

THE CRETACEOUS LIMESTONES WITH RUDISTS FROM THE GODEANU QUARRY (MEHEDIŢI COUNTY, SW ROMANIA)

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Abstract. Several limestone samples were collected from the limestone quarry located within the Godeanu village (Obârșia Cloșani commune, Mehedinți County, SW Romania) belonging to the Danubian Domain (Lainici nappe), some of which proved to be fossiliferous. Following the paleontological examination, it was found that the fossils belong to the species *Toucasia carinata* MATHERON 1842 and *Requenia ammonia* (DOUVILLÉ) 1838, which are characteristic of the Barremian-Aptian.

Keywords: limestones, Godeanu quarry, Barremian-Aptian, *Requenia*, *Toucasia*, Danubian Domain.

Rezumat. Calcarele cretacice cu requeniidae din cariera Godeanu (jud. Mehedinți, SV României). Din cariera de calcare situată pe raza satului Godeanu (comuna Obârșia Cloșani, jud. Mehedinți, SV României) care aparțin domeniului Danubian (pânza de Lainici) au fost recoltate mai multe eșantioane de calcare, dintre care unele s-au dovedit a fi fosilifere. În urma examinării paleontologice, s-a constatat că fosilele aparțin speciilor *Toucasia carinata* MATHERON 1842 și *Requenia ammonia* (DOUVILLÉ) 1838, caracteristice Barremian-Aptianului.

Cuvinte cheie: calcare, cariera Godeanu, Barremian-Aptian, *Requenia*, *Toucasia*, domeniul Danubian.

INTRODUCTION

The Godeanu village is a component of the Obârșia Cloșani commune, being located about 20 km west of Baia de Aramă town. From an administrative point of view, it belongs to the Mehedinți County (SW Romania, Fig. 1).

The limestone quarry is located right at the entrance to the village, on the right side of the national road DN 67D Târgu Jiu - Băile Herculane. The quarry front, which is characterized by a rough west – east orientation, is approximately 200 meters long and has a maximum height of about 6 meters (Fig. 2).

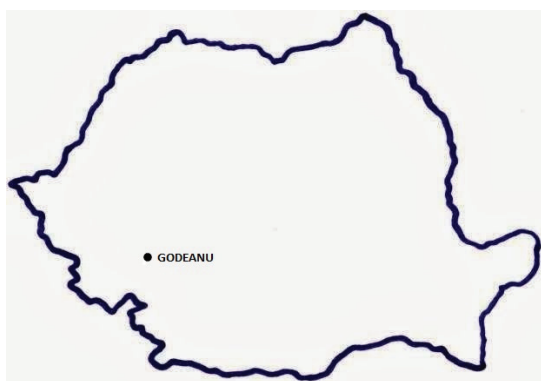


Figure 1. Location of Godeanu on the map of Romania.



Figure 2. The Godeanu quarry (photo Aurelian Popescu).

The mined limestones are compact, very hard, grey, and sometimes fossiliferous.

The fossil samples were collected during the years 2018 and 2019 by one of the authors (Aurelian Popescu), during field expeditions for the construction of a lithotheque of the Oltenia region (SV Romania). The present article deals with the results obtained through the analysis of these samples in rudists.

GEOLOGICAL FRAMEWORK

The geology of the lands that appear at the surface in the Mehedinți Plateau has been described in detail by several authors: CODARCEA 1940, DRĂGHICI 1962, MERCUS 1957, 1959, HÎRTOBANU 1975, ENACHE 2008. Our research on the limestone quarry shows that it is located in the upper Albian, just below the Albian-Cenomanian deposits, just as in the case of Nadanova.

In a simplified west - east cross-section stretching from the foot of the Mehedinți Mountains to the Brebina Valley springs, the following sedimentary formations of the Danubian Domain emerge (Fig. 3).

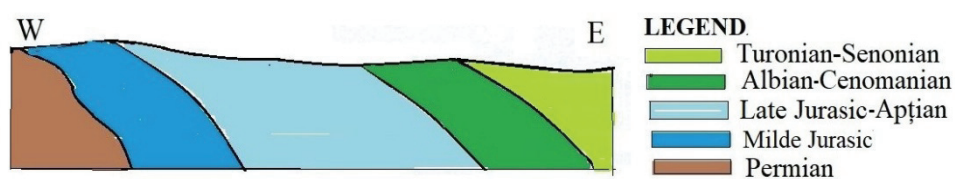


Figure 3. Geological section in the Godeanu quarry sector

Upper Permian - with conglomerates, sandstones and red clays.

Middle Jurassic - represented by quartzite sandstones and marls, which are discordant over the Permian deposits.

Upper Jurassic-Aptian – at the lower part of which there are stratified limestones with flints, followed by massive gray limestones in which MERCUS (1957) described, in the case of Nadanova, *Requenia scalaris* var. *minor* Douvillé and *Toucasia carinata* Matheron, which belong to Barremin-Aptian.

Albian-Cenomanian - represented by the “Nadanova Beds”, consisting of an alternation of limestone, calcareous schists and marls (ENACHE, 2008).

Turonian-Senonian – with wildfish character, consisting of black clays and sandstones in chaotically placed plates (ibidem).

MATERIAL AND METHOD

Several samples of limestone with Requieniidae were taken (Fig. 4) and other small Rudists (Fig. 5).



Figure 4.
Godeanu quarry sample,
with Requieniidae (photo Constantin Enache).



Figure 5. Small rudists
(photo Aurelian Popescu).

The descriptions and images presented in the scientific works listed by the authors in the References section were used to determine the fossils from Godeanu's quarry (MASSE, 1995; CHIKHI-AOUMIER, 1983; MASSE, ÖZER, FERENCI-MASSE 2004; as well as palaeontology treatises: DAVITAŞVILI (1956), NISTOR-HANGANU et al. (1982), NISTOR HANGANU et al. (1983).

RESULTS

*PALEONTOLOGY***Class: Bivalvia****Order:** Hyppuritoida**Family:** Requinidae DOUVILLÉ 1914**Genus:** *Toucasia* MUNIER-CHALMAS, 1873***Toucasia carinata*** MATHERON 1842

(Plate I, Figs. 6-9)

1842 *Toucasia carinata* MATHERON, pp. 35-38, Plate I, Figs. 4-6.1903 *Toucasia carinata* PÂQUIER, p. 41, Figs. 4-5, Plate VI, Figs. 1-2.1915 *Toucasia carinata* PÂQUIER, p. 10, Plate 6, Figs. 1-2.1959 *Toucasia carinata* MERCUS D. p. 970, Fig. 2.1972 *Toucasia carinata* MACAROVICI & TURCULEȚ, p. 96, Plate XXXIII, Fig. 61967 *Toucasia carinata* SAULEA, p. 526, Plate XXXI, Fig. 51983 *Toucasia carinata* CHIKHI-AOUIMEUR. pp. 35 - 38, Plate I, Figs. 4-6.2004 *Toucasia* gr. *carinata landelei* MASSE, FERENCI-MASSE, OSER p. 525, Figs. 4A-B.2007 *Toucasia carinata* MACÉ-BORDY, Figs. 3B-C.

Inequivalve shell. The opening is oval, compressed in the antero-posterior direction. The left (fixed) valve has a compression in the antero-posterior direction within the section that is perpendicular to the plane of the valve commissure. The left border is thicker than the right one, being slightly curved. The left valve has a rounded lateral posterior and an almost flat anterior part.

The dorsal-ventral axis (DV) varies between 5 - 8 cm, while the antero-posterior (AP) axis varies between 4 and 5 cm. Therefore, the ratio (AP / DV) is 0.8 to 0.71, which represents a value very close to that of *Toucasia carinata* MATHERON (1842) from Orgon, Bouches-du-Rhone. We attribute to this toucasiform genus the lower valve of the shell, which has an elongated, asymmetrical part whose posterior side is raised above the commissure. The front margin is thicker than the back one.

Geographical and paleontological distributionMATHERON (1842) describes *Toucasia carinata* from Orgon, Bouches du Rhône (holotype), France.CZABALAY (1994) mentions *Toucasia carinata* in Austria.

According to CHIKHI-AOUIMEUR (2002), it is known in the Aptian from Northern Africa (Algeria, Tunisia) and Southern Europe (Spain, Bosnia, Bulgaria, France, Yugoslavia, Serbia) in Barremian-Aptian Urgonian limestones.

Genus: *Requenia* MATHERON 1842***Requenia scalaris*** MATHERON 1842

(Plate I Figs. 10-12)

1878 *Requenia ammonia* BAYLE, Plate CIV, Fig. 31886 *Requenia ammonia* DOUVILLÉ, p. 765, Plate XXVIII, Figs. 1-71918 *Requenia ammonia* DOUVILLÉ H. p. 7, Plate 1, Figs. 1-51959 *Requenia scalaris* var. *minor* MERCUS D. p. 976, Fig. 11972 *Requenia ammonia scalaris* MACAROVICI & TURCULEȚ, p. 96, Plate XXXIII, Fig. 51967 *Requenia scalaris* SAULEA, p. 526, Plate XXXI, Fig. 161995 *Requenia ammonia*2007 *Requenia ammonia* MACÉ-BORDY, Fig. 1H

Extremely inequivalve, spiralled shell. The left valve, identified as such, is rolled-up. Near the commissure, the contour of this valve is almost circular or oval. The hinge is a little obvious. The left valve has a small tooth slightly raised and a dimple separated from the visceral cavity by two teeth, also poorly developed. At the commissure level, the antero-posterior diameter of the left valve varies between 3 and 4 cm.

Geographical and paleontological distributionThe same as *Toucasia carinata* Math.***Requenia* sp.**

(Plate III Fig. 14)

2004 *Requenia* sp. MASSE, OZER, FERENCI-MASSE, p. 79, Fig. 4b.

Small size requenids (less than 2 cm) form dense assemblies, associated to a micritic matrix. With the oval shell and the absence of a myoforal plate on the lower valve suggests belonging to *Requenia* but its belonging to *Matheronia* cannot be excluded either (MASSE et al., 2004).

Geographical and paleontological distribution

Quoted by Masse (2004) in the Aptian from the mainland Italy.

***Agriopleura* sp.**

(Plate III Fig. 15)

1992 *Agriopleura* sp. MASSE, p. 247, Figs. 4 a, b

The cross section through the lower valve at the level of the commissure is almost triangular, characteristic for this species. The figure shows the anterior and posterior tooth fosses. The cross sections at the level of the commissure vary between 10/12 mm and 7/10 mm.

Geographical and paleontological distribution

Quoted by Masse (1992) in the lower Aptian from the mainland Italy.

Pentalodontia sp.

(Plate III Fig. 16)

2004 *Pentalodonta* ? sp. MASSE, ÖZER, FERENCI, p. 81, Fig. 6

This shape is illustrated by a cross section of the lower valve. Due to the thinner rear part this form is therefore *Petalodontia*.

Geographical and paleontological distribution

Quoted by MASSE et al. (2004) in the limestones of the lower Aptian from the mainland Italy.

Himaelites sp.

2004 *Himaelites* sp. MASSE, FERENCI-MASSE, VELIĆ. p. 125, Plate III, Figs.1-4

We attribute to this genre a set of cross sections of the lower valve. The contour is rounded with a slightly antero-dorsal-postero-ventral compression. The dorso-ventral (DV) axis has a length of 3.2 to 4 cm, while the antero-posterior (AP) is 2.5 to 3 cm.

The sharp posterior part which is ended with a vertical cut, is characteristic of this species.

Geographical and paleontological distribution

Quoted by MASSE et al. (2004) in the karst limestones of the Dinaric Alps in Croatia.

DISCUSSIONS

Toucasia carinata, described and represented by MATHERON (1842), was reported in the French province of Midi only in the limestone deposits belonging to the Upper Barremian - Lower Aptian. Since 1933, in the Cretaceous of the Getic Nappe, MACOVEI & ATANASIU mention compact limestones from the Reșița area, with numerous specimens of *Toucasia carinata* and *Requienia ammonia*, characteristic for the lower Barremian - Aptian.

CODARCEA (1940), who studied the southern Banat and the Mehedinți Plateau regions, also mentions *Toucasia carinata* only in the Barremian-Aptian limestones from the sedimentary of the Getic Nappe from the Resita area.

MERCUS (1957), who studied the "Nadanova Beds" belonging to the Danubian Domain in the Mehedinți Plateau, mentions the massive grey limestones in the Urgonian facies below these strata, in which, for the first time, he cites *Requienia scalaris* var. *minor* and *Toucasia carinata*, which attests to their Barremian-Aptian age.

SAULEA EMILIA (1967) mentions the massive Neo-Jurassic limestones that continue in the Cretaceous, starting from the Cerna area to Tismana, with rare specimens of *Requienia scalaris* and *Toucasia carinata*.

In the note on the *Geological Map of Romania*, Scale 1:200,000, *Baia de Aramă* sheet, NĂSTĂSEANU & BERCIA (1968) mention the massive upper Barremian limestones - Aptian with *Requienia scalaris* var. *minor* Douv. and *Toucasia carinata* in the Danubian Domain.

NĂSTĂSEANU S & BERCIA I. (1968) in the note on the geological map of Romania Sc: 1/200.000, the *Baia de Aramă* sheet, they mention in the massive Barremian-Upper Aptian limestones *Requienia scalaris* var. *minor* Douv. and *Toucasia carinata* Mat., without mentioning where these fossil shapes were reported and without quoting the author.

MERCUS D. (1957, 1959) who studied "the Nadanova Beds" in the ~~native~~ Danubian Domain mentions the massive grey limestones in the Urgonian facies below these layers, in which, for the first time, he quotes and images *Requienia scalaris* var. *minor* Douv. and *Toucasia carinata* Mat., which attests to their Barremian-Aptian age. In the article published in 1959, he mentioned, at the end, that "it remains for future research to prove to what extent these conclusions can be extended to other regions of the Cerna sedimentation zone". Our research is part of the evidence of the extension of limestones with Barremian-Aptian *requenies*, in the northwest of the Mehedinți Plateau at Godeanu.

CONCLUSIONS

The fossiliferous limestones from Godeanu quarry are located about 15 km north of Nadanova, constituting the second fossiliferous place with *Toucasia carinata* Math. and *Requienia ammonia* Math., which attests within this new sector of the Mehedinți Plateau the Upper Jurassic-Aptian age in the Danubian Domain.

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Received: March 30, 2020

Accepted: August 11, 2020

Plate I



Figure 6. *Toucasia carinata* Math. x1

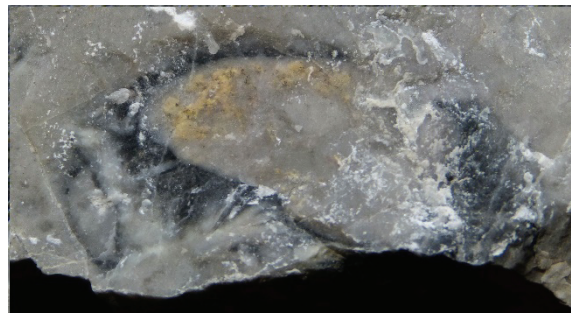


Figure 7. *Toucasia carinata* Math x1



Figure 8. *Toucasia carinata* Math. x1



Figure 9. *Toucasia carinata* Math. x1



Figure 10. *Requienia scalaris* Math. x1

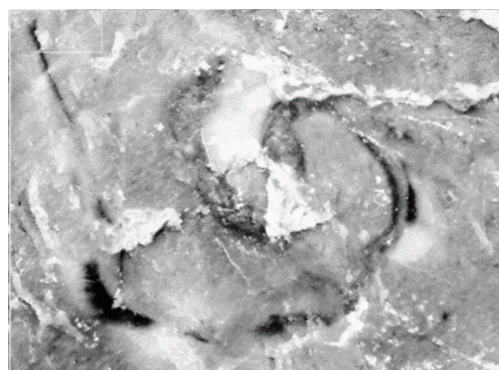


Figure 11. *Requienia scalaris* Math.x1



Figure 12. *Requienia scalaris* Math x1

Plate II

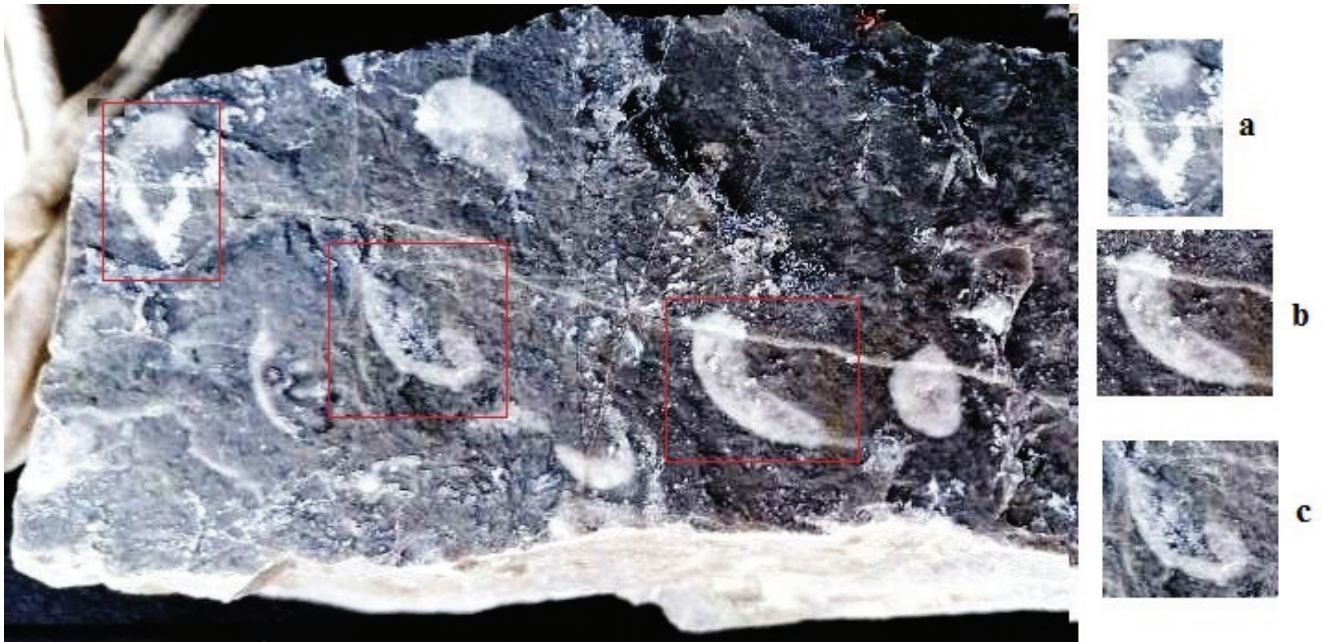


Figure 13. Godeanu quarry sample. a, b, c: *Himaelites* sp x 2 (Photo Constantin Enache).

Plate III

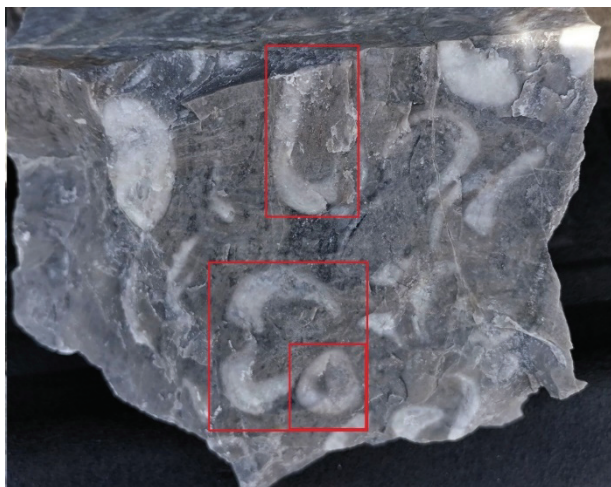


Figure 14. *Requienia* sp. x1



Figure 15. *Agripleura* sp x1



Figure 16. *Petalodontia* sp. x1

Figure 14. a. *Requienia* sp.; b. *Agripleura* sp.; c. *Petalodontia* sp. (Photo Constantin Enache).