

The first Baltic amber dysagrionine damselfly (Odonata: Zygoptera: Thaumatonneuridae: Dysagrioninae)

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Abstract. A new genus and species *Electrophenacolestes serafini* is described. It is the first Thaumatonneuridae recorded from an amber deposit and the second record of the family in the European Paleogene. A comparison with related genera and families is done.

Résumé. Le premier Zygoptera Dysagrioninae de l'ambre balte (Odonata: Zygoptera: Thaumatonneuridae: Dysagrioninae). Le premier Thaumatonneuridae connu de l'ambre balte est décrit sous le nom d'*Electrophenacolestes serafini*. Il s'agit du second représentant connu de cette famille dans le Paléogène d'Europe. Le fossile est comparé aux familles et genres proches.

Keywords: Odonata, Zygoptera, Thaumatonneuridae, Dysagrioninae, Baltic amber.

The Thaumatonneuridae: Dysagrioninae is a fossil damselfly subfamily not frequent in the fossil record. Only five genera are known to date, one from the Late Jurassic Laiyang Formation (Shandong Province, China), three from different Paleogene deposits in the USA, and another from the Early Oligocene of Primorye Territory (Russia).

Recently Mr. Jacek Serafin provided us a fossil damselfly from Baltic amber for its study. The fossil represents a new genus and species *Electrophenacolestes serafini*. It is the fourth adult Zygoptera species described and named from Baltic amber after *Platycnemis antiqua* Pictet & Hagen 1856, *Litheuphaea carpenteri* Bechly 1998, and *Pamita hannahdaltonae* May & Carle 2005 (Bechly 1998; May & Carle 2005).

In this work, we follow the wing venation nomenclature of Riek (1976), Riek & Kukalová-Peck (1984), amended by Kukalová-Peck (1991), Nel *et al.* (1993) and Bechly (1996). The higher classification of fossil and extant Odonatoptera is based on the phylogenetic system of Bechly (1996).

Suborder ZYGOPTERA

Family THAUMATONEURIDAE Tillyard &

Fraser 1938

Subfamily DYSAGRIONINAE Cockerell 1908

Genus *Electrophenacolestes* n. gen.

Type species. *Electrophenacolestes serafini* n. gen., n. sp.

Etymology. After Elektron for amber and *Phenacolestes*.

Diagnosis. Wing petioles very long and narrow; two secondary antenodal cross-veins between C and ScP, distal of Ax2; discoidal cell closed, elongate, with distal part broader than basal part; base of IR2 below nodus; postdiscoidal area greatly broadened distally, with two rows of cells opposite nodus level; area between MP and CuA greatly broadened distally, with eight rows of cells along posterior wing margin; cubito-anal area broad, with four rows of cells between CuA and posterior wing margin; no oblique vein 'O'; base of RP2 in a very distal position.

Electrophenacolestes serafini n. sp.

(Figs 1-2)

Material. Holotype specimen MNHN-LP-R63880, preserved in a large piece of amber (5 cm x 3.5 cm x 1.5 cm), (coll. Jacek Serafin, Poland), Laboratoire de Paléontologie, Muséum National d'Histoire Naturelle, Paris, France.

Occurrence. Middle to Late Eocene, Baltic amber, Poland.

Etymology. After Mr. Jacek Serafin.

Diagnosis. As for the genus.

Description. The thorax with one fore wing and the two hind wings attached, and the three basal segments of the abdomen.

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Thorax 9.1 mm long, around 5.5 mm high and 7.3 mm wide; first abdominal segment 2.0 mm long, 4.4 mm wide, second 4.8 mm long, 3.8 mm wide, third (not completely preserved 7.0 mm long, 3.8 mm wide); wings hyaline; length of preserved part of fore wing 16.0 mm, width 6.5 mm; length of preserved part of hind wing 31.3 mm, width 8.0 mm; preserved structures of fore and hind wings very similar; petiole of wing very long and narrow, 6.5 mm long, 1.9 mm wide; vein AA emerging from posterior wing margin just distal of Ax1; CuP midway between Ax1 and Ax2, well distal of base of AA; distance between wing base and Ax1 0.5 mm, between Ax1 and Ax2 0.2 mm, between Ax2 and nodus 0.8 mm; two secondary antenodal cross-veins between C and ScP distal of Ax2 in fore and hind wings, but none in area between ScP and RA; no cross-vein in area between RA and RP basal of subnodus; median and submedian spaces free; discoidal cells of fore and hind wings free of cross-veins, of same shape, rather broad, quadrangular, broader in their distal part than basally, length of basal side of discoidal cell 0.03 mm, of costal side 0.16 mm, of posterior side 0.21 mm, of distal side 0.12 mm; subdiscoidal cell long and narrower than discoidal cell; arculus just basal of Ax2; area between RP and MA basal of base of RP3/4 free of cross-veins; distance between arculus and base of RP3/4 0.6 mm, between base of RP3/4 and subnodus 0.30 mm, base of RP3/4 nearer of subnodus than of arculus; base of IR2 0.26 mm distal of that of RP3/4, just below nodus; nine postnodal cross-veins preserved, more or less aligned with the corresponding postsubnodal cross-veins; base of RP2 seven cells and 0.5 mm distal of subnodus; no oblique vein 'O'; areas between IR2 and RP3/4 and between RP3/4 and MA distally broadened; postdiscoidal area with one row of cells between discoidal cell and nodus level, then greatly broadened, with six to seven rows of cells along posterior wing margin; area between MP and CuA also distally broadened, with eight rows of cells along posterior wing margin; cubito-anal area very broad, with four rows of cells between CuA and posterior wing margin.

Discussion

Among the damselflies with broad cubito-anal area and large discoidal cell, *Electrophenacolestes* n. gen. differs from the Austroperilestidae Petrulevičius and Nel 2005 (Eocene of Argentina) in its broad and shorter discoidal cell, with its distal side less oblique (Petrulevičius & Nel 2005). It differs from the Frenguelliidae Petrulevičius and Nel 2003 (Eocene of Argentina) in its basally closed discoidal cell, and nodal structures (Petrulevičius & Nel 2003). It differs from the Sieblosiidae Handlirsch 1906 (sensu Nel *et al.* 2005a) in the absence of oblique vein 'O', and base of IR2 just below subnodus, instead of being in a more basal position.

Electrophenacolestes n. gen. shares with the fossil Thaumato-neuridae: Dysagrioninae Cockerell 1908 (sensu Bechly 1996), viz. *Dysagrion* Scudder 1878, *Phenacolestes* Cockerell 1908, *Primorilestes* Nel *et al.* 2005, *Petrolestes* Cockerell 1927, and *Congqingia* Zhang 1992, the following characters: antesubnodal space without any cross-veins; no oblique vein 'O'; cubito-anal area very broad; base of IR2 below nodus; base of RP3/4 between arculus and nodus, close to nodus; base of RP2 in a very distal position; discoidal cell broad, but broader in its distal part than in its basal part.

The Petrolestini Cockerell 1927 (*Petrolestes* and *Congqingia*) differ from *Electrophenacolestes* in the absence of secondary antenodal cross-veins distal of Ax2, between C and ScP, and in the base of IR2 in a more basal position (Cockerell 1927; Zhang 1992; Nel &



Figure 1
Electrophenacolestes serafini n. gen., n. sp., photograph of the holotype.

Paicheler 1994; Bechly 1996). Rust (1999) revised the “Dysagrioninae gen. indet. *jutlandica* (Henriksen 1922)”, originally attributed to the genus *Phenacolestes*. This taxon also differs from *Electrophenacolestes* in the absence of secondary antenodal cross-veins, but also in its distinctly narrower cubito-anal area, with only two rows of cells between CuA and posterior wing margin. But they share the base of IR2 below nodus, as in *Dysagrion* and *Phenacolestes*.

Electrophenacolestes differs from *Primorilestes* in the presence of secondary antenodal cross-veins between C and ScP, the absence of secondary antenodal cross-veins between ScP and RA, narrower cubital area with four rows of cells between CuA and posterior wing margin, instead of six (Nel *et al.* 2005b). Nevertheless, they have nearly the same organization of the areas between branches of RP, MA, MP, and CuA, and long and narrow petioles.

Electrophenacolestes shares with the Dysagrionini Cockerell 1908 (*Dysagrion* and *Phenacolestes*) the presence of two secondary antenodal cross-veins between of C and ScP, distal of Ax2, the broad cubito-anal area, and the base of IR2 below nodus (Scudder 1890; Cockerell 1908; Calvert 1913). *Electrophenacolestes* differs from *Dysagrion* in its distinctly longer petioles, longer and narrower discoidal cells, presence of three rows of cells in postdiscoidal area distal of nodus level, instead of one, MA distally not zigzagged, and area between MP and CuA distally greatly broadened (Scudder 1890: pl. 6, figs 3, 9). It

is more similar to *Phenacolestes* in the elongate petiole, elongate discoidal cell, and postdiscoidal area distally broadened. But they differ in the presence of only one row of cells in postdiscoidal area opposite nodus in *Phenacolestes*, instead of two in *Electrophenacolestes*, and in the presence of only two rows of cells between MP and CuA near the apex of CuA in *Phenacolestes*, instead of 3-4 in *Electrophenacolestes* (Calvert 1913: pl. 14, figs 1-5).

If *Congqingia* is a Jurassic Chinese damselfly, the other Dysagrioninae are Paleogene. More precisely, *Phenacolestes* is known from the Late Eocene–Early Oligocene of Florissant (Colorado, USA), *Dysagrion* from the Eocene of the Green River (Wyoming, USA), *Petrolestes* from the Eocene of Colorado, USA, and *Primorilestes* from the Early Oligocene of Primorye Territory, Russia. Only the “Dysagrioninae gen. indet. *jutlandica* (Henriksen 1922)” is known from the Danish Paleocene-Eocene. The present discovery supports the presence of the Dysagrioninae in the Western Palearctic Paleogene.

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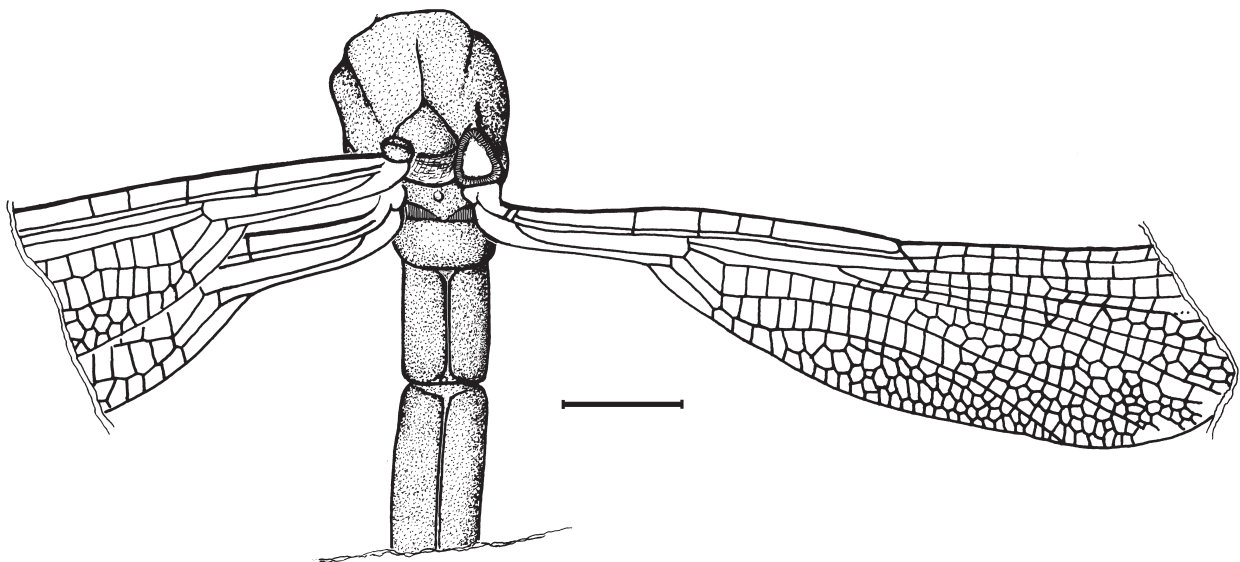


Figure 2
Electrophenacolestes serafini n. gen., n. sp., holotype, reconstruction of habitus (scale bar represents 0.5 mm).

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