MIOCENE MOLLUSCS AND NANNOPLANKTON OF THE EASTERN PART OF THE BOROD DEPRESSION

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Abstract. The Miocene deposits identified in drilling 3163, located north of the locality of Borod mainly consists of marls, clays and interlayers of sands, gravels and coals. In the upper part of the Miocene succession a marker level for the Neogene of the Borod Depression can be found - the Congeria ornithopsis level - represented by a lumachelle of various species of this genera. A second brackish, mio-pliohaline (3 - 16.5%) assemblage with Tymanotonos margaritaceus and Pirenecola plicata div. ssp. was evidenced at several levels. Another assemblage with Turritella and Anadara characterizes a marine brachi-euhaline (16.5 - 35%) paleobiotope which was generally depleted in genera. The nannoplankton assemblage which can be paralleled to the last two mollusc assemblages contains Helicosphaera ampliaperta, thus being assigned to the NN4 Biozone. On this basis, the deposits which host the associations mentioned above were attributed an Eggenburgian-Ottangian age. Key Words: Borod Depression, Drilling 3163, Mollusca: Bivalvia, Gastropoda, Scaphopoda, Calcareae nannofossils, Lower Miocene: Eggenburgian-Ottangian.

Drilling 3163 is situated in the north-eastern side of the Borod Depression, more precisely in the northern part of the locality of Borod (Fig. 1).

This drilling crossed Miocene deposits 378 m in thickness, after which it intercepted the crystalline foundation. The Miocene deposits mostly consist of marls associated with clays, interlayered with sands, gravels, sandstones and coals.

Within the first 50 m, the most important faunal assemblage is met between meters 43 - 52 and includes Congeria ornithopsis and a diversity of other species of the genera. It is well known that this assemblage constitutes a marker level, encountered in most of the drillings carried out in the eastern side of the Borod Depression. It is located in the upper part of the second coal bed of Lower Sarmatian age.

The 50-164 m interval lacks fauna, unlike the 164-325 m one which contains a rich mollusc fauna that can be assigned to two types of assemblages.

These are a mio-pliohaline (3 - 16.5%), brackish assemblage met along almost the whole mentioned interval (164-325 m) and a brachi-euhaline (16.5 - 35%) thus almost normal marine assemblage, that was found within two intervals: meters 230-245 and 303-306.50 (Fig. 2).

The marine mollusc assemblage within the 230-245 m interval contains:

- Anadara diluvii (LAMARCK)
- Gouldia minima (MONTAGU)
- Turritella eryna rotundata SCHAFFER
- Turritella turris turlaoaevis SACC
- Calyptroea chinensis LINNE
- Nassa basteroti MICHELOT
- Odostomia perosa BOETTGER
- Turbonilla costellata (GRATELOUP)
- Eulimella conulus EICHWALD
- Eulimella acicula PHILIPPI
- Pyramisella cf. plicosa BRONN
- Ringicularia costata EICHWALD
- Cylindrochamoma cf. cylindracea (PENNANT)
- Dentalium michelotti HOERNES (PI. II, III)

The assemblage is dominated by Turritella eryna rotundata and Eulimella acicula both represented by specimens which had reached the adult stage, as well as by many juvenile specimens.

In the 230-245 m interval (at 230.10 m) a nannoplankton assemblage with Helicosphaera ampliaperta was found, which proves the presence of the NN4 Biozone. Accompanying the zonal form, other species are also present: Coccodolithus miopelagicus BUKRY
- Cyclicargolithus floridanus (ROTH & HAY)

BUKRY
- Cyclicargolithus abisectus MULLER
- Euphrasia catena helicina (BROCHI)
- Nassa sp.
- Cerithiopsis sp.
- Turbonilla costellata (GRATELOUP)
- Eulimella acicula PHILIPPI
- Ringicularia costata EICHWALD
- Cylindrochamoma cf. cylindracea (PENNANT) (PI. II, III)

The nannoplankton we have identified within this interval (303.30 m) with:
- Helicosphaera ampliaperta BRAMLETTE & WILCOXON
- Cyclicargolithus floridanus (ROTH & HAY)
- Euphrasia catena helicina (BROCHI)
- Nassa sp.
- Cerithiopsis sp.
- Turbonilla costellata (GRATELOUP)
- Eulimella acicula PHILIPPI
- Ringicularia costata EICHWALD
- Cylindrochamoma cf. cylindracea (PENNANT) (PI. II, III)
- Dentalium michelotti HOERNES (PI. II, III)

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Fig. 1 – Geological map of the eastern Vad-Borod Depression (scale 1:50,000)
This assemblage contains less genera but represented by more specimens (*Pirerella* and *Theodoxus*). In this interval containing brackish fauna, the nannoplankton assemblage does not include the zonal forms, but only rare forms of:

*Cyclicargolithus florianus* (ROTH & HAY)
*Bukry*
*Calicidiscus leptoporius* (MURRAY & BLACKMAN)
*Loeblich & Tappan*
*Reticulofenestra pseudoumbilicus* (GARTNER)
*Gartner*
*Coccocithus miopelagicus* BUKRY
*Helicosphaera cartieri* (WALLICH) KAMPTNER
*Bradorosphaera bigelowii* (GRAN & BRAAUD)
*Deflandre*
*Sphenolithus sp.*
*Cyclicargolithus abies* (MULLER).

Many forms are reworked from the Upper Cretaceous.


The mollusc assemblage identified in this drilling shows similarities with the fauna of the Hida Formation. In addition, the presence of *Helicosphaera ampliapertura* (NN4 Biozone) (Fig. 3) makes us extend the chronostratigraphic frame of this association from the Egenburgian stage to the Egenburgian-Ottangian one. The presence of some widespread genera in the Badenian of the Central Paratethys which were also met in our study especially between m 164-230 does not exclude the possibility of the presence of some Badenian deposits in the succession. This drilling did not yet provide taxa that would certainly prove this age. Petrescu & Nicorici (1977) in their study regarding some drillings situated in the western part of the village of Borozel, include the encountered pre-Sarmatian deposits into a wider chronostratigraphic interval, the Egenburgian-Badenian one.

The pre-Sarmatian formations from the Borod Depression were for the first time mentioned in a few outcrops situated between the village of Cetea and the Baija Valley (Suraru & Suraru, 1973), than also in the drillings located between the Cetea Valley and the village the Ghgehie (Marinescu et al., 1980; Papasianopol et al., 1984).

The presence of the same formations north of the locality of Borod (drilling 3163) as indicated in our study confirms the opinion of Suraru & Suraru (1973) according to which these deposits extend eastward the limit being northeast at the village of Cornițel. The two types of mollusc assemblage that we separated - the marine and the brackish one - are also to be found in the outcrops of the village of Cetea and the Baija Valley. At Cetea (western slope of the Codrișoare Hill) a marine assemblage was highlighted, in which Turritella prevails. In the Baija Valley (Lapului Brook) a brackish assemblage with *Tympanotonos* and *Pirerella plicata* div. ssp. was found.

The Lower Miocene from the eastern Borod Depression has been a controversial problem till today.

In the studied drilling two types of mollusc assemblages are present: a marine and a brackish one. Both of them are atypical zonal assemblages for *Chlamys gigas*.
Fig. 3 – Stratigraphical range of the nanoplankton species in drilling 3163

Zone (Moisescu & Popescu, 1980).

Our study highlights for the first time the presence of the Lower Miocene deposits east of the Baita Valley.

In this paper some genera of bivalves (Gouldia minima, Ertilia pusilla), gastropods (Odostomia perrara, Eulimella conulus, E. acicula, Ringicula costata, Cylindrotheca cylindracea) and scaphopods (Dentalium michelotti) are mentioned for the first time in this area of the eastern Borod Basin.

References:


Sacco, F. (1890-1904) I Molluschi dei terreni Tertiari del Piemonte e della Liguria. VI-XXX, Torino.


Captions of Plates

Plate 16. I
Fig. 1. *Polymesoda convexa convexa* (Brongniart) - m 216,30 (x 1)
Fig. 2, 3. *Theodoxus (Vitriolithon) pictus pictus* (Ferussac) - m 188,20 (x 3)
Fig. 4. *Melanopsis impressa monregalenensis* Sacco - m 246,30 (x 2,3)
Fig. 5, 6, 7. *Pirenella plicata papillata* (Sandberger)-m 319,20 (5, 7); - m 329 (6) (x 1,5)
Fig. 8, 9. *Pirenella plicata trinodosa* Schaffer-309,50 (8) (x 3); - m 329 (9) (x 1,5)
Fig. 10. *Tympanotonos margaritaceus grateloupI* (d'Orbigny) - m 216,30 (x 1,5)
Fig. 11, 12. *Terebralina bidentata bidentata* (Delfrance in Grateloup) - m 177,90 (11) (x 1,4); - m 216,30 (12) (x 3)
Fig. 13. *Dorsamnum nodosocostatum* Hilber - m 263 (x 2)

Plate 16. II
Fig. 1, 2, 3. *Anadara diluvii* (Lamarck) - 231,70 (1) (x 2); - 243,20 (2) (x 1), (3) (x 3)
Fig. 4. *Gouldia minima* (Monlagu) - m 233,10 (x 8)
Fig. 5, 7, 8, 9, 10. *Turritella eryna rotundata* Schaffer - m 230,10 (7, 8) (x1,7), (10) (x 2) - m 233,10 (5, 9) (x 2)
Fig. 6. *Turritella turris taurolaevia* Sacco - m 230,10 (x 2,2)
Fig. 11. *Triphora perversa* (Linne) - m 303,30 (x 23)
Fig. 12. *Calyptreae chinensis* (Linne) - m 232 (x 8,5)
Fig. 13. *Euspira catena helicina* (Brocchi) - m 303,30 (x 9)

Plate 16. III
Fig. 1, 2, 3. *Nassa basteroti* Michelotti - m 230,10 (1, 3) (x 3), (2) (x 3,5)
Fig. 4. *Odostomia perrara* Boettger - m 230, 10 (x 20)
Fig. 5. *Pyramidella cf. plicosa* Bronn - m 243,20 (x 9)
Fig. 6, 7. *Eulimella acicula* Philippi - m 306,20 (x 20)
Fig. 8. *Eulimella conulus* Eichwald - m 232 (x 30)
Fig. 9. *Turbonilla costelata* (Grateloup) - m 303,30 (x30)
Fig. 10, 11. *Ringcula costata* Eichwald - m 232 (10) (x27); - 306,20 (11) (x 20)
Fig. 12. *Clychina cf. cylindracea* (Pennant) - 232 (x 24)
Fig. 13. *Dentalium michaeloti* Hoernes - m 232 (x 3).

Fig. 1 - Lithostratigraphy of the Saxtang Formation in the Sircs. (Permission of the University of Florida.)