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## Berendtimiridae fam. n., a new family of fossil beetles from Baltic Amber

(Coleoptera, Cantharoidea)

By Josef R. WINKLER

### Abstract

Palaeoentomology, taxonomy, Baltic amber, Berendtimiridae fam. n., *Berendtimirus* gen. n., type-species *Berendtimirus progenitor* sp. n., Collection BERENDT, Natural History Museum Berlin. Probable affinity to the predecessors of Omalidae presumed. Taxonomic position of *Cacconorphocerus cerambyx* SCHAUFUSS within Cantharoidea reasoned.

### Introduction

A virtual scientific hoard, the large collection of fossil Baltic amber Coleoptera in the Natural History Museum of Humboldt University, Berlin, GDR, preparatorily assorted to the families (HIEKE & PIETRZENIUK 1984), involves 4 inclusions preliminarily assigned to Lycidae (or ? Lycidae). One of these inclusions, just that one marked with the interrogation mark was proved to be a new family of Cantharoidea, described and discussed below.

The other three inclusions comprise the virtual representatives of the family Lycidae, and are a topic of the separate paper (WINKLER 1987).

### Material and methods

The type specimen was examined, measured, pictured and described dry under stereomicroscope.

The drawings of various bodyparts were pictured by means of ocular grid and put together in order to set up the reconstruction of the habitus picture straightened to the dorsal norm.

The black-white microphotographs (as well as colour slides used for morphological precisions, not published here, however) were performed by means of direct coupling (without projective) of the stereomicroscope Carl Zeiss Jena GSM and 35 mm camera Beirette vsn, very suitable for this purpose (two 60 W bulbs, distance of each from the object  $\pm 150$  mm, black – white film 21 DIN [= 100 ASA] or colour reversal film for artificial light 17 DIN [= 40 ASA]), the same exposure time for both films, 25 s, alternation of black and white rests, the plastic clay sometimes used for fixing the object examined in the desired situation.

### Acknowledgements

I am obliged with my thanks first of all to Dr. Fritz HIEKE and Dr. Erika PIETRZENIUK, Natural History Museum (Naturhistorisches Museum) of Humboldt University, Berlin, GDR, for encouragement to palaeoentomological

studies, placing the fossil material at my disposal, and for their excellent hospitality during my visits to their institution, Dipl.-Ing. silv. Jiří KOLIBÁČ, Ostrava, Czechoslovakia, for setting up the reconstruction and picturing the holotype, to Dr. Roy A CROWSON, The University, Glasgow, Scotland, Great Britain, for many valuable information and generous gift of his excellent papers on higher classification and fossil Coleoptera, and to Dr. Roland GERSTMEIER, Zoological State Collection (Zoologische Staatssammlung), Munich, FRG, who very kindly provided me with some difficultly accessible papers.

### Berendtimiridae fam. n.

Type genus: *Berendtimirus* gen. n.

#### Definition of the family

Coleoptera, Elateriformia, Cantharoidea; related to Omalisidae, displaying antennal segment 3 similar in size and vestiture to 2, abdomen with six visible ventrites, elytra with short longitudinal humeral costae, and seriate circular, antepically indistinctly reticulated punctuation, elongate trochanters and simple claws without setae, differing, however, by long filiform antennae without antennal sockets, articulating dorsally, with cranium forming a raised flat shield-like formation.

#### *Berendtimirus* gen. n.

Type-species: *Berendtimirus progenitor* sp. n.

Derivatio nominis: The generic name is in honour of Dr. Georg Carl BERENDT, Entomopalaentologist of the past century, whose internationally well known collection of Baltic amber inclusions is now a part of the imposing Berlin collection; is composed of his surname, and the Latin adjective mirus, -a, -um=miraculous, admirable, wonderful, etc. Masculine in gender.

Range: Only one species known until now.

#### Description

Body small.

Head distinctly wider than long, mandibles sharp, relatively short, wide and curved, four segments of maxillary palpi visible from above, labial palpi slender, short and club-shaped. (Labrum and clypeus not observable.)

Eyes very large, projecting, finely faceted, situated laterad beneath the raised, frontally and laterally concave shield-shaped formation.

Antennae long, filiform, 11-segmented, quite separated from eyes, antennal sockets not developed, growing out from small flat articulation areae located rather medianly near the concave anterior shield-shaped part of the cranium.

Pronotum distinctly wider than long, narrower than elytra, anterior margin only very moderately convex, nearly straight, lateral margins distinctly bordered with darker ledge-like bordures, first widening in the middle, then narrowing. Hind corners short, sharp, directed obliquely. Dorsal surface uneven.

Prosternum in front of coxae longer than width of a coxa.

Scutellum relatively large, cup-shaped.

Elytra fully covering abdomen, relatively wide, with raised short humeral costa separating dorsal surface from epipleurae, with rather regular longitudinal rows of punctures. Punctuation in anterior

part of elytra more circular, and interstices flat, in ante-apical part punctuation with certain tendency to reticulation, interstices there more raised and forming here and there not very distinct costae.

Metathoracic wings fully developed.

Legs of normal length, extremely slender, all coxae articulating separately, trochanters long, narrow and oblique, femora very slender, only in forelegs thicker than tibiae, without distinct tibial spurs, without tarsal lobes except the very wide, deeply bifid fourth tarsomere lobed below.

Metasternite very long and narrow, punctured by coarse deep obliquely elongated punctures.

Abdomen high and narrow, composed of six visible ventrites. First and second ventrites punctuated by similar, but finer punctures as in metasternite, succeeding three ventrites practically smooth and more lustrous. Sixth ventrite short and wide.

### *Berendtimirus progenitor* sp. n.

(Figs 1–5)

Type material: Holotype, sex undetermined. Inclusion labelled as follows: MB J. 518 / Lycidae? nicht *Lycus* / det. Hieke, 1983 / Slg. Berendt // , designated here as holotype ) (red label) *Berendtimirus* / *progenitor* gen. n., sp. n. / Holotype / J. R. Winkler det., 1987 // [printed, complemented with handwriting]. Deposited in Humboldt University Natural History Museum.

Derivatio nominis: progenitor, -oris, m. (Latin) = grandfather, forefather, predecessor.

### Description

Body length:  $\pm 2,5$  mm.

Head dorsally much darker than other bodyparts, dully black, eyes and mouthparts lighter.

Antennae long, reaching to two-thirds of the length of elytra, with diversified antennal segments: The first three segments widest, not flattened, however. The succeeding ones much thinner, the ultimate segment smallest. (For exact proportions see the appended Table of basic meristic data.)

Pronotum with uneven surface, deepened areae towards hind corners and on the disc, the raised places formed by irregularly scattered small tubercles, lateral margins with very short oblique setae.

Elytra relatively broad, slightly narrowing in a half of their length, then widening again, glittering, bare, with smooth lustrous humeral bulge, distinct 7–8 regular longitudinal rows of deeply punctured unpigmented dots. Dots in humeral part usually circular, only exceptionally somewhat irregular, posteriorly more irregular, oblong or polygonal, indicating a very feeble tendency to reticulation. Apices rounded, with only very short pre-apical dehiscence. The only vestiture observable on outer margins of elytra in five-sixths of their length in pre-apical and apical areae.

Legs very peculiar, i. e. extremely thin, perhaps only with exception of forelegs femora of the same width as tibiae, tarsi very long and thin, tarsal claws tiny. Vestiture of legs very poor: femora and tibiae display sporadically only here and there individual solitary short oblique setae.

### Discussion

The taxonomic position and kinship of the new family Berendtimiridae fam. n. in Elateriformia and Cantharoidea were examined in light of modern taxonomic criteria as proposed by CROWSON (1972, 1973).

\*) The mark / means arrangement of lines on a label, the mark // individual labels, parentheses ( ) serve for detailed characteristics of labels, and square brackets [ ] for various notices, ect.



1

Fig. 1: *Berendtimirus progenitor* gen. n., sp. n. Holotype, dorsal view. Black rest.



2

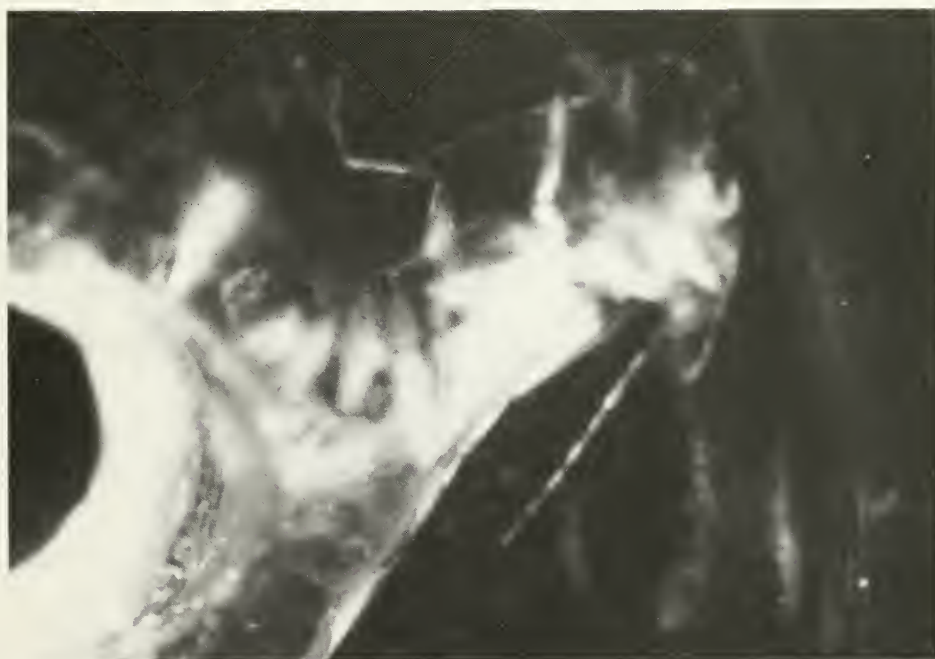
Fig. 2: *Berendtimirus progenitor* gen. n., sp. n. Holotype, dorsolateral view. White rest.

(Photographs by J. R. WINKLER)



**3**

Fig. 3: *Berendtimirus progenitor* gen. n., sp. n. Holotype, location of the insect in the amber inclusion. White rest.



**4**

Fig. 4: *Berendtimirus progenitor* gen. n., sp. n. Holotype, ventrolateral view showing spread of the milkiness. Black rest. (Photographs by J. R. WINKLER)

## Table of basic meristic data

Ratio lengths of head : pronotum : elytra		1 : 1.1 : 5.74
Ratio head length : width		1 : 1.61
Ratio antenna lengths of segments	I	2.24
	II	1.2
	III	1.45
	IV	1.44
	V	1.44
	VI	1.24
	VII	1.52
	VIII	1.52
	IX	1.48
	X	1.2
	XI	1
Ratio width of head : width of pronotum (hind corners)		1 : 1.14
Ratio length of elytron : width of both elytra		2.25 : 1
Ratio lengths tibia : tarsus	I	1.29 : 1
	II	1.37 : 1
	III	1.06 : 1
Mutual ratio of lengths of tibiae	I	1.05
	II	1
	III	1.21
Mutual ratio of lengths of tarsi	I	1
	II	1.09
	III	1.81

Although the unadvantageous situation of the beetle in corner of the Baltic amber inclusion (being before probably a bead of the necklace, subsequently honed flat for study; see Fig. 3), and first of all the milkiness \*) (Fig. 4) rendered examination of some very important characters (ventral side of the head, prosternum, etc.) impossible, many weighty characters, however, in otherwise limpid inclusion could be observed.

Although very significant characters – absence or presence of the intercoxal process, its size and structure, are not at disposal, analysis of the characters important for classification (CROWSON, 1972) enabled the ascertainment the separate new family of Cantharoidea is the subject under discussion.

The family Berendtimiridae is coincident with the family Plastoceridae in number of visible ventrites (6), but differs from it by structure of the elytra being in the latter family without regular rows of punctures, and by short trochanters. Berendtimiridae fam. n. differs from the family Cneoglossidae besides the same difference in length of the trochanters, and sculpture of the elytra, also in number of visible ventrites (5 in Cneoglossidae). From the family Lycidae Berendtimiridae fam. n. differs first of

\*) The term "milkiness" is taken from the monograph of LARSSON (1978). The white film of fossilized water transpired from the tissues of an insect, resembling mould or bast, often impeding or even making observation of the important characters impossible, is meant. The German authors give this phenomenon a name "Phlom".

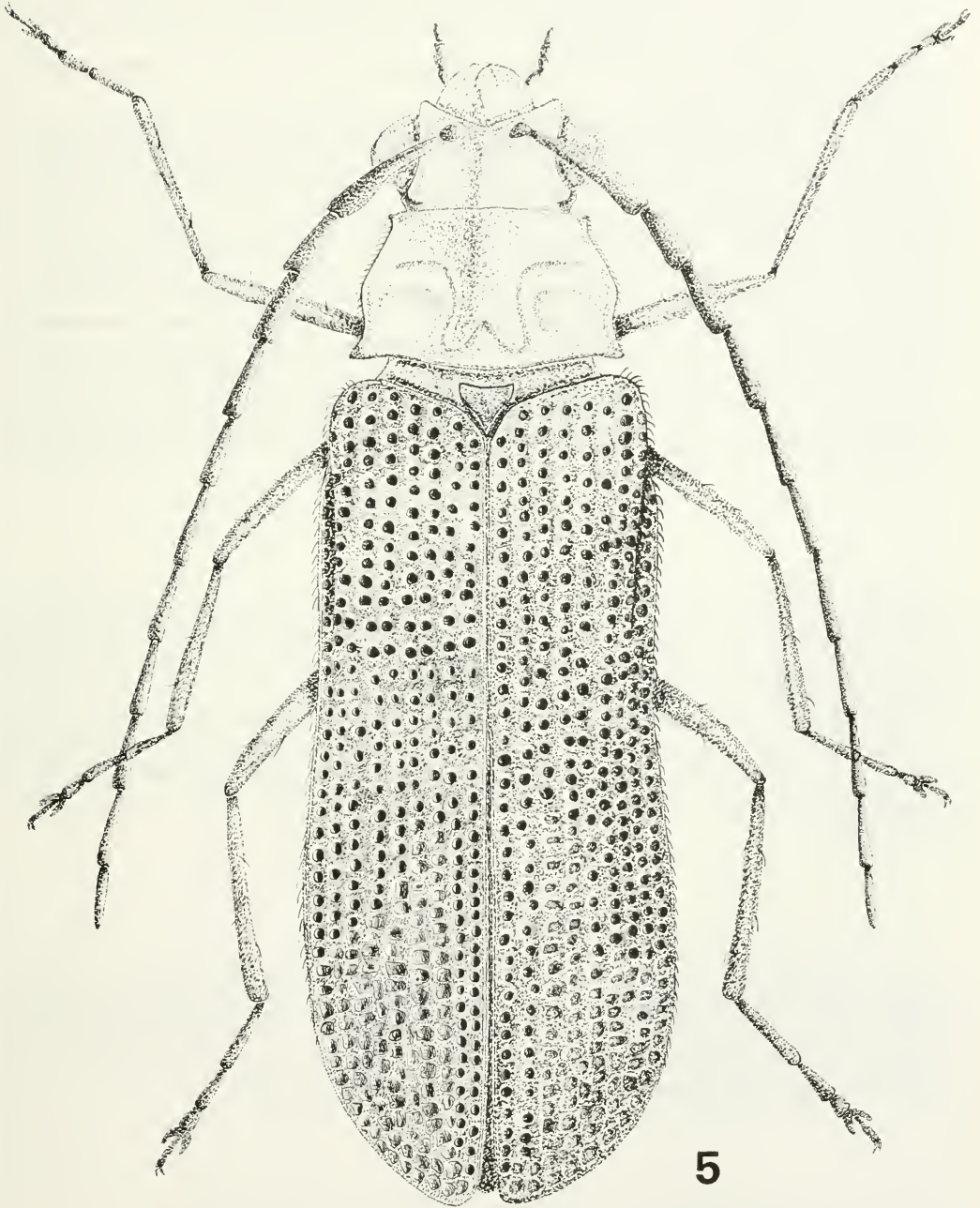


Fig. 5: *Berendtimirus progenitor* gen. n., sp. n. Holotype, reconstruction straightened to the dorsal norm.

As most closely related appears the family Omalissidae \*) with which the family Berendtimiridae fam. n. has the greatest number of common characters (coincident number of visible ventrites [6], serrate punctuation of elytra, 4. tarsomere widened, bifid, and lobed below, antennal segment 3 similar in size and vestiture to 2, tibial spurs not distinct).

As to characters not proved, perhaps the structure of the intercoxal process as in Omalissidae, and more probably rather male-, than female, sex of the examined specimen may be supposed if we presume the common ancestors of both families.

The differences separating both families are viz. typically evolutionary and reflexing the time factor in development of the characters.

The antennae of Berendtimiridae fam. n. are still very long, filiform, with flat articulation, the antennal sockets are entirely lacking. This circumstance is probably very important as parallelly with Berendtimiridae fam. n. the absence of the antennal sockets was ascertained consistently also in three new genera of Baltic amber Lycidae \*) so that perhaps a more generalized view of the evolutionary trend of mutability in the Omalissid-Lycid line between Lower Oligocene and recent period is at stake. Very remarkable also are the very primitive structure of the head with relatively large and protruding eyes, the pronotum with sharp fore-, as well as hind corners, the legs relatively long and very slender, the humeral costa of the elytra little distinct, and a certain trend of the elytral punctures to be reticulate.

All these characters may be considered as archaic and evoke a notion of Berendtimiridae as a possible extinct ancestral sister group of the direct predecessors of the recent Omalissidae.

The discovery of a new family in Baltic amber is, indeed, a very remarkable and unexpected result as in general the taxa at a family-, and subfamily level of the recent Coleoptera were stabilized already in the Tertiary era.

### Supplement

Within the framework of my preparatory studies of the literary data dealing with fossil Cantharoida preceding this paper I reasoned the family appurtenance of the very interesting taxon hitherto placed in Cantharidae, *Caccommorphocerus* SCHAUFUSS, 1891 (type-species *Caccommorphocerus cerambyx* SCHAUFUSS, 1891). (See SCHAUFUSS 1891, KORSCHESKY 1939.)

I have had not a possibility of direct examination of this Baltic amber fossil, but from the original description and the ensuing pictures (KORSCHESKY 1939) may be with certainty judged the taxon is not a virtual Cantharid, but the representative of a taxonomic unit displaying perhaps some affinities with Phengodidae, or, may be, Telegeusidae. Comparison with these taxa might possibly bring more realistic classification.

### Zusammenfassung

In vorliegender Arbeit wird eine neue fossile Käferfamilie Berendtimiridae fam. n. (typische Gattung *Berendtimirus* gen. n., typische Art *Berendtimirus progenitor* sp. n.), die in eine der Bernsteininklusionen aus den Sammlungen des Naturhistorischen Museums der Humboldt-Universität zu Berlin, DDR, entdeckt wurde, beschrieben. Die neue Familie steht der rezenten Familie Omalissidae am nächsten und stellt möglicherweise eine ausgestorbene Schwestergruppe dar.

\*) Omalissidae = Homalissidae auct. For nomenclatural substantiation see WINKLER (in press).

\*) For details see WINKLER (1987).



Die Entdeckung der neuen Familie im Tertiär ist sehr bemerkenswert, da die rezenten systematischen Kategorien – höher als die Gattung – in dieser geologischen Ära schon stabilisiert sind und die Entdeckung der bisher unbekanntenen neuen fossilen Käferfamilie eine seltene Ausnahme ist.

Für Einzelheiten (einschließlich die Erwägung der taxonomischen Position von *Cacomorphocerus cerambyx* SCHAUFUSS) siehe Supplement.

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Adress of author:  
Dr. Josef R. WINKLER  
c/o M. Vodička  
V Cibulkách 1  
15000 Praha 5 – Kös.  
Czechoslovakia

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