



Some stratigraphically important Larger Benthic Foraminifera from the Lower Jurassic and *Sievoides blumenthali* sp. nov., Beyaz Aladag Unit, Eastern Taurides, S Türkiye

Cemile SOLAK¹

Abstract: The Lower Jurassic succession in the Beyaz Aladağ Unit (Eastern Taurides) includes Hettangian-Pliensbachian shallow-marine carbonates. The studied Sinemurian-Pliensbachian strata, characterized by abundant oncoïds and megalodontid bivalve shells, contain a diversified benthic foraminiferal assemblage including orbitopsellids, hauraniids, biokoviniids, cyclamminids, and siphonalvulinids taxa. This paper focuses on the morphological analysis of the key biostratigraphic marker species *Lituosepta recoarensis* CATI, 1959, *Lituolipora termieri* (HOTTINGER, 1967), *Bosniella oenensis* GUŠIĆ, 1977, and introduces a new Larger Benthic Foraminifera, *Sievoides blumenthali* sp. nov. Some poorly known morphological characteristics of these index species have been illustrated, and some potential discrepancies have been improved. The selected taxa have been documented here for the first time from the Beyaz Aladağ Unit, Eastern Taurides. The new species, probably restricted to the Pliensbachian *Orbitopsella* Zone, is characterized by a coarse agglutinated wall with an irregular, subepidermal polygonal network, a developed spiral stage followed by a long uniserial cylindrical stage, and a simple aperture. It differs from the type species *Sievoides kocyigiti* FARINACCI & EKMEKÇİ (2004) by a developed spiral stage and stratigraphic position (Pliensbachian). This new species is distributed in the peri-Mediterranean platforms (Taurides, Apennines, Dinarides). The discovery of *Sievoides blumenthali* in the Lower Jurassic confirms the earlier appearance of the larger Foraminifera having a wall with a subepidermal network, which is known to be common in the Mid-Late Jurassic.

Keywords:

- Sinemurian;
- Pliensbachian;
- micropaleontology;
- index species;
- shallow-marine carbonates;
- Taurus Mountains

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Résumé : *Quelques grands foraminifères benthiques stratigraphiquement importants du Jurassique inférieur et Sievoides blumenthali sp. nov., unité de Beyaz Aladağ, Taurides orientales, sud de la Turquie.*- La succession du Jurassique inférieur de l'unité de Beyaz Aladağ (Taurides orientales) comprend des carbonates de plate-forme marine peu profonde d'âge Hettangien à Pliensbachien. Les niveaux étudiés, datés du Sinémurien au Pliensbachien et caractérisés par l'abondance d'oncoïdes et de coquilles de bivalves mégalodontidés, renferment une association diversifiée de foraminifères benthiques, comprenant notamment des orbitopsellidés, des hauraniidés, des biokoviniidés, des cyclamminidés et des siphonalvulinidés. Cet article porte sur l'analyse morphologique de plusieurs espèces clés à valeur de marqueurs biostratigraphiques : *Lituosepta recoarensis* CATI, 1959, *Lituolipora termieri* (HOTTINGER, 1967) et *Bosniella oenensis* GUŠIĆ, 1977. Il présente également un nouveau grand foraminifère benthique, *Sievoides blumenthali* sp. nov. Certaines caractéristiques morphologiques peu connues de ces espèces stratigraphiques de référence sont illustrées, et plusieurs divergences potentielles sont clarifiées. Les taxons sélectionnés sont signalés ici pour la première fois dans l'unité de Beyaz Aladağ, dans les Taurides orientales. La nouvelle espèce, probablement limitée à la zone à *Orbitopsella* du Pliensbachien, se caractérise par une paroi agglutinée grossière présentant un réseau polygonal sous-épidermique irrégulier, un stade spiralé bien développé suivi d'un long stade unisérié cylindrique, avec une ouverture simple. Elle se distingue de l'espèce type, *Sievoides kocyigiti* FARINACCI & EKMEKÇİ (2004), par son stade spiralé développé et par sa position stratigraphique, correspondant au

¹Department of Geological Engineering, University of Mersin, Çiftlikköy Campus, 33343, Mersin (Türkiye)
cemilesolak@mersin.edu.tr





Pliensbachien. Cette nouvelle espèce est présente sur les plates-formes péri-méditerranéennes, notamment dans les Taurides, les Apennins et les Dinarides. La découverte de *Sievoides blumenthali* dans le Jurassique inférieur confirme l'apparition précoce de grands foraminifères possédant une paroi à réseau sous-épidermique, une caractéristique connue pour être fréquente au Jurassique moyen et supérieur.

Mots-clefs :

- Sinémurien ;
- Pliensbachien ;
- micropaléontologie ;
- espèces stratigraphiques de référence ;
- carbonates de milieu marin peu profond ;
- Monts Taurus

1. Introduction

During the Early Jurassic, shallow-marine carbonates formed extensively in the Mediterranean Tethys (DERCOURT *et al.*, 2000). The Aladağlar/Aladağ Mountains, situated in the Eastern Taurides, is one of the valuable areas where shallow-marine Early Jurassic carbonates are well represented by an expanded succession (Fig. 1) (SOLAK *et al.*, 2025). The Lower Jurassic succession of the Beyaz Aladağ Unit documenting the recovery of diversity from the Triassic/Jurassic boundary to the Pliensbachian is rich in Larger Benthic Foraminifera and relatively low in algae. Simple forms such as the genus *Siphovalvulina* SEPTFONTAINE, 1988, and textulariids mostly characterize the Hettangian strata of the studied Beyaz Aladağ succession. The lower Sinemurian is characterized by the genus *Everticyclammina* REDMOND, 1964, and *Duotaxis* KRISTAN, 1957 species, besides relatively abundant simple forms. Hauraniid forms, the genus *Lituolipora* GUŠIĆ & VELIĆ, 1978, and *Lituosepta recoarensis* CATI, 1959, mark the upper Sinemurian strata. The abundant and diverse complex forms with alveoles and internal pillars, such as the genus *Orbitopsella* MUNIER-CHALMAS, 1902 and *Bosniella* GUŠIĆ, 1977, are typical in the Pliensbachian strata of the Beyaz Aladağ succession. Following the Pliensbachian stage, the platform emerged in the Toarcian and Tithonian interval until subsiding in the Berriasian (SOLAK *et al.*, 2025).

The biostratigraphy of the Aladağlar Lower Jurassic succession will be discussed in a future paper in conjunction with C-isotope stratigraphy. This study focuses on the micropaleontologic investigation of the Larger Benthic Foraminiferal taxa of the Lower Jurassic shallow-marine succession. The Lower Jurassic Larger Benthic Foraminifera of the peri-Mediterranean carbonate platforms have been studied by a number of authors (e.g., HOTTINGER, 1967; SEPTFONTAINE, 1980, 1986, 1988; BASSOULLET, 1997; BASSOULLET *et al.*, 1999; FUGAGNOLI, 2000; BOUDAGHER-FADEL *et al.*, 2001; KABAL & TASLI, 2003; FUGAGNOLI, 2004; BOUDAGHER-FADEL & BOSENCE, 2007; VELIĆ, 2007; GALE, 2014). This paper aims to report and discuss stratigraphically important Larger Benthic Foraminifera from the Beyaz Aladağ and to describe a new

species from the Pliensbachian. The record of *Sievoides blumenthali* sp. nov. confirms the occurrence in the Lower Jurassic of a taxon with a developed alveolar network (or hypodermic network SEPTFONTAINE (1988), which is known to be common in mostly Mid to Late Jurassic taxa.

2. General setting

The Aladağlar/Aladağ Mountains are situated at the west end of the Eastern Taurides and bounded by the Ecemiş left-lateral strike-slip fault on the west (e.g., METZ, 1956) (Fig. 1). They are composed of a series of different tectonic slices named as nappe structures (BLUMENTHAL, 1952; TEKELI *et al.*, 1984) or thrust sheets (ROBERTSON *et al.*, 2022). The nappe structure of the Aladağlar was formed as a result of the ophiolite obduction, which began around the end of the Maastrichtian (TEKELI *et al.*, 1984). This movement affected the entire Eastern Taurides (ÖZGÜL, 1984; TEKELI *et al.*, 1984) and was interpreted as the closure of the Internal Tauride Ocean (ŞENGÖR & YILMAZ, 1981).

The nappes or thrust sheets are referred to as Yahyalı, Siyah Aladağ, Minaretepeler, Çataloturan, Beyaz Aladağ, and Aladağ Ophiolite nappe (or Pozanti-Karsanti ophiolite, ROBERTSON *et al.*, 2022) from bottom to top (TEKELI *et al.*, 1984). The Beyaz Aladağ Unit displays the largest and highest-peaked exposure. It begins with the Triassic dolomite and limestones containing the megalodon shells in the upper parts. The conformably overlying Lower Jurassic consists of dolomite and limestones containing abundant oncoids, megalodon shells, and relatively small gastropods. The Lower Jurassic (Hettangian to Pliensbachian) in the Aladağlar is represented by an expanded stratigraphic succession that is about 850 meters thick. The Cretaceous pelagic carbonates unconformably cover the Triassic and Lower Jurassic shallow marine platform carbonates with a thickness up to 2000 meters (SOLAK *et al.*, 2025). The pelagic carbonates are small outcrops on the high peaks at different localities. Different Cretaceous condensed pelagic successions (e.g., Berriasian-Valanginian, Albian-Cenomanian, and Turonian-Coniacian) unconformably overlie the Triassic-Lower Jurassic platform carbonates. The pelagic carbonate succession displays a chaotic character containing debris-flow intercalations and gravity-

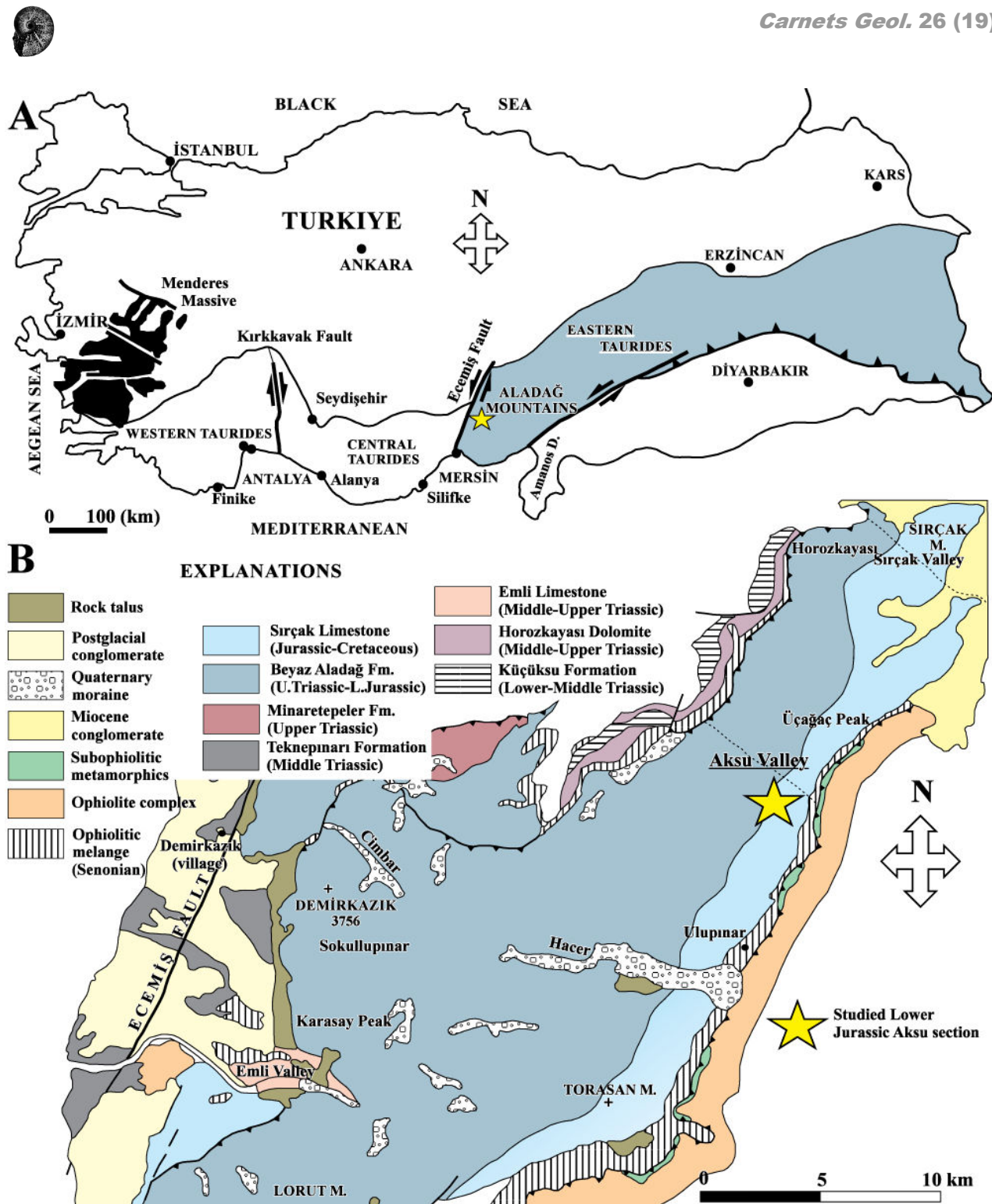


Figure 1: Maps showing the Aladağ Mountains. **A**, Geographical subdivision of the Taurides (ÖZGÜL, 1984). **B**, Simplified geologic map of the Aladağ Mountains (TEKELİ *et al.*, 1984) showing the studied Aksu stratigraphic sections (yellow star).

slide limestone blocks, which constitute approximately half of the 50 m thick succession (SOLAK *et al.*, 2025). A mélangé unit consisting of radiolarite, volcanic rock, and neritic limestone blocks tectonically overlies the Cretaceous condensed succession (e.g., TEKELİ *et al.*, 1984; SOLAK *et al.*, 2025).

3. Material and methods

Selected Larger Benthic Foraminifera were investigated from the Aksu section of the Aladağlar (= Aladağ Mountains). The Aksu section (Coordinates: 37°50'20.93"N 35°21'12.23"E) is located south of the Aksu Valley, about 3.5 km northeast of Ulupınar village (Fig. 1). Accessing

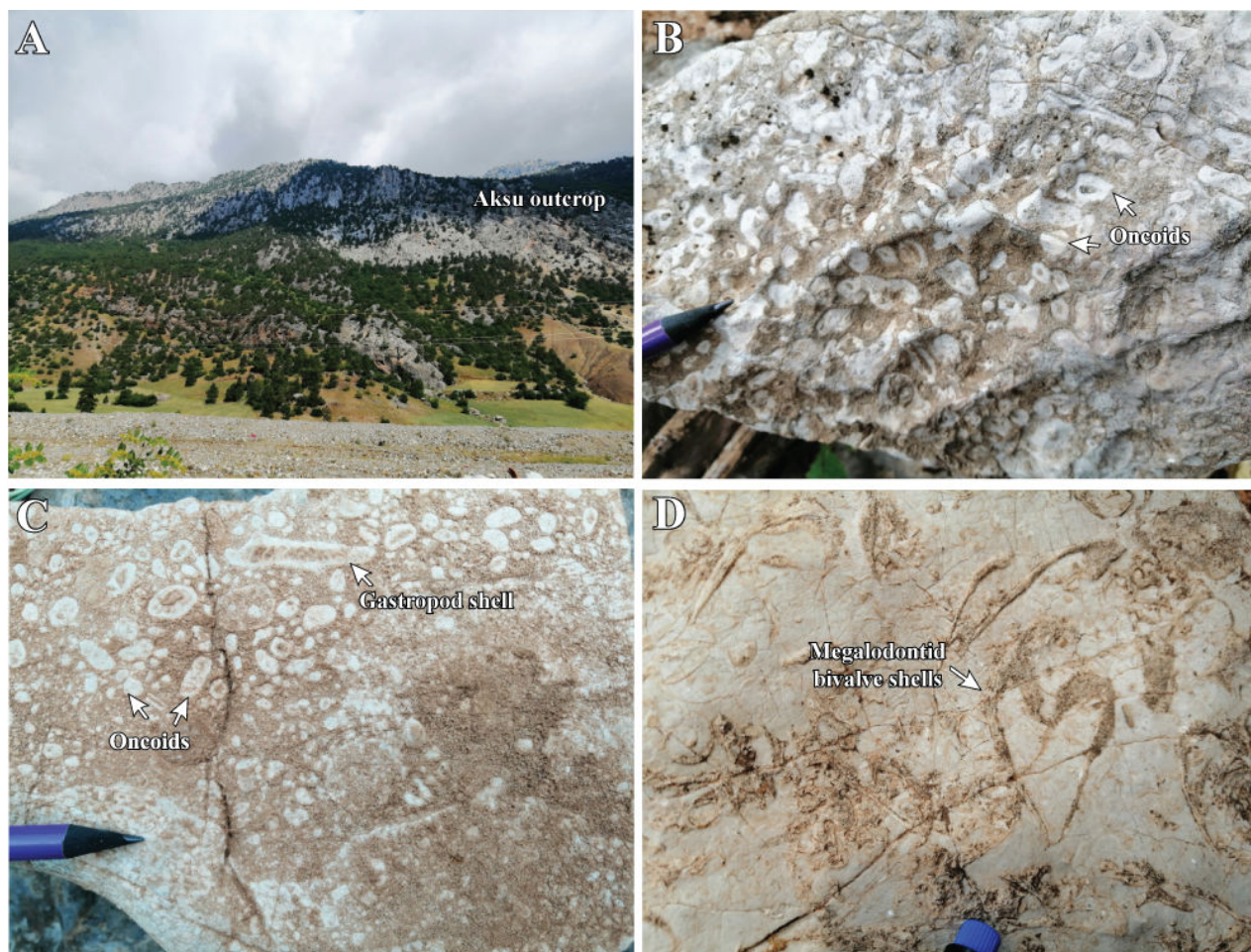


Figure 2: Field photos of the Sinemurian-Pliensbachian shallow-marine limestones in the Aksu area. **A**, General view of the Aksu outcrop. **B-C**, Oncoidal limestones, Pliensbachian. **D**, Limestones with megalodontid shells, Sinemurian.

the outcrops of the Aksu is difficult due to the cliff-like formations (Fig. 2A). A 600 m-thick succession was sampled, starting from the lowest exposed limestones and a total of 200 samples were collected. Vertical faults commonly cut the succession (Fig. 2A); therefore, the total thickness of the outcrops seems excessive. The limestone samples are lithified carbonates, and thus benthic Foraminifera were studied in thin sections, as with many studies on similar lithology (e.g., DE CASTRO, 1967; FLEURY 1979; ARNAUD-VANNEAU, 1980; SCHROEDER & NEUMANN, 1985; LOEBLICH & TAPPAN, 1987; HOTTINGER, 2006; TASLI *et al.*, 2006; VELIĆ, 2007; CHIOCCHINI *et al.*, 2008; CONSORTI *et al.*, 2016; SCHLAGINTWEIT & CVETKO TEŠOVIĆ, 2017; SOLAK & TASLI, 2020; SOLAK, 2021, 2022; SOLAK *et al.*, 2021; KOÇ & SAĞALTICI, 2024).

The Aksu section is composed of beige-cream-coloured massive limestones and characterized by abundant oncooids (Fig. 2B), gastropods (Fig. 2C), and megalodontid bivalve shells (Fig. 2D). It has a diverse and abundant Larger Benthic Foraminiferal assemblage (Fig. 3). The first 200 m of the section, assigned to the Sinemurian, contains locally abundant gastropod and megalodontid shells. It includes mainly algae: *Palaeodasycladus mediterraneus* (PIA, 1920), *Palaeodasycladus gracilis* CROS

& LEMOINE, 1967, and benthic Foraminifera; *Everticyclamina praevirguliana* FUGAGNOLI, 2000, *Duotaxis metula* KRISTAN, 1957, and *Siphovalvulina* spp. The following 100 m of the section is marked by *Lituosepta recoarensis* CATI, 1959, which characterizes the upper Sinemurian (e.g., BASSOULLET, 1997; AZERÉDO *et al.*, 2003; VELIĆ, 2007). The upper Sinemurian limestones in the Aksu section do not contain any macrofossils. The remaining 300 m-thick part of the section is rich in oncooids, and microfossils. This part is mostly composed of oncolidal grainstone and less packstone microfacies and is characterized by the abundant occurrence of the genus of *Orbitopsella* MUNIER-CHALMAS, 1902, and *Bosniella oenensis* GUŠIĆ, 1977, which are typical for the Pliensbachian stage (e.g., HOTTINGER, 1967; BASSOULLET, 1997; FUGAGNOLI, 1998; FUGAGNOLI & LORIGA BROGLIO, 1998; PERELIS GROSSOWICZ *et al.*, 2000; BOUDAGHER-FADEL & BOSENCE, 2007; VELIĆ, 2007). The stratigraphic distribution of the selected Larger Benthic Foraminifera is given in Figure 3.

All studied thin-sections for this work (labelled as As-1 to As-200) are stored at the thin section archive of the General Geology Laboratory, Department of Geological Engineering, Mersin University, Türkiye.

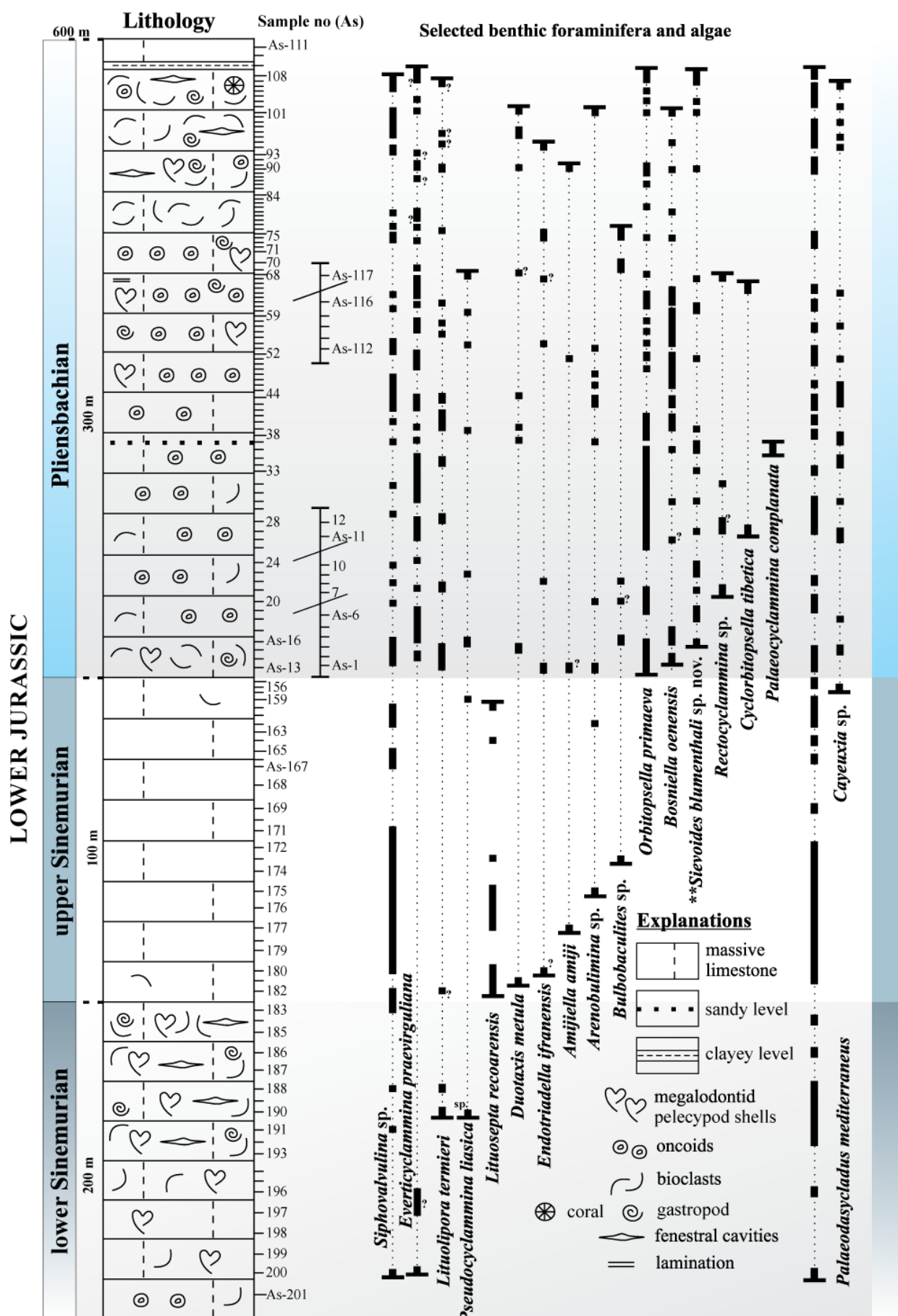


Figure 3: Stratigraphic distribution of selected benthic Foraminifera, the new species *Sievoides blumenthali*, and algae in the Aksu section.



4. Systematic paleontology

The KAMINSKI 2010 systematic classification has been followed (KAMINSKI, 2014).

Class Foraminifera ORBIGNY, 1826

Subclass Globothalamana

PAWLOWSKI *et al.*, 2013

Order Loftusiida

KAMINSKI & MICHALEVICH, 2004

Superfamily Haplophragmioidea

EIMER & FICKERT, 1899

Family Cribratinidae LOEBLICH & TAPPAN, 1964

Genus *Sievoides* FARINACCI & EKMEKÇI, 2004

Type species: *Sievoides kocyigiti* FARINACCI & EKMEKÇI, 2004

***Sievoides blumenthali* sp. nov.**

(Figs. 4-5)

1977 Lituolidae?; CHIOCCHINI, Pl. 5, fig. 2.

? 1977 *Haurania* sp.; GUŠIĆ, Pl. 11, fig. 1, left.

2015 *Pseudocyclammina liassica* HOTTINGER; SOYCAN *et al.*, Fig. 9 (9-10).

Holotype: Longitudinal section in Figure 4A, thin section As-39.

Paratype: Specimens figured in Figures 4B-I, 5.

Diagnosis: Test large, consisting of a moderately developed initial planispiral stage with a large proloculus, followed by a long uniserial cylindrical stage having a circular transverse section. Wall and septa coarsely agglutinated. Imperforate microgranular, thin epidermis; exoskeleton formed by numerous beams (vertical partitions) and rafters (horizontal partitions) (HOTTINGER, 1978) produces an irregular subepidermal or hypodermic network (SEPTFONTAINE, 1988) polygonal network. Central zone of chambers not subdivided (no pillars or partitions). Aperture simple, centrally terminal.

Derivation of name: Dedicated to Mor M. BLUMENTHAL for his first preliminary, comprehensive studies and impressive contributions to the knowledge of the Aladağlar Mesozoic shallow-marine carbonates.

Material: Total of 77 specimens in 62 thin sections from 21 samples.

Locality and horizon: The Aksu section (Coordinates: 37°50'20.93"N 35°21'12.23"E), south of the Aksu Valley, about 3.5 km northeast of Ulupınar village, Beyaz Aladağ Unit. Beige-cream coloured, massive limestones with abundant oncoids and fewer gastropods and megalodontid shells.

Stratigraphic range/occurrence: *Sievoides blumenthali* sp. nov. is described from the Beyaz Aladağ Lower Jurassic shallow marine limestones. It has been found throughout the *Orbitopsella* zone assigned to the Pliensbachian.

Description: Evidence of dimorphism is absent in the test. The test consists of a spiral initial part and an uniserially arranged cylindrical adult part. The spiral-coiled part has a large proloculus and the following four spiral chambers are arranged planispirally, consisting of one whorl.

Diameter of the spiral-coiled part is a minimum of 1.2 mm and a maximum 1.8 mm, and approximately equal to that of the first uniserial chambers. A prominent proloculus is in the equatorial section of a specimen (Fig. 4E). The coarse agglutinated grains deformed the spherical or subspherical shape of the proloculus. The measured inner diameter of the proloculus is approximately 0.26 mm. Aperture of the coiled part is single and near the base of the septum (Fig. 4B).

The spiral-coiled part is followed by an adult part consisting of uniserially arranged cylindrical chambers with a circular transverse section. The uniserial part of the test, which is made up of four or five chambers, is straight. However, there can be a direction difference between the first chamber of the uniserial part and the last chamber of the spiral part (e.g., Fig. 4B). Septa are curved in the direction of growth, with a single, sub-triangular cross-sections central aperture. Almost all specimens occur in random sections, often oblique; therefore, it is difficult to determine the overall height of the test. The measured maximum height of the uncoiled uniserial part in random sections is 5.22 mm. The width/diameter of the uncoiled chambers is mostly about twice the height. Their diameter in transversal sections varies from 1.22 mm to 1.72 mm. The uncoiled chamber diameters increase slightly in the growth direction of the test. However, it is often difficult to follow this from the random sections due to the curvature in the uniserial part.

Wall and septal texture is coarsely agglutinated containing small benthic Foraminifera and larger other grains (e.g., intraclast, bioclasts, cortoids, and pellets/peloids) (e.g., Figs. 4A, D, I, 5D, I). Exoskeleton consists of a very coarse, irregular subepidermal network (or hypodermic network) produced by a series of beams and rafters. This network exhibits an irregular polygonal pattern in the tangential sections (Fig. 4C). The subepidermal polygonal network appears quite irregular due to larger agglutinated grains (Figs. 4-5). Therefore, it is difficult to identify the number of alcove rows/orders in each chamber. In transverse sections, longer primary beams (main partitions) and two to three? short secondary beams (secondary partitions or intercalary beams) are easily distinguished (Fig. 5A). Microgranular thin epidermis is clearly recognizable in well-preserved specimens (e.g., Figs. 4A, F, 5A). Wall thickness is equal to almost half the total chamber height.

No pillars or partitions subdivide the central zone of the chambers.

Dimensions: Given in Description Section.

Remarks: An exoskeleton with a well-developed subepidermal network, consisting of numerous beams and rafters, is mostly well known from Mid and Late Jurassic genera (e.g., *Spiraloconulus* ALLEMAN & SCHROEDER, 1980; *Bostia* BASSOULLET, 1998; *Kastamonina* SIREL, 1993; *Sievoides* FARINACCI & EKMEKÇI, 2004). Additionally, a few species

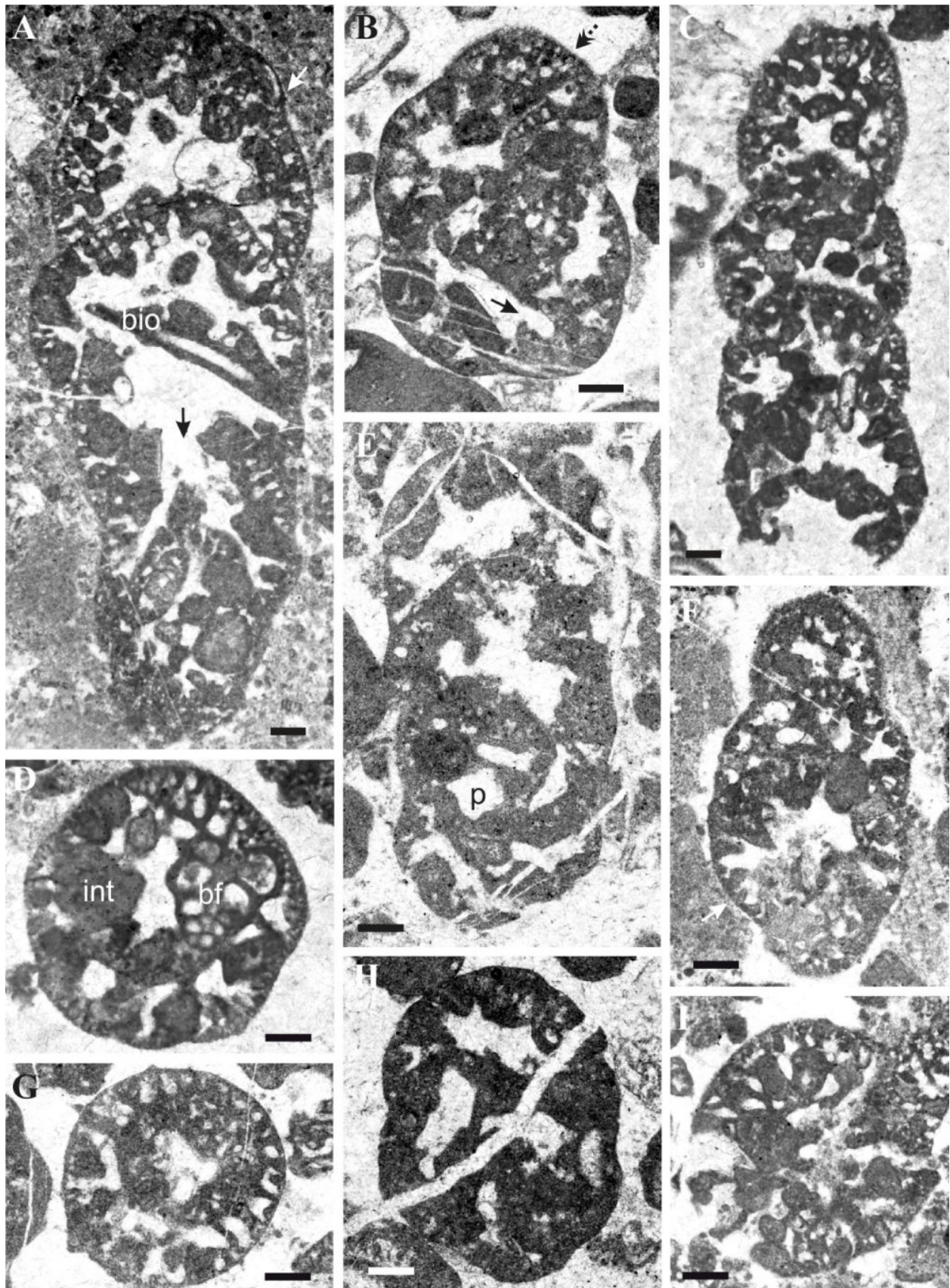


Figure 4: Thin-section microphotographs of *Sievoides blumenthali* sp. nov. from the Pliensbachian of the Beyaz Aladağ Unit (Aksu section). **A**, sample As-39, holotype. **B**, sample As-27. **C**, sample As-60. **D**, sample As-60. **E**, sample As-27. **F**, sample As-39. **G**, sample As-37. **H**, sample As-37. **I**, sample As-67. Abbreviations: p; proloculus, bf; benthic Foraminifera, int; intraclast, bio; bioclast. The black arrow shows a single aperture in the spiral part and the uncoiled part. White arrows show thin epidermis. The black dashed arrow shows a slightly curved first uniserial chamber following the spiral part. Scale bars: 0.25 mm.



with a subepidermal network were reported from the Lower Jurassic. *Ijdranella atlasica* BASSOULET *et al.*, 1999, which was described from the Lower Jurassic (Pliensbachian) beds with *Orbitopsella praecursor* (GÜMBEL, 1872) of Morocco. This species has a well-developed subepidermal polygonal network and multiple apertures. *Cymbriaella lorigae* FUGAGNOLI, 1999, was described from the Domerian (upper Pliensbachian) of the upper part of the Rotzo Member (*Lithiotis* facies), North-eastern Italy. Its exoskeleton is characterized by a coarse, irregular subepidermal polygonal network; it has multiple apertures and a bilaterally compressed test. The mentioned two species

have a more regular and fine subepidermal networks, unlike the very coarse and irregular, clearly more primitive network of the new species *Sievoides blumenthali* sp. nov. In addition, the first occurrence of *Cymbriaella lorigae* is in the Domerian. The new species *Sievoides blumenthali* sp. nov. is observed in the first Pliensbachian beds with *Orbitopsella primaeva* zone overlying the *Lituosepta recoarensis* zone (upper Sinemurian). The type species *Sievoides kocyigiti* is Kimmeridgian (Late Jurassic) in age. Therefore, this new taxon is considered to represents the earliest stage of development in the evolution of the Jurassic complex-walled benthic Foraminifera.

Table 1: A summarized comparison of some Jurassic genera with the genus *Sievoides*.

Genus	<i>Spiraloconulus</i> ALLEMAN & SCHROEDER, 1980 (LOEBLICH & TAPPAN, 1987) [Type species: <i>S. perconigi</i> (ALLEMAN & SCHROEDER, 1972)]	<i>Kastamonina</i> SIREL, 1993 (Type species: <i>K. abanica</i> SIREL, 1993)	<i>Bostia</i> BASSOULET, 1998 (Type species: <i>B. irregularis</i> BASSOULET, 1998)	<i>Cymbriaella</i> FUGAGNOLI, 1999 (figure after SCHLAGINTWEIT & VELIĆ, 2011) (Type species: <i>C. lorigae</i> FUGAGNOLI, 1999)	<i>Sievoides</i> FARINACCI & EKMEKÇI, 2004 (Type species: <i>S. kocyigiti</i> FARINACCI & EKMEKÇI, 2004)
Illustrations					
Shape of test*	large, a short initial trochospiral or planispiral, conical to cylindrical, enrolled stage producing a flattened test apex	uniserial, elongated to high conical in microspheric, high conical with a tapered base in megalospheric forms	large, a short planispiral stage followed by a cylindrical or compressed uniserial stage, complex embryo	large, initially coiled in a low trochospire or planispirally, later uniserial and rectilinear chambers, bilaterally compressed	large, elongate, uniserial, rectilinear to slightly arcuate, circular
Central zone**	pillar-like growths from the septa interspersed between the apertural pores	no pillars	no pillars	no pillars	no pillars
Wall composition	coarsely agglutinated, irregular subepidermal network (beam, rafter)	agglutinated, subepidermal alveolar network (or hypodermic network, SEPTFONTAINE, 1988) (beam, rafter)	agglutinated, subepidermal network delimiting irregular cortical alveoles	coarsely agglutinated, a coarse irregular subepidermal polygonal network (consisting of beams and shallow rafters)	agglutinated with coarse material, externally smooth; subepidermal alveolar network
Aperture**	cribrate on the terminal face	irregularly distributed cribrate aperture	multiple openings	multiple apertures in the terminal face	simple, centrally terminal, on an internal neck extending outward
Stratigraphic distribution	Middle Jurassic	Kimmeridgian-Tithonian (Upper Jurassic)	upper Bathonian (Middle Jurassic)	Pliensbachian (Domerian) (Lower Jurassic); upper Aalenian-lower Bajocian (Middle Jurassic)	Kimmeridgian (Upper Jurassic)
Geographic distribution	France, Italy, Arabia, Oman, Karst Dinarides of Croatia	North of Türkiye, Akkaya Limestone	NE of Aquitaine basin, Dordogne, France	Trento Platform, Venetian Prealps, Northeastern Italy, Karst Dinarides of Croatia (SCHLAGINTWEIT & VELIĆ, 2011)	Balgıkhisar, northern boundary of the Taurus Mountains, Türkiye

** reliable diagnostic criteria; * relatively reliable diagnostic criteria



Comparisons: Table 1 provides a summary comparison between some Jurassic genera that have a subepidermal network and the genus *Sievoides*. *Rectocyclammina* HOTTINGER, 1967, was known from the Upper Jurassic (Kimmeridgian) and has an agglutinated wall with an imperforate outer layer, subepidermal "choffatelloid" network and a single terminal aperture. The early stage of *Rectocyclammina* is planispiral in the microspheric forms, but megalospheric forms can be completely uniserial (LOEBLICH & TAPPAN, 1987). This genus differs by its subepidermal "choffatelloid" network from the new species. *Spiraloconulus* ALLEMAN & SCHROEDER, 1980, described from the Middle Jurassic, is characterized by a coarsely agglutinated, irregular subepidermal network and cribrate aperture on the terminal face. The description also includes the existence of pillar-like growths from the septa interspersed between the apertural pores (LOEBLICH & TAPPAN, 1987). BOUDAGHER-FADEL (2008) also mentioned the existence of thick, heavy pillars in *Spiroloconulus*. However, SCHLAGINTWEIT (2011) stated that grains integrated into the inside of the chamber and come into contact with the chamber floor might have been misinterpreted as pillars. SCHLAGINTWEIT *et al.* (2018) reported *Bispiraloconulus* from the Berriasian showing identical structural features as *Spiraloconulus* except for the arborescent shell. They explained that grains in the central zone are interconnected to each other and to the following septum by short columnar and micritic elements at the roof of the chamber. *Limognella* PELISSIÉ & PEYBERNÈS, 1982, is described from the Middle-Upper Jurassic of France. LOEBLICH and TAPPAN (1987) considered it a junior synonym of *Spiraloconulus* ALLEMAN & SCHROEDER, 1980. *Bostia* BASSOULLET, 1998, described from the upper Bathonian (Middle Jurassic) of France, has a large complex embryo, agglutinated wall, subepidermal network, and multiple openings. The *Spiraloconulus* genus is distinguished from the new species mainly by its pillar-like structures, and cribrate aperture, and the genus *Bostia* by its large complex embryo and multiple apertures. The Middle Jurassic genus *Robustoconus* SCHLAGINTWEIT *et al.*, 2013, differs in having a complex central zone consisting of anastomizing micritic septal excrescences (with constrictions and swellings) that extend deep into the chamber lumen (not interseptal pillars) and a short planispiral stage. The Upper Jurassic (Kimmeridgian-Portlandian) genus *Kastamonina* SIREL, 1993, consisting of uniserial chambers, differs from the new species by its irregularly distributed cribrate aperture and the lack of a spiral initial part.

The hitherto monospecific genus, *Sievoides* (Type species: *Sievoides kocyigiti*), was described by FARINACCI and EKMEKÇI (2004) from the Kimmeridgian (Upper Jurassic) of the northern boundary of the Taurus Mountains (Central Taurides). *Sievoides kocyigiti* is characterized by an agglutinated wall with coarse material and uniserial 4-6

chambers, a subepidermal network, and a simple terminal aperture, produced centrally inside the arcuate septal thickness, as an internal neck extending outward. In the description of the *Sievoides kocyigiti*, the presence of a spiral part was not mentioned. The developed spiral part and stratigraphic position (Pliensbachian) allow the new species to be easily distinguished from the type species.

Stratigraphic and geographic range: A well-preserved longitudinal section identified as Lituolidae? from the upper Lias (Lower Jurassic) of the Abruzzo Apennines (CHIOCCHINI, 1977) is identical with the new species, *Sievoides blumenthali*. A transversal section assigned to *Haurania* sp., from the Sinemurian-Pliensbachian of the Dinarides (GUŠIĆ, 1977), is similar to the *Sievoides blumenthali*. Two specimens identified as *Pseudocyclammina liassica* from the Pliensbachian of the Lycian Nappes, Western Taurides, belong to the new species (SOYCAN *et al.*, 2015). These show that the new species was common in the Tethys Early Jurassic platforms. Its stratigraphic range is probably restricted to the Pliensbachian, zone with *Orbitopsella*.

Superfamily Loftusioidea BRADY, 1884

Subfamily Orbitopsellinae

HOTTINGER & CAUS, 1982

Genus *Lituosepta* CATI, 1959

Type species: *Lituosepta recoarensis* CATI, 1959

Lituosepta recoarensis CATI, 1959

(Fig. 6)

- 1959 *Lituosepta recoarensis* CATI; CATI, Pl. 1, figs. 1-5, 7, 11, 14.
1962 *Lituosepta recoarensis* CATI; SARTONI & CRESCENTI, Pl. 13, fig. 2; Pl. 47, fig. 7.
1967 *Lituosepta recoarensis* CATI; HOTTINGER, Figs. 15-16; Pl. 4, figs. 14-16; Pl. 8, figs. 27-29.
1977 *Lituosepta recoarensis* CATI; CHIOCCHINI, Pl. 8, figs. 2-3.
1984 *Lituosepta recoarensis* CATI; SEPTFONTAINE, Pl. 1, figs. 6-11.
1994 *Lituosepta recoarensis* CATI; CHIOCCHINI *et al.*, Pl. 2, figs. 7, 15.
2003 *Lituosepta recoarensis* CATI; KABAL & TASLI, Pl. 2, figs. 1-7.
2004 *Lituosepta recoarensis* CATI; FUGAGNOLI, Pl. 1, fig. 8.
2007 *Lituosepta recoarensis* CATI; BOUDAGHER-FADEL & BOSENCE, Pl. 1, fig. 3; Pl. 2, fig. 3; Pl. 3, figs. 1, 4.
2007 *Lituosepta recoarensis* CATI; VELIĆ, Pl. 2, figs. 5-8.
2015 *Lituosepta recoarensis* CATI; FUGAGNOLI & BASSI, Figs. 3.1-3.9, 4.1-4.7, 5.1-5.4.
2018 *Lituosepta recoarensis* CATI; BOUDAGHER-FADEL, Pl. 4.16, figs. 8-9.

Taxonomic notes/remarks: *Lituosepta recoarensis* was described by CATI (1959) from the Lower Jurassic of the Calcarei Grigi Group, Southern Alps, northern Italy. Later, HOTTINGER (1967) described *Lituosepta compressa* based on the illustrations of CATI's (1959) original specimens and his own specimens from Morocco. According to HOTTINGER (1967), *Lituosepta compressa* differs from *Lituosepta recoarensis* in having a

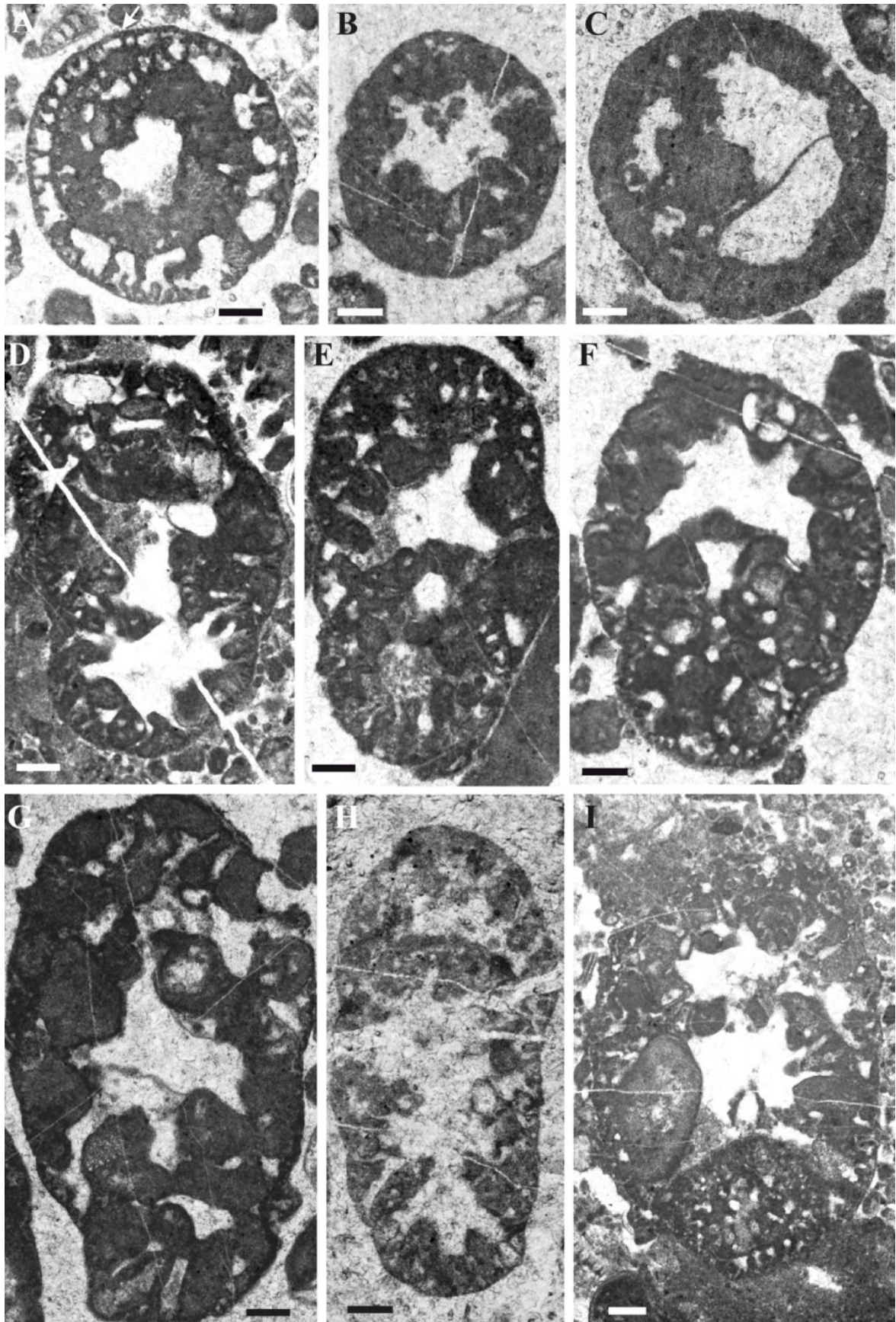


Figure 5: Thin-section microphotographs of *Sievoides blumenthali* sp. nov. from the Pliensbachian of the Beyaz Aladağ Unit (Aksu section). **A**, sample As-60. **B**, sample As-33. **C**, sample As-51. **D**, sample As-67. **E**, sample As-30. **F**, sample As-60. **G**, sample As-51. **H**, sample As-33. **I**, sample As-67. White arrows show thin epidermis. Scale bars: 0.25 mm.



smaller test, more pronounced flattening, the significantly more marked development of the pillars in the adult stages, and a smaller proloculus (0.06-0.08 mm) in megalospheric forms. HOTTINGER noted that the transversal sections of *Lituosepta recoarensis* in CATI's (1959) illustrations could also belong to the genus *Haurania*. Therefore, he believed that both species of *Lituosepta* were laterally flattened. Unlike HOTTINGER (1967), SEPTFONTAINE (1984) agreed that *Lituosepta recoarensis* of CATI (1959) has a circular transversal section and he subsequently created the new genus, *Planisepta*, with a flattened test (SEPTFONTAINE, 1988). FUGAGNOLI (1998) and FUGAGNOLI and LORIGA BROGLIO (1998), however, disregarded the validity of the genus *Planisepta* and accepted HOTTINGER's (1967) interpretation. LOEBLICH & TAPPAN (1987) considered *Lituosepta* as a junior synonym of the genus *Labyrinthina* WEYNSCHENK, 1951. GALE (2014) noted that the distinction between the two species was not sufficiently well defined and, partly agreeing with SEPTFONTAINE (1984), accepted HOTTINGER's (1967) Moroccan specimens as *Lituosepta compressa*. GALE, following a similar view to FUGAGNOLI (1998) and FUGAGNOLI and LORIGA BROGLIO (1998), accepted *Planisepta* as a synonym for *Lituosepta*. Lastly, FUGAGNOLI and BASSI (2015) resampled the type stratigraphic section of CATI (1959) in order to better define the *Lituosepta recoarensis*. In that study, the original nomenclature *Lituosepta compressa* was retained, and the genus *Planisepta* was declared invalid. *Lituosepta recoarensis* specimens in the Beyaz Aladağ Unit were examined, taking into account the detailed morphological descriptions of FUGAGNOLI and BASSI (2015). Recently, BUCUR (2025) did not consider test compression a generic feature when comparing the morphologically very close Cretaceous genera *Scythiolina* (flattened-compressed test) and *Histerolina* (uncompressed). BUCUR (2025) presented an emended diagnosis for the genus *Scythiolina*.

Morphological remarks: A total of twenty-five well-preserved specimens with random sections of *Lituosepta recoarensis* CATI, 1959, were examined. The population comprises three forms described by FUGAGNOLI and BASSI (2015): two generations of megalospheric forms (A1 and A2) and a microspheric form (B). A1 megalospheric forms are dominant in the population. The planispiral part of the A1 forms is composed of a simple proloculus (inner diameter of 0.13 mm to 0.17 mm) (Fig. 6B-C, E, G) followed by 1.5 planispiral whorls consisting of more than 15 chambers (Fig. 6B, E). The diameter of the planispiral part is 0.45-0.75 mm. The planispiral part of the test is followed by the uncoiled part of 5-12 chambers (Fig. 6C, E, G-I). The height of the A1 test is between 0.85 mm and 1.33 mm.

A2 megalospheric forms (Fig. 6A left, D) are characterized by 1.5 planispiral whorls consisting of more than 20 chambers. The uncoiled part has not developed in this form. The proloculus of the A2 (inner diameter of 0.12 mm to 0.14 mm) is smaller than that of the A1 forms. The A forms have approximately similar morphometric parameters to those studied by FUGAGNOLI and BASSI (2015) from the type material of CATI's stratigraphic section (CATI, 1959). However, unlike the typical material of CATI, no specimen with 2 planispiral whorls has been observed.

The microspheric B forms are represented by three specimens (Fig. 6A right, F, J). Due to the random sections, the proloculus and planispiral part are not clear. The specimens display a well-developed uncoiled uniserial stage that is slightly laterally compressed (Fig. 6J). The diameter/width of the chambers expands consistently in a cone-like arrangement (Fig. 6A right). The uncoiled part is composed of a maximum of 21 uniserial chambers. The maximum height of the B test is 2.16 mm. The megalospheric specimens (B forms) examined in this study are larger in size than those in CATI's type material.

Stratigraphic and geographic range:

BASSOULLET (1997) stated that *Lituosepta recoarensis* is a stratigraphically important species for the Sinemurian. SEPTFONTAINE (1984, 1988) identified its stratigraphic range as upper Sinemurian. The stratigraphic position of *Lituosepta recoarensis* below the *Orbitopsella* zone in the Taurides supports this opinion. It was recorded from the upper Sinemurian in the Beyaz Aladağ Unit (Eastern Taurides). Similarly, KABAL and TASLI (2003) reported it from the upper Sinemurian of the Central Taurides. The range of *Lituosepta recoarensis* in the Taurides, Türkiye, can be constrained to the upper Sinemurian. It was also recorded from the upper Sinemurian of the Algarve Basin, Portugal (AZEREDO *et al.*, 2003) and the Central High Atlas, Morocco (ETTAKI *et al.*, 2025).

However, its range was expanded from the Sinemurian to the Pliensbachian in some studies. It is reported from the upper Sinemurian-lower Pliensbachian of the Karst Dinarides (VELIĆ, 2007), from the Pliensbachian of Israel (PERELIS GROSSOWICZ *et al.*, 2000), from the Sinemurian-lower Pliensbachian of Spain, from the Sinemurian-Pliensbachian of Morocco and Greece (BOUDAGHER-FADEL & BOSENCE, 2007), and from the Pliensbachian of the Northern Alps, Italy. It is recorded from the Pliensbachian of the Apennines (CHIOCCHINI *et al.*, 1994). In the Taurides, this species has not yet been found in association with the common Pliensbachian taxon, *Orbitopsella*.



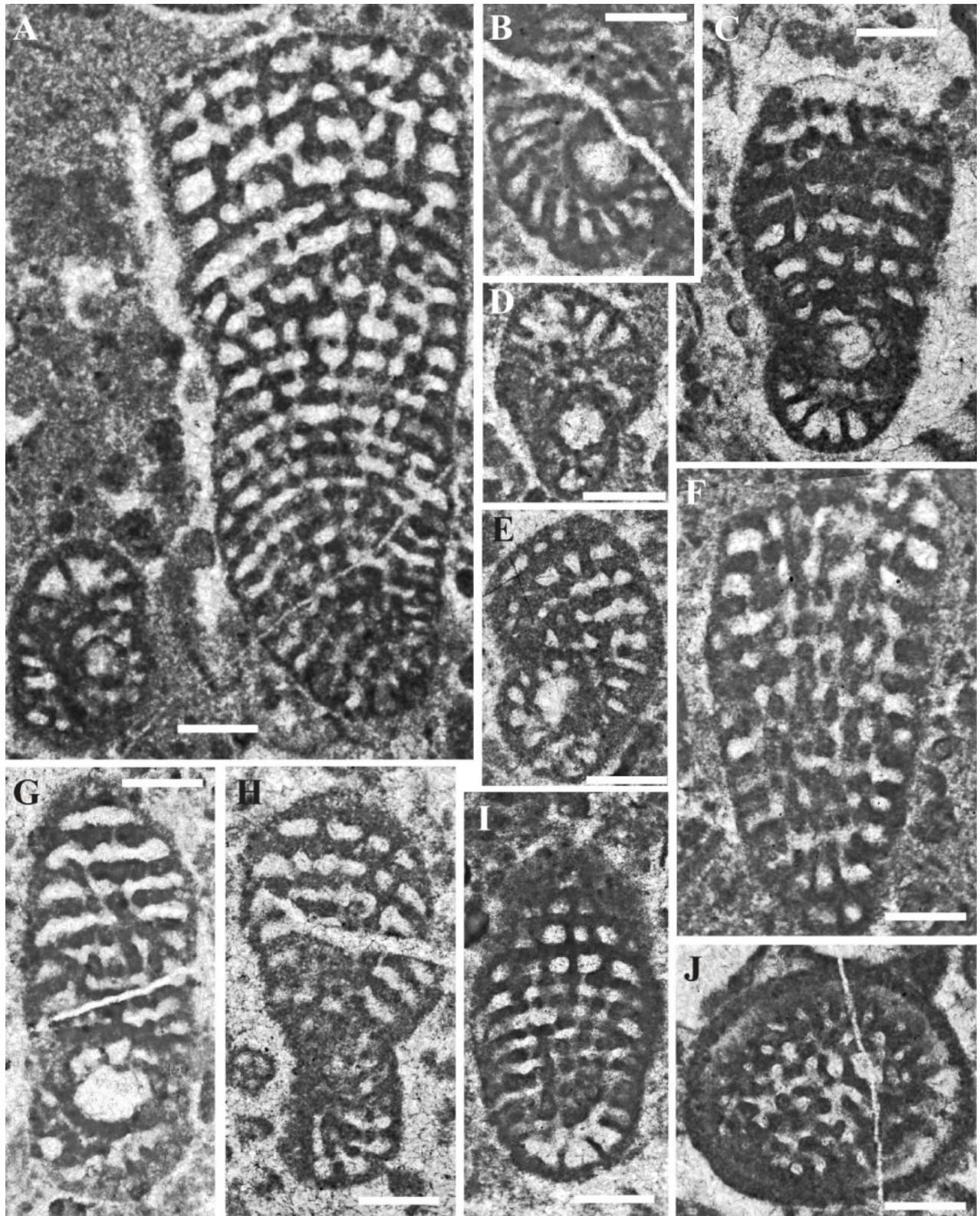


Figure 6: Thin-section microphotographs of *Lituosepta recoarensis* CATI, 1959, from the upper Sinemurian of the Beyaz Aladağ Unit (Aksu section). **A**, sample As-177. **B**, sample As-159. **C**, sample As-181. **D**, sample As-177. **E**, sample As-181. **F**, sample As-177. **G**, sample As-177. **H**, sample As-181. **I**, sample As-181. **J**, sample As-178. B-C, E, G-I: Megalospheric A1 forms. A left side and D: Megalospheric A2 forms. A right side, F, J: Microspheric B forms. Scale bars: 0.25 mm.



Suborder Biokovinina KAMINSKI, 2004
Superfamily Biokovinoidea GUŠIĆ, 1977
Family Lituoliporidae GUŠIĆ & VELIĆ, 1978
Genus Lituolipora GUŠIĆ & VELIĆ, 1978

Type species: *Mayncina termieri* HOTTINGER, 1967

***Lituolipora termieri* (HOTTINGER, 1967)**
emend. KABAL & TASLI, 2003

(Fig. 7)

- 1967 *Mayncina termieri* HOTTINGER; HOTTINGER, p. 31, Pl. 3, figs. 2-10.
 ? 1977 *Mayncina termieri* HOTTINGER; CHIOCCHINI, Pl. 8, fig. 7.
 1978 *Lituolipora polymorpha* GUŠIĆ & VELIĆ; GUŠIĆ & VELIĆ, Pls. 1-9.
 1984 "*Mayncina*" *termieri* HOTTINGER; SEPTFONTAINE, Pl. 1, fig. 20; Pl. 2, figs. 1-2, 4.
 1988 *Paleomayncina* n. gen. *termieri* (HOTTINGER); SEPTFONTAINE, p. 242.
 1998 *Paleomayncina termieri* (HOTTINGER); FUGAGNOLI, Pl. 7, figs. 1-5.
 1998 *Paleomayncina termieri* (HOTTINGER); FUGAGNOLI & LORIGA BROGLIO, Fig. 8 (1-2).
 1999 *Paleomayncina termieri* (HOTTINGER); BASSOULLET *et al.*, Pl. 4, figs. 1-3.
 2003 *Lituolipora termieri* (HOTTINGER); KABAL & TASLI, Pl. 1, figs. 1-20.
 2006 *Lituolipora termieri* (HOTTINGER); CAI *et al.*, Pl. 4, figs. 13-21.
 2007 *Bosniella oenensis* GUŠIĆ; BOUDAGHER-FADEL & BOSENCE, Pl. 7, figs. 3-4.
 2014 *Lituolipora termieri* (HOTTINGER); GALE, Pl. 1, figs. 10-12.
 2015 *Mayncina termieri* HOTTINGER; SOYCAN *et al.*, Fig. 9 (7-8).
 2015 *Lituosepta compressa* HOTTINGER; SOYCAN *et al.*, Fig. 9 (13-14).
 2017 *Lituolipora termieri* (HOTTINGER); GALE & KELEMEN, Fig. 4G.
 2018 *Bosniella oenensis* GUŠIĆ; BOUDAGHER-FADEL, Pl. 4.16, figs. 1-2.
 2025 *Paleomayncina termieri* (HOTTINGER); ETTAKI *et al.*, Fig. 3B-E.

Remarks: Twenty well- and medium-preserved specimens of *Lituolipora termieri* (HOTTINGER, 1967) with random sections were examined. Almost all of the specimens consist of equatorial and subequatorial sections. No dimorphism was observed in the population. All specimens were identified as the megalospheric form. The wall is microgranular, including rare peloidal grains. The faint remnants of the keriothecal-like (= canaliculate; e.g., BANNER *et al.*, 1991) wall structure, which is mostly obscured, are rarely visible (Fig. 7B). The test in all specimens consists of the spiral and uncoiled parts. The spiral part is composed of a proloculus followed by 1.5-2 planispiral whorls consisting of 8 to 13 chambers in the last whorl. Spiral chambers are broad, low, and arched towards the direction of growth. The uncoiled part is well developed in specimens with 1.5 whorls, reaching a maximum of 10 (rarely 16) chambers (min. 4 chambers). In the uncoiled part, the height of the chamber is almost equal to the thickness of the septa. The septa are slightly in-

flated in the direction of growth (Fig. 7A). The uncoiled section exhibits approximately cylindrical growth (Fig. 7A, F-H). The maximum height of the test (including the spiral part) is 1.5 mm. In some unusual specimens, the uncoiled stage consisting of 16 chambers reaches a height of 2.4 mm.

Aperture is single, near to basal in the spiral part (Fig. 7E), later becoming cribrate in the last whorl of the spiral part (Fig. 7B), and also in the uncoiled part (e.g., Fig. 7A, F-G).

Stratigraphic and geographic range: This species was identified as *Mayncina termieri* in Morocco's Lower Jurassic by HOTTINGER (1967). It is recorded from Atlas, Morocco, in the Pliensbachian (SEPTFONTAINE, 1984; BASSOULLET *et al.*, 1999) and in the uppermost Sinemurian-lower Pliensbachian (ETTAKI *et al.*, 2025). Later, SEPTFONTAINE (1988) reported its stratigraphic range as upper Sinemurian-Pliensbachian. VELIĆ (2007) recorded its stratigraphic distribution in the Adriatic platform (Karst dinarides) as the upper Sinemurian-Pliensbachian. GALE (2014) and GALE and KELEMEN (2017) reported it from the lower Pliensbachian of the Dinarides (Slovenia). Its range in the Southern Alps (Northern Italy) was specified as the upper Sinemurian-Pliensbachian by FUGAGNOLI (1998) and by FUGAGNOLI and LORIGA BROGLIO (1998). Its range was given as Pliensbachian-Toarcian in the central-southern Apennines (CHIOCCHINI, 1977, 1987). CAI *et al.* (2006) reported it from the middle Lower Jurassic of Tibet, China.

Lituolipora termieri ranges from the upper Sinemurian to the Toarcian? in the Central Taurides (KABAL & TASLI, 2003). It was reported as "*Mayncina termieri* HOTTINGER" and as "*Lituosepta compressa* HOTTINGER" from the Pliensbachian of the Lycian Nappes, Western Taurides (SOYCAN *et al.*, 2015). *Lituolipora termieri* is recorded from the upper Sinemurian-Pliensbachian in the Beyaz Aladağ Unit (Eastern Taurides).

Family Biokovinidae GUŠIĆ, 1977
Genus Bosniella GUŠIĆ, 1977

Type species: *Bosniella oenensis* GUŠIĆ, 1977

***Bosniella oenensis* GUŠIĆ, 1977**

(Fig. 8)

- 1977 *Bosniella oenensis* GUŠIĆ; GUŠIĆ, Pl. 11, figs. 1-2; Pl. 12, figs. 1-4, Pl. 13, figs. 1-3.
 1998 *Bosniella oenensis* GUŠIĆ; FUGAGNOLI, Pl. 19, figs. 1-9; Pl. 20, figs. 1-2.
 1998 *Bosniella oenensis* GUŠIĆ; FUGAGNOLI & LORIGA BROGLIO, Fig. 10 (1-5).
 non 2007 *Bosniella oenensis* GUŠIĆ; BOUDAGHER-FADEL & BOSENCE, Pl. 5, figs. 4, 6; Pl. 7, figs. 3-4; Pl. 8, fig. 6. [Pl. 5, figs. 4, 6 = unidentified species; Pl. 7, figs. 3-4 = *Lituolipora termieri* (HOTTINGER, 1967)]
 2014 *Bosniella oenensis* GUŠIĆ; GALE, Pl. 1, figs. 3-9.
 2017 *Bosniella oenensis* GUŠIĆ; GALE & KELEMEN, Fig. 4B.
 non 2018 *Bosniella oenensis* GUŠIĆ; BOUDAGHER-FADEL, Pl. 4.16, figs. 1-2. [= *Lituolipora termieri* (HOTTINGER, 1967)]
 non 2021 *Bosniella oenensis* GUŠIĆ; HAIG *et al.*, Figs. 6J-K, 7J-K. (non ? *Bosniella* sp., Fig. 6L, N) (= unidentified species)

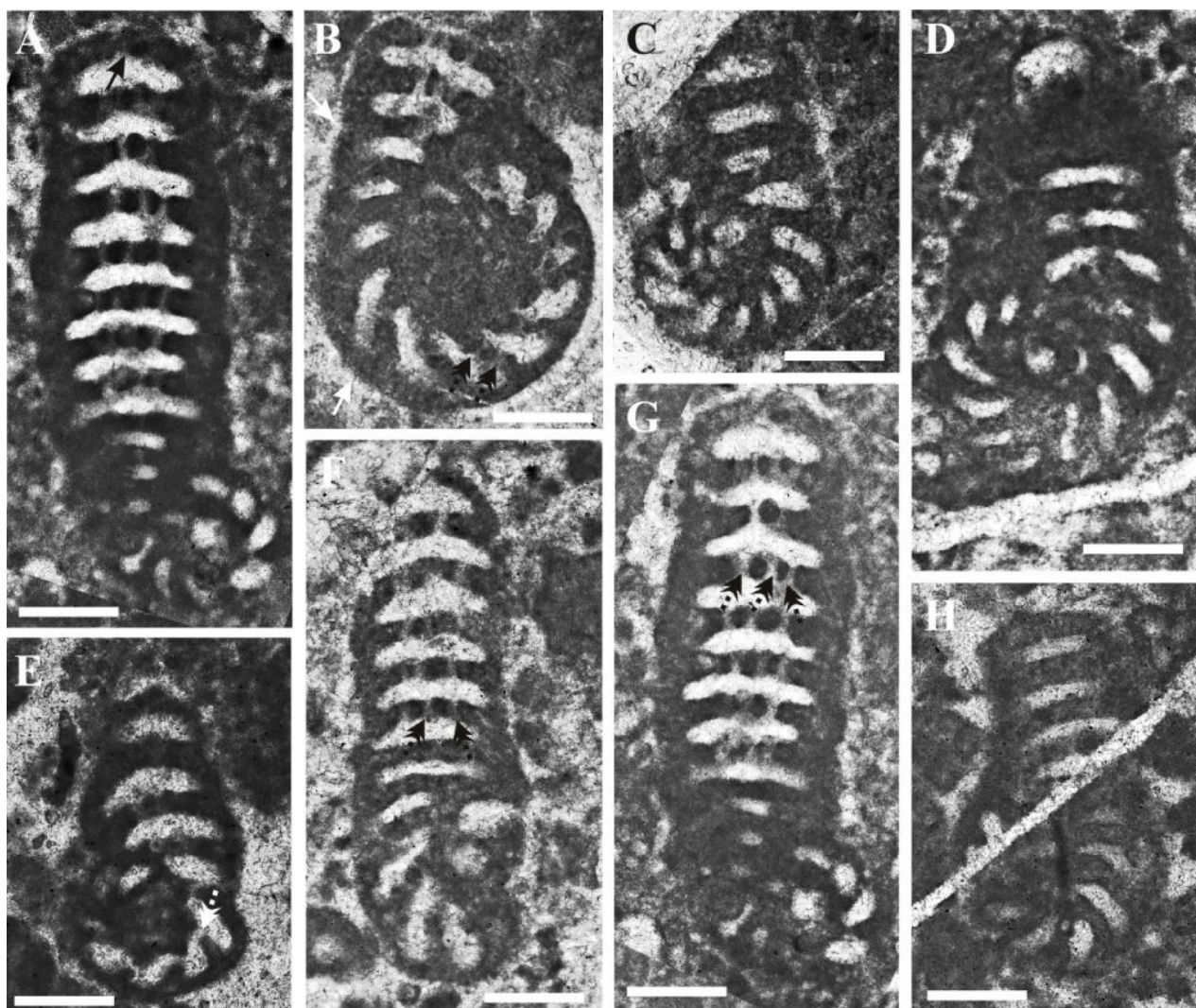


Figure 7: Thin-section microphotographs of *Lituolipora termieri* (HOTTINGER, 1967) from the Sinemurian-Pliensbachian of the Beyaz Aladağ Unit (Aksu section). **A**, sample As-190. **B**, sample As-61. **C**, sample As-21. **D**, sample As-190. **E**, sample As-190. **F**, sample As-188. **G**, sample As-190. **H**, sample As-190. White arrows show the faint remnants of the keriothecal-like wall structure. The black arrow indicates slightly inflated septa in the direction of growth. The white dashed arrow shows a single aperture in the spiral part. Black dashed arrows show the cribrate aperture in the uncoiled part. Scale bars: 0.25 mm.

2026 *Bosniella oenensis* GUŠIĆ; POSENATO *et al.*, Fig. 6F.
(= poorly preserved specimen for identification)

Remarks: The material consists of numerous well-preserved specimens that best represent the species *Bosniella oenensis* GUŠIĆ, 1977. More than thirty-five specimens in random sections were examined. Microgranular wall has a single thick keriothecal-like textured layer. The wall thickness is 0.096–0.116 mm in the equatorial sections; it is 0.110–0.123 mm in the uncoiled part. The thickness of the wall in the equatorial sections of the juvenile specimens (e.g., Fig. 8K–L) is thinner, 0.070–0.080 mm. The keriothecal-like wall structure is mostly not well preserved, probably due to diagenetic recrystallization. Nevertheless, in some specimens it is clearly visible in some parts of the test (e.g., Fig. 8F–G, I–J). The population includes megalospheric and microspheric generations. Two specimens may have microspheric tests (Fig. 8C, I); megalospheric tests predominate (Fig. 8A–B, D–H, J–L).

Two specimens that have a well-developed uncoiled stage are considered microspheric (Fig. 8C, I). Although the proloculus and the early stages of the specimens are unknown, the large size of the tests (3.77 mm and 1.63 mm, the height of the uncoiled stage of the test, respectively) and the numerous uncoiled chambers suggest that they may have been microspheric. The presence of the uncoiled stage is not a distinguishing feature according to the original description of GUŠIĆ (1977), "Some microspheric specimens are likely to have developed an uncoiled stage also, but this does not seem to be an entirely fixed characteristic. However, in some megalospheric tests tend to uncoil." A megalospheric specimen with an uncoiled stage is composed of four chambers [FUGAGNOLI & LORIGA BROGLIO, 1998, p. 65, Fig. 10 (1)] and was found in this study (Fig. 8B, D–F); it shows the presence of an uncoiled stage in megalospheric test. But the longitudinal section of a probable micro-

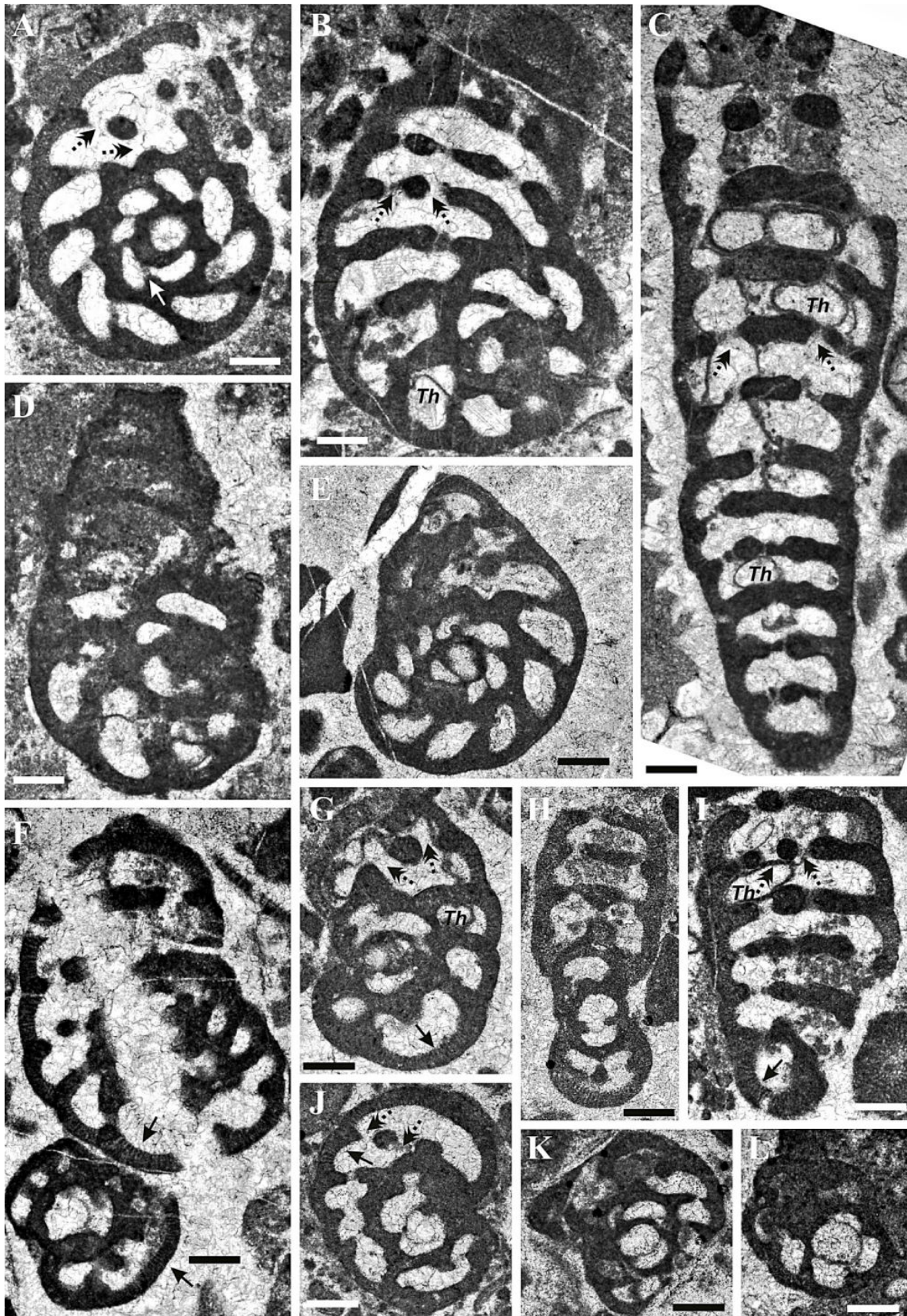


Figure 8: Thin-section microphotographs of *Bosniella oenensis* Gušić, 1977, from the Pliensbachian of the Beyaz Aladağ Unit (Aksu section). **A**, sample As-58. **B**, sample As-47. **C**, sample As-65. **D**, sample As-16. **E**, sample As-51. **F**, sample As-36. **G**, sample As-36. **H**, sample As-16. **I**, sample As-36. **J**, sample As-36. **K**, sample As-36. **L**, sample As-14. Black arrows show preserved keriothecal-like wall structure. The white arrow shows a single aperture in the spiral part. Black dashed arrows show cribrate aperture in the final stage of the last whorl of the spiral part and in the uncoiled part. Abbreviation: Th; cryptoendolithic thaumatoporellaceans. Scale bars: 0.25 mm.



spheric test in Figure 8C, which has twelve uncoiled chambers, seems to be an exception and an unknown new feature. Based on this, it can be inferred that the uncoiled stage in megalospheric tests is less developed.

Megalospheric tests represent the vast majority of the specimens in this study. The embryonic stage of some megalospheric tests shows a distinct bilocular nucleoconch (e.g., Fig. 8E, J-K). The two chambers are not always distinguishable due to poor preservation; in such specimens, the embryonic stage appears as a single oval chamber (Fig. 8L). The proloculus is 0.11–0.18 mm in inner diameter. The spiral part is planispiral (e.g., Fig. 8A–B, E) and consists of 2 whorls. The last whorl is composed of 8 or 9 chambers. The spiral part is generally followed by an uncoiled part consisting of 2 or 4 chambers. Also some megalospheric tests are without an uncoiled part (e.g., Fig. 8G–H). The heights of their spiral tests are 1.11 to 1.38 mm. The height of tests, including the uncoiled part, varies between 1.50 mm and 2.25 mm. The aperture is single, basal to central in the spiral part (e.g., Fig. 8A); it is cribrate in the uncoiled part (e.g., Fig. 8B–C, I) and also in the final stage of the last whorl of the spiral part (e.g., Fig. 8A, G, J). The thaumatoporellaceans were erroneously considered an integral part of the test in the Lower Jurassic species (e.g., phrenoteka-like structures in *Biokovina gradacensis* and *Bosniella oenensis*) (e.g., GUŠIĆ, 1977; LOEBLICH & TAPPAN, 1987; HOTTINGER, 2006). SCHLAGINTWEIT and VELIĆ (2012) explained that these structures are not elements/parts of the foraminiferan test but rather cryptoendolithic microorganisms, which they refer to as thaumatoporellacean algae, attached to the interior surfaces of the foraminiferan chamber walls. The thin-walled cryptoendolithic thaumatoporellaceans inside the chambers of *Bosniella oenensis* can be seen in Figure 8C, G, I.

Stratigraphic and geographic range: *Bosniella oenensis* GUŠIĆ, 1977, was described from the Sinemurian–Pliensbachian of the Dinarides. According to BASSOULLET (1997), it ranges from the upper Sinemurian to Pliensbachian in Bosnia (Dinarides). VELIĆ (2007) gave the stratigraphic distribution in the Adriatic platform (Karst Dinarides) as the upper Sinemurian–Pliensbachian. GALE (2014) and GALE and KELEMEN (2017) recorded it from the lower Pliensbachian of the Dinarides (Slovenia). Its range in the Southern Alps (Northern Italy) was designated as the Sinemurian–Pliensbachian by FUGAGNOLI (1998) and by FUGAGNOLI and LORIGA BROGLIO (1998). A poorly preserved specimen assigned to *Bosniella oenensis* was reported from the upper Pliensbachian of the Southern Alps (POSENATO *et al.*, 2026). The stratigraphic distribution of *Bosniella oenensis* in the Beyaz Aladağ Unit (Eastern Taurides) is limited to the Pliensbachian. It has not been found below the *Orbitopsella* zone. It is noteworthy that this species may have a restricted paleogeographic

distribution, as it has not been found in other areas of the Taurides.

In my opinion, the occurrence of *Bosniella oenensis* in Spain (Betic Cordillera), Morocco (High Atlas) (BOUDAGHER-FADEL & BOSENCE, 2007; BOUDAGHER-FADEL, 2018), and in Timor-Leste (HAIG *et al.*, 2021) is invalid due to misidentification.

5. Conclusions

The Sinemurian–Pliensbachian strata in the Beyaz Aladağ Unit (Eastern Taurides) are characterized by mostly oncoids and megalodontid shells, and are rich in Larger Benthic Foraminifera. The stratigraphically important *Lituosepta recoarensis* CATI, 1959, *Lituolipora termieri* (HOTTINGER, 1967), and *Bosniella oenensis* GUŠIĆ, 1977, which characterize these stages, are represented by numerous well-preserved specimens. Detailed morphological analysis of the Beyaz Aladağ assemblage has enabled the identification of a new species, the illustration of previously little-known morphological features of the aforementioned species, and the correction of some misidentifications.

A new, Larger Benthic Foraminifera *Sievoides blumenthali* sp. nov. from the Pliensbachian is characterized by a developed initial spiral stage with a large proloculus, followed by a long uniserial cylindrical stage, a coarse agglutinated wall with an irregular subepidermal polygonal network, and a simple aperture. The new species reveals the presence of a developed subepidermal network in a Lower Jurassic taxon, which is typical of most Middle–Upper Jurassic taxa. Therefore, it is considered that this taxon represents the earliest evolutionary stage in the evolution of Jurassic complex-walled benthic Foraminifera. In addition, *Sievoides blumenthali* sp. nov. has a widespread occurrence in the Tethys Early Jurassic platforms (Abruzzo Apennines, Dinarides, Taurides).

Lituosepta recoarensis has not yet been documented in the Taurides in association with *Orbitopsella*, a typical Pliensbachian taxon.

Bosniella oenensis GUŠIĆ, 1977, is reported here, for the first time, from the Pliensbachian of the Taurides. It is significant that *Bosniella oenensis* may have a limited paleogeographic distribution in the Taurides because it has not been found in other parts of the Taurides, and it has not been discovered below the *Orbitopsella* zone. In addition, identifying incorrect species determinations in the literature has revealed that the paleogeographical distribution of the species is limited to the Dinarides, the Alps, and the Taurides.

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