New Genera of Foraminifera Identified for the Upper Badenian Deposits to the North-Eastern Part of the Moldavian Platform

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Abstract: In the North-East of the Moldavian Platform, the upper Badenian is composed of three lithologic units, on top of which there is Limestones and Marls with *Lithothamnium* Formation. At the level of this formation, the geological research conducted in four localities near the Prut Valley demonstrated, based on two new foraminifera genera identified in this area—*Oolina* and *Velapertina*—favorable conditions for the development of the stenohaline fauna, a marine shelf environment with warm water, as well as the certitude regarding the age of the late Badenian for these. These results were not previously reported in this area.

Key words: Foraminifera, Moldavian Platform, upper Badenian, biostratigraphy, paleoecology.

1. Introduction

This study is based on the geological research carried out in the upper Badenian from the North-East of the Moldavian Platform, at the level of the Supraanhydritic Formation (Limestones and Marls with *Lithothamnium*) of an outcrop from Crasnaleuca, on 3 drillings executed to Trușești-Drisea, Hlipiceni, Șipote (Fig. 1) and on the identification, in this area, of 2 new genera: *Oolina* and *Velapertina*.

The upper Badenian deposits of the Supraanhydritic Formation crop out in the Romanian territory, in the North-East of the Moldavian Platform, in the Prut Valley, being studied by various researchers, especially in the last century. In a geological study on the Prut Valley area from the North-East of the Moldavian Platform, Simionescu [1] identified, near Crasna-leuca, the deposits of the Limestones and Marls with *Lithothamnium* Formation and determined a bivalve fauna.

At Crasnaleuca, Ionesi [2] signaled the

Badenian/Sarmatian boundary and determined, at the level of Limestones and Marls with *Lithothamnium* Formation, a rich fauna of foraminifera, ostracods, bryozoans, bivalves etc.

L. Ionesi and B. Ionesi [3] carried out a geological profile at Grimești bend (Crasnaleuca), in which they present the Cenomanian/Badenian and Badenian/Sarmatian (Buglovian) contacts.

The drillings executed to Trușești-Drisea, Hlipiceni and Șipote were studied from the point of view of lithology, micro- and macro-fauna, in a study by Ref. [4]. Also, in Trușești (Trușești-Drisea) and Șipote drillings, Brânzilă and Chira [5] highlighted the Badenian/Sarmatian contact, based on molluscs, foraminifera and nannoplankton.

2. Geology of the Studied Area

The upper Badenian crops out in the North of the Moldavian Platform, between Oroftiana de Sus and Liveni, localities situated on the Prut Valley [6] and, in terms of lithology, it comprises three units: the Detrital or Infraanhydritic Formation, the Evaporitic Formation, and the Calcareous Marl Clay or the Supraanhydritic Formation [3, 7]. The last lithologic

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Fig. 1 Location of micropaleontological samples (map taken from Ref. [6]): 1—Crasnaleuca; 2—Trușești-Drislea; 3—Hlipiceni; 4—Șipote. The abbreviations mean: cm—Cenomanian; bn—Badenian; bg—Buglovian; vh—Volhynian; bs—Bessarabian; Q—Quaternary.

unit is represented in the North-East of the Moldavian Platform by deposits consisting of Limestones and Marls with *Lithothamnium*, which grow in thickness with the approach to the Carpathian orogen [7].

This stratigraphic substage is part of the last sedimentation cycle of the Moldavian Platform, upper Badenian—Meotian [7], and it is characterized by a rich and diverse stenohaline fauna, represented by bivalves, gastropods, foraminifera, ostracods, bryozoans etc. The presence of these organisms explains a marine regime with a normal salinity, a high oxygen content [4, 8], as well as the conditions of a warm sea [9].

3. Materials and Methods

The main tools used in performing the present study consisted of a Picard hammer, a soffit, a Nikon Coolpix S2500 camera, a weighing, 3 standard analytical sieves, a #204 Celestron professional microscope and micropaleontological cells.

The collected samples were processed in the

laboratory of Geology and Paleontology of the Faculty of Geography and Geology, by standard micropaleontological methods. The identified taxa were photographed at the electron microscope of the Faculty of Biology, within the “Alexandru Ioan Cuza” University.

From the samples taken for micropaleontological analyses, *Oolina* taxa were identified to Crasnaleuca (1 sample, Fig. 2), Trușești-Drislea (1 sample, Fig. 3), Hlipiceni (1 sample, Fig. 3) and Șipote (2 samples, Fig. 3), and *Velapertina* taxa in the S1 sample, from the Șipote drilling (Fig. 3).

The analyzed samples were also used in a far more complex micro-paleontological study [10].

4. Significance of Analyzed Microfauna

The *Oolina* genus d’Orbigny, 1839 (Fig. 4) has been identified in all mentioned collection points; it has a low frequency in the foraminifera assemblage identified in the area and it indicates a marine shelf environment. It has a globular-oval, unilocular,

Fig. 2 Image and lithological column of the outcrop from Crasnaleuca (after Ref. [10], modified).

hyaline, calca-reous and smooth test and it occupies a large stratigraphic interval, from the Jurassic to the Holocene [11]. The species of *Oolina* (Fig. 4) identified in this area are new for Science, because I did not find them in other specialized studies.

It is spread in the Eastern Paratethys [12], in the Central Paratethys [13-18], as well as in other basins around the Globe [19-22].

The *Velapertina* genus Popescu, 1969 (Fig. 5) also has a low frequency in the microfauna assemblage, being present in the S1 sample of the Șipote drilling. It features a subglobular test, with perforated calcareous wall [11]. It is planktonic and it indicates a warm water marine environment [23]. In terms of stratigraphy, it represents an index taxon for the Upper Badenian [24]. I think that the species of *Velapertina*

(Fig. 5) from the studied area are new for Science, because I did not find them in other specialized studies.

The distribution area of the *Velapertina* genus constitutes the Eastern and the Central Paratethys [23, 25-27], as well as other regions [28, 29].

5. Conclusions

The geological research conducted in North-East of the Moldavian Platform, at the level of the Supraanhydritic Formation of the upper Badenian, revealed new foraminifera genera for this area: *Oolina* and *Velapertina*. The samples for micropaleontological analyses taken from the Crasnaleuca outcrop and from the drillings carried out at Trușești-Drislea, Hlipiceni and Șipote identified a foraminifera assemblage, in which the new mentioned genera have a low weight.

Fig. 3 Lithological columns of Truşeşti-Drislea, Hlipiceni and Şipote drillings (after Ref. [10], modified).

Fig. 4 *Oolina* n. sp.: 1 (from Hlipiceni drilling); 2-4 (from S1 sample of Şipote drilling)—2 is also illustrated in Ref. [10]; 5 (from S2 sample of Şipote drilling).

Fig. 5 *Velapertina* n. sp. (from S1 sample of Şipote drilling)—1a-1c is also illustrated in Ref. [10].

However, the taxonomic and paleo-ecological importance that the *Oolina* genus presents, as well as the stratigraphic value of the *Velapertina* genus, prove the upper Badenian age of the deposits from which the samples were taken and favorable marine conditions for the development of the

stenohaline fauna.

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