New plant bugs (Insecta, Hemiptera, Heteroptera, Miridae) from the Eocene Baltic amber

Aleksander Herczek & Yuri A. Popov

Abstract: New fossil representatives of the plant bugs (family Miridae) from Baltic amber (Late Eocene) are described: *Stenoptera sambiensis* gen. et sp.nov. (Mirinae) and *Epigonopsallops groehni* gen. et sp.nov. (Psallopinae).

Key words: Baltic amber, Heteroptera, Miridae, Mirinae, new genus, new species, Psallopinae.

Santrauka: Aprašomos naujos rūšys, priklausančios žolinėms blakėms (šeima Miridae) iš Baltijos gintaro (vėlyvasis eocenas): Stenoptera sambiensis n.gen. et n.sp. (Mirinae) ir Epigonopsallops groehni n.gen. et n.sp. (Psallopinae).

Raktiniai žodžiai: Baltijos gintaras, Heteroptera, Miridae, Mirinae, nauja gentis, nauja rūšis, Psallopinae.

Introduction

This present joint article is a continuation of a series of papers on fossil mirid bugs from various insectiferous resins, in particular from Baltic amber (Prussian Formation). Miridae, or plant bugs, are the largest family of true bugs (Heteroptera) widespread all over the world, with about 1,500 genera and over 10,000 species (Schuh & Slater 1995; Kerzhner & Josifov 1999). The majority of described and undescribed fossil heteroptera are plant bugs, whose oldest finds are known from the Upper Jurassic of the south-western part of Kazakhstan (Becker-Migdisova 1962; Popov 1968; Herczek & Popov 2001) and the Upper Cretaceous (Cenomanian-Turonian) of north-east Siberia (Popov & Herczek 1998). They generally dominate the heteropterofauna in the most famous Baltic amber where mirids are represented by 8 subfamilies, most common among them being the Cylapinae, Isometopinae and Mirinae. About 70% of the described fossils belong to plant bugs (Miridae, c. 50 genera and over 70 species), among them 25% are represented by the subfamilies Isometopinae (6 genera and c. 10 species) and 32% by Cylapinae (over 10 genera and over 20 species) (Popov & Herczek 2008). But one should bear in mind that such "domination" in amber is not a realistic picture because the representatives of the last two subfamilies are usually connected with fungi and the bark of trees or rotten logs of mainly Coniferaceae, where most of them lead a predatory life.

The small subfamily Psallopinae is probably a relict group (Schuh 1976) and is closely related to the subfamilies Isometopinae and Cylapinae, the latter two are dominating in Baltic amber of the Late Eocene (Popov & Herczek 2008). In recent years the number of known fossil Psallopinae in Baltic amber has considerably increased (Herczek & Popov 1992, 1998; Popov & Herczek 2006). However, even though three genera and three species (*Isometopsallops schuhi* Hercz. & Pop., *Epigonomiris skalskii* Hercz. & Pop., and *Cylapopsallops kerzhneri* Pop. & Hercz.) have been described until now, at present there are several undescribed psallopine bugs of the extant genus *Psallops* and also another new genus, not counting *Epigonopsallops groehni* gen. et sp.nov. The discovery of fossil psallopineous bugs in Baltic amber indicates that the appearance and spreading of this peculiar group ocurred during the early Cenozoic.

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Fig. 1: *Stenoptera sambiensis* nov.sp.; holotype, ♀, dorsal view.

Systematic part

Order Hemiptera
Suborder Heteroptera
Infraorder Cimicomorpha Leston, Pendergrast & Southwood, 1954
Superfamilly Miroidea Hahn, 1833
Family Miridae Hahn, 1833
Subfamily Mirinae Hahn, 1833
Mirini Hahn, 1833

Stenopterna nov.gen.

Type species: *Stenopterna sambiensis* nov.sp.

Description: Body length about 10 mm. Dorsal surface of body smooth, clearly not punctated, with dense adpressed hairs. Head long and subhorizontal; eyes large and prominent, contiguous to anterior margin of pronotum. Antenniferous tubercles placed near ventral margins of eyes. Antennae long and thin, first segment thicker, the same thickness of pronotal collar; 2nd segment longest, some more 2x longer than 3rd one. Rostrum reaching not less than half of abdominal length; first segment distinctly passing fore coxae. Pronotum trapezoidal, clearly transverse, not less than twice as wide as long; collar wide and distinct, calli absent. Mesoscutum and scutellum broadly exposed. Hemelytra with indistinct veins, medial and cuneal fractures distinct; cuneus slightly elongated; membrane biareolate, wrinkled and transparent. Hind femora subincrassate, not reaching apex of abdomen; tibiae with numerous short spines on upper and lower sides, not longer than diameter of tibia. Tarsi 3-segmented; 1st segment thickest and longest, 2x longer than 2nd one; two first segments are covered by very dense brush-like hairs; claws quite short, apical part curved, with flattened and divergened parempodia apically, pulvilli developed.

Etymology: The genus *Stenopterna* is named in combination with two recent genera *Stenotus* Fieb. and *Pachypterna* Fieb., with which the new genus is compared.

Comparison: The new genus belongs to some recent mirin genera which has the longest first tarsal segment (twice as long as the 2nd one). Two of them belong to the tribe Mirini (*Pachypterna* Fieb. and *Stenotus* Jak.), the third peculiar genus *Erimiris* Miy. & Haseg. is found in the Oriental tribe Mecistoscelini. Flattened and apically diverged parempodia, 3rd antennal segment shorter than the 2nd one, and the availability of pronotal collar: all these features are typical for the tribe Mirini, in which this new genus is placed. *Stenoptera* is more similar to the monotype genus *Pachypterna* having the same long subvertical head (especially preocular part), the thickest first tarsal segment and big size (*Pachypterna fieberi* Fieb. is 7.7-8.3 mm). However, it is distinguished by a longer rostrum reaching the 7th abdominal segment and a longer first rostral segment, as well as larger semiglobular eyes and a very long second antennal segment (more than twice as long as the third one). Representa-

Fig. 2: *Stenopterna sambiensis* nov.sp.; holotype, ventral view.

tives of *Pachypterna* are mainly distributed in mountain regions of the Balkan countries (they are also found in Turkey and Syria) where they inhabit coniferacea, in particular *Pinus cembra* L. (FRANZ & WAGNER 1961; WAGNER & WEBER 1964; WAGNER 1970).

Stenopterna sambiensis nov.sp. (Figs 1-2)

Material examined: Holoptype, macropterous ♀, in Baltic amber (Late Eocene); Kaliningrad Region, Samland Peninsula, Russian Federation; housed in the collection of the Geologisch-Paläontologisches Institut und Museum, University of Hamburg, Typ.Kat.Nr. GPIMH 4662 (ex coll. C. GRÖHN, Glinde, Germany, Nr. 5353). The specimen is well preserved in an irregular shaped, light-yellowish, moderate size (30 x 25 mm) piece of amber.

Description: Body length from head to apices of hemelytra 10 mm. Generally oblong-oval, 3x as long as wide, lateral sides almost parallel. General coloration uniformly yellow-brownish. Dorsal surface of body covered with very short, fine, adpressed hairs: light on head and dark on other parts. Head clearly subhorizontal, distinctly pointing forward; frons and clypeus convex, the latter not prominent, vertex weakly convex, 1.2x wider than width of eye. 2nd antennal segment 2.2x longer than 3rd, 4th shorter (c. 1.3x) than 3rd. Pair of small occipital impressions placed near inner side of eyes. Rostrum reaching 7th abdominal segment in female; 1st segment distinctly surpassing anterior margin of prosternum; 3rd segment distinctly shortest, other segments almost of equal size. Pronotum 2.3x as wide as long, lateral margiuns weakly converging anteriorly (LSP=2), posterior margin slightly emarginate (0.2). Legs with very short pressed or adpressed hairs; hind tibiae relatively short, only 1.3x longer than femora and c. 2.7x longer than tarsi; 1st tarsal segment longest, twice and 1.4x longer than 2nd and 3rd segments, respectively.

Measurements (in mm): Body length (including hemelytra) 10.0, width 3.3; head: length 1.12, width 1.4, height 0.7; eye: width 0.6; vertex: width 0.72; antennal segments I-IV: 0.7:3.1;1.4:1.1; labial segments I-IV: 1.3:1.4:0.84:1.2; pronotum: length 1.3, width 1.5 (ant.) and 3.0 (post.); mesoscutum: length of open part 2.4, width 0.7; scutellum: length 1.5, width 1.5; claval commissure 1.9; hind legs: femora 3.24, width 0.4; tibia: length 4.1; tarsi: length 1.54, tarsal joints: I: 0.7, II: 0.36, III: 0.5.

Etymology: Specific name refers to the Sambian peninsula to which this inclusion most probably belongs.

Subfamily Psallopinae SCHUH, 1976

Epigonopsallops nov.gen.

Type species: *Epigonopsallops groehni* nov.sp.

Description: Small size, not more than 4 mm. Oblong-oval body with short suberect pubescence. Head distinctly short, much wider than long (c. 3x), posterior margin with one row of short erect hairs; eyes very large, flattened and situated closely to each other; vertex dis-

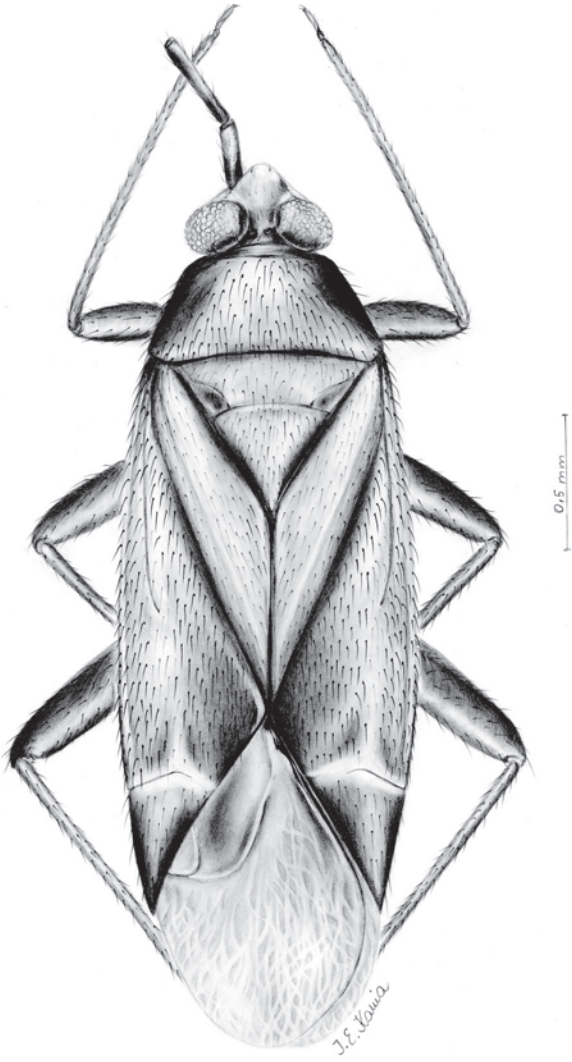

Fig. 3: *Epigonopsallops groehni* nov.sp.; holotype, reconstruction, dorsal view.

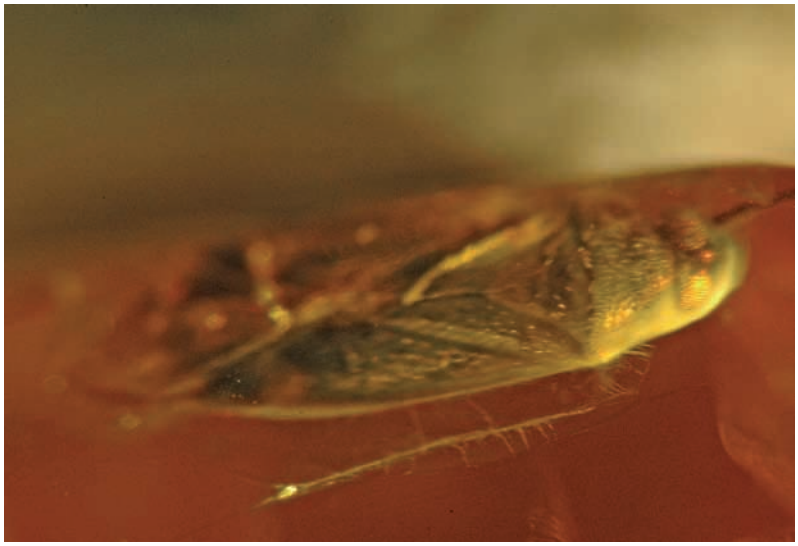

Fig. 4: *Epigonopsallops groehni* nov.sp.; holotype, ♀, dorsal view.

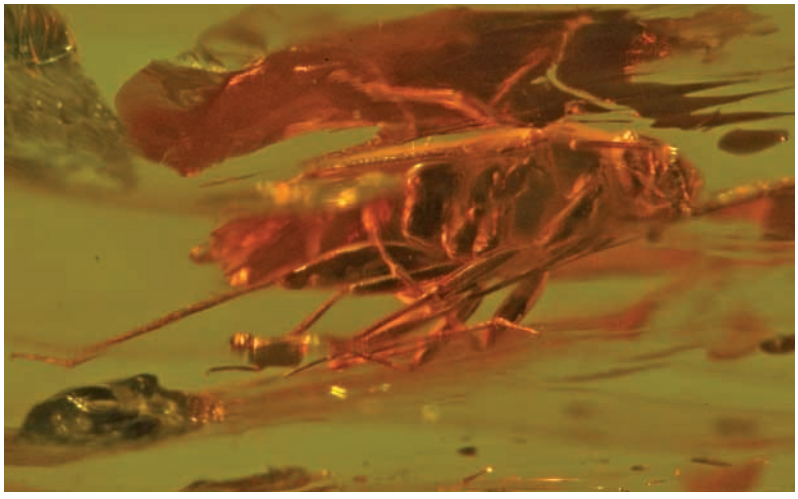

Fig. 5: *Epigonopsallops groehni* nov.sp.; holotype, ♀, ventral view.

tinctly narrow, less than half as wide as eye; ?ocelli very small, distinctly reduced; antenniferous tubercles set on under lower margin of yes, first antennal segment reaches beyond head apex, 2nd segment longest; rostrum reaches almost middle of abdomen, first rostral segment reaches anterior margin of prosternum, 2nd segment distinctly longer than the third one. Pronotum considerable transverse, twice as wide as long and lateral margins weakly converging anteriorly; collar distinct. Mesoscutum broadly exposed, half as long as scutellum. Hemelytra with short cuneus, 4.5x shorter than outer margin of corium, costal fracture short, venation indistinct; membrane biareolate, hyaline, crumpled. Legs with incrassate hind femora (3.5x longer than wide), not reaching middle of abdomen; distal half of tibiae with numerous erect spines on upper and lower sides, slightly longer than diameter of tibia; tarsi 2-segmented, covered by very dense brush-like hairs; claws quite short, weakly curved, with small subapical tooth, hardly visible.

Etymology: The name is combination of the Greek "epigonos" (= descendants) and the extant genus *Psallops* USINGER.

Comparison: This new psallopinous genus mostly resembles the fossil genus *Epigonomiris* HERCZ. & POP. from Baltic amber – it has a short head and flattened eyes, pronotum twice as wide as long with lateral margins weakly converging anteriorly, similar proportion of antennal segments, incrassate hind femora, etc. However, there are some other external morphological characters distinguishing this new genus from the genus *Epigonomiris* (Figs 6, 7): e.g. small size, large eyes and narrow vertex (less than half as wide as eye), short rostrum reaching basal part of abdomen, the first rostral segment reaching only the anterior margin of prosternum, more exposed mesoscutum, very short hind femora with a considerable gap between it and the apex of abdomen, and finally the dark pubescence of the dorsal surface of the body.

Remarks: This new unusual representative of the subfamily Psallopinae, *Epigonopsallops groehni* n.sp., has indistinct traces of the morphological structure on the base of head, which closely resembles strongly reduced ocelli. This remarkable character is quite important for understanding possible relationships between the mirid groups Isometopinae and Psallopinae. All known extinct Isometopinae have normally developed ocelli and they are rather small (*Electromyiomma*, *Clavimyiomma*) or of a middle size (*Archemyiomma*, *Metoisops*). However, another unusual isometopid *Electrocoris ritzkowskii* HERCZ. & POP. from Baltic amber demonstrates quite clearly the process of reduction of the ocelli in Isometopinae, where very small ocelli are distinctly reduced and situated in the flat pits near the posterior margin of the head. It is therefore possible to assume that the earlier representatives of the Psallopinae possessed and that, like in some Isometopinae (e.g. *E. ritzkowski*), this process also existed in Psallopinae. These findings would also support the supposition made by SCHUH & SCHWARTZ (1984) who assumed that the reduction of ocelli had occurred twice in Cylapinae and Psallopinae while Isometopinae, Psallopinae and Cylapinae comprise a monophyletic mirid group. As the phylogenetic proximity is concerned, the relationship of these three subfamilies was recently analyzed by GORCZYCA (2000).

Epigonopsallops groehni nov.sp. (Figs 3-5)

Material examined: Holotype, macropterous ♀, in Baltic amber (Late Eocene), GPIMH 4515 (coll. Gröhn Nr. 5350).

Description: Body length slightly greater than 3 mm. Generally oblong-oval (almost 3x longer than wide), lateral body margins parallel; dorsal surface smooth, covered by short, adpressed, dense, dark hairs. Head horizontal, rather short, large eyes contiguous with pronotum and reaching gula inferiorly; clypeus weakly prominent in front of eyes, frons and vertex not convex, depressed; reduced ocelli situated near posterior margin of head and near inner sides of eyes; 2nd antennal segment 1.4x longer than 3rd segment, 3rd and 4th segments of equal size. Pronotum trapezoidal, posterior margin about 1.5x wider than anterior one; pronotal collar is as thick as antennal segments; calli absent; humeral angles moderately rounded; anterior margin straight and lateral margins almost straight; posterior margin almost straight (very weakly emarginated). Proportion of length of hemelytron, corium and cuneus: 10-7.4-1.6. Mesoscutum and scutellum broadly exposed. Legs with very short pressed or adpressed hairs; hind tibiae relatively long, 1.5x longer than femora and 4.5x longer than tarsi.

Measurements (in mm): length of body from apex of hemelytra 3.3, width 1.15; length of head 0.35, width 0.35; width of eye 0.275; width of vertex 0.125; antennal segments I-IV: 0.2:0.7:0.5:0.45; labial segments I-IV: 0.4:0.6:0.4:0.35; pronotum: length 0.425 (min.) and 0.45 (max.), width 0.62 (ant.) and 0.9 (post.); length of open part of mesoscutum 0.2; length of scutellum 0.35; length of hemelytron, corium and cuneus: 2.5:1.85:0.4; claval commissure 0.65; hind legs: femora: length 1.05, width 0.3; length of tibia 1.6; length of tarsus 0.35 (0.125+0.275).

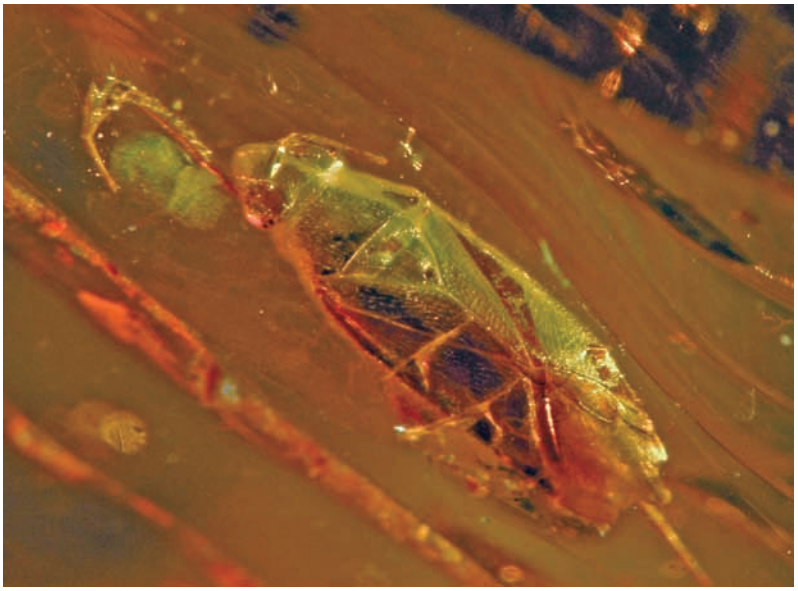

Fig. 6: *Epigonomiris skalski* HERCZEK & POPOV; holotype, ♂, dorsal view.

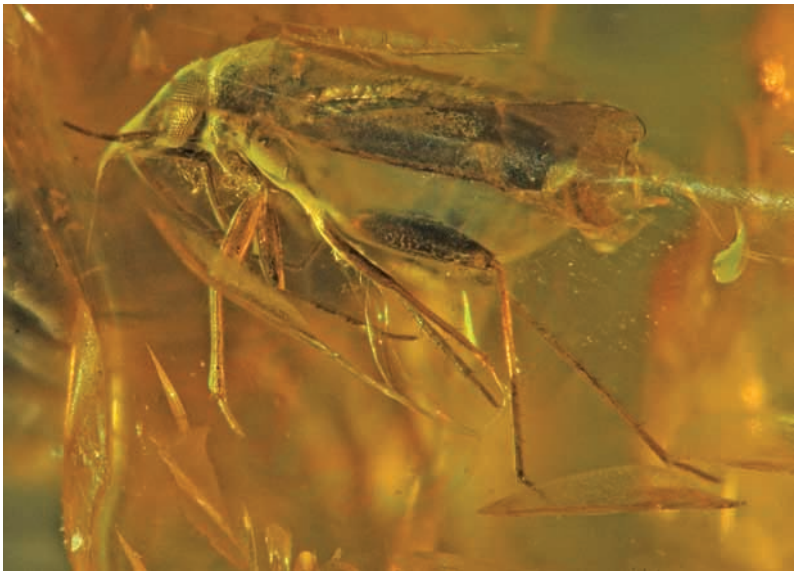

Fig. 7: *Epigonomiris skalski* HERCZEK & POPOV, holotype, ventral view.

Etymology: This species is named after our friend Mr. Carsten GRÖHN (Glinde, Germany), who acquired these amber pieces for his collection, provided the specimens for scientific study and generously donated the type material to the GPIMH.

Zusammenfassung

Aus Baltischem Bernstein (Eozän) werden zwei neue fossile Gattungen und Arten der Familie Miridae (Weichwanzen) beschrieben und illustriert: *Stenopterna sambiensis* gen. et sp.nov. (Mirinae) und *Epigonopsallops groehni* gen. et sp.nov. (Psallopinae).

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Address of authors:

Aleksander HERCZEK
Department of Zoology
Silesian University
Bankowa 9
40-007 Katowice, Poland
E-Mail: aleksander.herczek@us.edu.pl

Yuri A. POPOV
Paleontological Institute
Russian Academy of Sciences
Profsoyuznaya str. 123
117997 Moscow, Russia
E-Mail: Elena@dataplus.ru