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BOGDANOWICZIA POCUTICA PISHVANOVA IN THE MIDDLE MIOCENE OF TRANSYLVANIA – PALEOENVIRONMENTAL AND STRATIGRAPHIC IMPLICATIONS

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Abstract: Occurrence of *Bogdanowiczia pocutica* represents an important event in the deep-water deposits of the Kosovian in Paratethys. Its presence is related to high stand conditions, when the initiation of sedimentary progradation in the deep sea made some important changes in the environment. The *Bogdanowiczia pocutica* assemblage represents a potential new marker for the sequence stratigraphic correlations at regional scale.

Keywords: Miocene, Kosovian, Bogdanowiczia, paleoecology, stratigraphy

INTRODUCTION

According to Rögl (1995), the foraminifer genus *Bogdanowiczia* has a tubular test with a very fine agglutinated and silicified wall, and constrictions reflecting the internal narrowing of the hollow space (pseudoseptae) occurring in irregular distances.

Species *Bogdanowiczia pocutica* was originally described (Pl. I fig. 2) from the Ukrainian Subcarpathians by Pishvanova (in Vyalov & Pishvanova, 1967). It is a well represented agglutinated taxon in the deep-water Kosovian formations of the Paratethyan area. Popescu (1979) mentioned its occurrence in the Subcarpathians and Getic Depression of Romania. It was also mentioned from the deep wells in the Transylvanian Basin by Filipescu (1994).

MATERIAL AND METHODS

Studied material was collected from the Middle Miocene (Kosovian) deposits penetrated by several deep wells in the Transylvanian Basin.

Slides with a large number of specimens were kindly provided by SNGN Romgaz S.A. Mediaş, from the former Micropaleontological Collection of the company.

The studied material was illustrated by using a digital camera on a Zeiss Stemi 2000C microscope and a digital Scanning Electron Microscope Zeiss DSM 940 at University College London.

As support for the micropaleontological observations, we used the sedimentological data gathered from the seismic profiles and well logs (Filipescu & Krézsek, in press). For a better understanding of the facies sequence, we processed data from seismic profiles and well logs. We could separate the main sequences and the associated systems tracts, these offering good possibilities of correlation between facies and foraminifera distribution.

RESULTS

Specimens of *Bogdanowiczia pocutica* are very common in the deep-marine sediments of the Kosovian and can be easily noticed in the micropaleontological washed material because of particular accumulations, with a large number (almost exclusive) of individuals (Pl. I, fig. 1).

The particular occurrence of the species suggested a particular relationship with the paleoenvironmental setting. This relationship proved to have a potential stratigraphic application.

As resulted from the sedimentological data, planktonic assemblages (radiolarians, foraminifera, pteropods, diatoms, calcareous nannoplankton) dominate the transgressive tract of the lower Kosovian sequence (fig. 1).

Further on, at the level of maximum flooding surface, only planktonic species (*Velapertina* Biozone) are present. This happened probably because of missing vertical water circulation, which generated anoxic bottom waters.

The sedimentary succession above the maximum flooding surface preserve the proof of an important facies change, with benthic agglutinated *Bogdanowiczia pocutica*, a distinctive assemblage compared to the previous oceanic planktonic populations. Practically consisting almost of a single species, the assemblages suggest particular depth and oxygenation conditions. This microfaunal change can be interpreted as the first sign of re-oxygenation of the bottom waters. It also shows a change in sedimentation pattern by increasing the coarser sediment input.

For a better understanding of their presence, it is important to know that recent high-tube populations were mentioned in the vicinity of submarine canyons, in areas with high organic productivity (Kaminski & Kuhnt, 1995). A similar setting might be assumed for the Kossovian deep-water environments, as proven by the sedimentological data in the Transylvanian wells. Sedimentary lobes showing a prograding stacking pattern can be easily observed on the seismic profiles and well-logs (fig. 1).

Bogdanowiczia individuals were probably epifaunal suspension feeders. This is suggested by the shape of the preserved specimens, although it is usually hard to find complete specimens in life position, due to the particular dynamic factors in the paleoenvironment.

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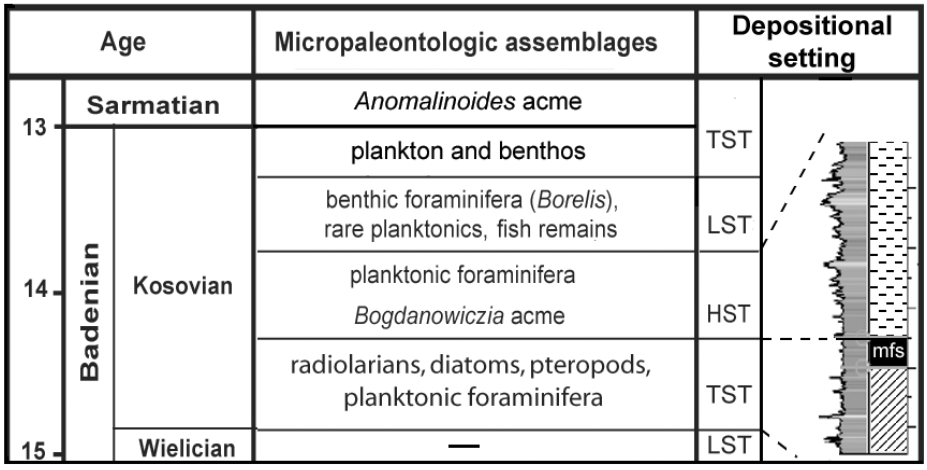

Figure 1. Micropaleontologic assemblages and depositional features of the Kosovian deposits in the Transylvanian Basin

Fragile organic cementation permitted sin- and postdepositional deformations of the tests. Flattening along the growth axis is the most common feature of the recovered tests (Pl. I, fig. 3). Perpendicularly flattened (Pl. I, fig. 4, 5), bent (Pl. I, fig. 7), twisted (Pl. I, fig. 8) or complex deformed specimens (Pl. I, fig. 6-8) can be also observed, suggesting the unstable conditions on the substrate during the sedimentation.

Direct observations on *Bogdanowiczia* specimens and sedimentological data suggest that the deformations were produced by a turbiditic-type of sedimentation, both by sudden sedimentary input (flows and slides resulting in bending and twisting) and subsequent sediment compaction (flattening).

The main reason for the re-population of the substrate with *Bogdanowiczia* assemblages must be related with the initiation of sedimentary progradation during the high stand in the middle part of the Kossovian. Deep-water prograding sedimentary lobes and associated moving bottom waters allowed the colonization of the substrate, both by providing the sand particles and oxygen for the agglutinating species.

CONCLUSIONS

The first occurrence of *Bogdanowiczia pocutica* in the Kosovian is related to an important stage of the regional evolution of the Paratethyan area. Placing the assemblage on a specific position on the relative sea-level curve, having a specific time significance, increases the stratigraphic value of the species, as an important marker for the regional sequence stratigraphic studies.

Acknowledgments

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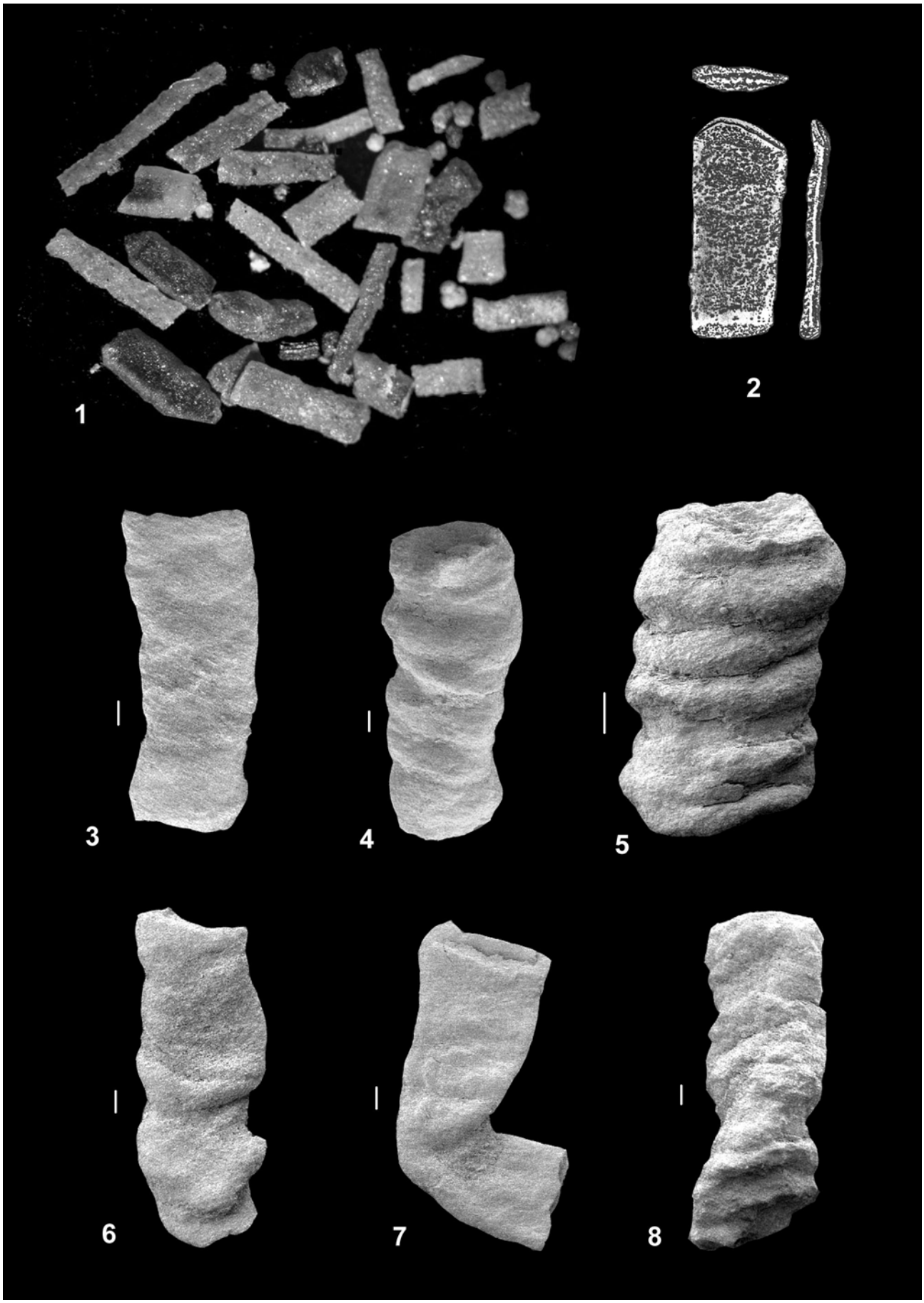
PLATE I

***Bogdanowiczia pocutica* PISHVANOVA**

Figures 1, 3-8 from Şoimuş wells (scale bars – 100 microns)

Fig. 1. Typical micropaleontological assemblage
Fig. 2. Type specimen, after Vyalov & Pishvanova (1967)
Fig. 3. Typical specimen, longitudinally flattened
Fig. 4, 5. Specimens showing different stages of transversal flattening
Fig. 6. Specimen affected both longitudinal and transversal flattening
Fig. 7. Bent and flattened specimen
Fig. 8. Twisted specimen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