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A New Lace Bug Species of the Genus *Sinaldocader* (Hemiptera: Heteroptera, Tingidae) from the Turonian of Southwestern Kazakhstan

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Abstract—*Sinaldocader rasnitsyni* sp.nov. (Heteroptera, Tingidae) is described from the Upper Cretaceous (Turonian) of southwestern Kazakhstan (Kzyl-Dzhar locality).

Keywords: Heteroptera, true bugs, Tingidae, lace bugs, Cantacaderinae, fossil, Mesozoic, Cretaceous, Kazakhstan, Mongolia, Transbaikalia, new species.

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INTRODUCTION

Late Cretaceous insects, and especially true bugs, or heteropterans, remain poorly knows: the number of both described species and studied localities remains many times smaller than that of Early Cretaceous ones. The Turonian locality Kzyl-Dzhar in the northern part of the Kara Tau Range (Southwestern Kazakhstan), where a small number of true bugs have been found, is no exception. In addition to the peculiar member of pleoid water heteropterans of the Cretaceous family *Mesotrephidae* (*Mesotrephes striata* Popov) described earlier (Popov, 1971), early terrestrial true bugs of the families Lygaeidae (three genera including three species), Coreidae s.l. (two genera including two species), ?Idiostolidae, ?Velocipedidae, and Veliidae, have been found at this locality, as well as the member of Tingidae described in this study. It should be noted that this Cretaceous locality, formed after the mid-Cretaceous shift in insect faunas (Rohdendorf and Zherikhin, 1974), which coincided with the last of the major floristic shifts, the Mesophytic–Cenophytic transition (Albian–Cenomanian), has a pecular faunistic composition of heteropterans.

To date, three species of Tingidae have been known reliably from the Early Cretaceous: *Golmonia pater* Popov, 1989, *Sinaldocader drakei* Popov, 1989, and *S. ponomarenkoi* Golub et Popov, 2008. In addition, in the superfamily Tingoidea, the peculiar monotypic family Ignotingidae from extreme Early Cretaceous (?Berriasian; Zhang et al., 2005) and the family Ebboidae from the Cretaceous amber of France (Albian–Cenomanian; Perrichot et al, 2006) were described. Subsequently, we already indicated that there were no sufficient reasons to place the latter family in Tingoidea, and suggested that it is one of the coleopteroid forms of the cimicoid family Microphysidae (Golub and Popov, 2008). From the same Cretaceous amber of France, another member of Cantacaderinae was described: *Ambarcader eugenei* (Perrichot et al., 2006). From the lower layers of the Upper Cretaceous of the United States (Turonian amber of New Jersey), two monotypic genera of tingoid Vianaididae were described: *Vianagramma goldmani* Golub et Popov, 2000 and *Vianathauma pericarti* Golub et Popov, 2003 (Golub and Popov, 2003). However, the placement of the latter species in Vianaididae was not accepted subsequently by the authors who were the first to study a fully winged form of a recent member of this family (Schuh, Cassis, and Guilbert, 2006), and therefore we consider this question open.

The new species of Tingidae described here is characterized by the following features: small cell structure of hemelytra; corium divided by protruding longitudinal veins into costal, subcostal, discoidal, and sutural fields; posterior margin of pronotum straight, not overlaying scutellum, thus entirely visible in dorsal view; and presence of protruding crossveins crossing subcostal field. These features allow placing the new species in the tribe Phatnomatini (Tingidae, Cantacaderinae). The division of the discoidal field with oblique veins into three large cells (basal, medial, and radial) shows that the new species belongs to the genus *Sinaldocader* Popov.

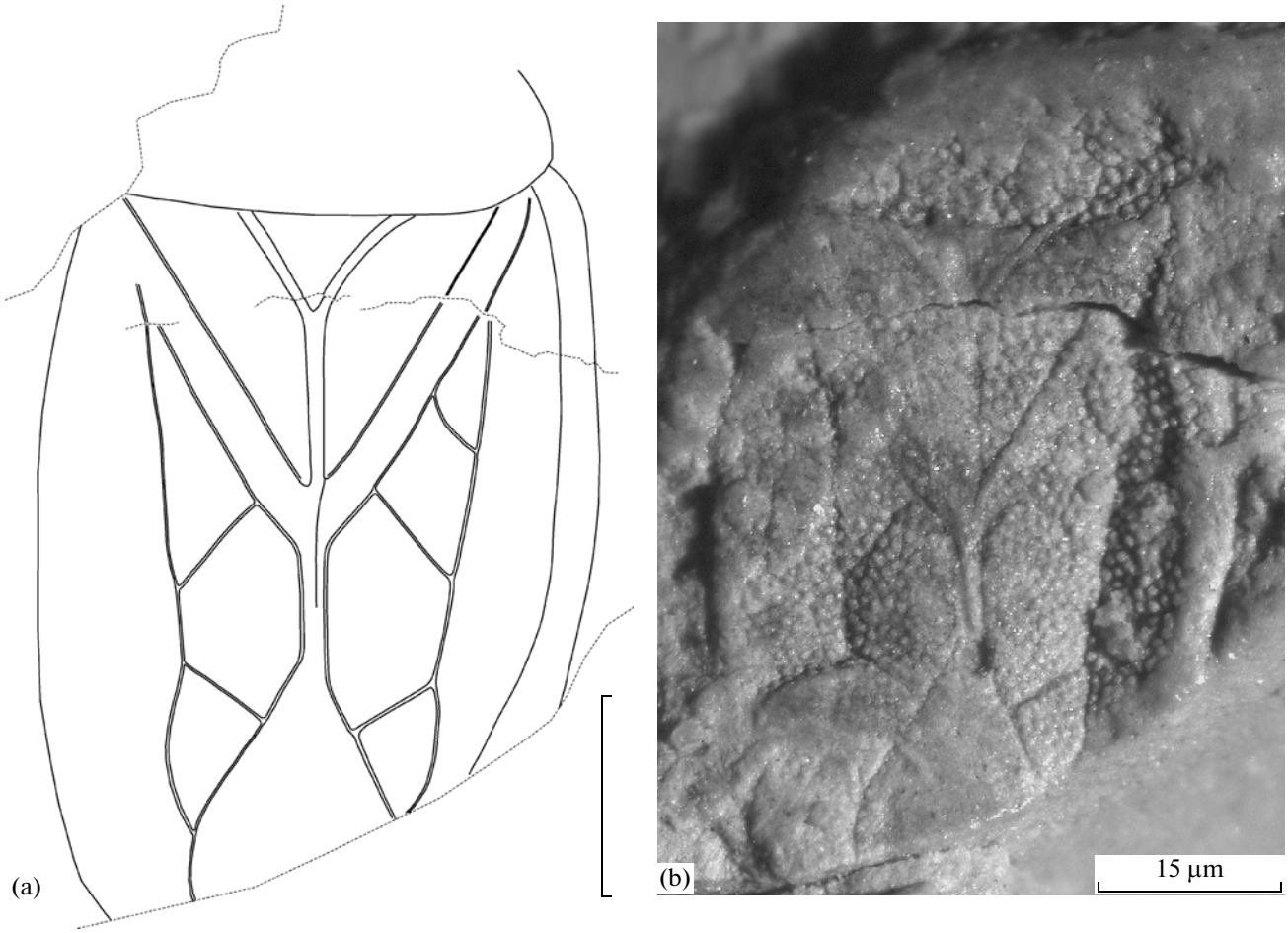

Fig. 1. *Sinaldocader rasnitsyni* sp. nov., holotype PIN, no. 3289/30, habitus: (a) drawing (scale bar 0.05 mm); (b) photograph.

Sinaldocader rasnitsyni sp. nov. is the third known species of this extinct Cretaceous genus (the finding of this tingid has already been mentioned earlier: Popov, 1989; Golub and Popov, 1998, 1999, 2000). The type species of the genus, *S. drakei* Popov, 1989 was described from the Lower Cretaceous of Mongolia (Bon Tsagaan locality), and *S. ponomarenkoi* Golub et Popov, 2008 was described from the Lower Cretaceous of Transbaikalia (Baisa locality). The new species is distinguished from them by the absence of pronotal carinae, considerably wider body and hemelytral fields, and some other features. The genus *Sinaldocader* is characterized by a rather long duration of existence (reliably, from the Early Cretaceous to the beginning of the Late Cretaceous, and probably even to the end of the Late Cretaceous), and by relatively small differences between species.

The holotype of the new species is stored in the Arthropoda Laboratory, is stored in the Borissiak Paleontological Institute, Russian Academy of Sciences (PIN).

SYSTEMATIC PALEONTOLOGY

INFRAORDER CIMICOMORPHA

Superfamily Tingoidea Laporte, 1832

Family Tingidae Laporte, 1832

Subfamily Cantacaderinae Stål, 1873

Tribe Phatnomatini Drake et Davis, 1960

Genus *Sinaldocader* Popov, 1989

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

Etymology. In honor of A.P. Rasnitsyn, a world-renowned paleoentomologist, on the occasion of his 75th birthday.

Holotype. PIN, no 3289/30 (negative impression); sex not determined reliably, but judging by rather wide hemelytra and fields of corium, probably female; head, legs, apex of scutellum, and apices of hemelytra have not been preserved; southern Kazakhstan, Kyzylorda Province, Shieli District, northwestern branches of Kara Tau Range, Kzyl-Dzhar locality; Upper Cretaceous, Turonian.

Description (Fig. 1). The body (without head) is broadly oval, approximately 1.6 times as long as wide.

The pronotum is rather wide, approximately 2.3 times wider than long, with large punctures, similar to the small cells of the hemelytral corium. Longitudinal carinae of pronotum and paranota are not discernible in the impression of the holotype. The posterior margin of pronotum is straight and does not cover the anterior margin of the triangular scutellum. The scutellum is rather large, 1.7 times wider than long.

The form is fully winged. The lateral margins of hemelytra are clearly rounded. The corium has a small cell pattern. The small cells of hemelytra are clearly rounded. The corium is distinctly divided by crossveins into fields: costal, subcostal, and discoidal (the nomenclature of wings and hemelytral fields in this study follows Drake and Davis, 1960). The costal field is moderately, wide, and has three discernible rows of small cells in its anterior half. The subcostal field is very wide, and has eight not entirely regular rows of cells; in some places, it is crossed by irregularly positioned, protruding and oblique veins. The discoidal field is very wide, and has nine or ten irregular rows of cells in the widest place; it is divided by two oblique protruding veins into three large cells: basal, medial, and radial (cell names according to Popov, 1989). Large cells are positioned along the discoidal field successively, divided from each other by protruding veins positioned obliquely in relation to the longitudinal axis of the body. R+M is almost straight, dividing into R and M far behind the basal cell; the free parts of R and M (distal of the division of R+M) are also straight. The free part of R obliquely deviates anteriad; the free part of M obliquely deviates posteriad. R divides the costal and discoidal fields; M divides the medial and radial cells. The radial cell is approximately half as large in area as the medial cell.

The sutural (internal) field, in its basal part, positioned parallel to the external margin of the clavus, and in the area where coria overlay each other, has two complete rows of cells and sparse cells of the third row. The apical sutural field transforms into the wide membrane. The membrane has one row of small rounded cells along its boundary with the corium, equal in size to the small cells of the corium. The rest of the membrane (at least medially) has traces of larger cells of rectangular and irregularly angulate shape.

The clavus is divided from the corium by a fracture, very wide, and has six rows of small rounded cells in its widest place.

M e a s u r e m e n t s, mm. Body length (without head) 2.4; width of both hemelytra together 1.5; pronotum length 0.5; pronotum width 1.15; scutellum length 0.26; scutellum width 0.47.

C o m p a r i s o n. The new species differs from the other two species of the genus in the absence of pronotal carinae (in *S. drakei*, the pronotum has one longitudinal carina; in *S. ponomarenkoi*, three such carinae), in its wide body with strongly rounded lateral margins of hemelytra, wider fields of hemelytra, and probably also in the sinuate lateral margins of its pronotum (lateral margins of the paranota?). In addition, the ratio of the areas of the medial and radial large cells in the discoidal field of the hemelytra is approximately 2 : 1 in the new species, and 3 : 1 in *S. drakei* and *S. ponomarenkoi*.

M a t e r i a l. Holotype.

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