

Lower Cretaceous cockroaches and mantids (Insecta: Blattaria, Mantodea) from the Sharin-Gol in Mongolia

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VRŠANSKÝ, P. 2005. Lower Cretaceous cockroaches and mantids (Insecta: Blattaria, Mantodea) from the Sharin-Gol in Mongolia. *Entomol. Probl.* 35(2): 163–167. – Dictyoptera assemblage from the Sharin-Gol in Mongolia indicate its earliest Cretaceous (the Berriasian or the basal Valanginian) age. The assemblage is characteristic for “Baissa cold type” and include 5 new species (*Shartegoblattina colorata* sp.nov., *Elisama fragmentaria* sp.nov., *Svabula vzorkovana* gen. et sp.nov., *Piniblattella sharingolensis* sp.nov. and *Vitisma orientalis* sp.nov.), and an unidentified mantid.

Key words: Insects, cockroaches, assemblages, Early Cretaceous, new species, new genera.

Introduction

The Lower Cretaceous cockroach and mantid assemblages of Asia are well known (VISHNIAKOVA 1986, GRATCHEV & ZHERIKHIN 1993, VRŠANSKÝ 1998, 1999, 2003, in press, VRŠANSKÝ et al. 2002). They can be divided into two types: the Sharin-Gol appear to belong to the type of assemblage characteristic for the Baissa “cold” layers, present also in the Purbeck, Santana and in Lebanese amber. An alternative assemblages of Baissa “warm” layers are also present in Bon Tsagaan in Mongolia, in European and Chinese localities.

Comparing the respective taxa within these assemblages, we might track the change of species within the changing ecosystem and determine the time-scale of the fossils.

Material and methods

34 cockroaches and mantids, preserved mostly as isolated fore- or hindwings, were collected in the coal quarry (Beds 350/6 (200-201 350/7)) of the Sharin-Gol, 45 km SE from Darkhan in Selenginskij Aymag, North Mongolia, by the Paleontological group of the Joint Soviet-Mongolian Palaeontological Expedition in 1986 (A. G. Ponomarenko, the head). The material is kept at the Paleontological Institute, Russian Academy of Sciences (PIN). Drawings are scanned and digitally improved, initially the photographs traced using ROTRING pens.

Systematics

Blattaria LATREILLE, 1810

Caloblattinoidea VRŠANSKÝ & ANSORGE, 2000 in VRŠANSKÝ 2000

Caloblattinidae VRŠANSKÝ & ANSORGE, 2000 in VRŠANSKÝ 2000

Shartegoblattina VRŠANSKÝ, 2004

Shartegoblattina colorata sp.nov.

(Figs 4, 6, 10, 11)

Holotype. 4306/ 175±. Forewing with a fragment of hindwing. Sharin-Gol, Mongolia. Lower Cretaceous.

Additional material: Forewings: 4306/ 168±, 169±, 170±, 173±, 176c±, 179±, 182, 197, 199, 200, 326±; Hindwings: 4306/ 186=189, 191.

Diagnosis. Forewing length 18–21mm. Coloration most apparent along the fore margin of the forewing. M simplified.

Description. Forewing Sc straight and branched (3); R slightly curved, with about 17 (in the holotype) veins; M simplified, with 4 branches; Cu expanded (with 8 branches in the holotype). Intercalaries distinct. Coloration dark along the fore margin, more pale in the distal part.

Hindwing with simple straight Sc, R1 secondarily branched; CuA with blind (sometimes branched) branches.

Remarks. Differs from its only congener, *S. elongata* VRŠANSKÝ, 2004 (length 14 mm) from the Tithonian of Mongolia in being larger, and in simplified M.

Character of preservation: 12 forewings, 2 hindwings.

Etymology: after the color (Latin for colour).

Blattoidea LATREILLE, 1810

Blattellidae KARNY, 1908

Piniblattella VRŠANSKÝ, 1997

Piniblattella sharingolensis sp. nov.

(Fig. 12)

Holotype. 4306/ 193. Hindwing. Sharin-Gol, Mongolia. Lower Cretaceous.

Additional material: Forewings: 4306/ 184, 198. Hindwings: 4306/ 174±, 190, 192.

Diagnosis. Hindwing length 9.0–11.5mm.

Description. Forewing with apparent intercalaries. Hindwing Sc simple, curved near apex; R differentiated into R1 (with 3 branches) and RS (with 12 branches); M simple; CuA with tertiary branchings (with 10 veins at the margin and additional blind branches).

Remarks. Forewing with apparent intercalaries is a plesiomorphy within Blattellidae, indicating this taxon diverged from the very early representatives of *Piniblattella*, close to its stem genus *Hispanoblatta* MARTÍNEZ-DELCLÓS, 1993 (Mesoblattinidae).

Hindwing of *Piniblattella vitimica* VISHNIAKOVA, 1964 differ in size (15.2mm) and in having more branched R1. The closest relative appear *P. minuta* VRŠANSKÝ, 1997 which slightly differs in size (forewing length 11.5–11.8mm, expected hindwing length over 11.5mm) and in intercalaries unapparent.

Character of preservation: 2 forewings, 4 hindwings.

Etymology: after the Sharin-Gol.

Polyphagoidea WALKER, 1868

Holocompsidae REHN, 1951

***Vitisma* VRŠANSKÝ, 1999**

***Vitisma orientalis* sp.nov.**

(Figs 1, 7)

Holotype. 4306/ 185=188. Forewing. Sharin-Gol, Mongolia. Lower Cretaceous.

Material: Holotype only.

Diagnosis. Forewing length/ width ca. 4.8/1.8mm. Sc comparatively short, straight, about the same length as clavus. A numerous (6+). Coloration with pale macula in the central part of media.

Description. Costal space narrow, Sc comparatively short, simple and straight; R slightly arcuated, with about 10 veins; M branched, with about 6 veins; CuA short and straight, simplified (with 3 veins). CuP sharply curved; numerous anal veins simple (6 and possibly more).

Remarks. *V. orientalis* sp. nov. differs from *V. diffusa* VRŠANSKÝ, 2003 (forewing length 6.5mm) from the Barremian of the Bon Tsagaan Nuur in Mongolia and *V. occidentalis* VRŠANSKÝ & ANSORGE, 2000 from the Hauterivian of Spain (forewing length 5.7mm) in smaller size. *V. rasnitsyni* VRŠANSKÝ, 1998 from the ?Valanginian of Baissa in Siberia is of the same size (4.7-5.5mm) but is apomorphic in longer Sc, reduced A and more terminal placement of the pale macula. The following phylogenetical scheme of the genus *Vitisma*, originating from an undescribed genus of the family Liberiblattinidae known from the Kimmeridgian sediments of the Karatau in Kazakhstan (unpublished observation) results: (1. *V. diffusa* + (2. *V. occidentalis* + (3. *V. rasnitsyni* + *V. orientalis*))).

Synapomorphies: **1.** Synapomorphies of the genus *Vitisma*: reduced outer valvae, forewing completely colored,

small (–7mm), with simplified venation, simple A; hindwing CuA with exclusively primary branched veins; no autapomorphies of *V. diffusa* **2.** Forewing length under 6mm; no autapomorphies of *V. occidentalis*, but specimens are poorly preserved **3.** Clavus and Sc short; *V. rasnitsyni* is autapomorphic in having the pale forewing macula shifted terminally.

V. orientalis appear most closely related to the stem group of the genus *Cretaholocompsa* MARTÍNEZ-DELCLÓS, 1993 (autapomorphies of both *V. orientalis* and *V. rasnitsyni* include short clavus but terminally shifted forewing macula is autapomorphic for *V. rasnitsyni*).

Character of preservation. 1 forewing.

Etymology: after orient (latin for East).

Superfamily incertae sedis

Blattulidae VISHNIAKOVA, 1983

***Elisama* GIEBEL, 1856**

***Elisama fragmentaria* sp.nov.**

(Figs 5, 9)

Holotype. 4306/ 201. Hindwing. Sharin-Gol, Mongolia. Lower Cretaceous.

Additional material: Forewings: 4306/ 171±, 172, 177±, 183 (with body and hindwing), 194, 329; Hindwings: 4306/ 196; Pronotum: 4306/ 187.

Diagnosis. Length/width ca. 10–11/3mm.

Description. Pronotum length/width ca. 2.8/3.5mm. Hindwing Sc simple, slightly curved; R1 with simple, short (5 in the holotype) branches, RS with 2–3 branches; M simplified, with 2 branches; Cu with about 6 branches. A2 richly branched (6).

Remarks. Standard representative of the genus, differing from other Lower Cretaceous representatives in size (this character can discriminate species but can not be used for phylogenetic analysis).

E. parallela VRŠANSKÝ, 2003 from the Barremian of the Bon Tsagaan Nuur in Mongolia has identical size, but differ in having considerably more simplified R (less than 7) (apomorphy?) and more rich M (–5) (plesiomorphy?) in the hindwing.

Two closely related, undescribed *Elisama* species from the ?Valanginian of Baissa (Beds 31 and 22 respectively) also have the same size, but differ in having few long R1 in the hindwing (apomorphy) and secondarily branched CuA (plesiomorphy).

E. frontilongae (MARTÍNEZ-DELCLÓS, 1993) has the same size, but differ in having few long R1 branches in the hindwing (apomorphy).

Character of preservation: 6 forewings (one with body and hindwing), 2 hindwings, 1 pronotum.

Etymology: after fragmentum (latin for fragment).

***Svabula* gen.nov.**

Type species *S. vzorkovana* sp.nov is described below.

Composition: Type species.

Diagnosis. Shortened forewing with oval apex.

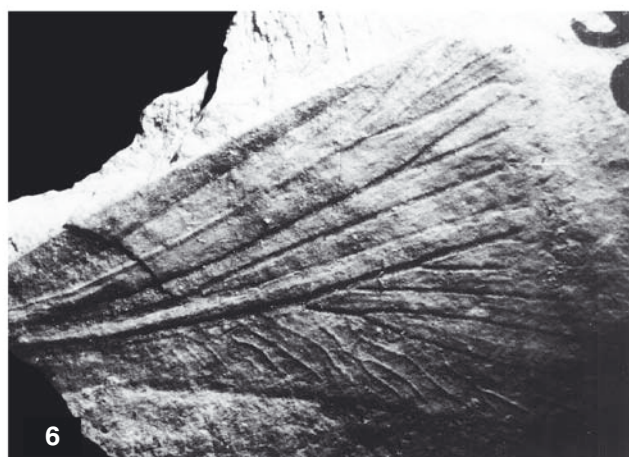
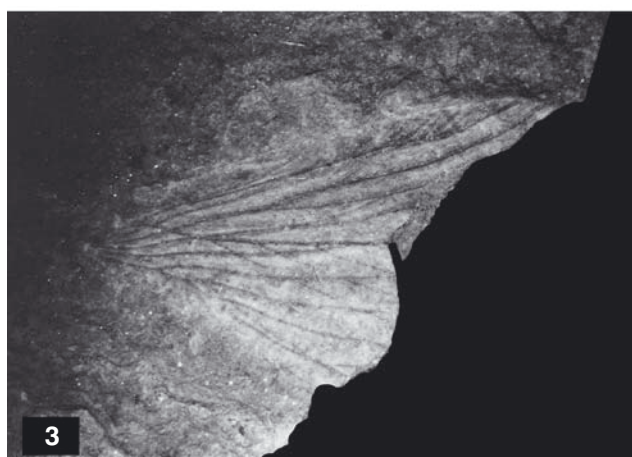
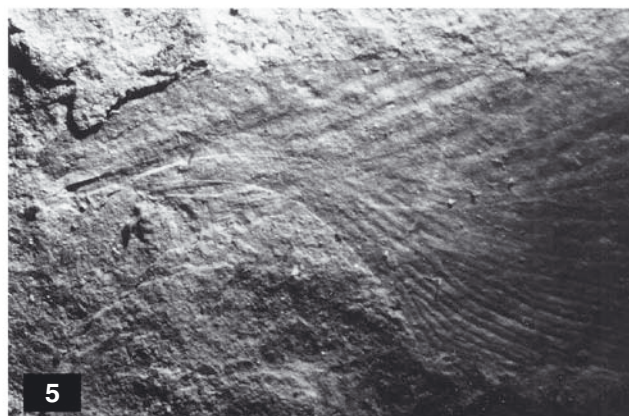
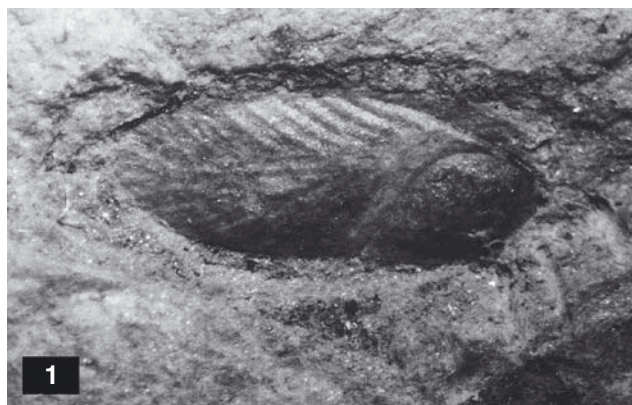
Clavus almost reaching wing midlength. Coloration with additional macula present in the area of bifurcation of M and R. R significantly curved, overlapping apex. Apically descending M simplified. CuA with branches long, running parallel to margin.

Description. Forewing short, with oval apex. Costal space very short and narrow; Sc simple and short. R sharply curved, in the widest point radial space taking more than half of wing width. Media starting comparatively apically, simplified (2). CuA very long, with branches running parallel to margin. Clavus almost reaching wing midlength, A simple with cross-veins apparent.

Three dark maculas present – in the basal part of the clavus, in the bifurcation of R and M, and in the base of CuA.

Remarks. The genus is characteristic of numerous autapomorphies (coloration; simplified, apically descending M; short forewing with oval apex). On the other hand, striking plesiomorphies such as strong dark branches, curved R and CuA running parallel to wing margin indicate the genus diverged from taxa close to *Eublattula* HANDLIRSCH, 1939 (synapomorphic in apparent dark venation, curved R reaching apex and parallel-to-margin running CuA) before or at the same time as *Elisama*.

Etymology: after šváb (Slovak for cockroach).



Figs 1–6. 1) *Vitisma orientalis* sp.nov. Holotype 4306/185; 2) *Svabula vzorkovana* sp.nov. Holotype 4306/ 178; 3) 4306/189 4) *Shartegoblattina colorata* sp.nov. Holotype 4306/175; 5) *Elisama fragmentaria* sp.nov. Holotype 4306/ 201; 6) *Shartegoblattina colorata* sp.nov. 4306/186.

***Svabula vzorkovana* sp.nov.**

(Figs 2, 8)

Holotype. 4306/ 178±. Sharin-Gol, Mongolia. Lower Cretaceous.

Material: Holotype only.

Description. Forewing length/width ca. 7/ 2.5mm. All branches strong, dark, intercalaries apparent. Sc straight and simple; R significantly curved, overlapping apex (11 veins in the type); M considerably simplified, with 2 veins; Cu running parallel to margin, with 5 long branches; A simple (5–6), with numerous cross-veins. Coloration present in the basal part of the clavus, macula extends the cubital area and reach M. Additional macula is present in the bifurcation of R and M.

Character of preservation: 1 forewing.

Etymology: after vzorkovaný (Slovak for patterned).

Mantodea BURMEISTER, 1838

***Cretophotina* GRATCHEV & ZHERIKHIN, 1993**

***Cretophotina* sp. indet**

Material: 4306/ 180=181.

Remarks. Material is too fragmentary for identification (basing on the character of branches and large size it can not be discriminated from other *Cretophotina* species).

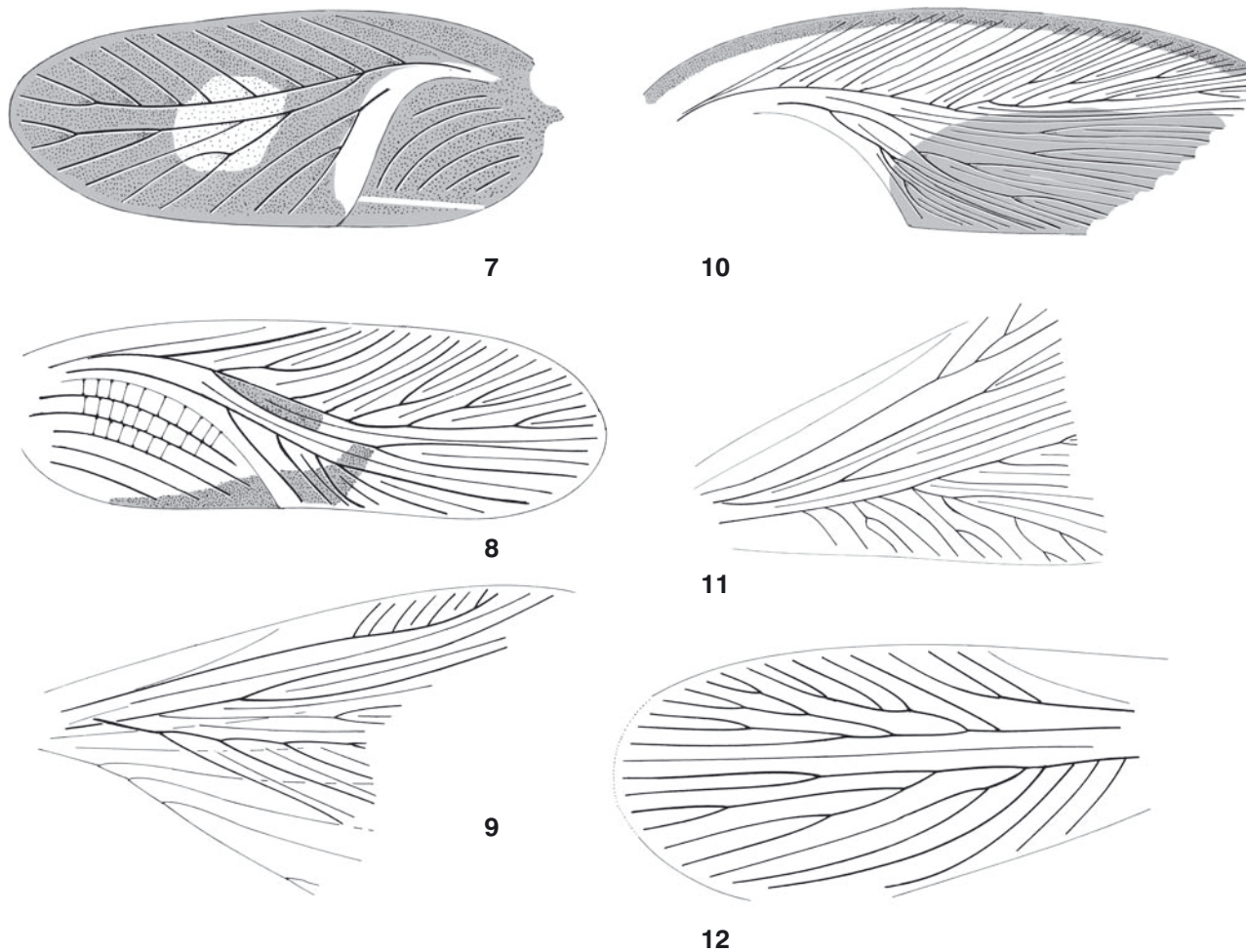
Character of preservation: 1 forewing.

Discussion

The composition of the Dictyoptera assemblage in Sharin-Gol is standard, characteristic for the Early Cretaceous, even when one rather advanced genus and species appear indigenous (of 5 genera, each represented by a single species).

This type of assemblage corresponds to Baissa “cold” layers, characteristic also for Lebanese amber and Purbeck in Britain (VRŠANSKÝ et al. 2002).

Other Lower Cretaceous assemblages from Mongolia – i.e., Erdeniy-Ula (VISHNIAKOVA 1986), Bon Tsagaan (VRŠANSKÝ 2003), Khurilt, Kholbotu, Shar-Tologoi (VRŠANSKÝ in press) are different, lacking the progressive Blattellidae, with the Holocompsidae being extremely rare. Notably, the Holocompsidae are common also in the Lower Cretaceous sediments from the European localities such



Figs 7–12. 7) *Vitisma orientalis* sp.nov. Holotype 4306/185; 8) *Svabula vzorkovana* sp.nov. Holotype 4306/ 178; 9) *Elisama fragmentaria* sp.nov. Holotype 4306/ 201; 10) *Shartegoblattina colorata* sp.nov. Holotype 4306/175; 11) *Shartegoblattina colorata* sp.nov. 4306/186; 12) *Piniblattella sharingolensis* sp.nov. Holotype 4306/ 193.

as in Montsec and Purbeck (MARTÍNEZ-DELCLÓS 1993, VRŠANSKÝ & ANSORGE 2001).

The genus *Piniblattella* is known from the ?Valanginian until the Barremian, but *P. sharingolensis* sp.nov. appear to be derived from the stem group sometimes near the J/K boundary and thus indicate slightly older age. *Elisama* is a cosmopolitan Mesozoic genus, but *E. fragmentaria* sp.nov. appear plesiomorphic when compared to ?Valanginian-Barremian species, indicating the earliest Cretaceous age. *Svabula* is indigenous, derived from *Eublattula* at the same time or before *Elisama*, i.e., during the Tithonian, but at the same time possess numerous autapomorphies, thus also indicating earliest Cretaceous age of the sediments. *Vitisma* is characteristic for the earliest Cretaceous, and *V. orientalis* sp.nov. appear closely related, but plesiomorphic when compared with *V. rasnitsyni* from the ?Valanginian sediments of Baissa in Siberia. The presence of *Shartegoblattina*, which is known otherwise only from the Tithonian of Mongolia in Shar-Teg, indicating the earliest Cretaceous age for the Sharin-Gol.

No closely related species are known from the Berriasian of Purbeck, indicating isolation of European and Asian cockroach assemblages of that time.

Altogether, the cockroaches indicate the earliest Cretaceous age of the Sharin-Gol sediments, most probably Berriasian or basal Valanginian.

This is with the concordance with the presence of the same species, e.g., beetles *Zygodenia caudatus* PONOMARENKO, 1966 and *Z. vitimensis* PONOMARENKO, 1966; and scorpion fly *Baissopsyche pura* NOVOKSCHONOV & SUKATCHEVA, 2001 in the Berriasian or Valanginian of Baissa and in Sharin-Gol (A.G. Ponomarenko, personal communication).

The character of preservation with 24 forewings, 8 hindwings and one pronotum also appear standard.

Tab. 1. Character of preservation. Unidentifiable are 4306/ 327 (leg), 195 (?). FW – forewings, HW – hindwings, P – pronotum.

Species	FW	HW	P	Total
<i>Shartegoblattina colorata</i>	12	2		14
<i>Piniblattella sharingolensis</i>	2	4		6
<i>Elisama fragmentaria</i>	6	2	1	9
<i>Svabula vzorkovana</i>	1			1
<i>Vitisma orientalis</i>	1			1
<i>Cretophotina</i> sp.	1			1
Unidentified	1		1	2
Total	24	8	2	34

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