

## TAXONOMIC NOTES ON THE BADENIAN CORALS FROM LĂPUGIU DE SUS (FĂGET BASIN, ROMANIA)

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**Abstract.** The Paleontology-Stratigraphy Museum of the "Babeş-Bolyai" University hosts a rich collection of molluscs, corals, foraminifera and bryozoans from Lăpugiu de Sus.

The present study focuses on the description and systematic presentation of the originally undefined material existing in the museum coral collection (Şuraru collection with more than 107 samples). The fauna are relatively well-preserved, thus the significant morphological elements for the species identification could be easily identified.

A number of 24 coral species assigned to 9 families with 18 genera have been identified. Quantitatively, genus *Plesiastrea* dominates (29 samples), while genus *Porites* is well-represented at species level (four species).

**Key words:** Coelenterata, Scleractinia, Badenian, Lăpugiu de Sus, Romania

### INTRODUCTION

After they being mentioned at Lăpugiu 150 years ago, the Badenian corals were subsequently rarely studied in Romania.

Lăpugiu de Sus is situated south from Mureş river, in the Făget Depression. This small Neogene basin represented one of the eastward extensions of the Pannonian Basin, and it is famous in Europe for its diverse Badenian fauna (molluscs, corals, bryozoans, foraminifers etc.) from Lăpugiu and Coştei. Numerous new species have been described by M. Hoernes (1856, 1870), R. Hoernes & Auinger (1879-1891), Boettger (1901-1907) Neugeboren (1847-1856). Age estimations were given by Petrescu et al. (1990), based on foraminifera, molluscs, and calcareous nannoplankton assemblages.

Corals have been only sporadically mentioned in several geological studies (Hauer & Stache 1863, Niţulescu 1930), or on the Badenian fauna, in general (Halavats 1876, Papp 1976).

The first paper exclusively focusing on corals was published by Neugeboren (1877), who described 28 species from Lăpugiu de Sus, but none was illustrated.

Koch (1900) synthesized the available information on the Badenian fauna identified by various authors from several occurrences in Transylvania. At that time, 37 species of corals had been recorded, mainly belonging to *Plesiastrea*, *Solenastrea* and *Trochocyathus* genera.

### MATERIAL AND METHODS

The material has been collected by M. Şuraru and N. Şuraru (Şuraru collection) some decades ago, during their field campaigns in Lăpugiu area. The undefined material was donated to the Museum of Paleontology-Stratigraphy of the

Babeş-Bolyai University in Cluj-Napoca, where it was inventoried and deposited.

The collection includes 107 fragments of colonies of solitary corals. The samples are relatively well-preserved, thus the significant morphological diagnostic elements (shape of colonies and calices, number and display of the septa, type of columella, the characteristic features of the coenosteum, etc.) are easy to identify.

### SYSTEMATIC PALEONTOLOGY

The coral material has been classified according to the schemes of Wells (1956) and Baron-Szabo (2006).

#### Phylum COELENTERATA

Class ANTHOZOA EHRENBERG, 1834

Order **Scleractinia** BOURNE, 1900

Suborder Astrocoeniina VAUGHAN & WELLS,  
1943

Family Acroporidae VERRILL, 1902

Genus ***Astreopora*** BLAINVILLE 1830

#### ***Astreopora* sp.**

Pl.1, fig.1

Material: one colony fragment (Inv. MPSUBB 23371).

Description: plocoid corallites with large coenosteum. Inside the calices, 16-18 septa are visible. The septa tend to gather towards the centre of the calice but the columella cannot be individualised.

Family Pocilloporidae GRAY, 1842

Genus ***Stylophora*** SCHWEIGGER 1819

#### ***Stylophora subreticulata* REUSS, 1871**

Pl.1, fig. 2

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- 1954 *Stylophora subreticulata* REUSS – Kopek, p.28, pl. X, figs. 1- 6, 8  
 1960 *Stylophora subreticulata* REUSS - Kojumdgieva, p. 14, pl. 1, figs. 3a, b  
 1972 *Stylophora subreticulata* REUSS – Hegedüs & Jankovich, pl. II, figs. 2-3

Material: one fragment of branch (dendroid colony) (Inv. MPSUBB 23372).

Description: The branch (height 1,7 cm/ diameter 1,3 cm) have circular shape in transversal section. Corallites distributed around the branch, slightly uprising, with circular calices. The coenosteum surface is finely-grained ornamented.

The exterior surface of the wall is ornamented with fine ribs. Six septa belonging to a single cycle are gathered inside the calices, around a very thin, styliform collumela.

Remarks: it resembles *Stylophora* cf. *sokkohennsis* GERTH, described and illustrated by Schuster (2002a, p.16, pl. 2, figs 7-8).

Suborder Faviina VAUGHAN & WELLS, 1943  
 Family Faviidae GREGORY, 1900  
 Genus *Favia* OKEN, 1815

***Favia gotschevi* KOJUMDGIEVA, 1960**  
 Pl.1, Fig. 3

- 1960 *Favia gotschevi* n. sp.- Kojumdgieva, p. 15, pl. II, fig. 1-2

Material: one fragment of colony (Inv. MPSUBB 23373).

Description: plocoid corallites, with more or less circular calices. The calices is deepened, and the wall rises about 1.5-2 mm over the coenostem surface. Numerous septa (22-24) are individualised belonging to 4 cycles. The first two cycles of septa reach the columella that is of spongy parietal type, or it may be absent. The third cycle is shorter; it represents 2/3 of S1. The septa belonging to the fourth cycle represent 1/3 of S1. The synapticulotheca shows well-pronounced ribs, interrupted by exothecal dissepiments. Both endothecal and exothecal dissepiments are present.

Remarks: the species is very similar to *Favia* sp. described by Schuster (2002b, p. 63, pl.2, figs.7, 8). These forms show the same number of septa and number of cycles, and their display is common, as well as the spongy collumela.

*Favia gotschevi* has been identified at Lăpugiu by Papp (1976).

Genus *Favites* LINK, 1807

***Favites neglecta* (MICHELOTTI in**

**D'ACHIARDI, 1868)**  
 Pl.1, figs. 4, 5

- 1960 *Favites neugeboreni* REUSS- Kojumdgieva, p. 15, pl. I, fig. 4, 5  
 2002b *Favites neglecta* ((MICHELOTTI in D'ACHIARDI)-Schuster, p. 63, Pl. 3, figs. 1-4  
 2002d *Favites neglecta* ((MICHELOTTI in D'ACHIARDI)-Schuster, p. 140, Pl. 4, figs. 1-3  
 2005 *Favites neugeboreni* REUSS – Tsaparas & Marcopoulou-Diacantoni, p. 632, pl. I, figs. 1-2

Material: seven fragments of colonies (Inv. MPSUBB 23374).

Description: massive colonies, ceroid and polygonal corallites. The calices, with diameters of 5-10 mm, are less individualised due to a very thin theca.

There are between 20-28 septa, which are free, and belong to four cycles. They are thin, porous and covered by granulations. S1 and S2 reach the columella. The distal margins of the septa are heterodont.

The columella is spongy and poorly-developed – it may even be missing from some calices.

Remarks: Species *F. neglecta* (= *Prionastrea Neugeboreni*) has been noticed at Lăpugiu by Neugeboren (1877, p. 50). It has been also identified in Bahna basin (Macovei 1909, p. 77).

The Papp collection, currently hosted by the Museum of Paleontology-Stratigraphy of the Babeş-Bolyai University Cluj-Napoca includes a fragment of *Favites* sp. (1976, p. 102, pl. XVII, fig. 6) that can be probably assigned also to species *Favites neglecta*.

***Favites oligocenica* CHEVALIER, 1955**  
 Pl.1, fig. 6

- 2002c *Favites oligocenica* LINK, - Schuster, p. 95, pl. 5, figs. 5-8

Material: one colony (Inv. MPSUBB 23375).

Description: cerioid corallites, pentagonal or hexagonal. The calices show common walls and the calices is pronouncedly deepened. Inside the calices, 25 to 32 septa are present, belonging to three cycles. The first two cycles touch the porous, poorly-developed columella. S1 and S2 have almost the same length and thinness, and they show paliform lobes. S3 are shorter, they represent 2/3 of S1. In some calices, the fourth cycle of very short and thin septa was also noticed. Laterally, the septa are fine grained. Numerous endothecal and exothecal dissepiments are present. The wall is of septothecal type.

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Genus *Plesiastraea* EDWARDS & HAIME 1848

*Plesiastraea conoidea* REUSS, 1871

Pl.1, figs. 7, 8

1909 *Heliastrea conoidea* REUSS, - Macovei, p. 132, pl. VIII; fig. 5

1954 *Orbicella conoidea* (REUSS)- Kopek, p. 11, pl. II, figs. 3, 7, 8, 9, pl. III, figs. 1, 2

1960 *Heliastrea conoidea* REUSS- Kojumdjieva, p. 17, pl. IV, figs. 2-3

1968 *Heliastrea conoidea* REUSS- Hînculov, p.75, pl. I, figs. 3-4

Material: 15 fragments of colonies (Inv. MPSUBB 23376)

Description: Plocoid corallites. The calices are small (1-2 mm); the distances in-between are < 1mm, or they even share common walls. The wall is ornamented with more pronounced ribs than in the case of *P. reussiana* REUSS. The calices are almost circular, and slightly deepened. Inside the calices there are 24 septa belonging to three cycles. S1 and S2 touch the columella, while S3 represents ½ of S1. The septothecal shows laterally ornamented ribs with fine spines ornamentation. The columella is styliform type.

The endothecal dissepiments are scarce and thin, while the exothecal ones are numerous, building up a vesicular coenosteum.

Remarks: species *P. conoidea* (= *Heliastrea conoidea*) was mentioned at Lăpugiu by Neugeboren (1877, p. 48,) and Papp (1976, p. 102, pl. XVII, fig. 5). Genus *Plesiastraea* is defined according to Wells (1956).

*Plesiastraea reussiana* (MILNE-EDWARDS & HAIME, 1850)

Pl.2, fig. 1

1909 *Heliastrea reussiana* (EDWARDS & HAIME) – Macovei, p. 131, pl. VIII; fig. 2 and pl. IX, fig. 1

1954 *Orbicella reussiana* (EDWARDS & HAIME) – Kopek, p. 9, pl. I, figs. 9-12

1960 *Heliastrea reussiana* (EDWARDS & HAIME) – Kojumdjieva, p. 16. pl. III, figs. 1,2

1968 *Heliastrea reussiana* (EDWARDS & HAIME) – Hînculov, p. 75, pl. I, figs. 1a, 1

Material: 14 colonies (Inv. MPSUBB 23377).

Description: massive colonies. Plocoid corallites The calices are 1-3 mm in diameter, with 1-6 mm distance in-between. The coenosteum surface is slightly deepened, and mainly ornamented with fine costae.

The circular calices are distinctive and arisen as compared to the coenosteum surface. Inside the calices, 24 septa belonging to 3 cycles were

noticed. The first two cycles touch the columella while the third cycle represents ½ of S1. The claviform- or rhopaloid-type septa are thicker in the axial zone. They are covered with granulations. The styliform-type columella is sometimes poorly visible due to the thickening of the septa. Septothecate wall. A vesicular caenosteum is present, while the endothecal dissepiments are very scarce and thin.

Remarks: The species was mentioned at Lăpugiu by Neugeboren (1877, p. 48).

Genus *Montastraea* BLAINVILLE, 1830

*Montastraea tchihatcheffi* (CHEVALIER, 1961)

Pl.2, fig. 2

1954 *Orbicella defrancei* (EDWARDS et HAIME) – Kopek, p.10, pl.

1960 *Heliastrea defrancei* (EDWARDS et HAIME)- Kojumdjieva, p. 16, Pl. III, fig. 1, 2

1968 *Heliastrea defrancei* (EDWARDS et HAIME) Hînculov, p. 76, pl.II, fig. 1

2002b *Montastraea tchihatcheffi* (CHEVALIER), Schuster, p. 63, Pl. 4, fig. 1, 2

Material: 14 fragments of colonies (Inv. MPSUBB 23378).

Description: Massive colonies. Plocoid corallites. The coenosteum surface almost totally ornamented with costae.

The calices are more or less circular, distinctive and slightly conical. They show diameters of 1-2 cm, and the distances in-between range between 3-4 mm. The 20-24 septa are displayed into three cycles. Septa belonging to the fourth cycles have been also noticed; they are very thin and short. The first two cycles touch the trabecular, well-developed columella. The septa are ornamented with subvertical spines ornamentation. The septa are compact in their distal end, but they become porous towards their proximal area.

Septothecate wall. The endothecal dissepiments are rare and thin; the exothecal dissepiments are also rare.

Remarks: Species *M. tchihatcheffi* (= *Heliastrea defrancei*) was mentioned from Lăpugiu de Sus by Neugeboren (1877, p. 48) and Papp (1976, p. 102, pl. XVII, fig. 2). The described species is similar to *Heliastrea oligophilla major* CHEVALIER, according to Hegedüs & Jancovich (1970, p. 47, pl. II, figs. 1,4) and to *Heliastrea oligophilla* REUSS, 1871 described by Hegedüs & Jancovich (1970, p. 49, pl. III, figs. 1-2) and Tsaparas & Marcopoulou-Diacantoni (2005 p. 631, pl. I, figs. 3, 4).

*Montastraea* sp.

Pl. 2, fig. 3

Material: one colony fragment (Inv MPSUBB 23393).

Description: poorly-preserved colony, in the upper part no intact calice is noticeable. The coenosteum surface consists of thick costae that are curved at the junction points. There are numerous septa (20-24) belonging to four cycles. The first two cycles are similar concerning length and thickness, and they reach the trabecular columella. The last cycle is much shorter and thinner. The septa are distally porous. A well-developed septotheca is present.

Remarks: the species is very similar to the previously described one (*M. tchihatcheffi*), except for the calices that are larger and show thicker septa.

Genus *Tarbellastraea* ALLOITEAU, 1952

***Tarbellastraea reussiana* (MILNE-EDWARDS & HAIME, 1950)**

Pl.2, fig. 4

1963b *Tarbellastraea reussiana* (MILNE-EDWARDS & HAIME)- Kühn, p. 104, pl. 1, figs. 4-6

1990 *Tarbellastraea reussiana* (MILNE-EDWARDS & HAIME)- Oosterbaan, p. 9, pl. 1, fig., 3

1996 *Tarbellastraea reussiana* (MILNE-EDWARDS & HAIME)- Stolarsky, p. 630, pl. 176, fig. 2

2002d *Tarbellastraea reussiana* (MILNE-EDWARDS & HAIME)- Schuster, p. 142, pl. 5, figs. 7,8

2005 *Tarbellastraea reussiana* (MILNE-EDWARDS & HAIME)- Tsaparas & Marcopoulou-Diacantoni, p. 632, pl. I, figs. 5, 6

Material: three fragments of colony (Inv. MPSUBB 23379).

Description: massive and plocoid colonies. Small calices (1-2 mm), located at very short distances were noticed. Sometimes they may share common walls. There are 24 thin septa belonging to three cycles. In the case of this species, S<sub>1</sub> touches the styliform columella that arises above the septa. Very fine granulations is typical.

Remarks: Oosterban (1990, p. 9, pl. 1, fig. 3) established a synonymy between *Orbicella conoidea* and *Orbicella reussiana* described and illustrated by Kopek (1954), and *T. reussiana*.

Genus *Solenastrea* EDWARDS & HAIME, 1848

***Solenastrea romettensis* (SEGUENZA, 1864)**

Pl.2, fig. 5

1909 *Solenastrea distans* REUSS, - Macovei, p. 134, pl. VIII, fig. 1

1954 *Cyphastraea distans* (REUSS), - Kopek, p. 12, pl. III, figs. 3, 6, 7, 8, 9 and pl. IV, figs. 1,3

1960 *Tarbellastraea distans* REUSS – Kojumdgieva, p. 18. pl. IV, fig. 6

1968 *Tarbellastraea distans* (REUSS) - Hînculov, p. 76, pl. II, fig. 6

2002d *Solenastrea romettensis* (SEGUENZA), - Schuster, p. 142, pl. 6, figs. 3-5

Material: nine fragments of colony (Inv. MPSUBB 23380).

Description: massive, plocoid colony. The circular calices have diameters of 1-2 mm. They are well-individualised by a thickened wall and they are slightly arisen from the coenosteum surface. A distance of about 2-3 mm separates the individual calices. Inside the calices, 24 septa belonging to three cycles were noticed. S1 and S2 are almost similar concerning length and thickness and they reach the spongy columella. S3 are thinner and shorter, they represent ½ of S2. The septa of the first two cycles show paliform lobes that are bound to the columella. The septa are heavily ornamented with granulations. The endothelial dissepiments are very rare or even absent, while the exothelial ones are numerous and they build-up a vesicular coenosteum. Septothecate wall.

Remarks: Stolarski (1996, p. 631, pl. 176, fig. 1) established a synonymy between *Cyphastraea distans* (REUSS) and *Plesiastraea romettensis* (SEGUENZA), and *Palaeoplesiastraea desmoulinsi* (MILNE-EDWARDS & HAIME). Oosterban (1990, p. 11) established a synonymy between *Cyphastraea distans* and *Solenastrea desmoulinsi* (MILNE-EDWARDS & HAIME). Schuster (2002d, p. 143) considered that the species *Solenastrea romettensis* and *Solenastrea desmoulinsi* are distinctive, but showing very similar features.

Family Mussidae ORTMAN, 1890

Genus *Syzygophyllia* REUSS, 1860

***Syzygophyllia brevis* REUSS, 1860**

Pl.2, figs.6, 7

1909 *Syzygophyllia brevis* REUSS.- Macovei p. 129, tab. VII, fig. 3

1960 *Syzygophyllia brevis* REUSS - Kojumdgieva p. 19, pl. V, figs. 3, 4,5

1996 *Syzygophyllia brevis* REUSS – Stolarski p. 631, pl. CLXXV; fig. 2

Material: one solitary coralla (Inv. MPSUBB 23381).

Description: a small trochoid corallum (2.5 cm in height, 1.6 cm in diameter).

The calice is circular, enlarged and slightly elongated with parietal spongy columella (3 mm diameter).

The 64 septa prominent and thick belong to three cycles. S1 and S2 touch the columella

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while S3 represents ½ of S2. The septa are ornamented on the lateral sides with fine grains. Numerous thick endothecal dissepiments are present. The polypier shows several seasonal growth rings.

Rejuvenation is a phenomenon that is common in the case of this species, also remarked on the studied specimen. It seems that after an interval when the growth of the polypier has stagnated due to various causes, it continued its growth. The septotheca is ornamented with thick ribs.

Remarks: the species has been mentioned from Lăpugiu de Sus by Neugeboren (1877, p. 46), Halavats (1976, p. 232), and Papp (1976, p. 103).

Genus *Acanthophyllia* Wells, 1937

***Acanthophyllia ampla* (REUSS, 1871)**

Pl.2, figs. 8, 9

1954 *Lithophyllia ampla* REUSS – Kopek p. 14, pl. III, figs. 4, 5 and pl. IV, figs. 4, 5

1960 *Lithophyllia ampla* REUSS - Kojumdgieva p. 19, pl. V, figs. 1, 2

1990 *Acanthophyllia ampla* (REUSS) – Oosterban p. 12, pl.2, fig. 5

Material: 10 solitary coralla (Inv. MPSUBB 23382).

Description: turbate corallum shapes with lengths varying between 4.5-1.7 cm and the diameter in the 6-1.5 cm range.

The calice is circular and very slightly deepened.

There are numerous septa that belong to at more four cycles. They are regularly anastomosed. The septa belonging to the first cycle are more visible due to their much more developed thickness and heights. S2 are thinner, but they show almost the same height and they reach the columella. S3 join S2 before reaching the columella, while S4 are much thinner and shorter, representing ½ of S1. The septa of the S1 and S2 cycles show paliform lobes. The septa are ornamented with fine grains displayed as subvertical rows, their distal margin being heterodont. Spongy and thin columella. Exothecal dissepiments present.

Remarks: the species was mentioned at Lăpugiu de Sus by Neugeboren (1877, p. 46, *Lithophyllia ampla*), and Papp (1976, p. 103, *Lithophyllia ampla*).

Suborder Caryophylliida VAUGHAN & WELLS  
1943

Family Caryophylliidae GRAY 1847

Genus *Deltocyathus* Edwards & Haime, 1848

***Deltocyathus italicus* MILNE-EDWARDS &**

**HAIME, 1848**

Pl.3, figs. 1, 2

1909 *Deltocyathus italicus* EDWARDS & HAIME - Macovei, p. 128, pl. VII, fig. 2

Material: one solitary corall (Inv. MPSUBB 23383).

Description: solitary, turbate to flabellate corallum (1.2 cm in height, and 1.8 cm/1.5cm diameter).

Corallite elliptical with very large and deepened calice. Inside the calice numerous septa belonging to four cycles are noticeable. The septa (6) of the first cycle are longer and thicker. S2 (6) reach the proximity of the columella. S3 (12) are 2/3 of S1. They join S2 in their axial part. The fourth order septa are clearly shorter. The first three cycles show well-individualised pali. The septal faces are ornamented with irregular granulations. The parietal columella is distinctive. Septothecate wall with pronounced costae, that correspond to S1 and S2 septa.

Remarks: The species is remarkably similar with *Trochocyathus majzoni* Hegedüs illustrated by Kopek (1954, p. 26, pl. IX, figs. 21-22, pl. XI, figs. 10-11).

Genus *Caryophyllia* (*Acanthocyathus*)

EDWARDS & HAIME 1848

***Caryophyllia* (*Acanthocyathus*) *transilvanicus* (REUSS 1871)**

Pl.3, figs. 3, 4, 5

1954 *Acanthocyathus vindobonensis* REUSS, - Kopek, p.25, pl. IX, figs. 12-20

1909 *Acanthocyathus transilvanicus* REUSS, - Macovei, p. 127, pl. VII, fig. 1

1960 *Caryophyllia* (*Acanthocyathus*) *vindobonensis* (REUSS), - Kojumdgieva, p. 21, pl. VI, figs. 6, 7

1963a *Acanthocyathus verrucosus transilvanicus* REUSS – Kuhn, p. 99, pl. 17, fig., 8

1996 *Caryophyllia* (*Acanthocyathus*) *transilvanicus* REUSS- Stolarski, p. 634, pl. 177, fig. 3

Material: one solitary corolla (Inv. MPSUBB 23384).

Description: small ceratoid corallum. Inside the calice, 32 thick septa curved towards the axial side and regularly anastomosed are noticeable. These septa belong to three cycles. The septa of the fourth cycle are rare, and they are obviously thinner and shorter. Lateral, the septa are ornamented with a spines granulation.

The columella is spongy and well-developed.

Epithelial wall shows fine ribs corresponding to the septa. Besides this ornamentation, small

granules displayed in vertical rows are visible. The theca is ornamented and it shows spines of various sizes displayed on 6 vertical rows.

Remarks: the species has been mentioned from Lăpugiu de Sus by Neugeboren (1877, p. 44).

Suborder Fungiina VERILL, 1865  
Family Calamophylliidae VAUGHAN & WELLS,  
1943  
Genus *Calamophyllia* BLAINVILLE, 1830

***Calamophyllia* sp.**  
Pl.3, figs. 6, 7

Material: two solitary corals and two colonies (Inv. MPSUBB 23385).

Description: This species shows both solitary individuals and colonies that form only through budding processes, having always centres of monocentric type. The height of the corals varies between 1.3-3 cm. The calices diameter is in the 3-5 mm range. Inside the calices 20-26 free, bicuneiform septa are individualised, belonging to three cycles. Inside the larger calices, also the fourth cycle may develop. The first two cycles (S1, S2) are equal concerning thickness and length, and they reach the trabecular columella. S3 are almost of the same length, but thinner and they occasionally may reach the columella. When S4 are present, they are very thin and short. The septa are compact and ornamented on the lateral sides with fine granulations displayed on subvertical rows.

The epithelial wall is well-developed. Besides the numerous and thick ribs, also exothecal dissepiments crossing the ribs, thus forming the coenosteum.

Family Siderastreidae VAUGHAN & WELLS,  
1943  
Genus *Siderastrea* BLAINVILLE, 1830

***Siderastrea froeclhichiana* (REUSS, 1847)**  
Pl.3, fig. 8

1954 *Siderastraea froeclhichiana* (REUSS)- Kopek, p. 16, pl. IV, fig. 7

Material: three fragments of colony (Inv. MPSUBB 23386).

Description: massive, cerioid colonies. The calices are irregular, polygonal in shape, with diameters of about 2-3 mm. The wall is poorly individualised due to its very reduced thickness. The calices is almost flat. There are numerous septa belonging to at least three cycles. The septa are free and they may join the neighbouring septa. The first cycles' septa touch

the columella and may develop paliform lobes. The septa of the last cycle are shorter. The columella seems to consist of the internal trabeculae of the septa that gather in the centre of the calice. Extremely thinned endothelial dissepiments are present, and the parathecal wall is very thin too.

Family Poritidae GRAY, 1842  
Genus *Porites* LINK, 1807

***Porites leptoclada* REUSS 1871**  
Pl.3, fig. 9

1954 *Goniopora leptoclada* (Reuss)- Kopek, p. 29, pl. XI, fig. 8

1990 *Porites* cf. *leptoclada* Reuss- Oosterbaan, p. 8, pl.1, fig. 4

1996 *Porites leptoclada* Reuss- Stolarski, p. 632, pl. 176, fig. 4

Material: a colony fragment (Inv. MPSUBB 23387).

Description: foliaceous colony, 1.5 cm in heights and 5.5 cm in diameter.

The structural elements are well-developed and the calices are well-individualised. A slightly deepened calice as compared to the calicinal border is visible. There are 12 septa belonging to two cycles. Those of the first cycle always touch the columella and they may show paliform lobes. The septa may be free or they may gather and show a fine granulations. A very thin trabecular columella is typical. Synapticulothecate wall.

***Porites* sp**  
Pl. 4, fig. 1

Material: four fragments of colony (Inv. MPSUBB 23388).

Description: cerioid corallites. The structural elements are rudimentary, thus very difficult to define. Small, 1-2 mm in size calices are present, with irregular shapes. The septa and columella are rudimentary and irregular.

***Porites incrustans* MILNE-EDWARDS & HAIME, 1851**  
Pl.4, fig. 2

1954 *Porites incrustans* MILNE-EDWARDS & HAIME- Kopek, p. 29, pl. XI figs. 2, 4

Material: a fragment of colony (Inv. MPSUBB 23389).

Description: the calices are poorly developed and flat. A number of 12 very thin and poorly granulated septa is present. The columella is trabecular and porous.

***Porites vindobonarum prima* KÜHN 1925**

Pl.4, fig. 3

1954 *Porites vindobonarum prima* KÜHN, Kopek, p. 29, pl. XI, fig. 7,9

1960 *Porites vindobonarum prima* KÜHN, Kojumdgieva, p. 24, pl. VII, fig. 3,4

1996 *Porites vindobonarum prima* KÜHN in FELIX-Stolarsky, p. 632, pl. 176, fig. 3

Material: six fragments of colony (Inv. MPSUBB 23390).

Description: the colonies are rounded or irregular, with heights between 2-8 cm and diameters between 3-10 cm. It is difficult to separate the calices, as well as to establish the number of septa or to define the columella. The radial elements consist of discontinuous vertical trabecules that are very porous, like the whole skeleton.

Suborder Dendrophyllina VAUGHAN & WELLS, 1943

Family Dendrophylliidae GRAY, 1847

Genus ***Dendrophyllia*** BLAINVILLE, 1830

***Dendrophyllia poppelacki* REUSS, 1871**

Pl.4, figs. 4, 5

1954 *Dendrophyllia poppelacki* REUSS, - Kopek, p. 19, pl. VII, figs. 3, 12

Material: two fragments of colony (Inv. MPSUBB 23391).

Description: dendroid colonies with the coenosteum surface constituted of costae.

The corallites are circular or elliptical shape, being distinctive due to a very thick wall. They may be located at distances of a few mm, or they may be next to each other. There are numerous septa (25-35) that belong to 3 cycles. The first cycle of septa reaches the trabecular columella. S2 partly reach the columella, while S3 join with S2 at about 2/3 from the distance between the wall and the columella. Some septa are slightly curved towards the axial side. The septa are ornamented by granulations.

Epitheca is thick, prominent and it is ornamented with fine and parallel ribs.

Remarks: the species was mentioned from Lăpugiu de Sus by Papp (1976, p. 103, pl. XVII, fig. 3).

***Dendrophyllia* sp.**

Pl.4, figs. 6, 7

Material: a fragment of colony (heights: 3.5

cm, maximum diameter: 2 cm, diameter of the calices: 2-4 mm) (Inv. MPSUBB 23392).

Description: dendroid colonies, the branches of the colony are short but they show different thicknesses. In transversal section, the branches are almost circular.

The calices are more or less circular. Inside the calices, septa belonging to at least 3 cycles are individualised. The septa are regularly anastomosed, by a specific pattern. The longest ones reach the spongy, rudimentary columella. Endothecal dissepiments of various thicknesses are also present. The synapticulotheca is thick.

Remarks: The species is similar with *Balanophyllia varians* (REUSS) (Kopek, 1954, p. 18, pl. V, figs. 4,5,6,7 and pl. VI fig. 2) and *Dendrophyllia taurinensis* MILNE-EDWARDS & HAIME (Stolarsky 1996, p. 638, pl. 176, fig. 8). Stolarski (1996) established a synonymy between *Balanophyllia varians* and *Dendrophyllia taurinensis*.

Genus ***Astroides*** QUOI & GAIMARD; 1827

***Astroides* sp.**

Pl. 4, fig. 8

Material: one colony (Inv. MPSUBB 23394).

Description: the colony is slightly convex. The calices are poorly individualised. Inside the calices, 12-14, very porous septa are present. The central columella is trabecular. Synapticulothecate wall.

**CONCLUSIONS-DISCUSSIONS**

24 scleractinian corals species belonging to 9 families (*Acroporidae*, *Pocilloporidae*, *Faviidae*, *Mussidae*, *Caryophylliidae*, *Calamophylliidae*, *Siderastreaeidae*, *Poritidae*, and *Dendrophylliidae*) have been described.

Genus *Plesiastraea* is dominant quantitatively, while genus *Porites* is best represented as number of species (by four species). As mentioned by Saint Martin et al. (2000), *Porites* is frequent in the coral patch reefs that occur near Budapest (Hungary).

The Badenian corals from Lăpugiu de Sus are remarkable due to the abundance and diversity, supporting the opinion that the Middle Miocene seas were characterised by abundant of scleractinian corals and the last climax of reef development was reached (Kießling et al., 1999).

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**PLATES**

**Plate I.**

- Fig. 1 *Astreopora* sp. -x3  
Fig. 2 *Stylophora subreticulata* REUSS – x4  
Fig. 3 *Favia gotschevi* KOJUMDIEVA –x3.5  
Figs. 4, 5 *Favites neglecta* (MICHELOTTI in D'ACHIARDI) - x2  
Fig. 6 *Favites oligocenica* CHEVALIER – x2.5  
Figs. 7, 8 *Plesiastraea conoidea* REUSS - fig. 7-x3; fig.8-x4

**Plate II.**

- Fig. 1 *Plesiastraea reussiana* (MILNE -EDWARDS et HAIME) – x3  
Fig. 2 *Montastraea tchihatcheffi* (CHEVALIER) –x2  
Fig. 3 *Montastraea* sp. – x2.5  
Fig. 4 *Tarbellastraea reussiana* (MILNE -EDWARDS & HAIME) – x2.5  
Fig. 5 *Solenastrea romettensis* (SEGUENZA) – x5  
Figs. 6, 7 *Syzygophyllia brevis* REUSS – x2  
Figs. 8, 9 *Acanthophyllia ampla* (REUSS) – x1.5

**Plate III.**

- Figs. 1, 2 *Deltocyathus italicus* MILNE-EDWARDS & HAIME – fig. 1-x2.5; fig. 2-x3  
Figs. 3, 4, 5 *Caryophyllia (Acanthocyathus) transilvanicus* (REUSS) – x2.5  
Figs. 6, 7 *Calamophyllia* sp. - fig. 6-x4, fig.7-x3  
Fig. 8 *Siderastrea froeichlichiana* (REUSS) – x4  
Fig. 9 *Porites leptoclada* REUSS – x2.5

**Plate IV.**

- Fig. 1 *Porites* sp. – x2,5  
Fig. 2 *Porites incrustans* MILNE-EDWARDS & HAIME – x5  
Fig. 3 *Porites vindobarium prima* KÜHN – x3  
Figs. 4, 5 *Dendrophyllia poppelacki* REUSS - fig. 4-x5, fig.5-x2  
Figs. 6, 7 *Dendrophyllia* sp. - fig. 6-x2.5; fig.7-x8  
Fig. 8 *Astroides* sp. – x2.5







