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A New Species of Tingidae (Insecta: Hemiptera: Heteroptera) from the Lower Cretaceous of Transbaikalia

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Abstract—A new species of lace-bug *Sinaldocader ponomarenkoi* sp. nov. (Tingidae: Phatnomatini) is described from the Lower Cretaceous Transbaikalian locality Baissa. The new species differs from the type species *S. drakei* Popov, 1989 from the Lower Cretaceous of Mongolia in the well-developed lateral carinae of pronotal disc and in the details of hemelytral venation.

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INTRODUCTION

The families of Tingidae known now from the Cretaceous are two extant, Tingidae and Vianaididae (Popov, 1989; Golub and Popov, 1999, 2000, 2003), and the third, extinct one, Ignotingidae from the Laiyang Formation of East China (Zhang et al., 2005; in this and many other papers the formation is dated Late Jurassic–Early Cretaceous, but the earliest Cretaceous is much more probable: Rasnitsyn and Zherikhin, 2002). Besides these, from the French Cretaceous amber (Albian–Cenomanian) the genus *Ebboa* singled out into the family Ebboidae is described in Tingidae (Perrichot et al., 2006). In our opinion, assignment of the cimicomorphan bug *Ebboa areolata* to a separate tingoid family is highly problematical. The markedly convex dorsum, much elongated head with very small eyes, antennal bases set much anterior to eyes, long 2nd antennomere, small pronotum, large scutellum, 3(?)-segmented tarsi, and also the venation of areolate hemelytra, much differing from that of all known fossil and recent tingoids, preclude allocation of *E. areolata* to Tingidae. The much elongated head with small eyes far separated from anterior margin of small pronotum, and also quite long legs (especially femora) are characteristic of the modern South American *Lipokophila chinai* Štys (Štys, 1967) and of yet undescribed species of Plokiophilidae from the Baltic amber (Popov, 2006). One cannot also exclude that *E. areolata* is a coleopteroid form of Microphysidae. In the case the statement of Perrichot et al. (2006) about very deep differences between Ebboidae and all other Tingidae is not surprising. Regrettably, the quality of published photographs of *E. areolata* is not sufficient to see important details.

Two most ancient species of Tingidae from the Early Cretaceous of Bon-Tsagaan, Mongolia, belonging to the subfamily Cantacaderinae, were first mentioned by Popov (1980, 1981) and later described as *Golmonia pater* (Golmoniini) and *Sinaldocader drakei* (Phatnomatini) (Popov, 1989) [classification of suprageneric taxa in Tingidae according to catalogue of Palaearctic Heteroptera (Aukema and Rieger, 1996)]. However, placement of these Cretaceous genera in Tingidae was recently doubted (Nel et al., 2004). Notwithstanding the phylogenetic analysis and classification of these taxa by leading experts in Tingidae (Lis, 1999; Golub, 2001), and also the latest papers by Wappler (2003, 2004, 2006), Nel and his coauthors suggested to treat *G. pater* and *S. drakei* as Heteroptera incertae sedis, as if there were no strong reasons to assign them to the family Tingidae. One of their arguments against placing the genera *Golmonia* and *Sinaldocader* in Tingidae is the absence of areolae on hemelytral membrane. Detailed re-examination of the type series of *G. pater* and the find of *S. ponomarenkoi* sp. nov. confirm again that both genera belong in this family. In particular, we ascertained the presence of small areolae on hemelytral membrane in *G. pater* (Figs. 1, 2a, 2b) and *S. ponomarenkoi* sp. nov. (Figs. 2c, 3); at original description of *Golmonia* and *Sinaldocader* these areolae were not revealed due to their faint preservation in the impressions.

Earlier (Popov, 1989) it was mentioned that undescribed lace bugs of the tribe Phatnomatini, similar to *S. drakei*, are found also in Southwestern Kazakhstan (Kzyl-Zhar locality, Turonian) and one of the best known and richest Early Cretaceous localities of Asia, Baissa in Transbaikalia (Early Cretaceous; Zherikhin et al., 1999). Obviously, the origin of this superfamily

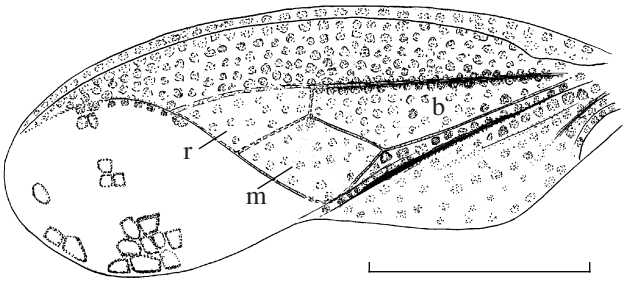

Fig. 1. *Golmonia pater* Popov, left hemelytron, paratype PIN, no. 3559/3406. Symbols: (b) basal, (r) radial, (m) medial cells. Scale bar 1 mm.

should be dated no later than latest Jurassic–earliest Cretaceous.

Herein a new species of the genus *Sinaldocader* from Baissa is described. The holotype of the new species is deposited in the collection of Arthropoda Lab, Paleontological Institute, Russian Academy of Sciences (PIN).

SYSTEMATIC PALEONTOLOGY

Infraorder Cimicomorpha

Superfamily Tingidae Laporte, 1832

Family Tingidae Laporte, 1832

Subfamily Cantacaderinae Stål, 1873

Tribe Phatnomatini Drake et Davis, 1960

Genus *Sinaldocader* Popov, 1989

Type species. *S. drakei* Popov, 1989

Diagnosis. Head shortened, apparently without spines. Eyes large. Rostrum reaching the base of 3rd abdominal sternite. Head and pronotum in dense, rather large punctures. Disc of pronotum with one or three areolate longitudinal carinae (lateral ones, when present, widely separated). Hemelytra with corium finely areolate, areolae rounded. Membrane less distinctly areolate, its areolae larger than on corium. Corium clearly subdivided by raised longitudinal veins into areas: costal, subcostal, discoidal, and sutural, the latter continuing into membrane (terms for areas after Drake and Davis, 1960). No stenocostal area. Subcostal area with several raised crossveins. Discoidal area including three large cells: basal, medial and radial (terms for cells after Popov, 1989), arranged in a series lengthwise and separated with raised crossveins; vein R + M forked into R and M far beyond basal cell. Clavus separated from corium.

Species composition. Besides type species, *S. ponomarenkoi* sp. nov.

Remarks. All main morphological features of the new genus allow its assignment to the family Tingidae: areolate hemelytra (including membrane); subdivision of corium by raised longitudinal veins into the areas, homologous to those of modern members of the family (costal, subcostal, discoidal, and sutural one continued apically into membrane); punctation of pronotum (similar to fine areolation of hemelytra); presence of areolate longitudinal carinae on pronotum. Arrangement of raised veins subdividing subcostal and discoidal areas in the genus *Sinaldocader* is the same as in some extant genera of the tribe Phatnomatini, e.g., *Sinalda* Distant, 1904 and *Etesinalda* Froeschner, 1996.

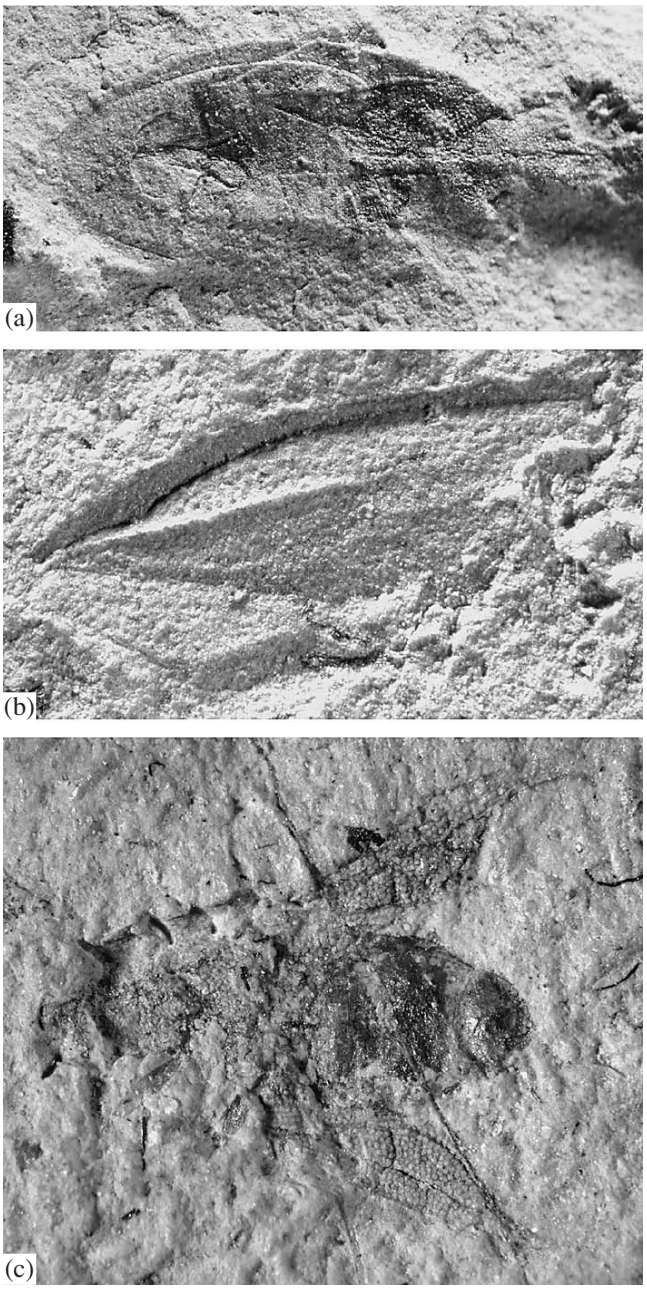

Fig. 2. Early Cretaceous lacebugs: (a, b) *Golmonia pater* Popov: (a) habitus, holotype PIN, no. 3559/3538; (b) left hemelytron, paratype PIN, no. 3559/3406; (c) *Sinaldocader ponomarenkoi* sp. nov., habitus, holotype PIN, no. 3064/5661, ×22.

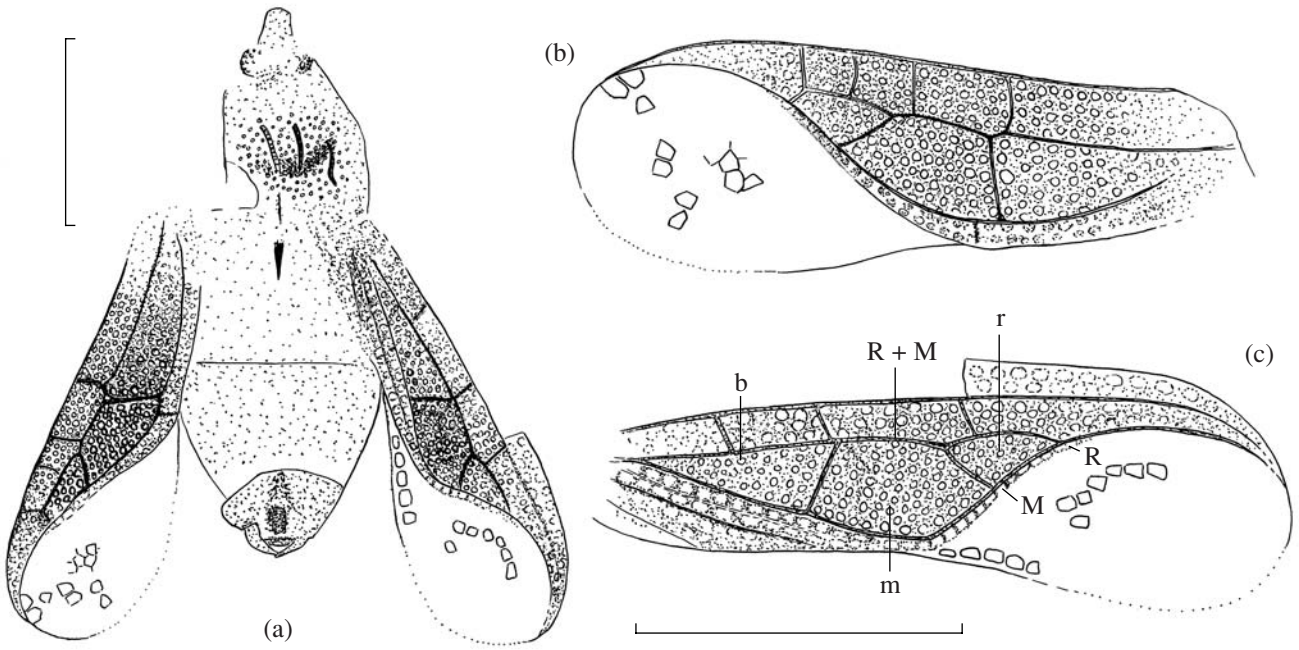

Fig. 3. *Sinaldocader ponomarenkoi* sp. nov., holotype PIN, no. 3064/5661: (a) habitus; (b) right hemelytron; (c) left hemelytron. Vein symbols standard, cells as in Fig. 1. Scale bar 1 mm.

***Sinaldocader ponomarenkoi* Golub et Popov, sp. nov.**

Etymology. Dedicated to the world renowned paleoentomologist A.G. Ponomarenko, who did so much for study of fossil insects of Europe and Asia, including Transbaikalia, where he participated in many field parties.

Holotype. PIN, no. 3064/5661, male (antennae and most legs not preserved); Buryatia, left bank of the Vitim River, locality Baissa, bed 31 (Martinson, 1961; Zherikhin et al., 1999); Lower Cretaceous, Zaza Formation.

Description (Figs. 2c, 3). Body elongate, 2.6 times as long as abdomen width. Head about as long (from apex of clypeus to posterior eye margin) as wide. Eyes quite large. Pronotum with three longitudinal carinae on disc (poorly traceable in the impression due to their deformation), each bearing a single row of rectangular areolae (lateral margins of pronotum untraceable). Hemelytra: corium with rounded areolae only slightly larger than punctures on pronotum. Distal part of R + M not smoothly continued with free part of R, both these veins arched forwards or bent at crossveins of subcostal area. Free part of M arched backwards, directed obliquely distad towards apex. Radial cell about one-third of medial cell in area. Costal area rather broad, with 2 rows of areolae in widest part (visible in distal half of right hemelytron). Subcostal area in widest part with 4 or 5 rows of areolae. Discoidal area in widest part with 8 rows of areolae. Sutural area along most of its length (from base of hemelytron to base of membrane) with 2 rows of areolae. Membrane with areolae chiefly rectangular or pentagonal (visible in central part and along inner margin of corium).

Measurements (mm): body length, 2.92; abdomen width, 1.12; head length and width, 0.57; hemelytron length, 2.14; maximal hemelytron width (in membrane area), 0.71.

Comparison. Differs from the type species in the lateral carinae developed on pronotal disc, arched or bent R + M and free parts of R and M, and direction of free M. In *S. drakei* only median carina is present on pronotum, straight R + M smoothly continued with straight R, and straight free part of M directed obliquely backwards.

Material. Holotype.

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