

A new subfamily of Mesozoic Hylicellidae (Homoptera: Cicadomorpha)

Новое подсемейство мезозойских Hylicellidae (Homoptera: Cicadomorpha)

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КЛЮЧЕВЫЕ СЛОВА: Homoptera, Cicadomorpha, Hylicellidae, Membracoidea, Archijassidae, ископаемые, филогения, жилкование, мезозой, триас, юра, мел.

ABSTRACT. New monobasic genera *Conjucella selene* **gen. et sp.n.** (Lower Cretaceous of Transbaikalia) and *Cinemala contrasta* **gen. et sp.n.** (Middle or Upper Jurassic of Mongolia) are placed in the new subfamily Conjuccellinae **subfam.n.** (Hylicellidae) along with *Homopterites* Handlirsch, 1906 from the uppermost Triassic of England and *Liassocercopis* Anson, 1996 from the Lower Jurassic of Germany. *Purbecellus* **gen.n.** is proposed for *Cicadellium psocus* Westwood, 1854 (= *Cercopidium telesphorus* Westwood, 1854); *Purbecellus psocus* (Westwood, 1854), **comb.n.** (Archijassidae: Karajassinae).

РЕЗЮМЕ. Новые монотипные роды *Conjucella selene* **gen. et sp.n.** (нижний мел Забайкалья) и *Cinemala contrasta* **gen. et sp.n.** (средняя или верхняя юра Монголии) отнесены к новому подсемейству Conjuccellinae **subfam.n.** (Hylicellidae), наряду с *Homopterites* Handlirsch, 1906 из верхов триаса Англии и *Liassocercopis* Anson, 1996 из нижней юры Германии. Для *Cicadellium psocus* Westwood, 1854 (= *Cercopidium telesphorus* Westwood, 1854) установлен новый род *Purbecellus* **gen.n.**: *Purbecellus psocus* (Westwood, 1854), **comb.n.** (Archijassidae: Karajassinae).

Introduction

The family Hylicellidae was established for a Triassic genus [Evans, 1956]. Later a second subfamily was added, Vietocyclinae (Jurassic – Lower Cretaceous) [Shcherbakov, 1988]. This family and a related Triassic one, Chilocyclidae, were separated into the superfamily Hylicelloidea, considered ancestral to all three extant superfamilies of Cicadomorpha (Membracoidea, Cercopoidea, and Cicadoidea) [Shcherbakov, 1996]. Yet another Triassic family, Mesojabloniidae was recently transferred to Hylicelloidea [Shcherbakov, 2011].

The family Ligavenidae (Lower Cretaceous) and the superfamily Ligavenoidea [Hamilton, 1992] were synonymized under Hylicellidae and Hylicelloidea, respectively [Shcherbakov, 1996]. The family Archijassidae [Becker-Midgisova, 1962], formerly placed in Hylicelloidea as a subfamily of Hylicellidae [Shcherbakov, 1992], was removed to Membracoidea [Anson, 1996] and expanded to include Karajassinae and Dellasharinae [Shcherbakov, 2012].

Two peculiar new genera described herein, Jurassic *Cinemala* **gen.n.** and Early Cretaceous *Conjucella* **gen.n.**, can be linked to the more typical hylicellids via the more primitive latest Triassic *Homopterites* Handlirsch, 1906 and Early Jurassic *Liassocercopis* Anson, 1996. All the four genera are classified in a new subfamily of Hylicellidae, Conjuccellinae **subfam.n.**

The vein nomenclature is after Shcherbakov [2012]. The specimens described below are preserved at the Borissiak Paleontological Institute RAS, Moscow (PIN). The numbers of specimens represented with part and counterpart are marked with “±”. Photographs were taken using a Leica M165C stereomicroscope and Leica DFC425 camera. *Conjucella selene* **sp.n.** was imaged without coating with backscattered electron (BSE) detector of a Tescan Vega XMU scanning electron microscope.

Taxonomy

Superfamily Hylicelloidea Evans, 1956
Family Hylicellidae Evans, 1956
Subfamily Conjuccellinae Shcherbakov, **subfam.n.**

TYPE GENUS. *Conjucella* **gen.n.**

DIAGNOSIS. Medium-sized. Tegmen elongate. Precostal carina broader than hypocostal one. bSc separated from R+M. Basal cell long, narrow (especially near base), pointed at apex; CuA base much more raised

than R+M; CuA elbowed at apex of basal cell; arcular fold along base of CuA stem absent. Usually stigmal cell narrow and dSc short. RP strongly arcuate basally, or originating early, or fused to MA for a distance; radial space at RP origin broader than medial one. RA simple (rarely forked); MA simple, MP forked or simple, CuA1 simple; 5–7 apical cells. 1A markedly converging to Pcu about midlength of clavus and/or connected to it by crossvein. Margin often ‘zebroid’ (pale with regular dark patches, including those at veins’ apices).

COMPOSITION. Type genus from the Lower Cretaceous of Transbaikalia, *Cinemala* **gen.n.** from the Middle or Upper Jurassic of Mongolia, *Homopterites* Handlirsch, 1906 (*H. anglicus* Handlirsch, 1906) from the uppermost Triassic of England, and *Liassocercopis* Ansoerge, 1996 (*L. schnicki* Ansoerge, 1996) from the Lower Jurassic of Germany.

COMPARISON. Distinct from other Hylicellidae in the poor vein branching, absence of arcular fold, trait to align arculus with CuA base, and medial cell small and/or contiguous with radial cell and/or CuA fork in the tegmen.

REMARKS. Some traits of Conjucellinae are shared with Membracoidea, e.g. the contiguous subapical cells and marginal appendix cut off by the straight ambient vein in *Conjucella* **gen.n.**, and the narrow costal space in *Liassocercopis*. However, conjucellines retain the structure of the basal cell characteristic of Hylicellidae and are not closely related to Archijassidae — the doubtless early membracoids.

KEY TO GENERA OF CONJUCELLINAE (TEGMEN)

- 1 Two subequal, contiguous subapical cells (medial cell broadly contiguous with both radial cell and CuA fork). Marginal appendix cut off by straight section of ambient vein and reaching distad of CuA1 apex. R and M forming stalk beyond basal cell *Conjucella* **gen.n.**
- Two unequal, isolated subapical cells (shorter medial cell at most touching radial cell and/or CuA fork). No such appendix 2
- 2 Radial and medial cells long (R stem much shorter than basal cell; medial cell longer than CuA fork). CuA stem arcuate. MP simple. Stigmal cell long *Cinemala* **gen.n.**
- Radial and medial cells shorter (R stem nearly as long as basal cell; medial cell shorter than CuA fork). CuA stem bisinuate. MP forked 3
- 3 Costal space much widened basally, costal margin more deeply arched there. Stigmal cell short triangular *Homopterites* Handlirsch, 1906
- Costal space less widened basally; costal margin shallowly arched or nearly straight before midlength *Liassocercopis* Ansoerge, 1996

Conjucella Shcherbakov, **gen.n.**

TYPE SPECIES. *Conjucella selene* **sp.n.**

DIAGNOSIS. Tegmen: costal margin deeply arched near base; two subequal, contiguous subapical cells; R+M stalk distinct; MP simple; appendix well-devel-

oped; fuscous with oblong pale spots and zebroid margin.

COMPOSITION. Monobasic.

ETYMOLOGY. From Latin *conjugare* (to yoke together) and *cella* (small room); gender feminine.

Conjucella selene Shcherbakov, **sp.n.**

Figs 1–3.

MATERIAL. Holotype right tegmen PIN 3064/4634± (bed 31); paratypes: female PIN 4210/1013± (bed 15) and left tegmen PIN 4210/1014± (bed 22), both poorly preserved; Baissa, upper reaches of Vitim R., Buryatia, Russia; Zaza Formation, Lower Cretaceous.

DESCRIPTION (Figs 1–3). Tegmen 12.8 mm long and 3.9 mm wide (holotype), elongate (3.3:1), broadest before apex of basal cell, costal margin deeply arched here and straight about RP origin; precostal carina broad up to RP origin, continued beyond dSc. R+M stalk beyond basal cell; medial space narrowest before midlength. R forked just before M fork. Medial cell broadly contiguous with both radial cell and CuA fork; *im* short or replaced with MA+(MP+CuA1) anastomosis, MP+CuA1 forked or simple. CuA base, long arculus, and R stem aligned and markedly raised. Moderately wide appendix (adjacent to CuA fork and cut off by straight ambient vein) continued with very narrow marginal membrane around tegmen apex. Unevenly infuscate (no contrasting bands), except for oblong pale spots at base of CuA stem and between R and M forks; margin zebroid. Unevenly covered with dark punctures (most densely around spots, subapically along veins only), in some areas nearly foveolate. Veins within spots (base of CuA stem, most of RP+MA) weak. Paratypes smaller (tegmen 10.3–11.7 mm long), with anastomosis instead *im*.

ETYMOLOGY. Greek *selene* (Moon).

Cinemala Shcherbakov, **gen.n.**

TYPE SPECIES. *Cinemala contrasta* **sp.n.**

DIAGNOSIS. Tegmen: costal margin moderately arched; two unequal, isolated subapical cells; MP simple; stigmal cell long; RA forked; appendix absent; dark with transverse pale bands.

COMPOSITION. Monobasic.

ETYMOLOGY. From French *cinéma* (shortened from *cinématographe*, from Greek *kinema*, movement) and Latin *ala* (wing); gender feminine.

Cinemala contrasta Shcherbakov, **sp.n.**

Figs 4–5.

MATERIAL. Holotype left tegmen PIN 3791/2134(2177)±; Bakhar (=Bahar), outcrop 275/1, 12 km NE of Tsetsen-Ula Mt., Bayankhongor Aimag, Central Mongolia; Togo-Khuduk Member, Bakhar Group, Middle or possibly Upper Jurassic.

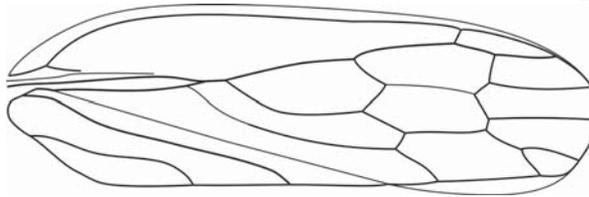
DESCRIPTION (Figs 4–5). Tegmen 8.3 mm long and 2.5 mm wide, elongate (3.3:1), broadest in middle third, costal margin more arched before apex of basal cell than about RP origin; precostal carina narrow ex-



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Figs 1–3. *Conjuccella selene* sp.n., Baissa, Lower Cretaceous, holotype PIN 3064/4634, tegmen: 1 — positive impression (SEM micrograph, BSE); 2 — negative impression (mirror image); 3 — venation.

Рис. 1–3. *Conjuccella selene* sp.n., Байса, нижний мел, голотип ПИН 3064/4634, переднее крыло: 1 — прямой отпечаток (СЭМ микрофотография, ОЭ); 2 — обратный отпечаток (перевернуто зеркально); 3 — жилкование.

cept near base. R and M forming at most very short, indistinct stalk beyond basal cell; medial space narrowest at base. R forked much before M fork. Medial cell separated from both radial cell and CuA fork; *im* long; both MP and CuA1 simple. CuA base and R stem separated by zone with weak veins and not forming continuous raised line; arculus short. No appendix. Dark with contrasting pale: apex (except for dark marginal patch posterior to MP) and two broad transverse bands (subbasal one incomplete, being reduced in clavus); margin mostly darkened, not zebroid. Densely punctate in dark parts of clavus and costal space, punctate only along veins in other dark zones. Veins within pale bands (especially apex of basal cell, base of CuA stem, M before fork) weak.

ETYMOLOGY. From Latin *contrastare* (to withstand).

Superfamily Membracoidea Rafinesque, 1815
Family Archijassidae Becker-Migdisova, 1962
Subfamily Karajassinae Shcherbakov, 1992

Recently, I synonymized *Cercopidium telesphorus* Westwood, 1854 (based on a tegmen) under *Cicadelli-*



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Figs 4–5. *Cinemala contrasta* sp.n., Bakhar, Middle or Upper Jurassic of Mongolia, holotype PIN 3791/2134(2177), tegmen.

Figs 4–5. *Cinemala contrasta* sp.n., Бахар, средняя или верхняя юра Монголии, голотип ПИН 3791/2134(2177), переднее крыло.

um psocus Westwood, 1854 (based on a hindwing; both from Purbeck Beds of England), designated *C. psocus* as the type species of the genus *Cicadellium* Westwood, 1854, assigned the latter to Karajassinae, and transferred the second species of that genus, *C. dipsas* Westwood, 1854 (based on a forewing) to Psocoptera [Shcherbakov, 2012]. However, I overlooked that Carpenter [1992] indicated *C. dipsas* as the type species of *Cicadellium* by subsequent designation by Handlirsch [1906–1908] (Handlirsch listed *C. psocus* under *Cicadellium* with a question mark). Therefore, the genus *Cicadellium* with its type and only species, *C. dipsas*, belongs in Psocoptera, and *Purbecellus* gen.n. is proposed here for *C. psocus*.

Purbecellus Shcherbakov, gen.n.

Cicadellium sensu Shcherbakov, 2012

TYPE SPECIES. *Cicadellium psocus* Westwood, 1854

DIAGNOSIS. Tegmen: very elongate; proximal part punctate; single *rm*; R fork much before M fork; R and M leaving basal cell separately; arculus short; *ir* present; radial and medial cells long; *mcu* replaced with rather long anastomosis; CuA beyond arculus arched and running close to CuP; nodal line present. Hindwing: elongate; *mcu* at 1/5 of CuA1; *rm* more distal; M and CuA stems, CuP and Pcu markedly curved; Pcu proximally well separated from 1A.

COMPOSITION. Monobasic: *Purbecellus psocus* (Westwood, 1854) comb.n. (= *Cercopidium telesphorus* Westwood, 1854).

COMPARISON. In other genera of Karajassinae wings are less elongate, with less curved veins, and MP+CuA1 is shorter in the tegmen [Shcherbakov, 2012].

ETYMOLOGY. From Purbeck Beds; gender masculine.

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