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Abstract: In the Fele (Yassıbel) area in the north of Beyşehir Lake in the Western Taurides, Upper Jurassic (Kimmeridgian) - Upper Cretaceous (Cenomanian) peritidal carbonates were studied in detail. In this study, 30 species of dasyclad algae were identified and 3 new *Salpingoporella* species were identified within the peritidal carbonates. It was determined that they belong to 13 different genera: *Acroporella*, *Actinoporella*, *Campbelliella*, *Clypeina*, *Cylindroporella*, *Epimastopora*, *Epimastoporella*, *Kopetdagaria*, *Macroporella*, *Otternstella*, *Rajkaella*, *Salpingoporella*, and *Selliporella*. *Salpingoporella* is the dominant genus. Some of the species are new records for Turkey: *Clypeina nigra*, *Clypeina parasolkani*, *Otternstella lemmensis*, *Salpingoporella biokovensis*, *Salpingoporella circassa*, *Salpingoporella piriniae*, and *Selliporella neocomiensis*. Their stratigraphic ranges are now modified according to the calibration of benthic foraminifera with which they are associated. The presence of these species in the Tauride platform extends their paleogeographic distribution in the world and sheds light on their taxonomic relationships in the Tauride region. For example, *Clypeina* aff. *nigra*, *Clypeina parasolkani* and *Salpingoporella* aff. *circassa* which were previously reported from northern Neotethys, and *Epimatospora cekici*, *Salpingoporella biokovensis*, *Salpingoporella piriniae*, *Otternstella lemmensis* and *Selliporella* cf. *neocomiensis*, had not been reported from the Taurides, are now present in southern Neotethys (Taurides).

Key Words: Fele (Yassıbel) area, Taurides, Peritidal carbonates, Dasyclad algae, *Salpingoporella*.

Fele (Yassıbel) Bölgesi Üst Jura (Kimmeridciyen)-Üst Kretase (Senomaniyen) Gelgit Çevresi Karbonatlarındaki Dasiklad Alglere Taksonomik ve Paleoceografik Yaklaşımlar (Batı Toroslar, Türkiye)

Özet: Fele (Yassıbel) bölgesinde, Üst Jura (Kimmeridciyen)-Üst Kretase (Senomaniyen) gelgit çevresi karbonatları detaylı bir şekilde çalışılmıştır. Bu çalışmada, gelgit çevresi karbonatları içerisinde, 30 dasiklad alg türü tespit edilmiş ve 3 yeni *Salpingoprella* türü tanımlanmıştır. Bu alg türleri Genera *Acroporella*, *Actinoporella*, *Campbelliella*, *Clypeina*, *Cylindroporella*, *Epimastopora*, *Epimastoporella*, *Kopetdagaria*, *Macroporella*, *Otternstella*, *Rajkaella*, *Salpingoporella* ve *Selliporella* gibi 13 farklı cins tekabül ederler. *Salpingoporella* cinsi en baskın türdür. *Clypeina nigra*, *Clypeina parasolkani*, *Otternstella lemmensis*, *Salpingoporella biokovensis*, *Salpingoporella circassa*, *Salpingoporella piriniae*, *Selliporella neocomiensis* gibi bazı türler Türkiye'de ve özellikle Toroslar'da ilk defa tespit edilmişlerdir ve birlikte bulundukları foraminiferler ile kalibrasyonları sonucu stratigrafik uzantıları değiştirilmiştir. Bu türlerin Toros platformunda bulunması, dünya üzerindeki paleogeografik dağılımlarını genişletmiş ve Toros bölgesindeki taksonomik ilişkilerini aydınlatmıştır. Örneğin; daha önce kuzey Neotetis'te varlığı bildirilmiş olan *Clypeina* aff. *nigra*, *Clypeina parasolkani* ve *Salpingoporella* aff. *circassa* ve Toroslar'da daha önce varlığı bildirilmemiş olan *Epimatospora cekici*, *Salpingoporella biokovensis*, *Salpingoporella piriniae*, *Otternstella lemmensis* ve *Selliporella* cf. *neocomiensis* türleri artık güney Neotetis'te (Toroslar) de bulunmuşlardır.

Anahtar Sözcükler: Fele (Yassıbel) bölgesi, Toroslar, Gelgit çevresi karbonatları, Dasiklad algler, *Salpingoporella*.

Introduction

The aim of this study was to present and document the taxonomic relationship of dasyclad algae species observed within the Upper Jurassic (Kimmeridgian)-Upper Cretaceous (Cenomanian) peritidal carbonates of the Fele area (Figure 1) and assess their stratigraphic and paleogeographic importance.

The study of calcareous algae began in the 1600s in Europe. The Dasycladacean green algae were the subject of excellent studies by Pia (1920, 1925). He presented reconstructions of several algae species and proposed the first comprehensive classification system. Later, Johnson (1961) and Maslov (1963) studied the taxonomy of calcareous algae. The Dasycladaceae family was classified by Levring (1969). Bassoulet et al. (1975, 1977) reviewed the classification of dasycladacean algae and reevaluated Pia's classification. Bassoulet et al. (1978) documented the Jurassic and Cretaceous dasycladacean alga genera and species. Granier and Deloffre (1993)

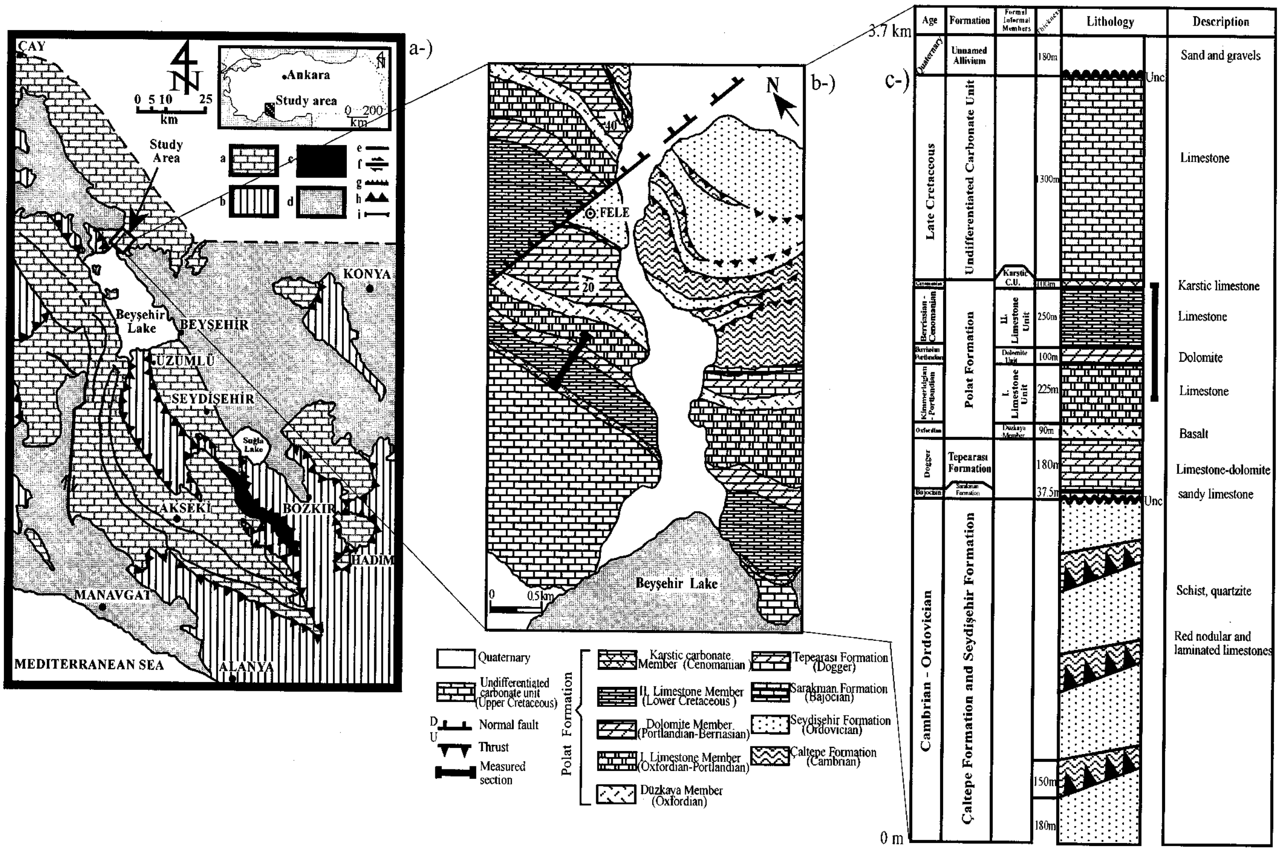

Figure 1. a) Simplified map of the central part of the westren Tauride region (Özgül, 1983) and location of the study area. a. Geyikdağı unit, b. Allochthonous units, C. Dipsiz Göl ophiolite, d. Neogene and Quaternary, e. Normal stratigraphic boundary, f. Strike slip fault, g. Normal fault, h. Thrust fault, i. Measured section; b) Geologic map of the study area (Altıner et al., 1998; Yılmaz, 1997) and position of the measured stratigraphic section in the Polat Formation; c) Generalised tectono-stratigraphic columnar section of the study area (Altıner et al., 1998; Yılmaz, 1997) and position of the measured section in the Polat Formation.

criticized and revised the taxonomy and the stratigraphic ranges of the Late Jurassic-Late Cretcaeous algae. De Castro (1997) described the morphological features of dasyclad algae and created a guide for thin section study of fossil Dasycladales.

In the Taurides, within the Upper Jurassic - Upper Cretaceous peritidal carbonates, the taxonomy of dasyclad algae has not been studied in detail. Jaffrezzo et al. (1978), Varol et al. (1988) and Conrad and Varol (1990) studied the Jurassic and Cretaceous dasycladacean algae in the Tauride belt. Jaffrezzo et al. (1978) identified and described *Pseudoepimastopora pedinculata* n. sp. and illustrated various species of dasycladacean algae. Varol et al. (1988) documented known species of *Actinoporella, Clypeina, Cylindroporella, Macroporella* and *Salpingoporella* but did not deal with the taxonomy of the dasycladacean algae. Conrad and Varol (1990) described *Cylindroporella taurica* n. sp. and reported different calcification patterns of dasycladacean algae.

In the present study, 30 species of dasyclad algae were examined taxonomically in detail. 3 new *Salpingoporella* species were identified. The paleogeographic distributions of the species are now modified according to their first appearance in the Taurides. During the study, each specimen of dasyclad algae was measured and noted. Identifications of the species were obtained using unoriented thin sections.

Representative species were photographed and fossil plates were prepared according to an alpabetical list of tribes and species. Measurements were taken according to classification criteria and identification of the dasyclad algae. The classification criteria for the fossil dasyclad algae were those of the International Code of Botanical Nomanculature (Greuter et al., 1994) and the study of Bassoulet et al. (1977).

Geologic Setting

The study area is geographically located at the northern corner of Beyşehir Lake (Figure 1). It lies west of Konya and northwest of Beyşehir. The section measured is located just to the southwest of the Fele (Yassıbel) village, which is the main settlement within the study area.

In the western Taurides, the studied succession (Figure 1a) belongs to the Geyik Dağı unit of Özgül (1976) which was recently named the Sultan Dağı subunit (Özgül et al, 1991). This subunit is delimited from the north by the Cambro - Ordovician exposures of the Sultan Dağı region and from the south by the Beyşehir - Hoyran nappes of Monod (1977) (Bozkır and Aladağ units of Özgül, 1976).

The oldest rock units within the Sultan Dağı subunit, whose exposures are mainly located to the north of Beyşehir Lake, are Cambro-Ordovician rocks represented by the Çaltepe and Seydişehir formations (Figure1b,c). The Seydişehir Formation, basically represented by a siliciclastic succession, generally repeats itself within the thrust sheets (include the Çaltepe Formation and these Cambro - Ordovician units) and are unconformably overlain by the Triassic, consisting of conglomerates, sandstones and siltstones (Pınarbaşı Formation), pelagic limestones (Taraşçı Formation) and fine siliciclastic rocks (Sarpiardere Formation). It should be noted that the highly tectonised and thrusted nature of these Lower Paleozoic units could be explained by Triassic tectonic events reported previously from the Western Taurides (Monod and Akay, 1984).

In the study area, the Jurassic of the Sultan Dağı subunit of the Geyik Dağı unit commences with sandstones, sandy limestones and limestones of the Sarakman Formation of the Bajocian Age (Altıner, 1989) and unconformably overlies the irregular topography of the basement, whose relief was gained through the Triassic tectonic events (Figure 1a, c). This unit is followed continuously by the dolomites of the Tepearası Formation (Monod, 1977) and shallow - water limestones and dolomites of the Polat Formation (Özgül, 1997) of the Malm to the Cenomanian ages. The succession also includes a prominent basaltic layer in the Oxfordian (Altıner, 1989). The rest of the Cretaceous stratigraphy is represented by rudist- and *Globotruncana*-bearing pelagic limestones. It is followed vertically up to the Middle Eocene (Lutetian) and is overlain by the Lutetian siliciclastic flysch facies, indicating a major change in the depositional regime in the Central Taurides (Özgül, 1976; Monod, 1977). The Beyşehir - Hoyran nappes of Monod (1977) (Bozkır and Aladağ units of Özgül, 1976) tectonically overlie the Geyik Dağı unit, following the main deformational and compressional events in the Neo-Tethyan domains (Şengör and Yılmaz, 1981).

The Geyik Dağı unit and allochthonous units emplaced in the region during Eocene times are unconformably overlain by the molassic Neogene units, including various types of continental deposits intercalated with volcanic rocks from the Quaternary alluvium (Özgül, 1991).

Within this generalized stratigraphic frame, the studied stratigraphic section in the Fele area corresponds to the most monotonous portion of the Polat Formation. The Polat Formation is divided into five formal and informal members in the study area (Figure 1b, c): the Düzkaya member (spilitic basalt; Özgül, 1991), I. Limestone member, dolomite member, II. Limestone member and karstic carbonate member.

The measured section starts within the I. Limestone member, which represents the Jurassic portion of the measured section, and terminates at the top of the karstic carbonate member, dominantly composed of karst breccia. The II. Limestone member belongs to the Lower Cretaceous portion of the measured section. The dolomite member, composed of massive to thick-bedded dolomites, is located at the Jurassic - Cretaceous boundary.

Biostratigraphy

Biostratigraphy was one of the most effective tools in this study. Architecture for establishing chronostratigraphic framework is provided especially by the biostratigraphy of benthic foraminifera and dasycladacean algae. Along a total thick measured section of 520 m, 327 samples were collected and analysed. In this study, distributions of benthic foraminifera and dasycladacean algae were recorded from the Upper Kimmeridgian to Cenomanian interval of the measured section of the Polat Formation, and biostratigraphic

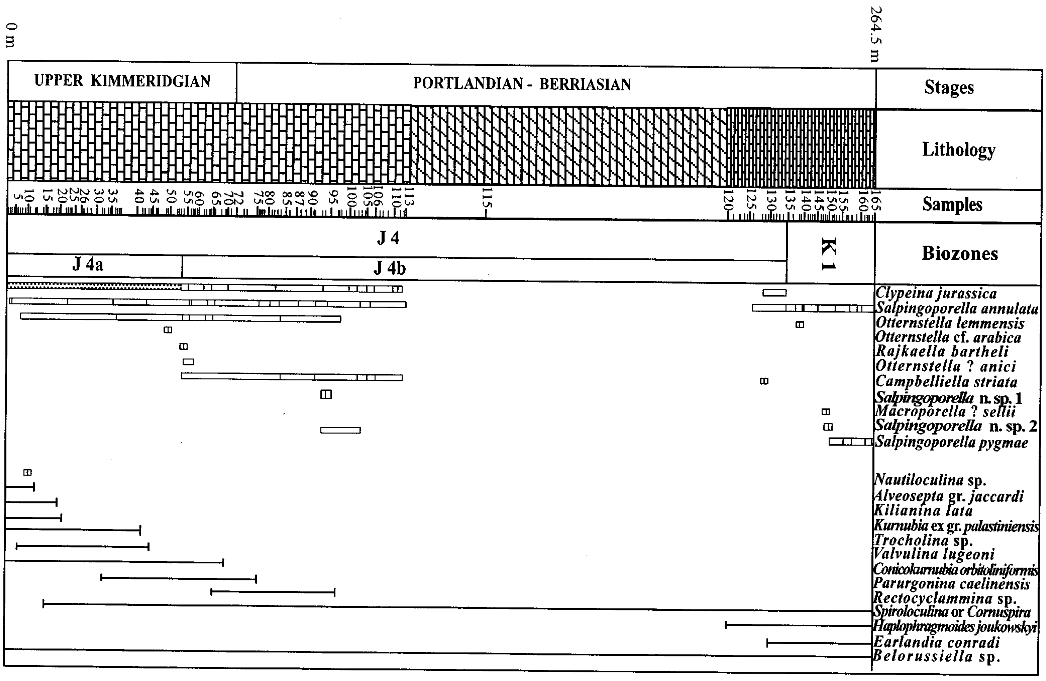

Figure 2. Biostratigraphy and distributions of benthic foraminifera and dasyclad algae in the Upper Kimmeridgian-Berriasian interval of the studied

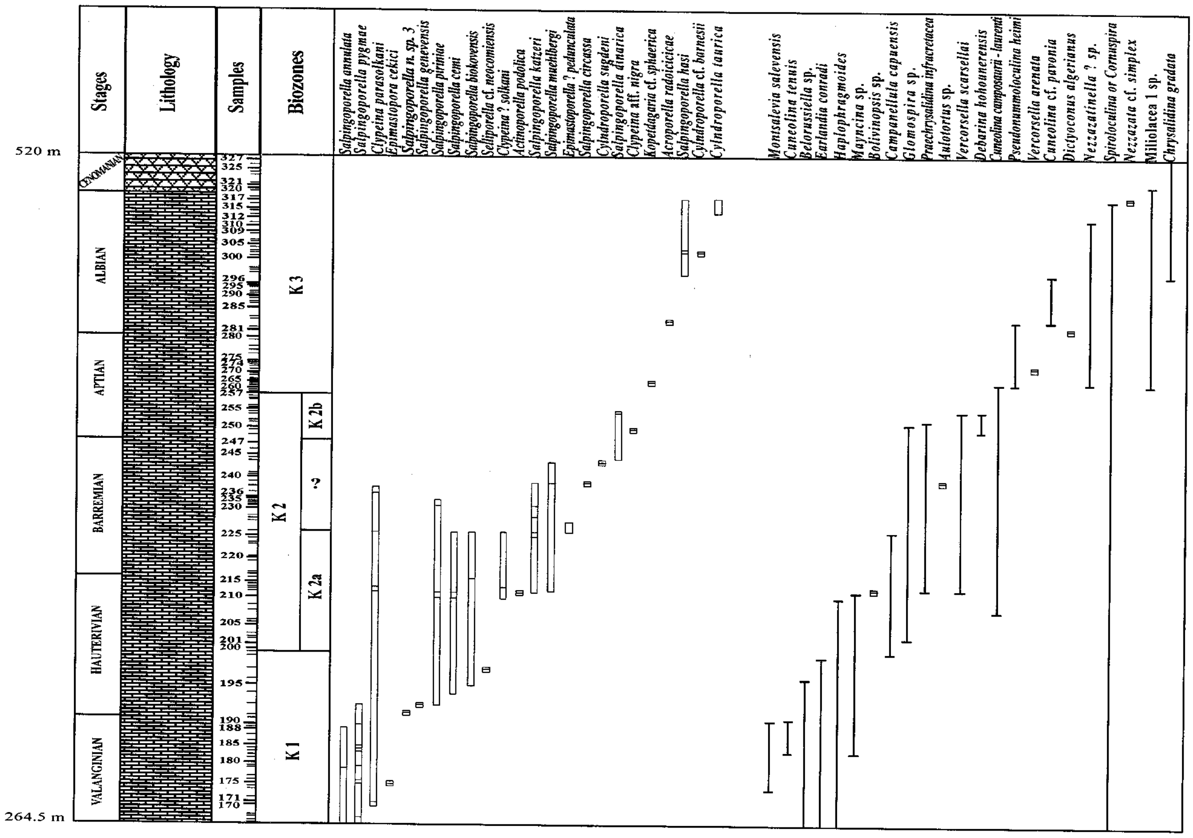

Figure 3. Biostratigraphy and distributions of benthic foraminifera and dasyclad algae in the Valanginian-Cenomanian interval of the studied section.

zones were established. Four biozones and three subzones were recorded (Figures 2, 3). This zonation scheme basically follows the zonation scheme introduced by Altıner in Kazancı et al. (1985) and Altıner et al. (1986). However it was partly modified by Yılmaz (1997), Altıner et al. (1998) and Altıner et al. (1999) as follows :

- *Clypeina jurassica* zone (J 4) (Samples: 1-135, chronostratigraphic interval: Upper Kimmeridgian – Lowermost Berriasian) (Figures 2, 3)

Clypeina jurassica - Kilianina lata subzone (J 4a) (Samples: 1-72, chronostratigraphic interval: Upper Kimmeridgian) (Figures 2, 3)

Campbelliella striata subzone (J 4b) (Samples: 72-135, chronostratigraphic interval: Portlandian – Lowermost Berriasian) (Figures 2, 3)

- *Salpingoporella annulata* zone (K 1) (Samples: 135-199, chronostratigraphic interval: Berriasian – Lower Hauterivian) (Figure 2, 3)

- *Vercorsella scarsellai - Salpingoporella dinarica* zone (K 2) (Samples: 199-257, chronostratigraphic interval: Upper Hauterivian – Lower Aptian) (Figures 2, 3)

Campanellula capuensis subzone (K 2a) (Samples: 199-226, chronostratigraphic interval: Upper Hauterivian – Lower Barremian) (Figures 2, 3)

Unnamed subzone (?) (Samples: 226-247, chronostratigraphic interval: Middle - Upper Barremian) (Figures 2, 3)

Voloshinoides murgensis subzone (K 2b) (Samples: 247-257, chronostratigraphic interval: Lower Aptian) (Figures 2, 3)

- *Cuneolina* gr. *pavonia* - Miliolidae 1 zone (K 3) (Samples: 257-327, chronostratigraphic interval : Upper Aptian - Cenomanian) (Figures 2, 3).

Systematic Paleontology

Classification lists of genera are given, in which the genus is mentioned first. For the title of a species within the genus, the classification list is not given. Only the authors who found it first and the date are given. The synonyms and the classification system adopted in this study are mainly those of the studies of Granier and Deloffre (1993) and Bassoullet et al. (1978). A proper description of the species is not given in this study. Only the measurements, stratigraphic range and particular remarks are shown.

In this study, the taxonomy of dasyclad algae is given in alphabetical order of trip, genera and species. Half of the total species found belong to *Salpingoporella.* The dominance of this species made it taxonomically more important.

Order Dasycladales Feldmann, 1938

Family Acetabulariaceae Häuck, 1885

Tribe Clypeineae Elliott, 1968

Genus *Actinoporella* (Gümbel in Alth, 1881) Conrad, Parturlon and Radoicic, 1974

Actinoporella podolica (Alth, 1878),

Conrad, Parturlon and Radoicic, 1974; Pl.1, Fig.1

1878 - *Gyroporella podolica,* Alth, Pl. 6, Fig. 1-8

1974 - *Actinoporella podolica;* Conrad, Praturlon and Radoicic; Fig., 1-6, 8-12

Remarks: This species can be easily distinguished from the other species of *Actinoporella* by the presence of its corona structure. It differs from *Actinoporella*? *maslovi* by its larger inner diameter, corona structure, and the number and shape of branches.

Measurements: D: Outer diameter, d: Inner diameter, W: Number of primary branches per verticil, p: Diameter of primary branches, h: Height between successive primary branches, L: Length of the thallus. These symbols are also used in the following pages of the dasyclad taxonomy. D: 2000 µm, d: 700 µm, W: ?, p: 194 µm, h: 160 µm, L: 480 µm.

Stratigraphic range: Portlandian-Hauterivian (Granier and Deloffre, 1993). In this study, this form was recorded in the Late Hauterivian (Figures 2, 3).

Genus *Clypeina* Michelin, 1845; emend, Rezack, 1959

Clypeina jurassica Favre and Richard, 1927; Pl.1, Fig. 6

1927 - Clypeina jurassica, Favre and Richard; Pl.1, Figs. 2 - 3.

Remarks: The primary fertile ramifications are arranged in distant euspondyl whorls, showing pitch and swell in the alternation of whorls. The shape of the ramifications is the phloiophorous type. Fertile branches are connected with the central axis with small pores, and towards the outside they bend, curve upwards and widen like a basket. Towards the upper end of the thallus , the basket-like whorls decrease in diameter.

Measurements: p_f: Diameter of fertile branches, p_s: Diameter of sterile branches. D: 1300 - 2280 µm, d: 350 - 600 µm, W:11 – 14, p_f: 270 – 420 µm, p_s: 60 -120 µm, h: 300 – 450 µm, L: 1380 µm.

Stratigraphic range: Kimmeridgian - Berriassian. (Granier and Deloffre, 1993). In this study, this form was recorded in the Upper Kimmeridgian - Lower Berriassian interval (Figure 2).

Clypeina **aff.** ***nigra*** Conrad and Peybernes; 1978; Pl.1, Fig. 7.

1978 - *Clypeina nigra,* Conrad and Peybernes; Pl. 2, Fig. 3.

Remarks: This species contains typical clup-shaped primary branches closed at the tips. These types of branches were assumed to be fertile. It has a microcrystalline sheath coating the verticils. This species is rare and only one sample was collected. It has a large d:D ratio.

Measurements: D: 482 µm, d: 206 µm, W :11, h: ?, L:?.

Stratigraphic range: Upper Barremian - Lower Aptian (Granier and Deloffre, 1993). In this study, this form was recorded in the Lower Aptian (Figures 2, 3).

Clypeina parasolkani Farinacci and Radoicic, 1991; Pl. 1, Figs. 8-10.

1991 - *Clypeina parasolkani,* Farinacci and Radoicic. p.137; Pl. 2, Figs. 1- 18.

Remarks: The primary branches are arranged according to the euspodyl type and are phloiophorous to vesicular but they are stretched and oval in shape. The verticils are subhorizontal in connection with the main axis. The branches are in slight lateral contact with each other for about half or 2/3 of their length. The main axis between the verticils is poorly calcified.

Measurements: D: 380 – 450 µm, d: 150 – 180 µm, W: 8 – 10, p: 60-80 µm, h: 100-120 µm, L: 500-600 µm

Stratigraphic range: Berriasian - Valanginian. (Conrad, Bucur and Radoicic, 1995). In this study, this form was recorded in the Valanginian-Barremian interval (Figures 2, 3).

Clypeina ? solkani Conrad and Radoicic, 1972; Pl. 1, Figs. 11-12.

1972 - *Clypeina solkani,* Conrad and Radoicic; Pl. 1, Figs. 2 - 5.

Remarks: This form has spaced out verticils having fertile primary branches. The primary branches are arranged acoording to the euspodyl type. The shape of the verticils is disc-like, but slightly rounded. The branches are phloiophorous to vesicular and are in lateral contact with each other for about half or 2/3 of their length. Calcification is very strong , especially around the stipe and weak at the distal parts. *Clypeina solkani* is sporadically observed. It can be confused with *Clypeina parasolkani,* but it has greater dimensions than *Clypeina parasolkani.*

Mesurements: D: 694 µm, d: 300 µm, W: 10, p: 166 µm, h: ?, L: ?.

Stratigraphic range: Malm - Albian (Granier and Deloffre, 1993). In this study, this form was recorded in the Upper Hauterivian - Lower Barremian interval (Figures 2, 3).

Genus *Kopetdagaria* Maslov, 1960

Kopetdagaria **cf.** ***sphaerica*** Maslov, 1960, Pl. 2, Fig. 21.

1960 - *Kopetdagaria sphaerica,* Maslov. p. 939, Fig. 1

Remarks: This species has a subspherical thallus, open at one end. It has primary branches which are subspherical and vesicle in shape. The branches are connected with the inner and outer surface of the thallus. At tangential sections, hexagonal sections of branches are observed due to the thin wall between them at the distal part. The dimentions are very large.

Measurements: D: 550 µm, d: 200 µm, W: 12, p: 70 µm, h: ?, L: 750 µm

Stratigraphic range: Barremian - Aptian (Granier and Deloffre, 1993). In this study, this form was recorded in the Aptian (Figures 2, 3).

Family Dasycladaceae Kutzing, 1843; orth. mut. Stizenberger, 1860

Tribe Cylindroporelleae Pal, 1976

Genus Cylindroporella Johnson, 1954

Cylindroporella **cf.** ***barnesii*** Johnson, 1954, Pl. 1, Fig. 13

1954 - *Cylindroporella barnesii,* Johnson, p. 787-790, pl. 93.

Remarks: This species has a cylindrical thallus, open at both ends. It has primary and secondary branches. The primary branches have sporangia that are almost spherical in shape. The secondary branches arise from the sterile primary branches and have smaller dimensions. In this study, only one specimen was recorded. As a results, some of the parameters could not be recorded.

Measurements: D: 320 µm, d: 55 µm, W: 6, ps: ?, pf: 30 µm, h: ?, L:?

Stratigraphic range: Valanginian - Cenomanian (Granier and Deloffre, 1993). In this study, this form was recorded in the Albian (Figures 2, 3).

Cylindroporella sugdeni Elliott, 1957; Pl. 1, Fig. 14.

1957 - ***Cylindroporella sugdeni,*** Elliott; Pl. 1, Fig. 1-6

Remarks: The species has a large cylindrical thallus and large dimensions. It has primary and secondary branches. The primary branches have sporangia. The secondary branches arise from the sterile primary branches. It has a calcified sheath composed of calcite covering the stipe. In this study, one specimen was recorded. As a result, some of the parameters could not be measured accurately.

Measurements: D: 500 µm, d: 130 µm, W: 8, ps: ?, pf: 90 µm, h: ?, L:?

Stratigraphic range: Barremian - Aptian (Granier and Deloffre, 1993). In this study, this form was recorded in the Barremian (Figures 2, 3).

Cylindroporella taurica Conrad and Varol, 1990, Pl. 1, Figs. 15-16

1990 - *Cylindroporella taurica,* Conrad and Varol, p. 196-197, Figs. 4-7

Remarks: The species has a simple cylindrical, straight or curved thallus. It has two types of primary ramification, sterile and fertile. Both are perpendicular to the axis. The sterile ramifications have a funnel-like, uncompressed shape, while the fertile remifications are pear-shaped or subspherical with a short norrow pedincule. A thin microcrystalline sheet covers the stipe and ramifications. The dimensions are very large.

Measurements: D: 850 µm, d: 180 µm, W: 15, ps: 80 µm, pf: 200 µm, h: 130 µm, L: 1650 µm.

Stratigraphic range: Barremian - Albian (Granier and Deloffre, 1993). In this study, this form was recorded in the Albian (Figures 2, 3).

Tribe Salpingoporelleae Bassoullet et al., 1979

Genus *Campbelliella* Radoicic, 1959a emend. Bernier, 1974

Campbelliella striata (Carozzi, 1954), Bernier, 1974; Pl. 1, Figs. 4-5.

1954 - *Vaginella striata,* Carozzi, Pl.1, Fig. 1- 38.

1974 - *Campbelliella striata*, Bernier, Pl. 32 - 34.

Remarks: This species can be easily identified by its amphora shape, conical longitidunal sections, striations and successively fitted verticils. It was difficult to determine protected primary ramifications due to high calcification. Consequently, the measurements for the species in this study do not include primary ramification values. De Castro (1993) stated that *Campbelliella striata* was very similar to *Campbelliella milesi* and could be differentiated by the number of pores per whorl, the diameter of the pores and the shape of the edges.

Measurements: D: 640–1800 µm, d: 260 – 410 µm, W : ?, p: ?, h: ?, L:1000-2200 µm.

Stratigraphic range: Upper Kimmeridgian - Portlandian (Granier and Deloffre, 1993). In this study, this form was recorded in the Upper Kimmeridgian - Portlandian interval (Figure 2).

Order Dasycladales Feldmann, 1938

Tribe Salpingoporelleae Bassoullet et al., 1979

Genus *Salpingoporella* Pia in Trauth, 1918

Salpingoporella annulata Carozzi, 1953; Pl. 2, Fig. 27.

1953 - *Salpingoporella annulata,* Carozzi; Pl. 27, Figs. 4 - 9.

Remarks: It is easy to differentiate this from other species by its zigzagging narrow furrows and annulations. However, it can be confused with *Salpingoporella grudii* in tangential sections. It shows high calcification in every part of the thallus. Due to the presence of annulations it was hard to determine a long longitudinal section and unfragmented complete sections. The measurements of this species correspond well to the range recorded in the original description.

Measurements: D: 350 – 470 µm, d: 170 – 200 µm, W: 8 – 10, p: 110 µm, h: 137 µm, L: 880 µm

Stratigraphic range: Upper Bathonian - Hauterivian (Bucur, Conrad and Radoicic, 1995). In this study, this form was recorded in the Upper Kimmeridgian - Valanginian interval (Figures 2, 3).

Salpingoporella biokovensis Sokac and Velic, 1979; Pl. 2, Figs. 28-30.

1979 - *Salpingoporella biokovensis,* Sokac and Velic, p. 145-147; Pl. 1, Figs. 1-6; Pl. 2, Figs. 1- 4; Pl. 3, Figs. 1-10.

Remarks: In this study, this species was recorded in limited abundance, so only limited measurements could be made on the available specimens. *Salpingoporella biokovensis* differs from other species of the genus by the shape of its branches. The distal part of the branches in tangential sections, which exhibits deformed squares, clearly distinguishes the species. *Salpingoporella hispanica* and *Salpingoporella adriatica* have similar outer branches, but the number of branches and their dimensions clearly distinguish *Salpingoporella biokovensis* from these species.

Measurements: D: 610 – 722 µm, d: ?,W : ?, p: 83 – 150 µm, h: 300 µm, L: 4166 µm

Stratigraphic range: Late Hauterivian - Aptian. (Granier and Deloffre, 1993). In this study, this form was recorded in the Hauterivian - Barremian interval (Figures 2, 3).

Salpingoporella cemi (Radoicic, 1968)

Conrad, Praturlon and Radoicic, 1973; Pl. 2, Figs. 31-32.

1968 - *Likanella* (?) *danilovae,* Radoicic.

1973 - *Salpingoporella cemi;* Conrad, Praturlon and Radoicic.

Remarks: This species is characterised by its large dimensions and funnel-like branches having a polygonal shape at the periphery of the thallus. The dimesions, shape of the branches and calcification pattern are similar to *Likanella* ? *danilovae.* However *Likanella* ? *danilovae* has clustered branches which emerge in various directions.

Measurements: D: 1600 µm, d: 630 µm, W : 15, p: 20 µm, h: 12 µm, L: 1900 µm

Stratigraphic range: Upper Hauterivian - Lower Aptian (Granier and Deloffre, 1993). In this study, this form was recorded in the Hauterivian - Barremian interval (Figures 2, 3).

Salpingoporella* aff. *circassa Farinacci and Radoicic, 1991, Pl. 2, Figs. 33-34.

1991 - *Salpingoorella circassa,* Farinacci and Radoicic, p.140; Pl. 4, Figs. 1-18; Pl. 5, Figs. 1-2

Remarks: Two tangential sections were obtained from the collected material. The most characteristic properties of the species are the shape of the branches and the small number of branches per verticil. This species is similar to *Salpingoporella genevensis,* but the shapes of branches are more edgewise, the dimensions are smaller and the number of branches is less than that in *Salpingoporella circassa.* In additional, *Salpingoporella genevensis* has spore imprints which are visible in the calcareous envelope. *Salpingoporella dinarica,* which has similarly shaped branches, can easily be distiguished by its multilayered calcification.

Measurements: D: 248 µm, d: ?, W: ?, p: 50 µm, h: 35 µm, L: 1527 µm

Stratigraphic range: Berriasian - Valanginian (Bucur, Conrad and Radoicic, 1995). In this study, this form was recorded in the Barremian (Figures 2, 3).

Salpingoporella dinarica Radoicic, 1959b; Pl. 2, Fig. 35.

1959 - *Salpingoporella dinarica,* Radoicic, p. 33, pl. 3-5.

Remarks: *Salpingoporella dinarica* can easily be distiguished from the other species of the genus by its yellowish, outer radial - fibrous calcite layer and inner micritic layer. The shape of the branches is similar to that in *Salpingoporella genevensis.*

Measurements: D: 337 µm, d: 241 µm, W : ?, p: ?, h: ?, L: 690 µm

Stratigraphic range: Valanginian-Aptian (Granier and Deloffre, 1993). In this study, this form was recorded in the Upper Barremian-Lower Aptian interval (Figures 2, 3).

Salpingoporella* cf. *genevensis (Conrad, 1969)

Conrad, Praturlon and Radoicic, 1973; Pl. 2, Figs. 36-37.

1969 - *Pianella genevensis,* Conrad. p. 571-582, pl. 1. fig. 1-9

1973 - *Salpingoporella genevensis,* Conrad, Praturlon and Radoicic.

Remarks: In this study, only one specimen in tangential section was found and some of the parameters could not be measured. *Salpinoporella urladanasi* can be confused with this species but it has a yellowish sheet in the calcareous envelope. *Salpingoporella circassa* can be distinguished from this species by its smaller dimensions. This species has relatively large dimensions and a small number of branches, which are compressed in shape and rectangular in the distal part when compared with other species.

Measurements: D: ?, d: ?, W: ?, p: 35 µm, h: 15 µm, L: 758 µm

Stratigraphic range: Hauterivian - Early Barremian (Granier and Deloffre, 1993). In this study, this form was recorded in the Lower Hauterivian (Figures 2, 3).

Salpingoporella hasi Conrad, Radoicic and Rey; 1976, Pl. 3, Figs. 38-39.

1976 - *Salpingoporella hasi,* Conrad, Radoicic and Rey, p. 101-104; Pl. 1 , Figs. 1-10

Remarks: This species shows similarity with *Salpingoporella genevensis, Salpingoporella hispanica, Salpingoporella urladanasi, Salpingoporella dinarica,* and *Salpingoporella biokovensis* in that it has rectangular ramifications in tangential sections. *Salpingoporella muehlbergi* has rhombic sections and *Salpingoporella katzeri* has polygonal sections. *Salpingoporella hasi* differs from these species in the number of branches, dimensions, type of calcification and shape of the branches, which have curved edges.

Measurements: D: 380 µm, d: 200 µm, W: 7, p: 60 µm, h: 50 µm, L: 790 µm.

Stratigraphic range: Albian - Middle Cenomanian (Granier and Deloffre, 1993). In this study, this form was recorded in the Albian (Figures 2, 3).

Salpingoporella katzeri Conrad and Radoicic, 1978; Pl. 3, Figs. 40-41.

1978 - *Salpingoporella katzeri,* Conrad and Radoicic, p. 69-71; Pl. 1, Figs. 1-6; Pl. 2, Figs. 1-11.

Remarks: In the samples, transversal sections of the species could not be obtained. As a result the number of branches could not be counted. It can easily be differentiated from other *Salpingoporella* species by its typical polygonal branches. It may be confused with *Salpingoporella hispanica* and *Salpingoporella muehlbergi,* but the conical shape of the primary branches and hexagonal shapes in tangential sections distinguish it from these species.

Measurements: D: 611 µm, d: 277 µm, W: ?, p: 96 µm, h: 65 µm, L: 2500 µm.

Stratigraphic range: Berriasian - Valanginian (Granier and Deloffre, 1993). In this study, this form was recorded in the Hauterivian - Barremian interval (Figures 2, 3).

Salpingoporella muehlbergii (Lorenz, 1902) Trauth, 1917; Pl. 3, Figs. 42-43.

1902 - *Diplopora muehlbergii,* Lorenz, p. 52 - 54; Figs. 3-7.

1917 - *Salpingoporella muehlbergii,* Trauth, p. 211-213; Fig. 4.

Remarks: This species is characterized by its larger dimensions and transversally flattened branches. It is distinguished from other species by its rhombic branches, which have a transversally flattened shape. *Salpingoporella dinarica, Salpingoporella genevensis, Salpingoporella katzeri,* and *Salpingoporella circassa* have a similar branch type, but the varying dimensions between two partions of branches, and the number and shape of the branches are different to those found in these species.

Measurements: D: 450 µm, d: 252 µm, W: 7, p: 45 µm, h: 23 µm, L: 1000 µm

Stratigraphic range: Upper Hauterivian - Lower Aptian (Granier and Deloffre, 1993). In this study, this form was recorded in the Barremian (Figures 2, 3).

Salpingoporella n. sp. 1; Pl. 3, Fig. 51.

Description: The shape of the thallus in this new species is not known. The species has phloiophorous, funnel-like primary branches and no secondary branches. The branches connect with the main axis by suddenly decreasing in diameter. Their diameter increases suddenly towards the distal part. It has a very large main axial diameter.

Measurements: D: 587 µm, d: 345 µm, W: 8, p:?, h: ?, L: ?.

Stratigraphic range: Portlandian (Figures 2, 3).

Remarks: In this study, only one specimen was recorded. Distingushing parameters could not be measured accurately. Its large dimensions and the type of branches distinguish it from the other *Salpingoporella species.*

Salpingoporella n. sp. 2; Pl. 3, Fig. 52.

Description: The shape of the thallus in this new species is not known. The species has phloiophorous, funnel-like primary branches and no secondary branches. The branches connect with the main axis by a very narrow canal. The daimeter of these branches increases suddenly towards the distal part on the narrow canal. This canal has a length equal to 1/3 that of the branches. This species has small dimensions.

Measurements: D: 175 µm, d: 83 µm, W: 7, p: ?, h: ?, L: ?.

Stratigraphic range: Berriasian (Figures 2, 3).

Remarks: In this study, only one specimen was found. Distingushing parameters could not be measured accurately. Its very small dimensions and the type of branches distinguish it from the other *Salpingoporella* species.

Salpingoporella n. sp. 3; Pl. 3, Fig. 53.

Description: Shape of the thallus in this new species is not known. It has phloiophorous, funnel-like primary branches and no secondary branches. The branches connect with the main axis by a narrow canal. The diameter of these branches increases towards the distal part.

Measurements: D: 275 µm, d: 130 µm, W: 10, p: ?, h: ?, L: ?.

Stratigraphic range: Hauterivian (Figures 2, 3).

Remarks: Only one specimen was found and the parameters could not be evaluated accurately. Its dimensions and the type of branches distinguish it from the other *Salpingoporella* species. It is similar to the *Salpingoporella* n. sp. 2, but it differs from that species by its number of branches and dimensions.

Salpingoporella piriniae Carras and Radoicic, 1991; Pl. 3, Figs. 45-47.

1991, *Salpingoporella piriniae,* Carras and Radoicic, p. 168-169, pl. 1, Figs. 1-7, pl. 2, Figs. 1-17, pl. 3, Figs. 1-9.

Remarks: The most characteristic feature of this species is the small thallus and the shape of the branches. It is similar to *Salpingoporella pygmae,* but it differs from this species by its smaller thallus and smaller number of branches, which have a subrectangular shape at the distal part where they touch each other at the cortex. Its branches are not flattened vertically or horizontally as in other species, but are irregularly arranged.

Measurements: D: 550 µm, d: 270 µm, W: 13, p: 55 µm, h: 27 µm, L: 640.

Startigraphic range: Hauterivian - Barremian (Carras and Radoicic, 1991). In this study, this form was recorded in the Hauterivian - Barremian interval (Figures 2, 3).

Salpingoporella pygmaea (Gümbel, 1891), Bassoullet et al., 1978; Pl. 3., Figs. 48-49.

1891 - *Gyroporella pygmaea,* Gümbel, p. 306; Figs. 6-7.

1978 - *Salpingoporella pygmaea,* Bassoullet, Bernier, Conrad, Deloffre and Jaffrezo, p. 247- 249; Pl. 30, Figs. 6 - 9.

Remarks: The characteristic features of the species are its large dimensions, the number and shape of the branches and their arrangements. The number of branches and the fact that they are closely spaced and have a circular shape in tangential sections distinguish it from *Salpingoporella piriniae.*

Measurements: D: 440 µm, d: 195 µm, W: 16, p: 50 µm, h: 27 µm, L: 1110 µm.

Stratigraphic range: Upper Bajocian – Upper Aptian (Bucur, Conrad and Radoicic, 1995). In this study, this form was recorded in the Potlandian - Lower Hauterivian interval (Figures 2, 3).

Tribe Uterieae Morellet, 1922

Genus *Otternstella* (Johnson, 1954) Granier, Mass and Berthou , 1994

Otternstella* cf. *arabica (Elliott, 1957), Pl. 3, Fig. 44.

Granier, Mass and Berthou, 1994,

1994 - *Otternstella arabica,* Granier, Mass and Berthou.

Remarks: This species has small a cylindrical thallus with a thin main axis. It has only primary branches that are both steril and fertile. They alternate both vertically and horizontally. The number of branches per verticil is small and the dimensions are small. In this study, only one sample was obtained and some of the parameters could not be recorded.

Mesurements: Wf: number of fertile branches, Ws: number steril branches, WT: total number of branches. D: 379 µm, d: 186 µm, Ws :?, Wf : ?, WT : 14, ps:?, Pf: ?, P: 61µm, h :?, L: ?.

Stratigraphic range: Malm - Hauterivian (Bucur, Conrad and Radoicic, 1995) in this study, this form has been recorded in Upper Kimmeridgian (Figures 2, 3).

Genus *Otternstella* (Nikler and Sokac, 1965) Ott, 1968

Otternstella anici (Ott, 1968)

Granier, Mass and Berthou, 1994; Pl. 2, Figs. 22-23.

1968 - *Heteroporella anici,* Ott, p. 257.

1994 - *Otternstella anici*, Granier, Mass and Berthou.

Remarks: This species has a cylindrical thallus. It has only primary branches that are both sterile and fertile. The sterile primary branches are very thin and the fertile branches have a disc shape and larger diameter. They alternate with each other vertically by forming verticils in regular rows and are perpendicular to the main axis. The dimensions are small. Calcification is not very strong. In this study, only one sample was obtained and some of the parameters could not be recorded.

Mesurements: D: 500 µm, d: 160 µm, Ws: ?, Wf: 11, ps: ?, Pf: 45 µm, h: ?, L: 1166 µm.

Stratigraphic range: Malm (Granier and Deloffre, 1993). In this study, this form was recorded in the Upper Kimmeridgian (Figures 2, 3).

Otternstella lemmensis (Bernier, 1971) (Bassoulett et al., 1978)

Granier, Masse and Berthou, Pl. 2, Figs. 24-25, 1994,

1978 - *Heteroporella lemmensis,* Bassoulett, Bernier, Conrad, Deloffre, and Jaffrezo, p.129-130, pl. 14, Figs. 1-5.

1994 - *Otternstella lemmensis,* Granier, Masse and Berthou, p. 134-135; Pl. 2, Figs. 4-5.

Remarks: This species has a cylindrical thallus with a rounded end and a very thin axial canal. It has only primary branches that are both sterile and fertile. The sterile primary branches are very thin and the fertile branches have an amphora-like shape and large diameter. They alternate with each other vertically by forming verticils and are perpendicular to the main axis. The dimensions are small. Calcification is not very strong. In this study, it was found to be more abundant than Otternstella anici. Sterile branches could not be determined.

Measurements: D: 344 µm, d: 69 µm, Ws: ?, Wf: ?, ps: ?, Pf: 80 µm, h : ?, L: 833 µm.

Stratigraphic range: Late Kimmeridgian - Early Berriasian (Granier and Deloffre, 1993). In this study, this form was recorded in the Upper Kimmeridgian - Lower Berriasian intervals (Figures 2, 3).

Family Diploporaceae Deloffre, 1988

Tribe Clavaphysoporelleae Güvenç, 1979

Genus *Selliporella* Sartoni and Crescenti, 1962

Selliporella* cf. *neocomiensis Radoicic, 1963; Pl. 3, Fig. 50.

1963 - *Triploporella ? neocomiensis,* Radoicic, p.139-144; Pl. 5

Remarks: This species is characterized by its short, almost globular primary branches which are vesicle-shaped, and long, thin, needle-like secondary branches which are trichophorous. It has an articulated thallus. The branches are arranged according to the spaced euspondyl type. The primary branches are perpendicular to the main axis and the secondary branches are bent slightly upwards at the distal part. Calcification is strong at the proximal part and weakens at the distal part. The most characteristic features of the species are the large dimensions, shape of the branches and articulated thallus. *Selliporella donzellii* is very similar to this species. Barattolo et al. (1988) stated that *Selliporella donzellii* was studied by Radoicic (1965) together with an assambledge of other dasyclads and declared that *Teutloporella gallaeformis* was a junior synonym of this species. Thus, the study of this species is of great importance. According to Dr. M. A. Conrad (personal communication), *Selliporella donzellii* is the probable ancestor of this form. This species was obtained in a few samples in oblique sections. Granier and Deloffre (1993) reported it as *Triploporella ? neocomiensis.*

Measurements: p': Diameter of secondary branches. D: 1600µm, d: 830µm, W:10, p: 140 µm, p': 55, h: ?, L: ?.

Stratigraphic range: Portlandian - Berriasian (Granier and Deloffre, 1993). In this study, this form was recorded in the Hauterivian (Figures 2, 3).

Family Seletonellaceae (Korde, 1950); Bassoullet et al., 1975

Tribe Dasyporelleae (Pia, 1920); Bassoullet et al., 1979

Genus *Macroporella* (Pia 1912); Bassoullet et al., 1978

Macroporella* ? *sellii Crescenti, 1959; Pl. 1, Fig. 20.

1959 - *Macroporella sellii,* Crescenti. p. 195, pl. 1

Remarks: The species has a small, miciritic, cylindrical thallus compressed at both ends. It has only primary branches. The primary branches are slightly inclined and slightly arched. They alternate between verticils according to the euspondyl type and arranged very close to each other. There is a large number of branches per verticil. The dimensions are small. Calcification is weak. This species is quite different from the other species in that it has a micritic thallus. It is generally considered a problematic alga. The number of branches can easily be counted and the form can not be confused with any other species.

Measurements: D: 440 µm, d: 160 µm, W: 25, p: ?, h: ?, L: 650 µm.

Stratigraphic range: Bathonian - Berriasian (Granier and Deloffre, 1993). In this study, this form was recorded in the Berriasian (Figures 2, 3).

Tribe Mastoporeae (Pal, 1976) Granier and Deloffre, 1993

Genus *Epimastopora* (Pia, 1922) Roux, 1979

Epimastopora cekici Radoicic, 1970; Pl. 1, Fig. 17.

1970 - *Epimastopora cekici,* Radoicic, p.104; Pl. 5, Figs. 1-2; Pl. 6, Figs. 1-4; Pl. 7, Fig. 1

Remarks: In this study, only a fragment from this taxon was found and the parameters could not be measured. The form exhibits typical asypondyl polygonal branches. This species has a subcylindrical to spherical thallus. The inner diameter is very large and the calcareous envelope is thin. It has only primary branches arranged according to the aspondyl type, flattened at the distal part having a polygonal shape. There are numeous branches per verticil.

Measurements: D: ?, d: ?, W: ?, p: 50 µm, h: ?, L: ?.

Stratigraphic range: Upper Hauterivian - Lower Barremian (Granier and Deloffre, 1993). In this study, this form was recorded in the Valanginian (Figures 2, 3).

Genus *Epimastoporella* Roux, 1979

Epimastoporella* ? *pedunculata (Jaffrezo , Poisson and Akbulut, 1978),

Granier and Deloffre, 1993; Pl. 1, Figs. 18-19.

1978 - *Pseudoepimastoporella pedunculata,* Jaffrezo, Poisson and Akbulut. p. 79-80; Pl. 2, Figs. 1-9; Pl. 6, Fig. 3

1993 - *Epimastoporella pedunculata,* Granier and Deloffre. Nonfigured.

Remarks: It has a tubular thallus with a curved top and a peduncle at the bottom. The dimensions are very large. It has a large main axis and only primary branches which are phloiophorous and rather short. They are arranged according to the euspondyl type and regularly alternate. Calcification is not very strong. This species differs from the other species of the genus by its large dimensions and the shape of the thallus. It has many synonyms; for example, *Korkyrella texana, Korkyrella ivanovici* and *Griphoporella auirigerica.*

Measurements: D: 1110 µm, d: 890 µm, W: 14, p: 83 µm, h: ?, L: 1340 µm.

Stratigraphic range: Aptian (Granier and Deloffre, 1993). In this study, this form was recorded in the Barremian (Figures 2, 3).

Family Dasycladaceae Kutzing, 1843, orth. mut. Stizenberger, 1860

Tribe Triploporelleae Pia, 1920

Genus *Acroporella* (Praturlon, 1964) Praturlon and Radoicic, 1974

Acroporella radoicicae (Praturlon, 1964)

Praturlon and Radoicic, 1974; Pl. 1, Figs. 2-3.

1964 - *Acroporella radoicicae,* Praturlon, p.177-179, fig. 8-11

Remarks: This species has a cylindrical, nonarticulated thallus. It has primary and secondary branches that are akrophorous and oblique to the main axis. The secondary branches emerge from the primaries with four subbranches. They are arranged according to the euspondyl type, alternating with each other. The secondary branches were hard to determine due to erosion. Calcification is strong.

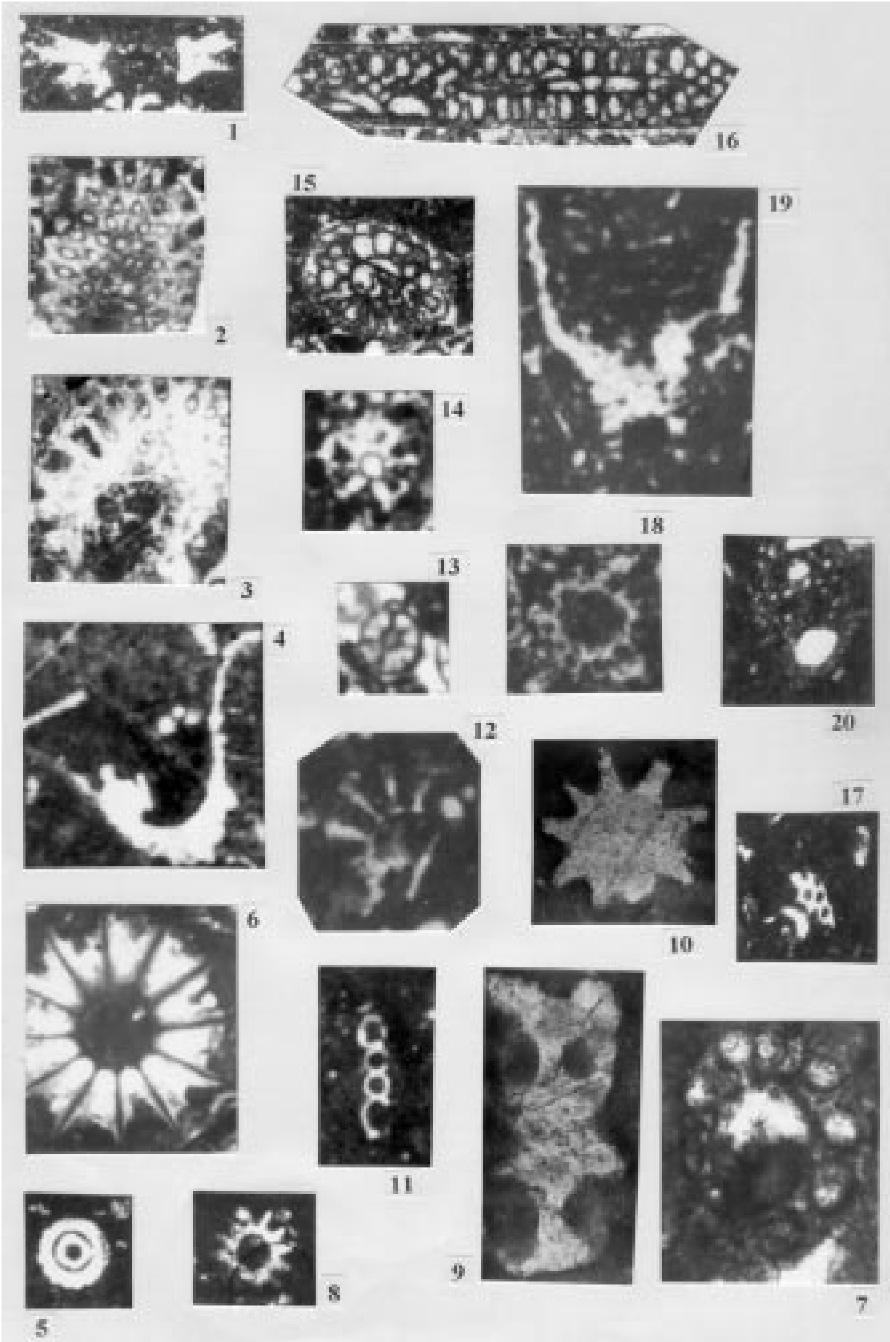

Plate 1. 1. *Actinoporella podolica* Alth, FO-211, x 18.6, 2. *Acropo-rella radoicicae* Praturlon, FO-283, x 18.6, 3. *Acroporella radoicicae* Praturlon, FO-283, x 18.6, 4. *Campbelliella striata* Carozzi, FO-102, x 34, 5. *Campbelliella striata* Carozzi, FO-104, x 34, 6. *Clypeina jurassica* Favre, FO-40, x 34, 7. *Clypeina* aff. *nigra* Conrad & Peybernes, FO-250, x 72, 8. *Clypeina parasolkani* Farinacci & Radoicic, FO-211, x 34, 9. *Clypeina parasolkani* Farinacci & Radoicic, FO-237, x 72, 10. *Clypeina parasolkani* Farinacci & Radoicic, FO-237, x 72, 11. *Clypeina solkani* Farinacci & Radoicic, FO-210, x 34, 12. *Clypeina solkani* Farinacci & Radoicic, FO-213, x 34, 13. *Cylindroporella* cf. *barnesii* Johnson, FO-303, x 34, 14. *Cylindroporella sugdeni* Elliott, FO-243, x 34, 15. *Cylindroporella taurica* Conrad & Varol, FO-318, x 18.6, 16. *Cylindroporella taurica* Conrad & Varol, FO-318, x 18.6, 17. *Epimas-tapora cekici* Radoicic, FO-175, x 34, 18. *Epimasta-porella* ? *pedunculata* Jafrezzo, Poisson & Akbulut, FO-227, x 34, 19. *Epimas-taporella* ? *pedunculata* Jafrezzo, Poisson & Akbulut, FO-226, x 34, 20. *Macropo-rella* ? *sellii* Crescenti, FO-149, x 34

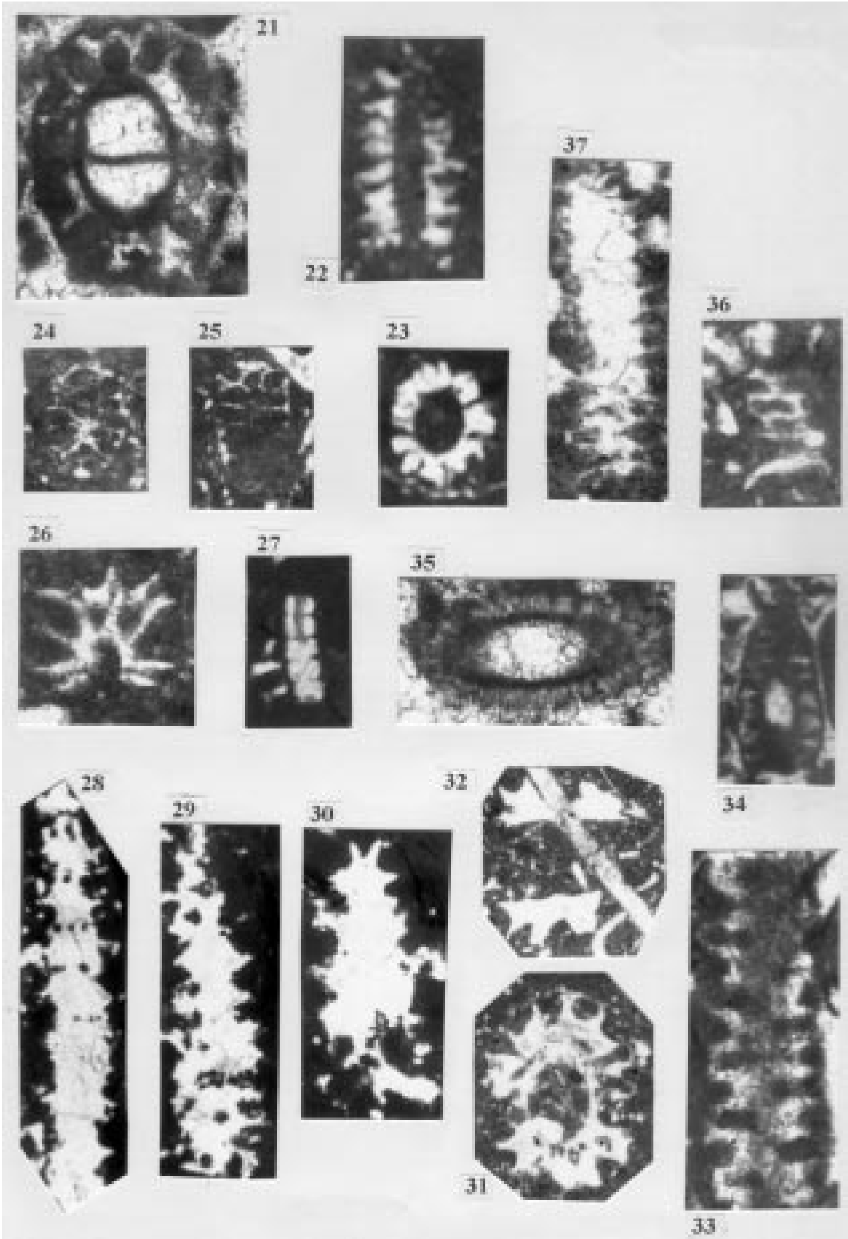

Plate 2. 21. *Kopetdegaria* cf. *sphaerica* Maslov, FO-266, x 72, 22. *Otternstella* ? *anici* Nikler & Sokac, FO-58, x 34, 23. *Otternstella* ? *anici* Nikler & Sokac, FO-58, x 34, 24. *Otternstella lemmensis* Bernier, FO-7, x 34, 25. Otternstella lemmensis Bernier, FO-7, x 34, 26. *Raj-kaella bartheli* Bernier, FO- 54, x 72, 27. *Salpingoporella annulata* Carozzi, FO-80, x 34, 28. *Salpingoporella biokoven-sis* Sokac & Velic, FO-216, x 18.6, 29. *Salpingoporella biokovensis* Sokac & Velic, FO-216, x 18.6, 30. *Salpingo-porella biokovensis* Sokac & Velic, FO-216, x 18.6, 31. *Salpingoporella cemi* Radoicic, FO-211, x 18.6, 32. *Salpingoporella cemi* Radoicic, FO-211, x 18.6, 33. *Salpingoporella circassa* Farinacci & Radoicic, FO-239, x 72, 34. *Salpingoporella circassa* Farinacci & Radoicic, FO-239, x 34, 35. *Salpingo-porella dinarica* Radoicic, FO-244, x 72, 36. *Salpingo-porella genevensis* Conrad, FO-193, x 72, 37. *Salpingo-porella genevensis* Conrad, FO-193, x 72

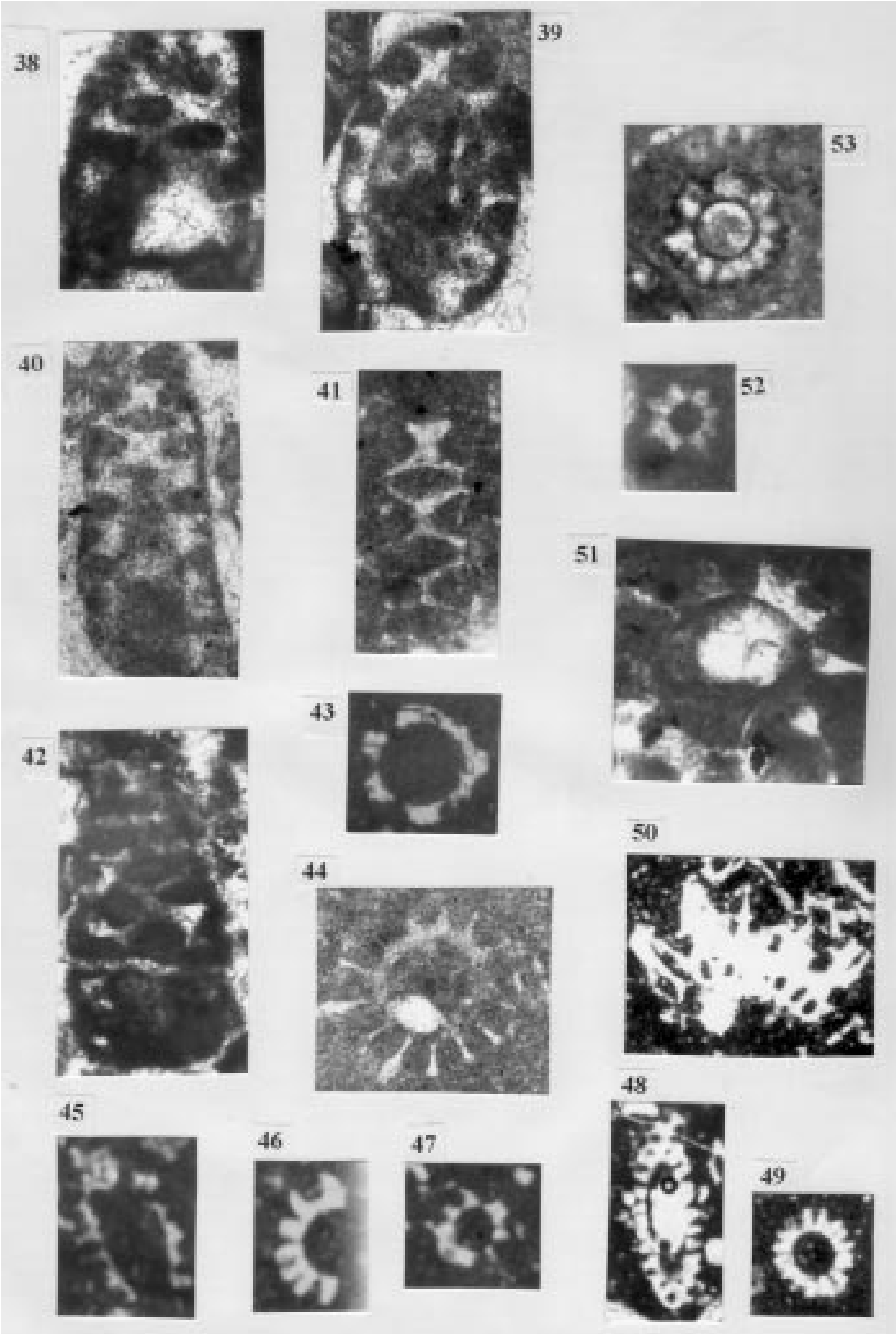

Plate 3. 38.. *Salpingoporella hasi* Conrad, Radoicic & Rey. FO-303, x 72, 39. *Salpingo-porella hasi* Conrad, Radoicic & Rey. FO-303, x 72, 40. *Salpingporella katzeri* Conrad & Radoicic. FO-229, x 72, 41. *Salpingoporella katzeri* Conrad & Radoicic. FO-226, x 72, 42. *Salpingo-porella muehlbergi* Lorenz, FO-239, x 72, 43. *Salping-oporella muehlbergi* Lorenz, FO-244, x 34, 44. *Otternstella* cf. *arabica* Elliott, FO-47, x 72, 45. *Salpingoporella piriniae* Carras & Radoicic, FO-232, x 34, 46. *Salpingo-porella piriniae* Carras & Radoicic, FO-211, x 34, 47.*Salpingoporella piriniae* Carras & Radoicic, FO-232, x 34, 48. *Salpingoporella pygmaea* Guembel, FO-155, x 34, 49. *Salpingoporella pygmaea* Guembel, FO-158, x 34, 50. *Selliporella* cf. *neocomiensis* Radoicic, FO-197, x 18.6, 51. *Salpingo-porella* n. sp. 1, FO-94, x 72, 52. *Salpingoporella* n. sp. 2, FO-150, x 72, 53. *Salpingo-porella* n. sp. 3, FO-192, x 72

Name	Realm	This Study
Clypeina aff. *nigr*a	Northern Neotethys	Southern Neotethys (Taurides)
Clypeina parosolkani	Northern Neotethys	Southern Neotethys (Taurides)
Epimatospora cekici	Southern Neotethys	Southern Neotethys (Taurides)
Salpingoporella biokovensis	Southern Neotethys	Southern Neotethys (Taurides)
Salpingoporella aff. *circassa*	Northern Neotethys	Southern Neotethys (Taurides)
Salpingoporella piriniae	Southern Neotethys	Southern Neotethys (Taurides)
Otternstella lemmensis	Southern & Northern Neotethys	Southern Neotethys (Taurides)
Selliporella cf. *neocomiensis*	Southern & Northern Neotethys	Southern Neotethys (Taurides)

Table 1. Names and realms of the species which were recorded for the first time in Tauride region in this study.

Measurements: x: The angle of branches to the horizontal, W': Number of secondary branches, p': Diameter of secondary branches. D: 1000 µm, d: 500 µm, W: 12, W': ?, p': 30 µm, p: 80 µm, x: 16, h: 80 µm, L: 2400 µm.

Stratigraphic range: Barremian - Aptian (Granier and Deloffre, 1993). In this study, this form was recorded in the Albian (Figures 2, 3).

Tribe Triploporelleae

Genus *Rajkaella* Dragastan and Bucur, 1988

Rajkaella bartheli (Bernier, 1971)

Granier ahd Berthou, 1994; Pl. 2, Fig. 25.

1971 - *Likanella bartheli,* Bernier. p. 180; Pl. 1, Figs. 1-10.

1994 - *Rajkaella bartheli,* Granier and Berthou, p.115.

Remarks: The two rows of branches, small main axis and pear-shaped branches are characteristic for this species. In this study, only one specimen was found and some parameters were not recorded.

Measurements: D: 350 µm, d: 73 µm, W: 7, p: 70 µm, h: ?, L: ?.

Stratigraphic range: Kimmeridgian - Lower Valanginian (Granier and Deloffre, 1993). In this study, this form was recorded in the Upper Kimmeridgian (Figures 2, 3).

Stratigraphic and Paleogeographic Importance

In this study, the stratigraphic ranges and paleogeographic distributions of some of the species have been modified. The species recorded here for the first time within the Tauride platform in Turkey are: *Clypeina nigra, Clypeina parasolkani, Epimatospora cekici, Otternstella lemmensis, Salpingoporella biokovensis, Salpingoporella* aff. *circassa, Salpingoporella piriniae,* and *Selliporella* cf. *neocomiensis.* The stratigraphic ranges of some of the species in this study have been changed after calibration with the benthic foraminifera with which they are associated. *Clypeina parasolkani* was found in the Valanginian – Barremian interval, which makes it younger than when it was reported in the Berriasian – Valanginian interval from the Carpathians by Bucur et al. (1995) and in the Berriasian from the western Pontides by Farinacci and Radoicic (1991). In this study, it was found together with the foraminifera *Campanellula capuensis* De Castro. Consequently, its stratigraphic range has now been changed to Valanginian-Barremian. *Salpingoporella* aff. *circassa* was reported in the Berriasian-Valanginian interval by Farinacci and Radoicic (1991) and Bucur et al. (1995). However it was found in the present study in association with the foraminifera *Praechrysalidina infracretacea* Luperto–sinni, *Vercorsella scarsellai* De Castro and *Debarina hohounerensis* Fourcade, Raoult and Vila. Therefore, its stratigraphic range is extended to Barremian. *Salpingoporella katzeri* was introduced by Conrad and Radoicic (1978) from the Berriasian-Valanginian of Yugoslavia. In the present study, it was found within the *Campanellula capuensis* subzone, and its occurence is extended up to the Hauterivian- Barremian.

Selliporella cf. *neocomiensis* was reported as *Triploporella neocomiensis* by Schindler and Conrad (1994) in the Berriasian-Valanginian from Italy, Granier and Deloffre (1993) in the Portlandian-Berriasian, and Bassoullet et al. (1978) in the Berriasian-Valanginian from Yugoslavia. However, according to M. Conrad (personal communication, 1997), it must be declared as *Selliporella* cf. *neocomiensis* by the new combination of species. Therefore, it is reported as *Selliporella* cf. *neocomiensis* in this paper. It was found in association with *Salpingoporella cemi* Radoicic, *Salpingoporella biokovensis* Sokac and Velic, and *Salpingoporella piriniae* Carras and Radoicic in this study, and its occurrence is now confirmed in the Hauterivian. *Epimatospora cekici* had a stratigraphic range from Upper Hauterivian to Lower Barremian in the study of taxonomic revision of dasycladales by Granier and Deloffre (1993). However, in the present study, this form was recorded in association with *Montsalevia salavensis* Charollais, Brönnimann and Zaninetti, which is a marker of the Valanginian stage. Therefore, its stratigraphic range has been changed to Valanginian-Lower Barremian. *Epimastoporella ? pedunculata* was reported as *Pseudoepimastoporella pedunculata* in the Aptian of the Beydağları of the western Taurides by Jafrezzo et al. (1978), and in the study of taxonomic revision of dasycladales by Granier and Deloffre (1993), it was reported as *Epimastoporella pedunculata* from the Aptian. However, in the present, study, it was recorded just before the last appearance of *Campanellula capuensis* De Castro. Therefore its stratigraphic range must be extended from Barremian to Aptian. Finally, *Acroporella radoicicicae* was reported in the stratigraphic range of Barremian- Aptian in the study of taxonomic revision of dasycladales by Granier and Deloffre (1993). However, here it was found in association with *Dictyoconus algerianus* Cherchi and Schroeder which is an Albian marker, and its stratigraphic range must be extended to the Albian. Moreover, although *Salpingoporella cemi* was reported by Altıner and Decrouez (1982) in the Tauride region, it was not figured, However, Varol and Akman (1990) figured *Salpingoporella cemi* in the Zonguldak region. In this study, it is figured for the first time in the Tauride region in Turkey.

The species, which were found for the first time in the Tauride region in Turkey now have a new site in their paleogeographic distribution. Some of the species were previously reported in southern Neotethys by different authors; for example, *Epimatospora cekici* from Yugoslavia by Bassoullet et al. (1978) and from Italy by Chiocchini et al. (1979), *Salpingoporella biokovensis* from South Croatia by Sokac and Velic (1979) and from northern Italy by Schindler and Conrad (1994), and *Salpingoporella piriniae* from Greece by Carras and Radoicic (1991) and from northern Italy by Schindler and Conrad (1994). Moreover, some of the species were found in both the southern and northern Neotethys by various authors; for example, *Selliporella* cf. *neocomiensis* was determined in both realms from Italy by Schindler and Conrad (1994) and was reported from Yugoslavia by Bassoullet et al. (1978). *Otternstella lemmensis* was reported from the western Pontides by Farinacci and Radoicic (1991) and from Yugoslavia by Bassoullet et al. (1978). However, they are here reported for the first time in the Tauride region and in Turkey. The presence of these species in the Taurides shows their intrusion from European and Balkan regions to the eastern Mediterranean, from west to east or from northwest to the southeast in southern Neotethys Ocean. Similarly, some of the species were previously found only in northern Tethys by various authors; for example *Clypeina nigra* from the Balkan region by Conrad and Peybernes (1978) and from the Pontides by Varol and Akman (1990). *Clypeina parasolkani* from the western Pontides by Farinacci and Radoicic (1991) and from the Carpatho-Balkan arc by Bucur et al. (1995), *Salpingoporella* aff. *circassa* from the western Pontides by Farinacci and Radoicic (1991) and from the Carpatho-Balkan arc by Bucur et al. (1995). However, they were found in the present study for the first time in the Tauride region in Turkey. Consequently, this data shows that their paleogeographic distributions are not limited to the north, but that they extend both margins of the Neotethys Ocean. Additionally, although Barattolo et al. (1991) stated the abundance of *Clypeina jurassica* and *Campbelliella striata* in Italy, and Barattolo and Carras (1990) showed the biozone of *Clypeina jurassica* from Greece. Farinacci and Radoicic (1991) declared the general absence *Clypeina jurassica* in the western Pontides. The following table (Table 1) shows the species recorded for first time in the Tauride region in this study and their previously known and new paleogeographic distributions.

Conclusions

Within the Upper Jurassic (Kimmeridgian) – Upper Cretaceous (Cenomanian) peritidal carbonates of the Fele area in the western Tauride region, 30 dasyclad algae species and 3 new *Salpingoporella* species were identified. The genus of *Salpingoporella* was dominant among the other identified genera within these carbonates. Some of the species are reported here for the first time in the Tauride region in Turkey, and some of their stratigraphic ranges are now extended according to their foraminiferal associations.

In this study, a 520 m thick measured section was obtained by collecting 350 samples. This frequent sampling helped us to obtain more precise stratigraphic ranges of the species. Following this study, if numerous sections from different parts of Turkey are measured in the same way, many new species and paleogeographic distributions can be recorded.

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