

Pavlostysia wunderlichi gen. nov. and sp. nov.,
the first fossil spider-web bug (Hemiptera: Heteroptera:
Cimicomorpha: Plokiophilidae) from the Baltic
Eocene amber

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Abstract. *Pavlostysia wunderlichi* gen. nov. and sp. nov., a remarkable new fossil genus and species of the cimicomorphan family Plokiophilidae, is described from Baltic amber.

Key words. Heteroptera, Cimicomorpha, Plokiophilidae, taxonomy, new genus, new species, fossil, comparative notes, Baltic amber

Introduction

The present paper is a continuation of a series devoted to fossil true bugs described or recorded so far from different types of amber (mainly Baltic and Dominican amber). The fossil fauna in the Eocene Baltic amber has certain similarities with the extant Oriental, Ethiopian, and Australian faunas (WUNDERLICH 1986) and the fauna of Central America. This opinion is supported, e.g., by the occurrence of some reduviids from the Oriental subfamily Centrocneminae in Baltic amber (PUTSHKOV & POPOV 1993, POPOV & PUTSHKOV 1998). Families known at present only from Southern Hemisphere also occur in Baltic amber, e.g., the Thaumastocoridae (*Proxylastodoris gerdae* Bechly & Wittmann, 2000); recent representatives of this family show a discontinuous distribution in South America, the Caribbean, Australia, and Southern India (BECHLY & WITTMANN 2000, HEISS & POPOV 2002).

A record of the small arachnophilic family Plokiophilidae from Baltic amber is therefore not totally unexpected. The first record of a fossil Plokiophilidae from Baltic amber, described here as *Pavlostysia wunderlichi* gen. nov. and sp. nov., was made by POPOV (2006). An undescribed fossil bug from the Early Cretaceous Canadian amber (75 mya) was also assigned to the Plokiophilidae (GRIMALDI & ENGEL 2005).

The Plokiophilidae, living as commensals only in the webs of a few tropical spiders or embiopterans, were first described as an aberrant subfamily of the Microphysidae (CHINA & MYERS 1929, CHINA 1953, CHINA & MILLER 1959, SCHUH 2006) and only later on raised

to family rank with two recognized subfamilies: the Plokiophilinae and the Embiophilinae (CARAYON 1961). The Plokiophilinae consist of 11 tiny, anthocorid-like species which belong to four genera: *Plokiophila* China & Myers, 1929 (only *Plokiophila cubana* China & Myers, 1929, Caribbean region), *Lipokophila* Štys, 1967 (four species, New World), *Plokiophiloides* Carayon, 1974 (six Afrotropical and Madagascan species). A monotypic genus *Heissophila* Schuh, 2006 (type species *H. macrotheleae* Schuh, 2006), recently described from Thailand, is treated as incertae sedis at the subfamily level (SCHUH 2006). A comprehensive analysis of the Plokiophilidae, including more detailed morphological characterization, can be found in CARAYON (1961, 1974), ŠTYS (1967, 1991), SCHUH (1993, 2006), SCHUH & ŠTYS (1991) and SCHUH & SLATER (1995).

In this paper, I describe the new genus and species, *Pavlostysia wunderlichi* gen. nov. and sp. nov., and discuss the position and relationships of another extinct genus from Baltic amber, *Electrocoris* Usinger, 1942.

Taxonomy

Family Plokiophilidae China, 1953 Subfamily Plokiophilinae China, 1953

Pavlostysia gen. nov.

Type species. *Pavlostysia wunderlichi* sp. nov.

Description. Small species, slender, not longer than 1.5 mm. Surface mat and bare, only preocular part of head and anterior part of costal margin of hemelytra bearing setae and trichobothria; setae on anterior angle of pronotum absent; general coloration uniformly dark, hemelytra without whitish spots.

Head strongly elongate, more than 1.5 times as long as wide; preocular and postocular parts of an equal length; eyes strongly flattened and weakly developed ocelli (male); tylus (anteclypeus) long, narrow, subparallel, narrowed towards apex and greatly surpassing small jugae; postocular part of head very long, lateral margins parallel, not separately rounded. Antennae relatively short, 0.5 times as long as body length; antennal segments 1 and 2 moderately thin, stick-shaped, segments 3 and 4 somewhat thinner; segment 1 attaining apex of head. Rostrum very long, slender and surpassing hind coxae; segment 1 short and broad, ratio of lengths of segments 1-4 equal to 5 : 10 : 10 : 12.

Pronotum trapezoidal, weakly transverse, less than 1.5 as wide as long; collar broad, posterior margin deeply emarginated, posterolateral angles broadly rounded, calli inconspicuous, placed near lateral margins of anterior part of pronotum. Mesoscutum glabrous and of equal length as scutellum. Hemelytra uniformly dark, with weakly expressed two veins (?R+M and Cu); 'corial glands' visible as punctation of exocorium; costal fracture distinct and long, located about one-fourth distance from base to apex of corium; coriomembranal juncture feebly marked, cuneus weakly distinct; membrane without venation. Legs (especially femora) slender, very long and thin, unarmed; tarsi long, 3-segmented, pretarsus consisting of two simple, short, very slender claws of conspicuously unequal length, without other discernible structures.

Abdomen rather narrow, slender, flattened laterally, ventrolateral tergites fused with sterna; pygophore short, very broadly connected to abdomen, opening of pygophore directed dorsally and parameres lying dorsally.

Differential diagnosis. *Pavlostysia* gen. nov. is clearly a member of the Plokiophilidae, primarily by the structure of the head, pronotum, and hemelytra (especially ‘corial glands’ – the most distinctive autapomorphy of the Plokiophilinae), long legs and elongate, asymmetrically developed claws. The new genus is similar to the extant Neotropical genus *Lipocophila* and the features common to both genera are as follows: strongly elongate (especially the postocular part) head, broad pronotal collar, strongly emarginated posterior margin of pronotum, very long and slender legs (especially femora), three-segmented tarsi (this is probably a symplesiomorphy), long, slender and nearly straight claws of unequal length, etc. On the other hand, *Pavlostysia* gen. nov. differs distinctly from *Lipocophila* by the following features: uniform dark coloration, strongly flattened eyes and weakly visible ocelli, shorter antennae, which are half as long as body length (species of *Plokiophiloides* and *Heissophila macrotheleae* have the same proportions), longer rostrum surpassing hind coxae, corium-membrane boundary obscure, cuneus weakly distinct, and membrane without venation and absent corial process. Except *Pavlostysia* gen. nov. and *Lipocophila*, only *Heissophila* possesses three-segmented tarsi, which set them apart from all other plokiophilid genera (SCHUH 2006). Moreover, the anterolateral angles of pronotum lack setae in *Pavlostysia* gen. nov. and in *Heissophila*. However, the distinctly shorter head and widely distributed corial glands, including pronotum, hemelytra and antennal segments, easily distinguish *Heissophila* from the two genera mentioned above; in *Heissophila* the hemelytral membrane also has four distinct longitudinal veins as in some Anthocoridae (SCHUH 2006). Finally, the genital segment in all known Plokiophilidae except *Heissophila* is elongate and tubular.

Etymology. This new genus is named after my old good friend and colleague, Prof. Pavel Štys, an outstanding specialist on the Heteroptera, on the occasion of his 75th birthday. The spelling of *Pavlostysia* gen. nov. is inspired by Czech and Russian declension of ‘Pavel’; feminine.

Bionomics. *Pavlostysia* gen. nov. most probably lived in spider webs. Arachnophilous heteropterans prefer webs with thick, horizontal mats or funnels. SCHUH (2006) listed the known associations of Plokiophilidae with webs built by relatively large spiders, e.g. *Agelena* C. L. Koch, 1837, and *Tengella* Dahl, 1901 (Araneomorphae: Agelenidae), or *Ischnothele* Ausserer, 1875 (Megalomorphae: Dipluridae) and *Macrothele* Ausserer, 1871 (Megalomorphae: Hexathelidae).

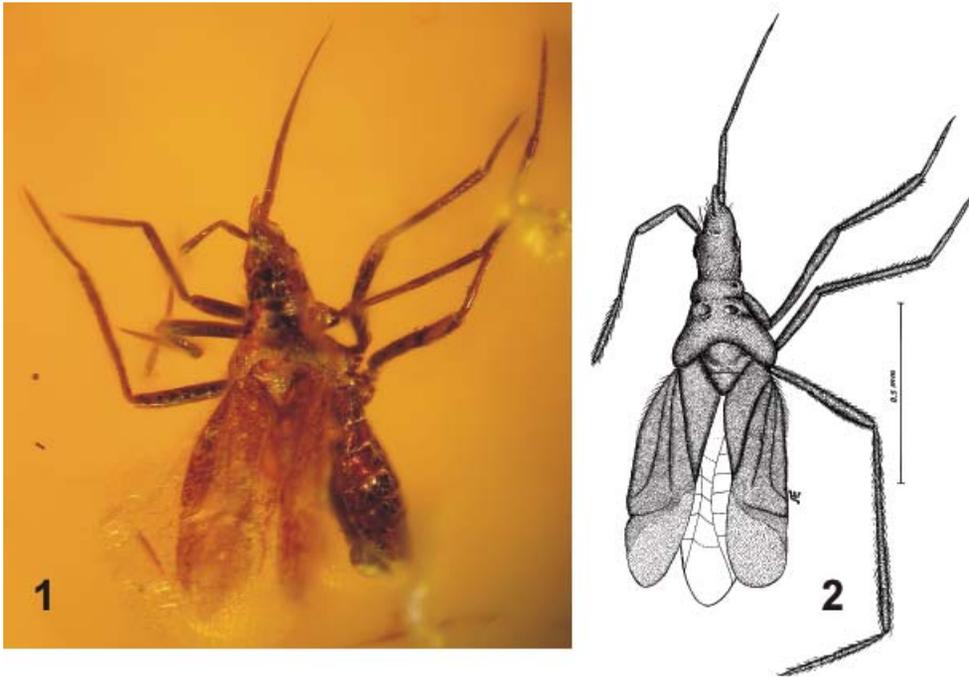
Pavlostysia wunderlichi sp. nov.

(Figs. 1-2)

Type material. HOLOTYPE: ♂, Baltic amber, No. BB MP HE 1, light yellowish medium-sized piece of amber (27 x 19 mm) of irregularly quadrangular shape. Only the dorsal face of the specimen is clearly visible; the antennae and legs are complete and the rostrum, antennae and legs are spread. The holotype is deposited in the collection of Ernst Heiss, Tiroler Landesmuseum, Innsbruck, Austria.

Description. Male. Macropterous, very small (total length 1.25 mm), moderately elongate suboval species, with very long and conspicuously slender legs.

Head elongate, 1.65 times as long as wide across eyes, with well-developed postocular region and two posteriorly directed long setae, situated near behind eyes. Antenniferous



Figs. 1-2. *Pavlostysia wunderlichi* gen. nov. and sp. nov., holotype, male habitus in dorsal view. 1 – photograph of amber inclusion (photo by D. E. Shcherbakov); 2 – reconstruction.

tubercles very small, situated close to anterior margins of eyes. antennal segment 2 almost 1.5 times as long as segment 1, segment 4 longest. Eyes small, coarsely faceted, more closely approaching each other on ventral side of head. Vertex greatly convex, reaching postocular part of head behind eyes posteriorly. Rostrum reaching most probably abdominal segment 3, all visible rostral segments thin and straight, tapering to acute apex.

Pronotum slightly convex, 1.35 times as wide as long, lateral margins weakly emarginated and slightly converging anteriorly, posterior margin almost two times as wide as anterior one; anterior part of pronotum with pair of obscure, low, small, ovoid, widely separated calli. Scutellum small, glabrous, almost equilateral, somewhat convex. Hemelytra of macropterous form distinctly surpassing abdomen; costal margin weakly convex and almost parallel, costal fracture angled anteromedially. Femora and tibia thin, straight, stick-shaped, without special structures; tarsi very thin, three-segmented, segments 1 extremely short, hardly recognizable, longest and ventrally well visible on hind tarsi, segments 2 and 3 almost equal in size.

Measurements (all in mm). Body length (from apex of head to apices of hemelytra) 1.25, width 0.34; head: length 0.28, width (diatone) 0.17; preocular part 0.17, ocular + postocular part 0.11; maximum width between eyes 0.14; antenna length 0.61, lengths of antennal segments 1-4 equal to 0.09 : 0.14 : 0.17 : 0.2; lengths of rostral segments 2-4 equal to

0.09 : 0.14 : 0.31; pronotum: maximum length 0.23, length of collar 0.05, length of pronotal lobe 0.18, medial length of pronotal lobe 0.13, width across collar 0.17, maximum width 0.31; scutellum: length 0.11, width 0.13; hemelytron: length 0.74, width 0.23; fore leg: length of femur 0.28, tibia 0.33, tarsus 0.21; middle leg: length of femur 0.29, tibia 0.37, tarsus 0.17; hind leg: length of femur 0.35, tibia 0.53, tarsus 0.24.

Etymology. This new species is named after the eminent German arachnologist Jörg Wunderlich (Straubenhardt), who delivered this inclusion to the collection of Ernst Heiss.

Discussion

Apart from *Pavlostysia* gen. nov., *Heissophila macrotheleae* resembles another extinct genus from Baltic amber, *Electrocoris*, whose systematic position remains unclear. Specimens of *Electrocoris* are quite common in the Eocene Baltic amber and represented by two most probably conspecific species, *E. brunneus* Usinger, 1942, and *E. pubescens* Usinger, 1942. In his original description, USINGER (1942) did not place this genus in the family Anthocoridae, most probably for a good reason, placing *Electrocoris* as 'an annectent genus of Cimicoidea' (sensu lato). He correctly noted that a 'closer study disclosed several aberrant characters which suggest relationships with Microphysid-Anthocorid complex'. Interestingly, the Plokiophilidae were also first described as a subfamily of the Microphysidae (CHINA 1953) but nearly all relevant publications on the family-level classification of the Cimicomorpha followed later (e.g., CARAYON 1961, 1974; ŠTYS & KERZHNER 1975; SCHUH & ŠTYS 1991). Further investigations are required to show whether *Electrocoris* belongs to the microphysid or the cimicoid clade, taking into account that the Microphysidae and Cimicoidea are completely separate lineages (SCHUH & ŠTYS 1991).

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