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3. PALEONTOLOGIE

PALEOZOOLOGIE

Project 58 Mid-Cretaceous events

THE PRESENCE OF THE GENUS *DIDYMOTIS* GERHARDT 1897 (BIVALVIA) IN THE UPPER CRETACEOUS OF ROMANIA AND ITS BIOCHRONOLOGICAL SIGNIFICANCE [1]

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Upper Cretaceous. Lower Coniacian. Bivalvia. Didymotis. Inoceramus. Biochronology. Systematic position. Geographic distribution. Biostratigraphic distribution. East Carpathians — Crystalline-Mesozoic Zone — Perşani Mountains ; Dobrogea — North Dobrogea — Babadag Basin.

Abstract

The paper describes several bivalve specimens certainly belonging to the genus *Didymotis*. *"Tellina" ürmösensis* Simionescu, 1899 is included in this genus. *Inoceramus persanensis*, a species named by Patrulius but unpublished so far, is described and figured in this paper, and assigned also to *Didymotis*. The range and geographic distribution of the genus *Didymotis* are discussed and the exact age of the Romanian specimens determined. The author concluded that here, as well as on other continents, *Didymotis* is a valuable biochronological marker for the Lower Coniacian.

Résumé

La présence du genre Didymotis Gerhardt, 1897 (Bivalvia) dans le Crétacé supérieur de la Roumanie et sa signification biochronologique. L'étude englobe la description de plusieurs exemplaires de Bivalves qui appartiennent certainement au genre *Didymotis*. On a établi aussi la position systématique correcte

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de l'espèce *„Tellina" ürmösensis* Simionescu, 1899 qui appartient au genre *Didymotis*. L'espèce *„Inoceramus" persanensis* déterminé par Patrulius mais restée en manuscrit est attribuée, elle aussi, au genre *Didymotis*, étant décrite et figurée dans cette étude.

On traite aussi la répartition stratigraphique et la dispersion géographique du genre *Didymotis*, en établissant l'âge exacte des spécimens prélevés de Roumanie. On est arrivé à la conclusion qu'en Roumanie, tout comme en d'autres continents, le genre *Didymotis* est un indice biochronologique très important pour le Coniacien inférieur.

Studying the Upper Cretaceous faunal association at Ormeniş (Perşani Mountains) Simionescu (1899) described several pelecypod specimens under the name of *Tellina ürmösensis* n.f. (Simionescu, 1899, p. 34, Pl. 2, Figs. 11, 12). More recently Pauliuc (1968) has described several specimens from the same place, assigned either to the species *T. ürmösensis* Sim. or to other species of *Tellina*. The collection of the Geological Institute of Bucharest (collection of D. Patrulius) stores several specimens that can be assigned to Simionescu's species as well as some others, rather similar to it, but less elongated in outline and labelled by D. Patrulius as *Inoceramus persanensis* n. sp. On the occasion of the researches carried out in the Babadag Basin (North Dobrogea) in the vicinity of the Caugagia locality we collected several bivalve specimens, obviously related to those from the Perşani Mountains.

The study of these specimens reveals several characters common to all of them : judging by the shell fragments preserved on several specimens it is found that the shell is very thin, of almost constant thickness and consists of a layer of prismatic calcite. The valves outline is generally elongated on a direction parallel to the hinge line which is long and straight. The umbo is small, sharp and does not project above the hinge line. The entire specimens show a long and narrow posterior wing, some of them exhibiting also the slightly flattened anterior part. Ornamentation consists of sharp or rounded ribs, most of the specimens having also radial ribs of variable thickness on the median and lower part of the valves.

If we take into account the valve outline, the umbo position and the vaulting degree, the studied specimens should belong to several species.

The enumerated features clearly prove that the studied specimens do not belong to the genus *Tellina*, which has a thicker shell and has no prismatic structure and posterior wing, but to the genus *Didymotis* Gerhardt 1897, as results from the description of this genus made by Imlay (1955, p. 584) and Cox (in Moore, 1969, p N 344).

By its characters the genus *Didymotis* shows rather great similarities to some Inoceramids grouped in the genus *Sergipia* Maury, which explains why sometimes the representatives of this genus were assigned to *Inoceramus* (Patrulius in Lupu, 1978, Fig. 25-*I. ürmösensis*).

According to Kauffman (1977, p. 182) the difference between the two genera consists in the lack of radial ornamentation and more rounded outline of the genus *Sergipia*. But taking into account the fact that in the genus *Didymotis* the radial ornamentation appears especially in the mature stage and that radial ornamentation appears also in some species assigned by Kauffman (1977) to the genus *Sergipia* (e.g. *Sergipia akamatsui* Yehara, 1924, p. 37, Pl. 2, Figs. 2-4), it is sometimes difficult to separate the two species. As regards the specimens of Romania, most of them show the clear characters of the genus *Didymotis*, only some of them may belong to the genus *Sergipia*.

It is worth mentioning that the genus *Didymotis* has been practically unknown so far in Europe, having been only recently mentioned by Kauffman (in Herm et al., 1979, p. 80) at Salzgitter (Germany).

There is no literature available for the specific determination of the whole material. The only reference to the systematic position of the genus and the only illustration of the genotype *Didymotis variabilis* Gerhardt we have found were made by Cox & Newell (in Moore: Treatise on Invertebrate Paleontology (N) Mollusca 6, Bivalvia, vol. I, Fig. C 68, 3).

We think that the species *Didymotis ürmösensis* (Simionescu) is a valid species as it shows obvious differences from *D. variabilis* Gerhardt the former has the umbo in a more anterior position, the posterior part of the valve being narrower and more elongated. Moreover, Simionescu's species was established almost simultaneously with that of the genotype. We designate as lectotype of the species *Didymotis ürmösensis* the specimen from Plate 2, Figure 11 of Simionescu (1899), the shorter and taller specimen (Pl. 2, Fig. 12, op. cit.) probably belonging to another species. Typical specimens of *D. ürmösensis* are figured by Pauliuc (1968, Pl. 25, Figs. 3, 4 — under the name of *Tellina ürmösensis)* and in the present paper (Pl. I, Figs. 5, 6 ; Pl. II, Fig. 9). Both with the specimens figured by Pauliuc and by us (Plate II, Fig. 9) in this paper the posterior wing can be clearly seen. All the specimens assigned to the species *D. ürmösensis* come from the outcrop in the Ormeniș village (Perșani Mountains).

A great number of specimens differ from those described above by the position of the umbo which is closer to the median part of the valve and by higher valves. Their ornamentation, which consists of irregular and rounded concentric ribs and of radial ribs, is generally more vigorous. By the mentioned characters these specimens (Pl. I, Figs. 1, 3, 9, 11 ; Pl. II, Figs. 7, 8) resemble *Didymotis variabilis* Gerhardt, but not knowing the variability domain of this species we cannot assign them to it with certainty. A single specimen of this type comes from the Racilor Brook (Augustin, Perșani Mountains) (Pl. I, Fig. 11), the others come from Caugagia (Babadag Basin, North Dobrogea).

Among the specimens from Caugagia, several (Pl. II, Figs. 4, 5, 6) are marked by the anterior position of the umbo, the rounded anterior part, the more elongated posterior part, which is obliquely truncated, and the relatively strong convexity of the valves. These specimens might belong to a species different from the mentioned ones, but the

fragmentary material and especially the lack of relevant literature do not allow a rigorous determination.

Finally some other specimens come from the Satului Brook — Ormeniș (Perșani Mountains) and belong to the collection of D. Patrulius (I.G.G. — P. 2546) who labelled them as *Inoceramus persanensis* n. sp., but did not describe and figure them so far. These specimens (Pl. I, Fig. 4 ; Pl. II, Figs. 10, 11) are characterized by an almost circular outline, a small and sharp umbo which does not project above the hinge line, and a posterior wing, clearly delimited from the disc. Ornamentation consists of sharp, relatively spaced, concentric ribs and very fine radial ribs. The shell is extremely thin and of prismatic structure.

It can be noticed that these specimens, by their outline, are related to the genus *Sergipia,* while by ornamentation to the genus *Didymotis.* At least provisionally, we include them to the latter genus under the name given by Patrulius, that is *Didymotis persanensis* (Patrulius MS), n. sp. designating as holotype the specimen from Plate I, Figure 4.

As regards the stratigraphic interval in which the genus *Didymotis* appears, Imlay (1955) mentions that when the stratigraphic situation is clear the genus always appears in America together with Coniacian ammonites. Kauffmann (1977, 1978) states that the genus *Didymotis* is characteristic of the Lower Coniacian, and at the same time that *"Inoceramus" akamatsui* Yehara, included by some authors (Imlay, 1955 ; Matsumoto, 1977) to the genus *Didymotis,* in fact belongs to the genus *Sergipia ;* therefore its presence in the Turonian is not in contradiction with the quality of *Didymotis* as index genus for the Lower Coniacian. We think that the problems connected with the separation of the two genera are not yet elucidated.

Concerning the age of the genus in Romania we underline that the specimens of *Didymotis* at Caugagia, in the Babadag Basin, come from two levels situated at an interval of 9-10 m of stratigraphic thickness from each other. In the first level *Didymotis* is associated with *Barroisiceras haberfellneri* and *Inoceramus rotundatus,* while in the second level with *Inoceramus waltersdorfensis waltersdorfensis.* Therefore here the genus surely occurs in the Lower Coniacian.

The situation in the Perșani Mountains is not so clear as in the outcrop from the Ormeniș Village, from which all the specimens of *Didymotis ürmösensis* were collected, ammonites indicating a sure age lack. We mention however that *Neocrioceras (Schlueterella) kossmati* (Sim.) which occurs here as well as in the Babadag Basin and on the Cheia Valley (Vînturarița), in the last two places is surely located in the Coniacian. It is also worth mentioning that in the section on the Cărbunelui Brook (Racoșul de Sus, Perșani Mountains), in the level with *Subprionocyclus* (Upper Turonian) specimens of *Didymotis* do not occur, although, judging by lithology, the ecological conditions were similar to those in the outcrop of the Ormeniș village. In our opinion these are sound arguments for the Coniacian age of the strata containing *Didymotis* in the Perșani Mountains. Thus one can state that

the faunal associations described by Simionescu (1899) and Pauliuc (1968) from the outcrop in the Ormeniș village, which was declared a geological reservation, wholly belong to the Lower Coniacian.

The importance of the genus *Didymotis* in inter-regional and inter-continental correlations obviously increases by the identification of various species of it in quite a large number also in Europe.

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PREZENȚA GENULUI *DIDYMOTIS* GERHARDT, 1897 (BIVALVIA) ÎN CRETACICUL SUPERIOR DIN ROMÂNIA ȘI SEMNIFICAȚIA LUI BIOCRONOLOGICĂ

(Rezumat)

Genul *Didymotis* a fost creat pentru specimene de Bivalvia de talie mică pînă la medie, în general alungite paralel cu marginea de închidere lungă și dreaptă, existînd însă și unele specii cu contur aproape circular. Toate speciile genului prezintă o aripă posterioară îngustă dar lungă, cochilia fiind foarte subțire, cu grosime aproape constantă și avînd un strat prismatic ca la inocerami. Valvele sînt egale, cu boltire mai slabă sau mai puternică, umbonele mic, ascuțit ce nu depășește marginea de închidere, poziția lui variind de la o specie la alta. Ornamentația constă în coaste concentrice ascuțite sau rotunjite și din coaste radiare mai largi sau mai înguste dezvoltate mai ales pe partea inferioară a valvelor.

După conturul valvelor, după gradul lor de boltire, poziția umbonelui și ornamentație, materialul din România (care provine din munții Perșani și bazinul Babadag) aparține la mai multe specii dintre care cea creată de Simionescu sub numele de *„Tellina" ürmösensis* (credem că este o specie validă, ca și cea etichetată de Patrulius sub numele de *Inoceramus persanensis*, descrisă și figurată în prezenta lucrare. Mai multe specimene aparțin probabil speciei *D. variabilis* Gerhardt, altele aparținînd probabil unor specii inedite.

În Europa genul *Didymotis* este practic necunoscut pînă în prezent, singura mențiune asupra existenței lui aparținînd lui Kauffman (in Herm et al., 1979).

Peste tot unde apare în asociație cu amoniți caracteristici genul *Didymotis* este localizat în Coniacianul inferior, fapt confirmat și în România (bazinul Babadag), așa că speciile genului reprezintă bune indicatoare pentru acest interval stratigrafic, servind și la corelări intercontinentale.

EXPLANATION OF PLATES

Plate I

Figs. 1, 3, 9. — *Didymotis* sp. (aff. *D. variabilis* Gerhardt). Lower Coniacian, Bal-Bair Hill, Caugagia, Babadag Basin, North Dobrogea.

Figs. 2, 7, 8, 10, 12. — *Didymotis* spp. Lower Coniacian, Bal-Bair Hill, Caugagia, North Dobrogea.

Fig. 4. — *Didymotis persanensis* (Patrulius MS) n. sp. (Holotype). Lower Coniacian, Ormeniș village, Perșani Mts.

Figs. 5, 6. — *Didymotis ürmösensis* (Simionescu). Lower Coniacian. Ormeniș village, Perșani Mts.

Fig. 11. — *Didymotis* sp. (aff. *D. variabilis* Gerhardt), Lower Coniacian, Racilor Brook-Augustin, Perşani Mts.

All the specimens are figured natural size and belong to the Collection of the Institute of Geology and Geophysics in Bucharest.

Plate II

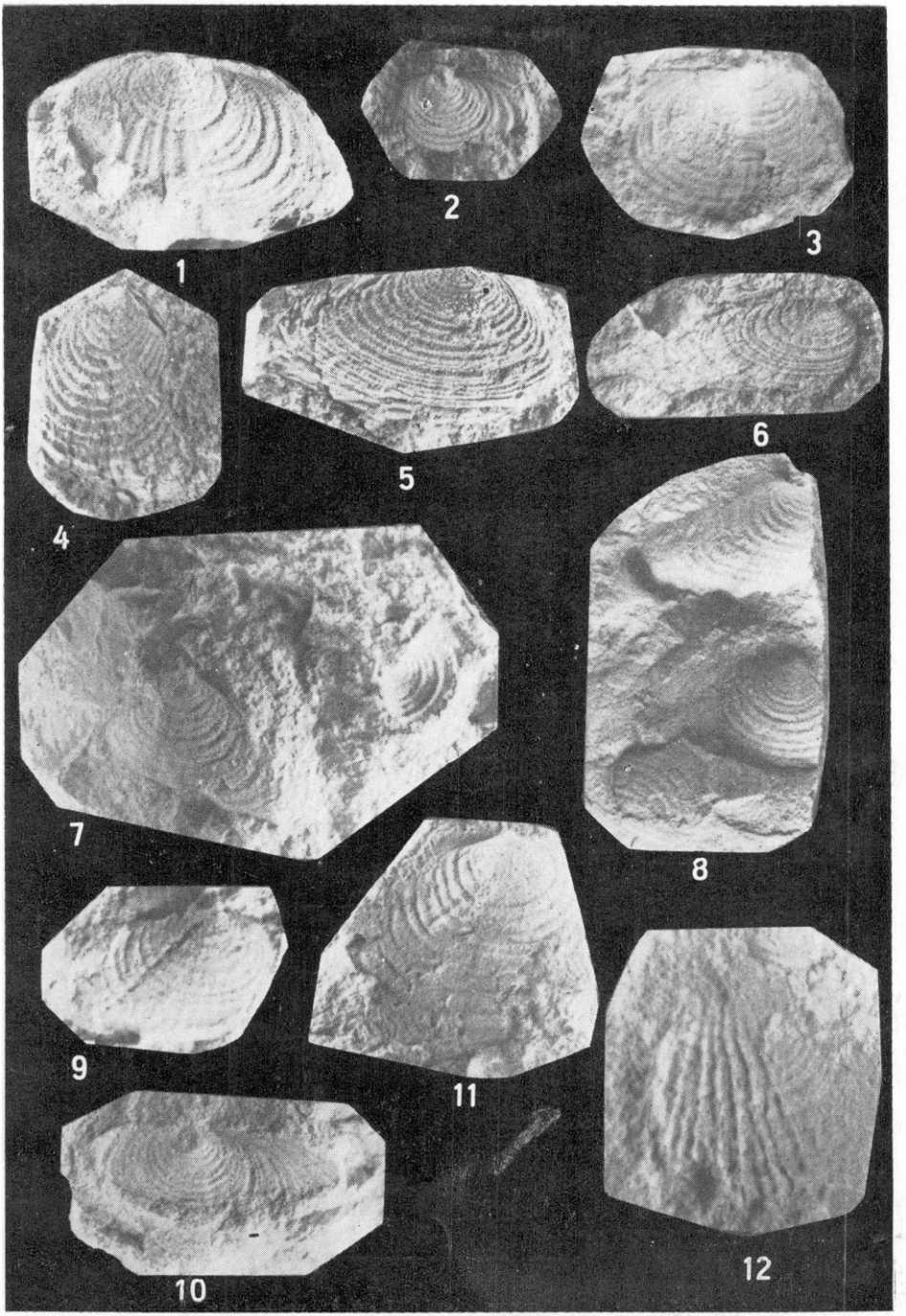
Figs. 1, 3, 4, 5. — *Didymotis* n. sp.? Lower Coniacian, Bal-Bair Hill, Caugagia, Babadag Basin, North Dobrogea.

Figs. 2, 6, 7. — *Didymotis* sp. (aff. *D. variabilis* Gerhardt), Lower Coniacian, Caugagia, North Dobrogea.

Fig. 8. — *Didymotis ürmösensis* (Simionescu) (typical specimen with well developed posterior wing), Lower Coniacian, Ormeniş village, Perşani Mts.

Figs. 9, 10. — *Didymotis persanensis* (Patrulius MS) n. sp. (paratypes) Lower Coniacian, Ormeniş village, Perşani Mts.

All the specimens are figured natural size and belong to the Collection of the Institute of Geology and Geophysics in Bucharest.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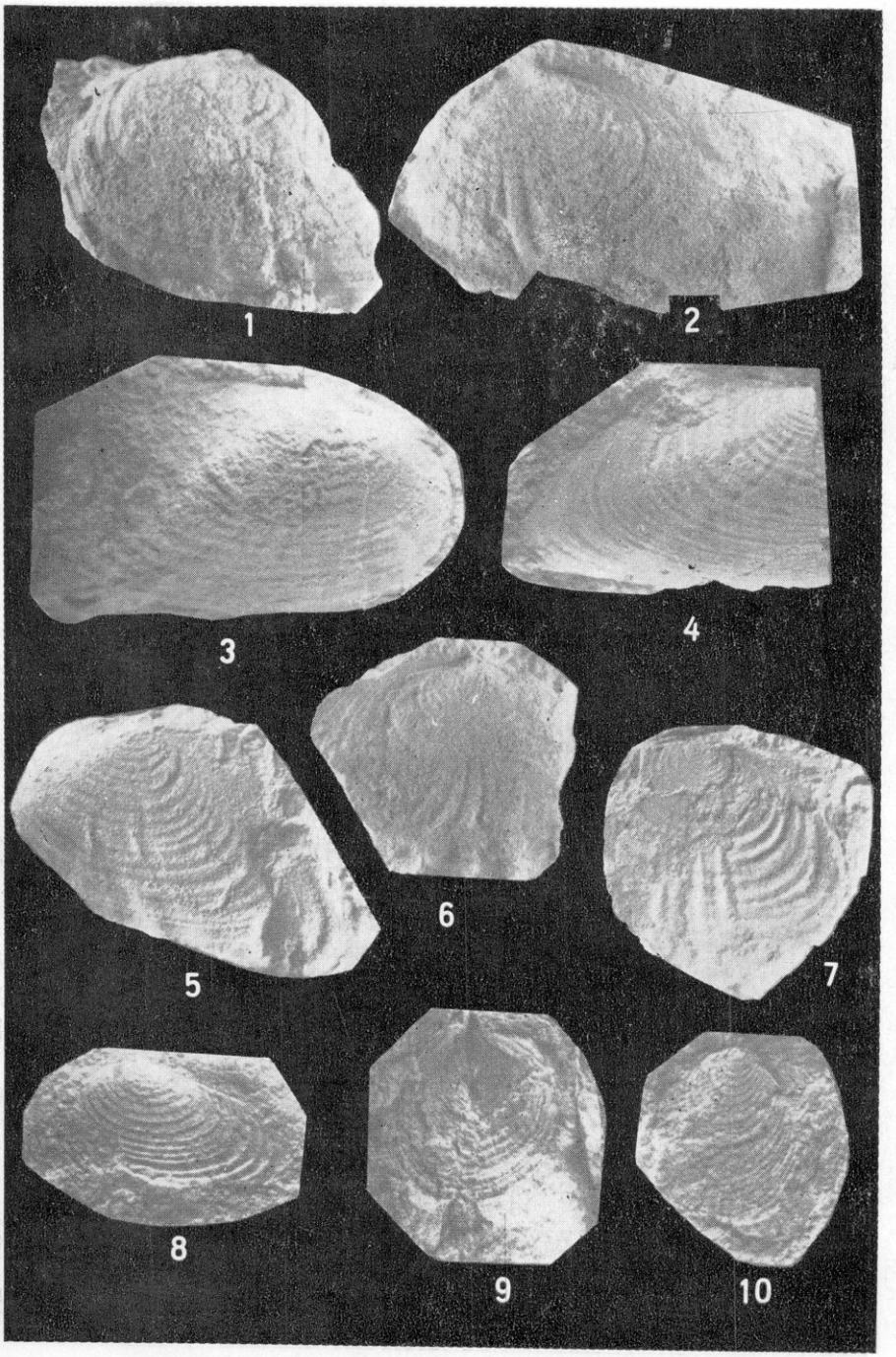
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