REVISION OF THE FAMILY NECROPHASMATIDAE (INSECTA: CNEMIDOLESTIDA)

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Summary. The type genus of the family Necrophasmidae, Necrophasma Martynov, 1925 from Karatau (Upper Jurassic of Kazakhstan), is re-described. The monotypic family Juraperlidae from Daohugou (Middle Jurassic of China) is synonymized under Necrophasmidae (Cnemidolestida). The genus Ferganomadygenia Storozhenko et Vršanský, 1995 from Madygen (Middle Triassic of Kyrgyzstan) is included in this family, which also contains the type genus and Juraperla Huang et Nel, 2007. The family Necrophasmidae is placed in the suborder Parmapterina of the order Cnemidolestida.

Key words: Insecta, Cnemidolestida, Parmapterina, taxonomy, Triassic, Jurassic.

INTRODUCTION

The family Necrophasmidae was placed by different authors in different suborders and superfamilies of phasmsids, namely order Phasmatodea: suborder Necrophasmatoidea (Martynov, 1925; 1938); suborder Chresmododea (Martynova, 1962); superfamily Xiphopteroidea (Sharov, 1968); superfamily Aeroplanoidea (Vishnyakova, 1980). Some authors voiced their doubts about the placement of Necrophasmidae in the phasmid order, but nevertheless discussed them within Phasmatida (Sharov, 1968; Nel et al., 2004) or did not discuss them at all (Gorokhov, 1993).

The genus Necrophasma is distinguished from phasmsids in the absence of alignment of veins subparallel to the wing margins, and in the division of M rather proximally, in the basal
quarter of the wing. In my opinion, this genus has no substantial differences from representatives of Juraperlidae (Huang & Nel, 2007; Cui et al., 2010; Aristov, 2016), and the family Juraperlidae is therefore synonymized here under Necrophasmidae. In the original description the family Juraperlidae was placed in the order Grylloblattida (Huang & Nel, 2007). The genus *Ferganomadygenia*, originally described in the family Tunguskapteridae of the order Grylloblattida (Storozhenko & Vršanský, 1995), was mentioned but not placed in Juraperlidae in the original description of that family (Huang & Nel, 2007). It was placed in Juraperlidae later, and the family itself was placed in the order Cnemidolestida (suborder Parmaterina: Aristov, 2016). In my opinion, the family Necrophasmidae also belongs to this order.

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**TAXONOMY**

**CLASS INSECTA LINNÉ, 1758**

*Infraclass Gryllones Laicharting, 1781*

*Superorder Perlidea Latreille, 1802*

*Order Cnemidolestida Handlirsch, 1937*

Cnemidolestodea Handlirsch, 1937: 63.


**Suborder Parmapterina Aristov, 2016**


**Family Necrophasmidae Martynov, 1925**


Juraperlidae Huang & Nel, 2007: 837; Cui *et al.*, 2010: 710; Aristov, 2016: 19; **syn. n.**

Type genus: *Necrophasma* Martynov, 1925.

**DESCRIPTION.** Anterior margin of forewing changing from concave to convex (in *Juraperla grandis* convex from base to apex). Costal area in basal half of wing wider than subcostal area. False costa (“C”) ending proximal of wing middle joining C or bifurcating and joining both C and SC. SC ending distal of wing middle joining C or bifurcating and joining both C and R. RS beginning around wing middle, simple. M₅ and first bifurcation of M close to each other; MA and MP simple. CuA dividing into CuA₁, with CuA₁ dividing distal of its middle, and CuA₂, with CuA₂ simple or with short fork. CuP simple (in *Ferganomadygenia* with very short fork). Veins in distal half of wing with sharp curves at junctions with crossveins (except in *Juraperla grandis*). Crossveins simple or, in fewer cases, Y-shaped or forming double row of cells.

**DIAGNOSIS.** The family is distinguished from all families of the suborder Parmapterina by the presence of the false costa (“C”). This character is absent in any other family of the suborder (Aristov, 2016).

**COMPOSITION.** Three genera: monotypic *Necrophasma* Martynov, 1925 from Karatau locality (Kazakhstan, South Kazakhstan Region; Middle-Upper Jurassic, Karabastau Formation), monotypic *Ferganomadygenia* Storozhenko et Vršanský, 1995 from Madygen locality
Key to genera of the family Necrophasmidae

1(2) "C" ending in basal quarter of wing; CuA2 with bifurcation ………………………………………...
……………………………………...
Ferganomadygenia Storozhenko et Vršanský, 1995

2(1) "C" ending distal of basal one-third of wing; CuA2 simple.

3(4) Forewing 4.9 times as long as wide; M5 joining CuA proximal of its division into CuA1 and CuA2 …………………………………………………
Necrophasma Martynov, 1925

4(3) Forewing 3–3.6 times as long as wide; M5 joining CuA around its division into CuA1 and CuA2 …………………………………………..……....
Juraperla Huang et Nel, 2007

Genus Necrophasma Martynov, 1925

Necrophasma Martynov, 1925: 584; Martynov, 1938: 127; Martynova, 1962: 160; Sharov, 1968: 112; Nel et al., 2004: 34.

Type species: Necrophasma shabarovi Martynov, 1925.


SPECIES INCLUDED. Type species only.

Necrophasma shabarovi Martynov, 1925

Figs 1, 2

Necrophasma shabarovi Martynov, 1925: 584, fig. 8; Martynov, 1938: 127, fig. 65; Martynova, 1962: 160, fig. 423; Sharov, 1968: 112, fig. 42zh; Nel et al., 2004: 34.

MATERIAL. Holotype PIN, No 1787/90, positive imprint of forewing; Kazakhstan: South Kazakhstan Region, Baidibekskii District, Mikhailovka Village; Middle-Upper Jurassic, Karabastau Formation; in PIN.

DESCRIPTION. Slender longitudinal vein running between “C” and SC. CuA1 and A1 with three branches each. Crossveins simple, equal in width to longitudinal veins, and simple and Y-shaped in medial area. Coloration near wing base and as longitudinal vein along anterior margin in central part of wing; veins colored; wing membrane covered with small hairs.

MEASUREMENTS. Forewing length 25 mm.

Genus Ferganomadygenia Storozhenko et Vršanský, 1995


Type species: Ferganomadygenia plicata Storozhenko et Vršanský, 1995.

DESCRIPTION. Forewing 3.1 times as long as wide. Wing apex rounded. “C” joining C near in basal quarter of wing. SC ending in bifurcation joining C and R in distal quarter of
wing. Base of M₅ and first bifurcation of M close to each other. M₅ joining CuA near its division into CuA₁ and CuA₂. CuA₂ with short fork.

SPECIES INCLUDED. Type species only.

**Genus Juraperla** Huang et Nel, 2007

*Juraperla* Huang & Nel, 2007: 837; Cui et al., 2010: 710; Aristov, 2016: 19.

Type species: *Juraperla daohugouensis* Huang et Nel, 2007.

DESCRIPTION. Forewing 3–3.6 times as long as wide. Wing apex pointed. “C” ending in bifurcation joining C and SC distal of basal quarter of wing. SC ending in bifurcation joining C and R near proximal boundary of distal one-third of wing. Base of M₅ and first bifurcation of M close to each other. M₅ joining CuA near its division into CuA₁ and CuA₂. CuA₂ simple.

SPECIES INCLUDED. Type species and *J. grandis* Cui, Béthoux, Shih et Ren, 2010.

REFERENCES


