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THE LATEST RECORD OF THE GENUS *BELMOPHENOPTERUM* (EOBLATTIDA: MESORTHOPTERIDAE) FROM THE MIDDLE TRIASSIC OF KYRGYZSTAN

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Summary. *Belmophenopterum rasnitsyni* **sp. n.** is described from the Middle Triassic Madygen locality in Kyrgyzstan. It is the latest record of the genus *Belmophenopterum* Rasnitsyn et Aristov, 2004. The Permian genus *Sylviodes* Martynov, 1940 and the Permian-Triassic genus *Belmophenopterum* are transferred from family Sylvaphlebiidae (Reculida) to the family Mesorthopteridae (Eoblattida).

Key words: insects, Reculida, Sylvaphlebiidae, Eoblattida, Mesorthopteridae, taxonomy, new species, Permian, Triassic.

С. Ю. Стороженко, Д. С. Аристов. Самая поздняя находка рода *Belmophenopterum* (Eoblattida: Mesorthopteridae) в среднем триасе Киргизии // Дальневосточный энтомолог. 2021. N 437. С. 31-36.

Резюме. Самой поздней находкой рода *Belmophenopterum* Rasnitsyn et Aristov, 2004 является описываемый из местонахождения Мадыген (средний триас Киргизии) *B. rasnitsyni* **sp. n.** Пермский род *Sylviodes* Martynov, 1940 и пермско-триасовый род *Belmophenopterum* переносятся из семейства Sylvaphlebiidae (отряд Reculida) в семейство Mesorthopteridae отряда Eoblattida.

INTRODUCTION

The monotypic genus *Belmophenopterum* Rasnitsyn et Aristov, 2004 was described from the Upper Permian locality of Belmont (New South Wales, Australia) in the family Sylvaphlebiidae Martynov, 1940 (Rasnitsyn & Aristov, 2004). Nowadays this family consists of eleven predominantly Permian genera (Martynov, 1940; Storozhenko, 1998; Aristov, 2004, 2020a; Procop *et al*., 2015) and placed in the order Reculida (*sensu* Aristov, 2015a). Herein the genera *Belmophenopterum* and *Sylviodes* Martynov, 1940 are transferred from

Sylvaphlebiidae to the family Mesorthopteridae Tillyard, 1916 of the order Eoblattida (*sensu* Aristov, 2015a), and a new species of *Belmophenopterum* is described. The holotype of new species and all other material examined are deposited in the Paleontological Institute, Russian Academy of Sciences (Moscow).

TAXONOMY

Order Eoblattida Handlirsch, 1906

Family Mesorthopteridae Tillyard, 1916

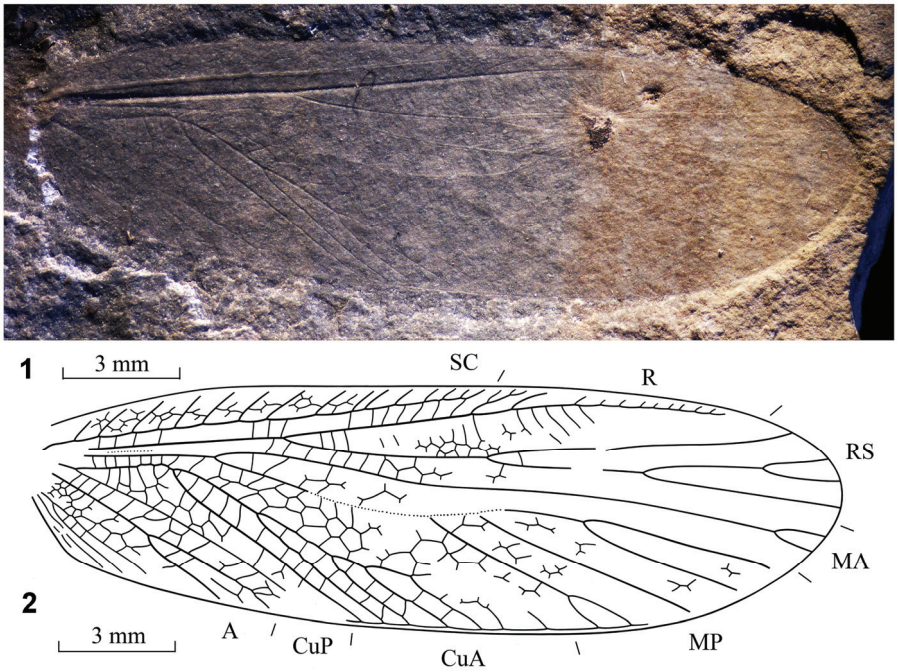
NOTES. The family consists of eleven genera known from the numerous Permian and Triassic localities in Russia, Kazakhstan, Kirgizstan, Australia, and South Africa, namely *Austroidelia* Riek, 1954, *Locustoblattina* Aristov, 2017, *Mesoidelia* Storozhenko, 1996, *Mesorthopterina* Storozhenko, 1996, *Mesorthopteron* Tillyard, 1916, *Parastenaropodites* Storozhenko, 1996, *Paridelia* Sharov, 1961, *Permorthopteron* Aristov, 2014, *Sharovites* Aristov et Storozhenko, 2013, *Taskanatus* Aristov, 2015, and *Tshermyaninus* Aristov, 2014 (Riek, 1954; Storozhenko, 1998; Aristov & Storozhenko, 2013; Aristov, 2014, 2015a, 2017, 2019). Two genera are newly associated with Mesorthopteridae below.

Genus *Sylviodes* Martynov, 1940

NOTES. It is a type genus of the family Sylviodidae Martynov, 1940. This family was synonymised under Sylvaphlebiidae by Sharov (1961), but herein is considered as a synonym of Mesorthopteridae based on the similarity of the wing-venation (see below). The genus consists of two species, *S. perloides* Martynov, 1940 from the Lower Permian Tshekarda locality and *S. martynovae* Aristov, 2015 from the Middle Permian Soyana locality, both from Russia (Martynov, 1940; Aristov, 2015b).

***Sylviodes perloides* Martynov, 1940**
Figs 1, 2

NOTES. It is a type species of the genus *Sylviodes*. The holotype of this species was redescribed and illustrated by Aristov (2004). In the collection of the Paleontological Institute a well preserved forewing of *S. perloides* from the type locality of Tshekarda is found (Figs 1, 2). It allows clarify the taxonomic position of the genus *Sylviodes*, which was placed in its own family Sylviodidae (Martynov, 1940), in Sylvaphlebiidae (Sharov, 1961; Storozhenko, 1998), or in the family Ideliidae (Aristov, 2004). The type species of *Sylviodes* is characterized by follow combination of forewing characters: SC reaching anterior wing margin distal to the second third of wing length; veinlets between anterior wing margin and SC well developed, simple, connected by few cross-veins; R reaching apical margin of wing; RS originate from R at the first third of wing length, with branches reaching the anterior wing margin; M forked earlier than R; MP desclerotized at the middle of wing; CuA not divided into anterior and posterior branches and forming a comb of branches directed to the posterior margin of wing (while in Sylvaphlebiidae CuA distinctly divided into CuA_1 and CuA_2); area between CuA and CuP without posterior branches of CuA (while such branches present in Ideliidae). All these characters are typical for Mesorthopteridae (Storozhenko, 1998; Aristov & Storozhenko, 2013); therefore *Sylviodes* undoubtedly belongs to this family.



Figs 1, 2. *Sylviodes perloides* Martynov, 1940 (PIN no. 1700/3991, forewing; Russia: Perm region, Suksun district, left bank of the Sylva River near the village of Tshekarda, Tshekarda locality; Lower Permian, Kungurian Stage, Koshelevka Formation): 1 – photograph; 2 – reconstruction.

Genus *Belmophenopterum* Rasnitsyn et Aristov, 2004

NOTES. This genus is most similar to *Sylviodes* and transferred here from Sylvaphlebiidae to Mesorthopteridae. The type species, *Belmophenopterum pectinatum* Rasnitsyn et Aristov, 2004, was described from the Upper Permian (Changhsingian) locality of Belmont in New South Wales, Australia (Rasnitsyn & Aristov, 2004). A new species from the Middle Triassic of Central Asia is described below.

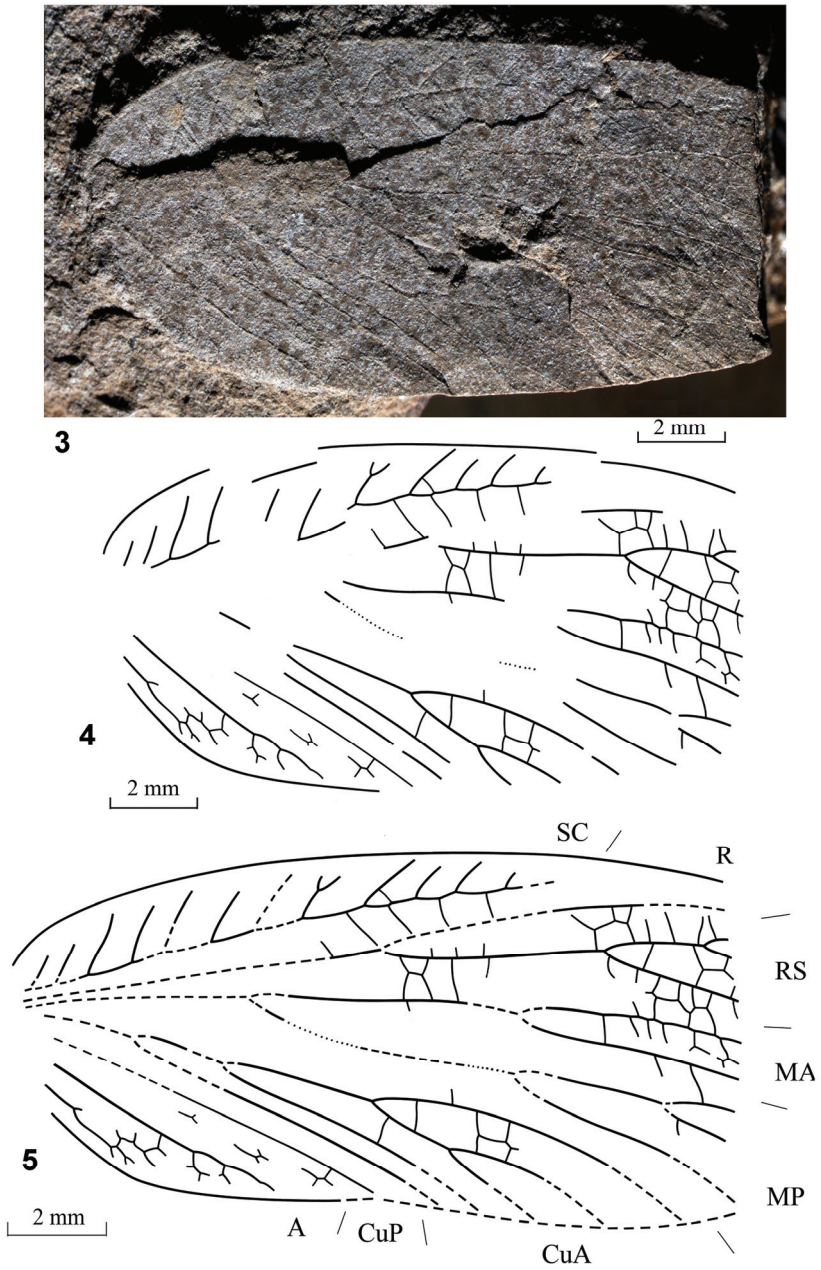
***Belmophenopterum rasnitsyni* Storozhenko et Aristov, sp. n.**

http://zoobank.org/NomenclaturalActs/3E09BFC1-9A90-4E57-942E-D58F8E19B8D2

Figs 3–5

MATERIAL. Holotype – PIN no. 2555/820, counterpart of a forewing shorten as a result of enclosing rock deformation; **Kyrgyzstan**: Osh Region, Batken District, Madygen Stow, Madygen locality; Middle Triassic, Ladinian-Carnian Stage, Madygen Formation.

DESCRIPTION. Forewing medium size. Anterior margin of wing convex. Costal area near origin of RS slightly wider than subcostal one. SC reaching anterior margin of wing before distal third of wing, with 12 usually simple or rare Y-shaped veinlets. RS originated from R before the middle of wing, with 3 or more branches directed to apex and posterior margin of wing. M divided into MA and MP in the basal quarter of wing; MA with 3 branches;



Figs 3–5. *Belmophenopterum rasnitsyni* sp. n. (holotype, PIN no. 2555/820, forewing; Kyrgyzstan: Osh Region, Batken District, Madygen Stow, Madygen locality; Middle Triassic, Ladinian-Carnian Stage, Madygen Formation): 3 – photograph; 4 – drawing; 5 – reconstruction.

MP desclerotized at the middle of wing, with 3 branches. CuA with 5 branches directed to posterior margin of wing. Area between CuP and A_1 very wide. A_1 with 3 weak apical branches; A_2 disappear within veinlets.

MEASUREMENTS. Length of forewing about 18 mm.

DIAGNOSIS. The new species is similar to *B. pectinatum* but differs from latter by RS originated from R before the middle of wing and by both MA and MP forked before the distal quarter of wing (in *B. pectinatum* RS originated from R in basal quarter of wing and both MA and MP simple before the distal quarter of wing).

ETYMOLOGY. The new species is named in honor of the famous Russian paleoentomologist Prof. Alexandr P. Rasnitsyn.

CONCLUSION

Nowadays representatives of the family Mesorthopteridae are known from the Permian and Triassic of Eurasia, Africa and Australia. There are a few hundred of parts and counterparts of body and isolated wings of Mesorthopteridae from the Middle Jurassic Daohugou locality in the Inner Mongolia (North-East China) in the collection of the College of Life Science, Capital Normal University (Beijing), but up to date all of them are not described (Aristov & Storozhenko, 2013). Beside described taxa five genera, *Paridelia*, *Permorthopteron*, *Sylviodes*, *Taskanatus*, and *Tshermyaninus*, are recorded only from the Permian. The species of four genera, *Belmophenopterum*, *Locustoblattina*, *Mesoidelia*, and *Parastenaropodites*, are known from both Permian and Triassic. The genera *Austroidelia*, *Mesorthopterina*, *Mesorthopteron*, and *Sharovites* are recorded only from the Triassic.

The changes of composition of the eoblattids families at the Permian–Triassic border are not so significant. The families Megakhosaridae, Blattogryllidae and Babalidae are known from the Babii Kamen' locality in Russia (Upper Permian, Vyatkian Stage) (Aristov, 2020b). Moreover, the Palaeozoic families Mesorthopteridae, Daldubidae, and Ideliidae are also recorded from the Triassic (Aristov, 2015a), while they are not found in the Babii Kamen' locality. Thus, only family Babalidae is known to have survived until the end of the Permian but not into the Triassic.

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