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Two unknown nymphs of Cantacaderinae (Heteroptera: Tingidae) from Baltic and Ukrainian amber

ABSTRACT. Two unknown nymphs of the lace bugs (Heteroptera: Tingidae) are described from Baltic and Ukrainian amber. First of them belongs to the Eocene genus *Paleocader* FROESCHNER, 1996 (Cantacaderini), the second evidently to *Sinalda baltica* (DRAKE,

1950) (Phatnomini). Thus, at present nymphs of three species are known from Eocene. Comparison of integument microsculpture of Recent and fossil Tingidae is also made.

Key words: Baltic and Ukrainian amber, Heteroptera, Tingidae, fossil nymphs of Cantacaderinae.

INTRODUCTION

Up till now a nymph of only one species has been known from Baltic amber, namely that of Tingidae – *Tingicader* sp. prop. *cervus* GOLUB et POPOV (1998). The drawings and photographs of it are also given in WEITSCHAT & WICHARD (2002; Pl. 44: g, h; Fig. 59). In this article, nymphs of two other fossil species are described. They belong to two Recent tribes of the subfamily Cantacaderinae. One of them is probably from

the genus *Paleocader* FROESCHNER, 1996 (Cantacaderini), the other – undoubtedly belongs to Recent genus *Sinalda* DISTANT, 1904 (Phatnomini) and, maybe, to *S. baltica* (DRAKE, 1950). Of great interest for understanding evolution of the thin structures of Tingidae surface is comparison of the microsculpture of Eocene and Recent nymphs of Cantacaderinae – the subfamily that has a complex of plesiomorphic features (GOLUB 2001).

SYSTEMATIC PART

Family **Tingidae** LAPORTE, 1832
Subfamily **Cantacaderinae** STÅL, 1873
Tribe **Phatnomini** DRAKE et DAVIS, 1960
Genus *Sinalda* DISTANT, 1904

Sinalda sp. prop. *baltica* (DRAKE, 1950)
(Pl. III: 1-2; Figs 1-3)

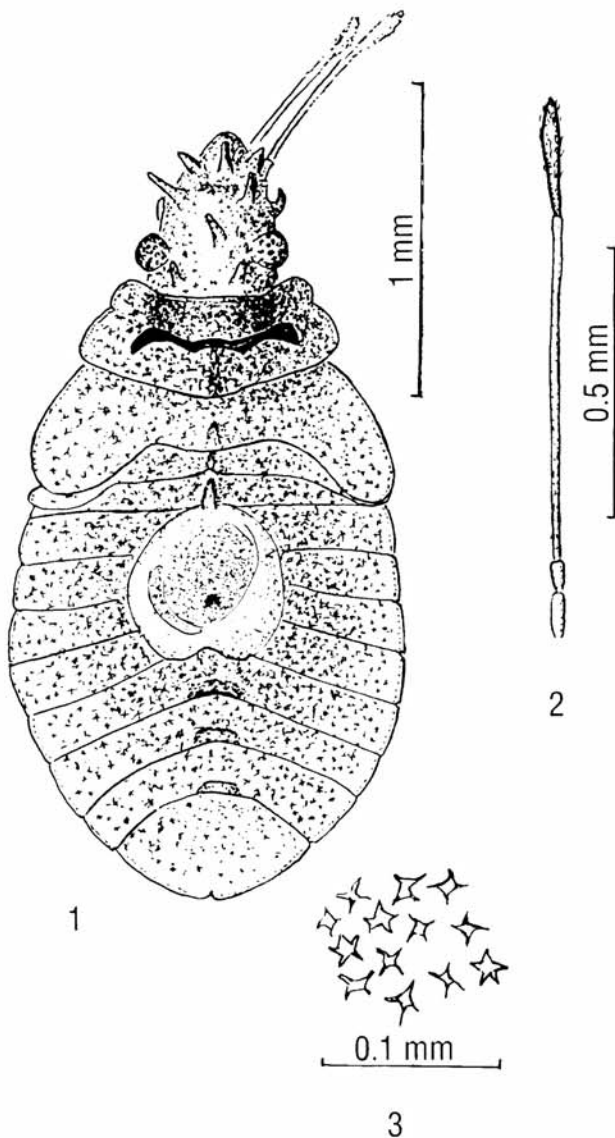
MATERIAL. Nymph of IV stage in a piece of Ukrainian amber (inv. No. MZ 23985, coll. A. WISZNIEWSKI), housed in the Museum of the Earth, Polish Academy of Sciences, Warsaw.

DESCRIPTION. Body oval, flattened, 1.9 times longer than wide. General coloration monotonous yellowish-brown. Dorsal surface covered with dense, in some places with very dense, tiny, light microstructures in the form 4-angled little pointed stars (Fig. 3).

Head practically as long as wide, distinctly elongated in front of eyes (preocular), with 8 moderately long

and rather thick tubercle-like processes at their base: along base of clypeus laterally with one pair of conical, lateral jugal processes; between them and slightly behind with an unpaired clypeal process; in front of eyes with pair of frontal processes; a single dorsomedian process between eyes, nearer to their anterior margins; behind eyes with a pair of conical occipital processes. Paired frontal processes longest, dorsomedian and occipital processes shortest, clypeal process slightly longer than jugal ones; clypeal process directed obliquely upwards and forwards, jugal, frontal and occipital processes diverging. Frons with transversal depression between unpaired clypeal and paired frontal processes. Eyes not large, but distinctly projecting laterally. Antennae not long, 3rd joint 1.2 times longer than head width and 1.67 times longer than the 4th one.

Pronotum 2.5 times wider than its median length, arch-like configuration, emarginated anteriorly and convex posteriorly; apical part obtuse-angled. Lateral



Figs 1-3

Sinalda sp. prop. *baltica* (DRAKE, 1950) (?), nymph of IV stage in a piece of Ukrainian amber, inv. No. MZ 23985.

1 - dorsal view; 2 - antenna; 3 - microsculpture, integument.

pronotal margins with excavation in its anterior part. Surface of pronotal disc covered with dense star-like microstructures; two sinusoid, smooth, narrow, transversal stripes in callosity place. The greater part of surface of anterior half (vesicular place of imago) elevated; posterior part bears median longitudinal lower carina; rudiments of lateral carinae not distinct. Mesonotum also with median lower carina in its posterior half; hemelytral lobes weakly elongated backwards (character of IV nymphal stage). Metanotum very short, posterior margin slightly emarginated, median carina inconspicuously prominent.

Lateral margins of abdomen weakly rounded, without spines. I abdominal tergite with narrow median tubercle elongated forwards. No other structures of II

and V tergites are visible. Posterior margin of III tergite with smallest median tubercle, IV tergite with a much bigger tubercle. Posterior margins of VI-VIII tergites with low transverse carina, every other upper tergite has a shorter carina than the one below it. Apex of IX abdominal segment excised; IX tergite without tubercles and carinae.

Ventral side of body brown, in rather dense star-like microstructures of 4-angled form. Rostrum very long, reaching anterior margin of VIII sternite. There is rather a deep groove passing from base of abdomen to posterior margin of VIII sternite where rostrum is embedded in repose.

Dimensions in mm. Body length 2.5, width 1.3; length of head from apex to anterior margin of eyes 0.37, to posterior margin of eyes 0.51, to anterior margin of pronotum 0.59, width of head 0.5; width of vertex 0.26; diameter of eye 0.12; ratio of visible antennomeres 2-4 as 0.07 : 0.56 : 0.21; length of pronotum along middle line 0.3, from apex of anterior angles to posterior angles 0.36; length of middle femur 0.4, length of middle tibia 0.51; length of hind femur 0.47, length of hind tibia 0.11.

COMPARISON. The general contour of body (oval) and some specific features of the structure, which are found both in nymphs and in imagos (emarginate paranotum in the anterior third of their length, number and location of head tubercles), point out that the described nymph belongs to the genus *Sinalda* DISTANT, 1904 and undoubtedly to the species *S. baltica* (DRAKE, 1950). The latter is known thanks to several specimens from the Eocene Baltic amber. The first description was made using only one specimen. GOLUB and POPOV (1998) redescribed imago on the basis of three specimens, and later on several more specimens were studied. Since comparatively numerous specimens were encountered, one can say that this species had been one of the most abundant in Europe in the Late Eocene, so the probability of discovering its nymphal stages is rather high.

Subfamily **Cantacaderinae** STAL, 1873

Tribe **Cantacaderini** STAL, 1873

Genus ***Paleocader*** FROESCHNER, 1996

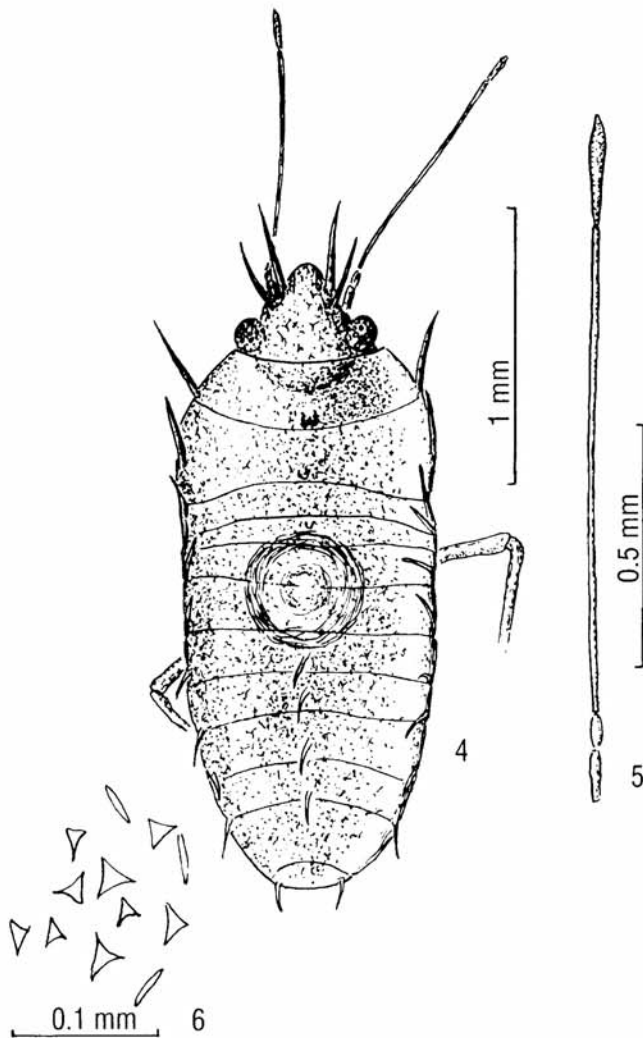
***Paleocader* sp. (?)**

(Figs 4-6)

MATERIAL. Nymph of III stage in a piece of Baltic amber (inv. No. MZ 24106, coll. M. KOTASHEVICH), housed in the Museum of the Earth, Polish Academy of Sciences.

DESCRIPTION. Narrowly oval, 2.3 times longer than wide. Lateral margins of pronotum and abdomen strongly folded upwards (probably due to deforma-

tion of surfaces in the process of resin hardening). Head, pronotum and abdomen from above yellowish-brown; dorsal surface covered with rather dense very tiny 3-pointed star-like microsculptures (Fig. 6).



Figs 4-6

Paleocader sp. (?), nymph of III stage in a piece of Baltic amber, inv. No. MZ 24106,

4 – dorsal view; 5 – antenna; 6 – microsculpture, integument.

Head 1.42 times wider than its length, distinctly elongated in front of eyes, with 4 very long and sharp, vertically erecting spines with diverged apices; length of each spine 0.37 mm and almost equal to vertex width. Base of anterior pair of spines is located at the level of clypeus base, posterior pair – in front of eyes. Eyes large, distinctly laterally projecting. Antennae very thin and rather long.

Pronotum with slightly emarginated anterior margin and widely rounded posterior one. Lateral margins

strongly diverge backwards with one sharp spine in posterior humeral angles. Posterior margin of pronotum with small median tubercle, apex of which slightly bifurcated. Mesonotum distinctly wider than pronotum, its lateral margins rounded; posterior margin with one very small median tubercle and with one long sharp spine located almost in the middle of lateral margin. Metanotum rather narrow, without tubercles, only with pair of marginal long spines located approximately in the middle of its lateral margin. Hemelytral lobes not expressed, which is typical for tingid nymphs of I-III stages.

All abdominal tergites with one long median (except small spine on anterior margin of I tergite) acute spine curving backwards: spines of IV and V tergites situated nearly in the middle of corresponding segment, spine of VI tergite – shifted a little backwards from the middle of its length, spine of VII tergite sited on its posterior margin. Spines of II and III tergites not visible because there is an air bubble on them. Thus, towards the apex of abdomen, on every consecutive tergite, median spine shifts a little backwards as compared with the proceeding tergite. Lateral margins of I-VII abdominal tergites with one long acute spine on posterior angles of segments. VIII abdominal segment without median and marginal spines. IX segment without median spine but with 2 marginal spines directed to each other by their apices.

Ventral side of body yellow brown, surfaces in yellowish-brown microstructures. Rostrum very long reaching base of VII abdominal sternite.

Dimensions in mm. Body length 2.3; width of pronotum approximately 1.0; width of abdomen approximately 0.93; length of head (from apex of clypeus to posterior margin of eyes) 0.37; width of head 0.53; width of vertex 0.29; width of eye 0.12; ratio of antennomeres 1-4 as 0.1 : 0.07 : 1.0 : 0.23; length of fore leg: femora 0.5, tibia 0.7; length of middle femora 0.5; length of hind femora 0.5.

COMPARISON. The general form of body, the elongated anterior part of head, the presence of paired (four) long frontal spines, and the ratio of the length of antennal joints – all these factors make us believe that the described nymph belongs to the tribe Cantacaderini (Tingidae: Cantacaderinae). Very long and thin III and short IV joint of antennae (III joint 4.38 times longer than the IV one) are similar to those of Eocene species of *Cantacader strictus* GOLUB et POPOV (1998) and especially with *Paleocader avitus* (DRAKE, 1950). Taking into account this specificity as well as significant dimensions of the nymph of III stage (imago of two described species of *Paleocader* is rather big, for instance, the length of *P. strictus* is about 4 mm), one may come to a preliminary conclusion that it belongs to one of the species of *Paleocader* genus.

NOTES ON THE PHYLOGENETIC ROLE OF SURFACE MICROSTRUCTURES OF EOCENE NYMPHS AND RECENT SPECIES OF TINGIDAE

Surfaces of Recent Tingidae nymphs of both subfamilies (Cantacaderinae and Tinginae) carry microsculptures of different kinds: flattened chaetae, spines, hairs, tubercles, star-like microstructures (3-5 angled forms) (PÉRICART 1983). These forms of microstructures do not differ much in the representatives of Cantacaderinae and Tinginae. The differences in the forms of microstructures of surfaces in Recent Tingidae manifest themselves only at the level of genera and species. Alongside synapomorphies

of imago (GOLUB 2001), the presence of these microstructures in the representatives of Cantacaderinae and Tinginae is undoubtedly one of synapomorphies pointing out monophyly of these two subfamilies. The discovery of homologous microstructure in nymphs of Eocene representatives of Phatnomini and Cantacaderini undoubtedly proves that there was harmony in the formation of this morphological feature in both groups, which is one more proof of the initial phylogenetic and taxonomic unity of Tingidae.

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VIKTOR B. GOLUB

Dwie nieznanne larwy Cantacaderinae (Heteroptera: Tingidae) z bursztynu bałtyckiego i ukraińskiego

Streszczenie

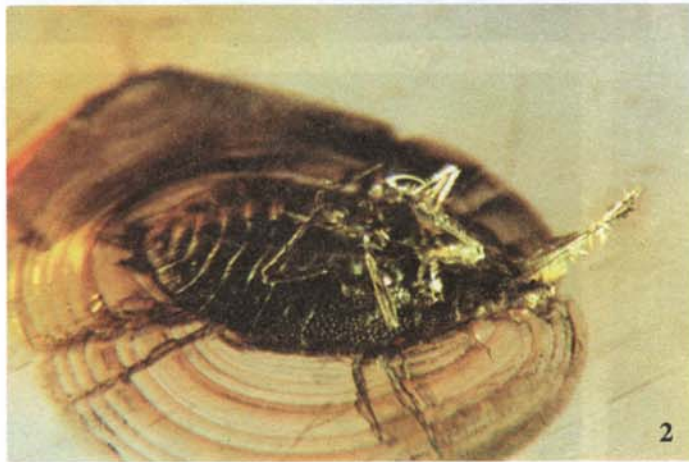
W pracy opisane zostały dwie nieznanne larwy prześwietlikowatych (Heteroptera: Tingidae) pochodzące z bursztynu bałtyckiego i ukraińskiego. Jedna z nich reprezentuje eoceniński rodzaj *Paleocader* FROESCHNER, 1996 (Cantacaderini), druga zaś to *Sinalda baltica* (DRAKE, 1950) (Phatnomini). Obecnie znane są

więc larwy trzech gatunków opisanych z eocenu. W pracy zamieszczono ponadto porównanie mikrorzeźby ciała współczesnych i kopalnych przedstawicieli Tingidae.

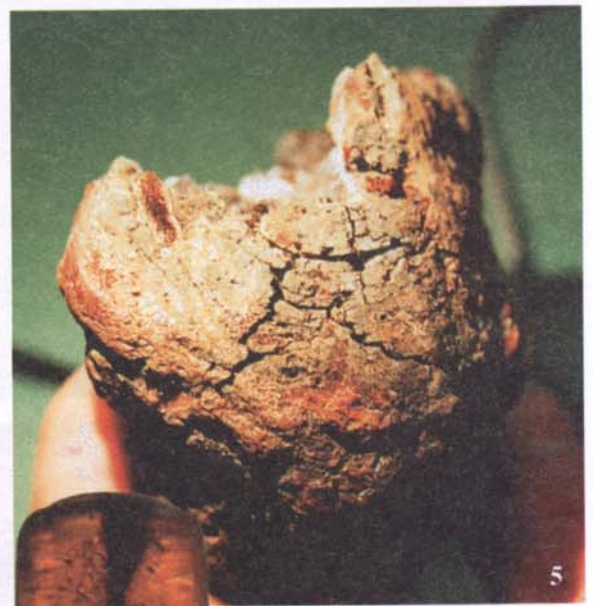
Thumaczył Aleksander HERCZEK

EXPLANATIONS OF PLATE III

Sinalda sp. prop. *baltica* (DRAKE, 1950) (?), nymph of IV stage in a piece of Ukrainian amber inv. No. MZ 23985,
1 – dorsal view; 2 – ventral view. Photo J. KUPRYJANOWICZ



1-2. V.B. GOLUB – Two unknown nymphs of Cantacaderinae (Heteroptera: Tingidae) from Baltic and Ukrainian amber
3-5. Y.A. POPOV – New microphysids (Heteroptera: Cimicomorpha, Microphysidae) from Baltic amber and taxonomy of this family



B. KOSMOWSKA-CERANOWICZ & S. RITZKOWSKI – The saved fragment of the Königsberg amber collection in Göttingen