middle to late Mesozoic, Tettigarctidae Distant, 1905 is notably absent from the Yixian Formation and, more broadly, from the Jehol Biota. Similarly, Procercopidae is relatively common in both the Jehol and Daohugou biotas, whereas Sinoalidae Wang & Szwedo, 2012, another major group of early froghoppers, are absent from the Jehol Biota. The contrasting cicadomorphan compositions of the Daohugou and Jehol biotas may reflect differences in age, climate, or vegetation.

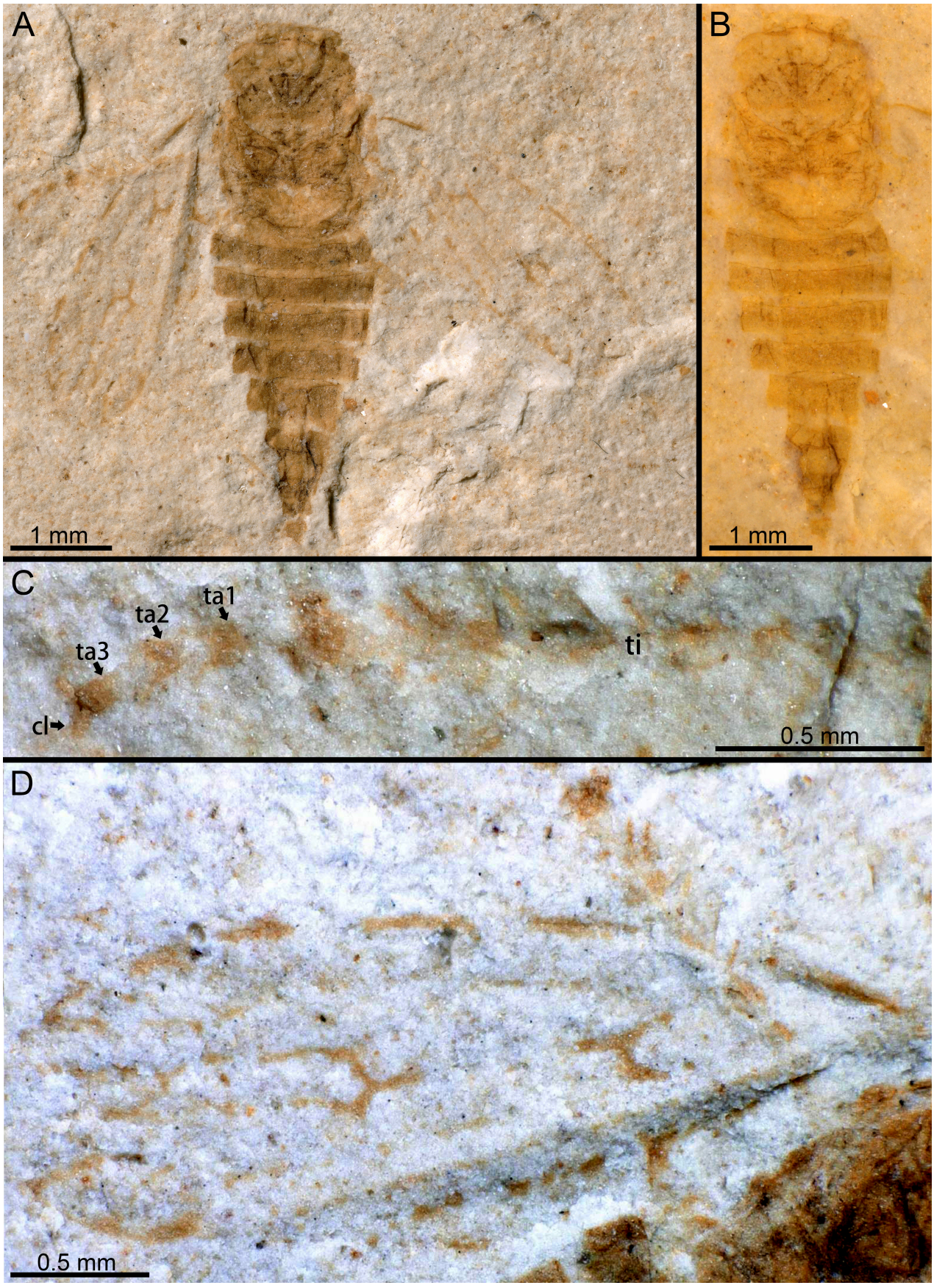

Figure 7. Cicadelloidea indet., Yixian Formation of northeastern China, NIGP209709. **A,** General habitus. **B,** General habitus photographed moistened with 70% ethanol. **C,** Hind leg. **D,** Forewing and hind leg. Abbreviations: ta1, tarsomere I; ta2, tarsomere II; ta3, tarsomere III; ti, tibia.

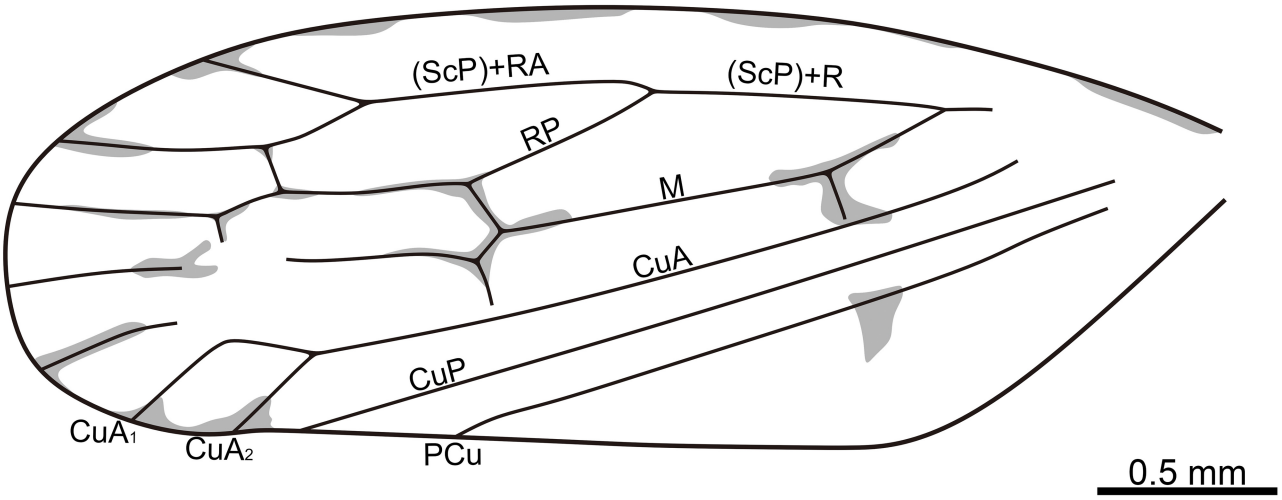

Figure 8. Cicadelloidea indet., NIGP209709, Line drawing of forewing.

Stellularis is the dominant representative of Procercopidae in the Jehol Biota. Within the Yixian Formation, five species are currently recognized: *Stellularis longirostris* Chen, Yao & Ren, 2015; *S. senjituensis* (Hong, 1984); *S. aphthosa* (Ren *et al*., 1998); *S. bineuris* Chen & Wang, 2020; and *S. minutus* Chen & Wang, 2020 (Chen *et al*. 2020). Additionally, four species based on isolated forewings were recently described from the overlying Jiufotang Formation in the Kazuo Basin, Liaoning Province (Zhang *et al*. 2024; Lü *et al*. 2025). *Sinocercopis* was erected from the Lower Cretaceous Yixian Formation of Jilin Province, northeastern China, and is characterised by a fusion of A_1 and PCu, a feature shared with Fulgoromorpha and early Cicadomorpha (Chen *et al*. 2020), thereby illustrating the morphological diversity of Cretaceous procercopids. Chen *et al*. (2020) subsequently revised the genus, synonymizing several previously described genera and species, resulting in only two procercopid genera being recognized from the Yixian Formation: *Stellularis* and *Sinocercopis*. Our new material, including four specimens assigned to *Stellularis longirostris* and one specimen tentatively referred to *Sinocercopis* **sp.**, provides additional data on venation and tegminal colour patterns.
Wang *et al*. (2010) noted that 'The superfamily Hylicelloidea (including Hylicellidae and Triassic Chiliocyclidae) is clearly a paraphyletic group, and requires detailed revisions'. Indeed, to date there is no recent diagnosis of Hylicelloidea based on clear synapomorphies. Vietocyclinae is known from the Lower Cretaceous Lushangfen Formation of Beijing, China (Ren 1998; Fu *et al*. 2019) but appear to have no clear record from the Yixian Formation. The new species *Cretohylicella lambkini* **sp. nov.**, tentatively placed in Hylicellidae, exhibits a more simplified and apically forked venation pattern compared with Vietocyclinae from the Lushangfen Formation.

The Jehol Entomofauna can be divided into five feeding groups: phytophagous, carnivorous, heterophagous, parasitic, and saprophagous, with the highest species diversity occurring in phytophagous insects (Zhang *et al*. 2010; Ren 2019). The new fossils described here, tentatively assigned to Hylicellidae, Procercopidae, and Cicadelloidea, enrich the cicadomorphan assemblage of the Yixian Formation and provide new information for reconstructing the ecological complexity of the Early Cretaceous Jehol Biota. Further examination of Cretaceous cicadomorphan material is warranted to better clarify the major evolutionary turnover within the group that led to the establishment of the modern diversity of cicadas, froghoppers, leafhoppers, and treehoppers.

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