NYMPHAEA Folia naturae Bihariae	XLIII	5 - 12	Oradea, 2016

Early Cretaceous ostracod *Cypridea* Bosquet, 1852 in the dinosaur bearing bauxite from Cornet - Lens 204, north-western Romania

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Abstract. Bauxite deposit Cornet – Lens 204 is well known due to its rich vertebrate content: dinosaurs, birds and pterosaurs. Little attention has been paid to the invertebrates, although rare charophyte, ostracod and gastropod fragments have been mentioned. After the acquisition of new equipments for the Paleontology Lab of the Țării Crișurilor Museum, preparation of some ostracods was possible from the compact bauxite samples. The ostracods are preserved as internal casts of articulated valves, their interior being completely calcified. Morphological features of one of the best preserved carapaces permit the identification of the genus *Cypridea* Bosquet 1852. The presence of *Cypridea* sp. in the bauxite of Cornet-Lens 204 extends the Early Cretaceous record of the genus in Romania.

Introduction

The Early Cretaceous vertebrate fauna from the bauxites of Cornet-Lens 204, Northwestern Romania, is famous due to its unusual type of fossilization. The vertebrate remains preserved in bauxite consist of dinosaurs (Jurcsák and

Popa, 1979, 1983b; Jurcsak and Kessler, 1991; Jurcsak, 1982; Marinescu 1989; Benton et al. 1997) pterosaurs (Jurcsak and Popa, 1983a, 1984; Dyke et al., 2011) and birds (Kessler, 1984; Kessler and Jurcsak, 1986; Jurcsak and Kessler, 1991; Dyke et al., 2011). Bauxite deposits have a very poor fossil record worldwide.

Regarding vertebrates, Cornet Lens 204 is a unique place, due to the high number of bones preserved in the bauxite, the majority of bauxite deposits lacking preserved fossils, especially vertebrates. Beside Cornet, the only vertebrate remain recorded in bauxites is that reported by Kretzoi and Noszky (1951), namely a crocodilian tooth and a bone fragment preserved in the Alsópere Bauxite Formation, Bakony Mts, Hungary. The uncatalogued specimen was thought to be lost, but it was recently relocated (Ősi et al., 2015) in the collection of the Hungarian Geological Museum of the Hungarian Geological Institute. Ősi et al. (2015) analyzed the tooth, concluding that it belonged to Mesoeucrocodylia indet..

Plant and invertebrate remains occur sporadically in bauxites, the majority of fossils are generally poorly preserved consisting of casts or impressions of plants, gastropods, bivalves or ostracods (Bardossy, 1977).

The presence of invertebrates in the bauxite of Cornet - Lens 204 was first mentioned by Patrulius et al. (1983), noting the presence of a charophyte stem and a tiny gastropod in the hematitic, arenitic bauxite level. Dragastan et al. (1988) included the detrital, boehmitic – hematitic, bedded dinosaur bearing bauxite in the third bauxite level (N III) and mentioned two ostracods from the bauxite: the marine *Schuleridea mediocaudata* and *Asciocythere* cf. *circumdata*, emphasizing that the latter was reworked, but has not figured or described them.

Marinescu (1989) distinguished fragments of charophytes, an ostracod, a fragment of a brachiopod and of a bivalve (possible caprotinid). He mentioned that due to the poor preservation of the invertebrate fossils determination of species was impossible.

An internal cast of small gastropod was figured by Jurcsák and Kessler, (1991) as unidentified Gastropoda, Pulmonata g. et. sp.

Cornet – Lens 204 is one of the several hundreds of small bauxite lenses in the Pădurea Craiului Mts., deposited on the palaeosurface of Late Jurassic limestones. The sequence of sediments of Lens 204 has been detailed by Patrulius et al. (1983), Benton et al. (1997) and Posmoșanu and Cook (2000). The bauxite deposit of Cornet-Lens 204 was initially considered to be Lower Neocomian in age (Patrulius et al, 1983, Marinescu, 1989), respectively Lower Berriasian – Lower Barremian for the entire interval of bauxite formation. Later studies reduced this interval to Late Beriassian (Dragastan, 1988; Cociuba, 2000; Dragastan et al, 2009).

Material and method

Ostracods are widely distributed in marine and non-marine sediments and usually are prepared chemically, using acid dissolution and screen-washing. Preparation of fossils preserved in bauxites implies mechanical techniques, at least when the compact bauxites are regarded. Some authors (Dragastan et al, 2009) evidenced ostracods in the bauxites of Pădurea Craiului Mts. by using thin sections, in which taxonomical identification is almost impossible.

The specimens discussed in this paper have been prepared from bone bearing bauxite samples (Fig. 1) collected by Tiberiu Jurcsák and Elisabeta Popa during the fieldworks carried out in 1978-1983. Unfortunately there is no indication regarding the lito-stratigraphic position of the samples within the stratified bauxite deposit of Cornet – Lens 204.

Figure 1. Semi-prepared ostracod preserved in the compact bauxite.

The samples were examined under microscope (Nikon 1000 Stereomicroscope) and the identified ostracods were mechanically prepared with the use of the vibrating cutter. This process was extremely difficult due to the fragile nature of the microfossils and the hardness of the bauxite. All the recovered ostracods are preserved as internal casts of articulated valves, their interior being completely calcified.

Terminology used for morphological description of carapace outline (Fig. 2), is that defined by Sames (2011). Size parameters used in this paper also follow that of Sames (2011), respectively: small (length 0.60-1.00 mm); medium (length 1.00-1.50 mm); large (length 1.50-5.00 mm). The specimen described in this paper is deposited in the Paleontology Collection of the Department of Natural Sciences - Țării Crișurilor Museum Oradea.

Abbreviation. MTCO – Ţării Crişurilor Museum Oradea.

Systematic paleontology

Class OSTRACODA Latreille, 1802
Order PODOCOPIDA Müller, 1894
Suborder CYPRIDOCOPINA Jones, 1901
Superfamily CYPRIDOIDEA Baird, 1845
Family CYPRIDEIDAE Martin, 1940
Genus CYPRIDEA Bosquet, 1852
Cypridea sp. (Fig. 3)

Material: MTCO 25006/2 is one of the best preserved specimens.
Dimensions: L=1.90 mm; H =1.26 mm
Description: internal mold of the carapace, semi rectangular in lateral outline, being the highest in the anterior half of the dorsal margin. The curvature of the anterior and posterior margins is infracurvate, being more narrower rounded towards the venter. The dorsal margin is convex; the ventral margin is almost straight. At the anterior half of ventral margin there is a well developed rostrum, situated behind a slightly deep rostral groove (alveolar groove), which is clearly preserved. The rostral groove extends almost halfway across the shell, being slightly curved. The rostral groove is stronger developed on the left valve, which is slightly larger than the right one. On the posterolateral margin there is a cyathus-like protrusion, this extension of the postero-lateral margin is visible in both valves, but is more distinct in the larger one, the left valve. The L/H coefficient in this specimen is low (length/height=1.50). The ornamentation can not be determined, since this specimen is an internal cast.

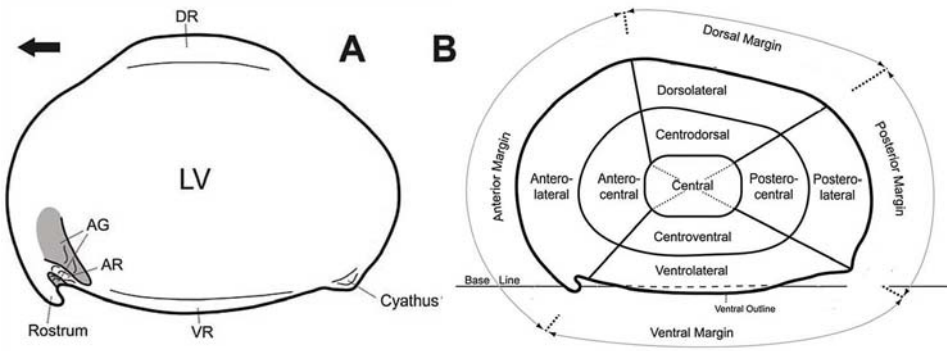

Figure 2. Terminology used in the text. A. Terminology used for morphological description. AG: alveolar groove; AR: alveolar ridge; DR: dorsal ridge; LV: left valve; VR: ventral ridge. B. Terminology used for the description of outline, outline regions and charapace margins of the genus *Cypridea*. (modified after Sames, 2011)

Discussion

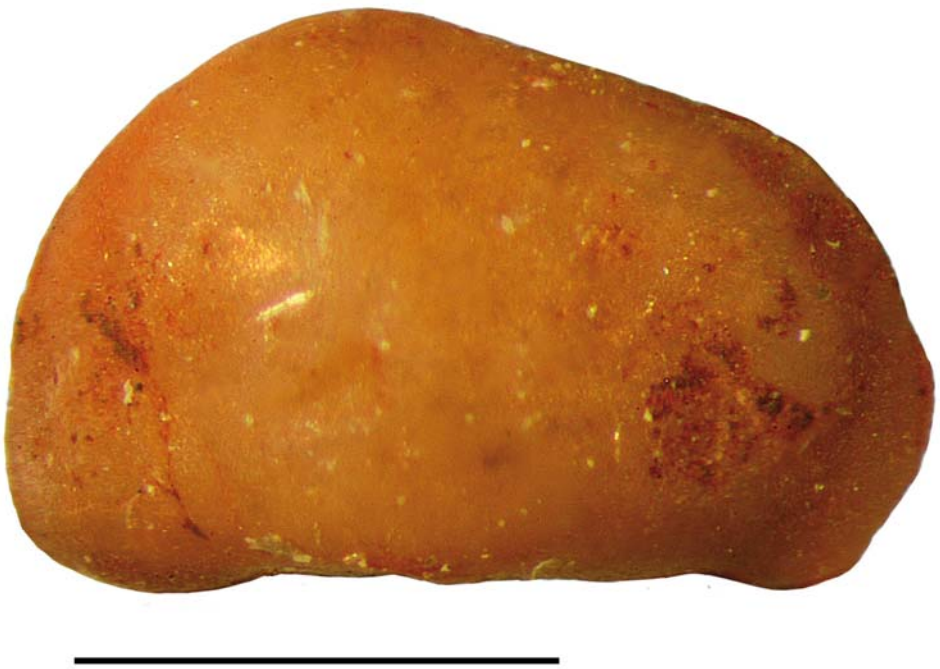

Figure 3. *Cypridea* sp., left valve in lateral view (MTCO 25006/2).

The taxonomy of the species within the genus *Cypridea* has been discussed in detail by several authors (Horne and Colin, 2005; Schudack and Schudack, 2009b, Sames, 2011). Although the external ornamentation of the MTCO 25006/2 specimen from Cornet – Lens 204 can not be determined, its morphology (i.e., subrectangular outline, the relatively high carapace, well developed rostrum with an extending, curved rostral groove and the distinct cyathus-like extension on the posterolateral margin, low L/H-coefficient), resembles species within the *Cypridea alta* species group. According to Sames (2011) "this group is characterized by a relatively high carapace [i.e., low L/H-coefficient], a distinct punctation, and a short but well-developed rostrum. Additionally, representatives of this group are all strongly inequivalve, have a distinct but small, weakly obtuse-angled cyathus with a narrow basis, and bear a strong ventral ridge". The Cornet specimen differs from *Cypridea alta* – species group by its larger size and the lack of dorsal ridge, the latter may be due to preservation.

The poor preservation of the Cornet specimen and the lack of any internal characters do not allow determination at species level, but based on its main morphological characters it can be determined as *Cypridea* sp.

Cypridea Bosquet 1852 is a widespread fresh-water ostracod genus, with a stratigraphic range extending from Kimmeridgian to Eocene (Horne and Colin, 2005; Sames, 2011). Biostratigraphical value of this genus has been widely used for Purbeck – Wealden sediments in England (Anderson, 1967; Anderson, 1985; Horne, 1988; Horne, 1995), Spain (Schudack and Schudack, 2009a; Schudack and Schudack, 2011) or Germany (Arp and Mennerich, 2008). In Romania a comprehensive study of the Purbeck sediments have been made by Marius Stoica in his PhD thesis. Stoica (1997) listed an ostracod association for the *Cypridea dunkeri* and *Cypridea granulosa* Biozones for the Early and Middle Purbeck of Dobrogea, South-Eastern Romania. According to Stoica (2007), there are several *Cypridea* species in Dobrogea: *Cypridea dunkeri dunkeri, C. dunkeri carinata, C. granulosa, C. setina, C. tumescens tumescens and C. tumescens praecursor*.

The presence of *Cypridea* Bosquet 1852 in the bauxite of Cornet - Lens 204 completes the record of the genus for the Early Cretaceous of Romania.

Further study of the ostracods from Cornet-Lens 204 is undergoing and will bring new paleontological and paleoecological data for this unique bauxite deposit.

Acknowledgments

Preparation of the ostracod material was possible due to the equipments acquired through the HURO 0901/024/2.5.1 project, implemented under the Hungary-Romania Cross Border Cooperation Programme 2007-2013 (www.huro-cbc.eu),

financed by the European Union through the European Regional Development Fund. Special thanks are given to Dr. Michael Benton and Dr. Elisabeth Cook for providing me copies of the published papers on the English Purbeck/Wealden ostracods and to Dr. Marius Stoica for providing me his study on the Romanian Purbeckian ostracods from Dobrogea.

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