

ABOUT THE FORMATION WITH *CRYPTOMACTRA* IN PALAS AREA, IAȘI: FOSSIL CONTENT AND LITHOLOGY

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Abstract. From geotechnical point of view, in Iași area there are two categories of rocks in sites where building foundations are erected, namely “bedrock” and “shallow deposits”. The “bedrock” is the correspondent of the Formation with *Cryptomactra*, and the “shallow deposits” are Quaternary. One of the most important criteria used to distinguish between these “soils” is their colour. Thus, the “bedrock” is grey while the “shallow deposits” are mostly yellow. The conclusion of our study, however, is that this criterion is not always valid.

During the construction works in Palas area, Iași Municipality, deposits belonging to the Formation with *Cryptomactra* were exposed in various sites. The following forms have been identified: *Cryptomactra pesanseris* (MAYER–EIMAR), foraminifera (*Porosonion subgranosus subgranosus* (EGGER), *Elphidium macellum macellum* (FICHEL et MOLL), *E. macellum converia* VENGLINSKI, *Nonion bogdanowiczi* VOLOSHINOVA, *Quinqueloculina akheriana* D'ORBIGNY), statoliths of *Mysidae*, ostracods etc. The fossil fauna was identified in the yellow clays located immediately below the foundations of the old buildings studied by archaeologists, but also in the underlying grey – greenish clays.

Keywords: benthic foraminifera, bivalves, Formation with *Cryptomactra*, Middle Miocene, Eastern Paratethys.

INTRODUCTION

In 2007, a residential project was started in the central part of Iași Municipality, near the Palace of Culture (Palatul Culturii) (Fig. 1). It was called “Palas,” after the name of the museum complex.

During the execution of the project, a series of excavations carried out using mechanical means revealed significant archaeological remains: foundations and walls

of stone buildings (Fig. 3), headrace water systems and roads with wooden pavement from the 17th century. These historical vestiges began to be studied by a team of archaeologists led by Professor Stela Cheptea, PhD. By her courtesy, we were able to perform also paleontological research on the sedimentary deposits that were exposed during this work.



Fig. 1 - Location of Palas area within Iași Municipality.

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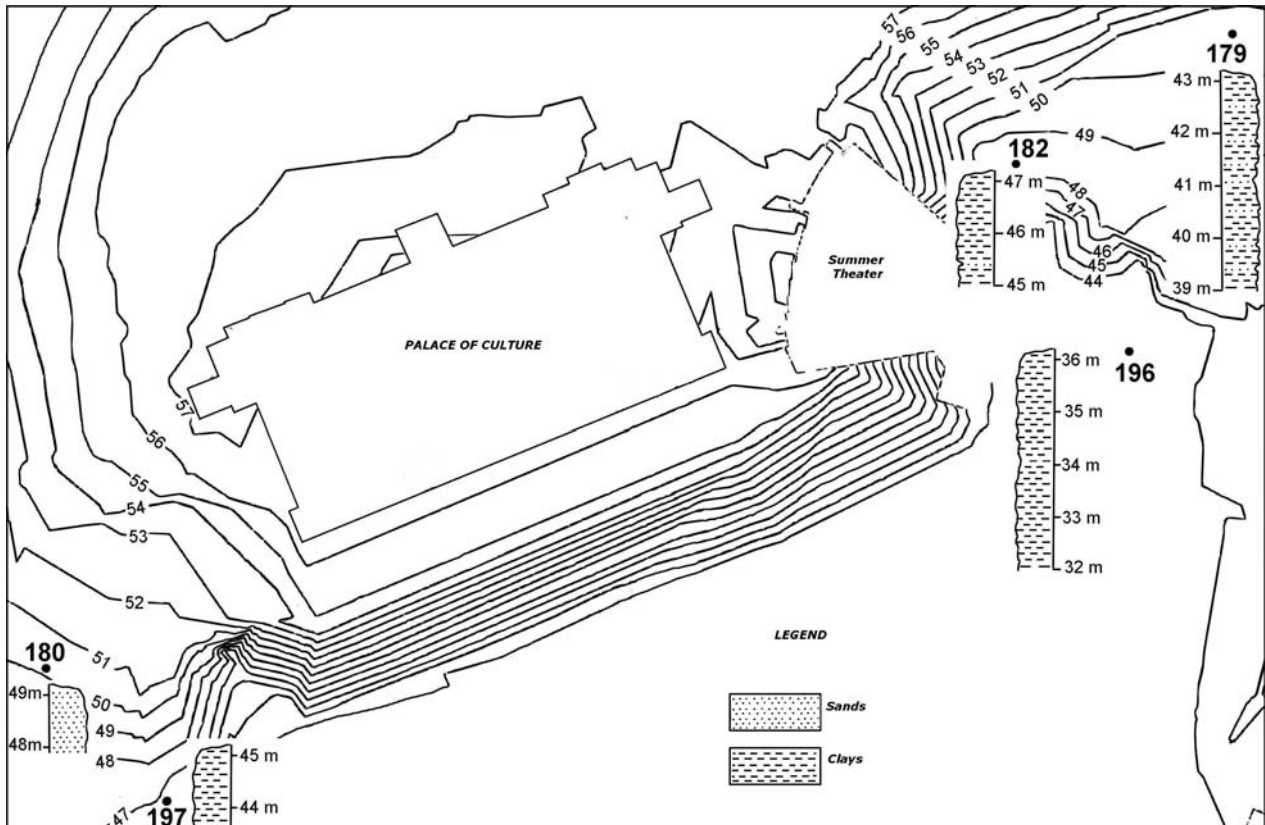


Fig. 2 - Location of sampling sites.



Fig. 3 - Location of samples P1 - P11, collected from site 179 (the red line separates the yellow clays found on the top, from the grey clays).

REGIONAL GEOLOGY

From structural point of view, Iași area belongs to the Moldavian Platform. This platform consists of a Precambrian basement, which has been eroded, and some sedimentary coverlets, formed during three megacycles: I. Upper Vendian - Devonian, II. Cretaceous - Palaeocene? - Middle Eocene, III. Upper Badenian - Meotian (L. Ionesi, 1994). At the surface, sedimentary deposits belonging to the third megacycle are exposed. They generally have a monoclinic arrangement, with a slight NW to SE tilt. The deposits of the last megacycle crop out, starting with the Badenian in the north, on the bank of the Prut River, up to the Meotian in the south of the platform. Quaternary terrace deposits sometimes appear along the water courses which cross the platform.

The deposits that occur in Iași area belong to the Formation with *Cryptomactra*, on top of which Quaternary deposits are placed. Văscăuțanu (1929) is the first researcher who reported and correctly interpreted, in biostratigraphical terms, the presence of clays with *Cryptomactra* on the left bank of the Prut River in the village of Ungheni (Ionesi et al., 2005). Subsequently, this formation from the Moldavian Platform was studied by researchers such as Tufescu (1937), Rosca and Saianov (1962), Paghida Trelea (1969), Jeanrenaud (1971), Bica Ionesi (1998, 1999), Brânzilă (1999) and others.

STUDIED SECTIONS AND MATERIAL

Our observation and sampling sites for fauna and/or microfauna are illustrated in Fig. 2.

From a lithological site of view, yellowish clay deposits are dominant at site 182 and site 197 and in the upper part of the deposits (site 179), while grey clay deposits are dominant at the bottom of the deposits (from sites 179 to 196). Subordinately, there are layers of yellow sand exceeding 1 m thickness (at site 180, for example), or very thin lenses, sometimes even mm-thick, within the clay deposits (sites 179, and 182), having the same colour as the clays.

We have sampled these deposits for both fauna and microfauna, as well as for physical and mechanical characteristics of the soils needed for establishing the quality of the foundation. In the grey clays of site 179 and in the yellow clays of site 182 we also found macrofossils (*Cryptomactra pesanseris* MAYER-EIMAR). At 3 sites (179, 182 and 197), we identified microfossils (foraminifera, ostracods and statoliths of *Mysidae*) (Table 1). Due to the fact that at site 179 the excavations carried out have exposed a larger area of clay deposits, we took several samples, both vertically and horizontally. Samples P1-P9 are of yellow clay; sample P10 is from an alternation of yellow and grey clay and sample P11 from grey clays (Fig. 3). Samples P12-14 were collected from approximately 10 m NE of the site of the previous sampling, from the yellow clay (P12), grey clay (P14), and from a transition area between the yellow clay and the grey clay (P13). Unlike the rest of the sites, where a clear stratification was noticed, in the outcrop of site 196 there are massive grey clays, with a distinctive mud odour, containing fragments of freshwater fauna (*Unio*).

DISCUSSIONS AND RESULTS

After studying the fauna found in the sites mentioned above, one can observe, firstly, that relatively well preserved valves of *Cryptomactra pesanseris* (MAYER-EIMAR) were found both in the yellow clays (Plate I, Fig. 13), at about 2 m from the surface, and in the grey clays (Plate I, Figures 14, 15) located at a greater depth. In the yellow clays, remains of *Cryptomactra pesanseris* (MAYER-EIMAR) were found at about 2 m below the foundation of an old building (named by archaeologists "the house with tiles" and located at site 182). Remains of the same taxon were also identified in the grey clays, at approximately 1 m below the yellow clays (sample P11, site 179).

As it can be seen in Table 1, there are no major differences regarding the faunistic content of the two types of clay (yellow and grey). Benthic foraminifera, mainly *Elphidium macellum macellum* (FICHTEL et MOLL) and *Porosonion subgranosus subgranosus* (EGGER), are predominant. Statoliths of *Mysidae* are also quite numerous. Research on the microfaunistic content of the Formation with *Cryptomactra* from other areas of the Moldavian Platform has also been conducted by Macarovici et al., 1957; Liteanu et al., 1963, 1966; Paghida Trelea, 1969, B. Ionesi and Brânzilă, 1990 and Brânzilă, 1999; our study revealed similar results to these previous studies.

The macro- and micropaleontological data indicate that the deposits from which samples 179, 182 and 197 were collected belong to the interval comprised between Lower Basarabian –beginning of Upper Basarabian (L. Ionesi et al., 2005). At site 196, the remains of *Unio* prove the existence of recent deposits formed in the old riverbed of the Bahlui River or in the area of an old lake that existed during the reign of Vasile Lupu (Andronic, 1986) - contemporary historical documents support this idea. At site 180, because we have not found any fossil remains or other timing elements, we cannot estimate the age of the deposits.

Given the aspects presented above, we can conclude that in the perimeter of the Palas area the foundations of future buildings will be placed on sedimentary deposits of different ages (Sarmatian or Quaternary) or of ages that cannot be estimated through the usual paleontological methods. As far as the *Globigerina bulloides* D'ORBIGNY and *Globigerinoides trilobus* (REUSS) taxa are concerned, we believe they have been reworked from deposits which are older than the Sarmatian ones.

Regarding the Sarmatian deposits, we feel the need for a specification. Currently, in geotechnical studies in Iași area, only grey clays are regarded as being of Sarmatian age, while yellow clays are considered to belong to the Quaternary. Sarmatian grey clays are attributed to the so-called "bedrock," while yellow clays are attributed to the Quaternary "shallow deposits". Given the new evidence presented, we can state that this separation based on the colour of the deposits is not always correct, as we have found both macrofaunistic and microfaunistic items that support the theory according to which yellow clay can be of a Sarmatian age too.

Table 1. Fauna assemblage identified in Palas area, Iași Municipality.

| Nr. crt. | Taxa | 179 | | | | | | | | | | | | | | 182 | 197 | |
|----------|---|------|------|------|------|----|----|----|------|------|------|-----|------|-----|------|-----|-----|------|
| | | P1 | P2 | P3 | P4 | P5 | P6 | P7 | P9 | P10 | P11 | P12 | P13 | P14 | | | | |
| | Bivalve | | | | | | | | | | | | | | | | | |
| 1 | <i>Cryptomactra pesanseris</i> (MAYER-EIMAR) | | | | | | | | | | | | x | | | | | x |
| | Foraminifera | | | | | | | | | | | | | | | | | |
| 2 | <i>Quinqueloculina akneriana</i> D'ORBIGNY | | | r. | v.r. | | | | | | | | v.r. | | r. | | | m. |
| 3 | <i>Elphidium hauerinum</i> (D'ORBIGNY) | | | f. | | | | | | | | | r. | | m. | | | r. |
| 4 | <i>Elphidium macellum macellum</i> (FICHEL ET MOLL) | v.r. | | v.r. | | | m. | | | | | | f. | | f. | | | r. |
| 5 | <i>Elphidium macellum converia</i> VENGLINSKI | | | v.r. | | | | | r. | | | | m. | | m. | r. | | r. |
| 6 | <i>Elphidium subumbilicatum</i> (CZJZEK) | | | | | | | | | | | | r. | | | | | |
| 7 | <i>Elphidium</i> sp. | | | v.r. | | | | | | | | | r. | | v.r. | | r. | v.r. |
| 8 | <i>Nonion bogdanowiczi</i> VOLOSHINOVA | v.r. | | r. | | | | | v.r. | v.r. | | | r. | | r. | | | m. |
| 9 | <i>Porosonion subgranosus subgranosus</i> (EGGER) | v.r. | r. | f. | r. | m. | m. | r. | | | | | v.f. | f. | v.f. | | f. | v.f. |
| 10 | <i>Porosonion subgranosus hyalinus</i> BOGDANOWICZ | v.r. | v.r. | | r. | | | | | | | | v.r. | | | | | v.r. |
| 11 | <i>Globigerina bulloides</i> D'ORBIGNY | | | | | r. | | | | | | | r. | | m. | | | r. |
| 12 | <i>Globigerinoides trilobus</i> (REUSS) | | | | | | | | | | v.r. | | | | v.r. | | | |
| | Ostracods | | | | | | | | | | | | | | | | | |
| 13 | <i>Xestoleberis serbica</i> KRSTIĆ | | | f. | | | | | v.r. | | | | v.r. | r. | | | | f. |
| 14 | Statoliths of Mysidae | v.r. | r. | f. | | r. | r. | | v.r. | r. | | | f. | | r. | | r. | |

Legend: v.r. – very rarely; r. – rarely; m. – medium; f. – frequently; v.f. – very frequently.

In Iași area we have encountered a similar situation in the Păcurari neighbourhood. At about 50 metres north of Păcurari Alley, another outcrop was exposed, with the purpose of erecting an apartment building. There, we noticed the same predominantly yellow deposits near the surface (about 6 m-thick), placed over grey clays. In both types of clay we found remains of *Cryptomactra pesanseris* (MAYER-EIMAR) which were quite well preserved. We intend to extend our study in this area as well.

Acknowledgments

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PLATE EXPLANATION

PLATE I

- Fig. 1 – *Quinqueloculina akneriana* D'ORBIGNY;
Fig. 2 – *Elphidium hauerinum* (D'ORBIGNY);
Fig. 3 – *Elphidium macellum macellum* (FICHTEL et MOLL);
Fig. 4 – *Elphidium macellum converia* VENGLINSKI;
Fig. 5 – *Elphidium subumbilicatum* (CZJZEK);
Fig. 6 – *Nonion bogdanowiczi* VOLOSHINOVA;
Fig. 7 – *Porosonion subgranosus subgranosus* (EGGER);
Fig. 8 – *Porosonion subgranosus hyalinus* BOGDANOWICZ;
Fig. 9 – *Globigerina bulloides* D'ORBIGNY;
Fig. 10 – *Globigerinoides trilobus* (REUSS);
Fig. 11 – *Xestoleberis serbica* KRSTIĆ;
Fig. 12 – Mysid statolith;
Figs. 13-15 – *Cryptomactra pesanseris* (MAYER-EIMAR).

PLATE I

